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Preface

The *Second International Conference on Constraint Propagation and Implementation* (CPAI'2005) was convened to study the design and analysis of new propagation algorithms as well as practical issues in and the evaluation of implementing existing and new constraint propagation algorithms in settings ranging from special purpose solvers to programming language systems.

The second part of the workshop was dedicated to the *First International CSP Solver Competition*. With this competition the CPAI'2005 organising committee intended to further some of the goals of the workshop. Hopefully, it will allow us to improve our understanding of the sources of solver efficiency, and the options that should be considered in crafting solvers. In particular, issues of interdependence and interaction among features can perhaps only be elucidated by comparing and testing actual implementations. Hopefully, efforts like this will further our understanding of the important dimensions of performance, for example robustness or versatility as opposed to problem-specific efficiency.

This part of the CPAI 2005 proceedings is dedicated to the competition. It includes five *invited* papers, which describe background details about the competition, and ten *contributed* papers, which describe the solvers submitted to the competition. One of the invited papers constists of a collection of tables, barcharts and graphs presenting the outcome of the tests.

The organisors wish to thank all authors for submitting their work, all participants of the solver competition for entering their solver, the invited speakers, Christian Schulte and Laurent Simon, the CP'2005 Workshop/Tutorial Chairs, Alan Frish and Ian Miguel, the members of the CPAI'2005 Programme Committee, and the members of the CPAI'2005 Competition Organising Committee. They wish to express their gratitude to Gene Freuder for providing support to the competition in the form of computing power and system administrator's time. Finally, they wish to thank Peter MacHale for his technical support of the solver competition.

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Introduction to the Solver Competition

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Abstract. This invited paper is an introduction to the First International CSP Solver Competition, which was organised by CPAI'2005 competition organising committee. It provides an outline of Volume II of the proceedings of the CPAI'2005 workshop, introduces the contestants and their solvers, describes the criteria for ranking the solvers, and presents the main results of the competition.

1 Introduction

This invited paper is an introduction to the First International CSP Solver Competition, which was organised by the CPAI'2005 competition organising committee. It provides an outline of Volume II of the CPAI'2005 proceedings, introduces the contestants and their solvers, describes the criteria for ranking the solvers, and presents the main results of the competition.

The remainder of this invited paper is as follows. Section 2 provides a brief outline of the proceedings, Section 3 presents the contestants of the competition, Section 4 describes the evaluation criteria, and Section 5 presents the rankings of the competition.

2 Outline

Volume II of the CPAI'2005 proceedings consist of two kinds of papers. The first kind of papers are the *invited papers*. These papers provide information about the background of the competition, describe organisational issues related to the competition, and present the results. The papers are authored by the members of the CPAI'2005 Solver Competition Organising Committee. The second kind of papers are the *contributed papers*. These papers are submitted by the contestants and outline the main implementation issues of their solver.

To lower the threshold for entering the competition it was decided by the CPAI'2005 solver competition organising committee to also accept short (at least 5-page) papers. In addition it was decided to allow contestants to enter the competition without the need of attending the workshop.

3 The Contestants

Table 1 lists the contestants and their solvers. In this table the contestant `Virtual` is a virtual contestant. Its solvers `table2opl/1` and `table2opl/2` were

created using Marc van Dongen's `Table2OPL` tool for converting problems specified in table format to `OPL`. The translation is almost identical to the way the table format is converted to `bordewijk` [1]. The resulting problems were solved using `ILOG`'s `OPL Studio` in batch mode. The solver `table2opl/1` uses `OPL Studio`'s default variable order. The other solver uses a smallest domain first variable order. The results for these solvers have been added to provide a point of reference.

Each contestant was allowed to submit one or two solvers. The columns "Solver#1" and "Solver#2" in Table 1 list the names of these solvers. All solvers are able to solve binary CSPs. The solver that are also able to solve non-binary CSPs have a + in the column "Non-binary" in the table. Some solvers are based on a SAT solver. They have a + in the column "SAT." Further information about the solvers may be found by reading the contributed papers, which were submitted by the contestants, and which may be found further on in these proceedings.

Contestants	Solver#1	Solver#2	Non-binary	SAT
A. Biere	`Biere/1`		+	+
G. Katsirelos and F. Bacchus	`EFC/1`		+	
D. Le Berre	`CSP2SAT4J/1`		+	+
C. Lecoutre *et al.*	`Abscon/1`	`Abscon/2`	+	
D. Mehta	`Bsol/1`			
O. Roussel	`csp2sat+zchaff/1`		+	+
M.R.C. van Dongen	`bordewijk/1`	`bordewijk/2`	+	
`Virtual`	`table2opl/1`	`table2opl/1`	+	
K. Zervoudakis	`quasi/1`	`quasi/2`	+	
N. Zhou and M. Wallace	`mosar/1`		+	
R.J. Wallace	`rjw/1`	`rjw/2`		

Table 1. List of participating contestants and solvers

4 Evaluation Criteria

The main criteria for evaluating the CPAI'2005 solver competition are as follows. The solver claiming the fewest incorrect results is the winner. Ties are broken by first considering the maximum amount of problems solved and next considering the smallest total solution time.

Many solvers did not conform to the criteria as outlined in the call for solvers, which clearly states that the first line on standard output (`stdout`) should be either `SAT` or `UNSAT`. However, many solvers sent error messages to standard output. This happened frequently when solvers crashed or baled out due to lack of memory. It was decided that any problem for which a solver produced output that did not conform to the guidelines would be considered "timed out" for that solver, i.e. not solved within the maximum time limit.

The only three solvers that did not crash were `Bsol/1`, `bordewijk/1`, and `bordewijk/2`.

The remainder of this invited paper presents the final ranking. The ranking is derived from the tables that are listed in the invited paper entitled "Tables, BarCharts, and Graphs," which may be found elsewhere in these proceedings.

5 The Rankings

This section presents the overall results of the CPAI'2005 solver competition. Each solver has its own strengths and weaknesses. For example, SAT solvers turned out to be remarkably good at solving quasigroup and other completion problems. Other solvers turned out excellent at solving domino problems.

In the end however, some ranking had to be produced. This being the first CSP solver competition, it was decided to keep things simple and only have rankings for binary CSPs, for non-binary CSPs, and for all CSPs.

It is recalled that the most important criterion for ranking the solvers is a minimal number of wrongly solved problems. Only two solvers produced wrong results. These solvers were `EFC/1`, which produced one wrong result, and `Biere/1`, which produced more than two wrong results. `EFC` produced the wrong result for a binary CSP. `Biere/1` produced wrong results for binary and non-binary CSPs. Care should be taken here because errors need not be the result of a solver but may have been introduced when converting from the competition problem specification format or when converting to the competition's output format.

Ranking	Solver	#Errors	#Solved	Time
1	`Bsol/1`	0	829	14083
2	`bordewijk/2`	0	823	14816
3	`bordewijk/1`	0	818	16741
4	`csp2sat+zchaff/1`	0	769	8070
5	`Abscon/1`	0	761	19346
6	`Abscon/2`	0	759	19188
7	`CSP2SAT4J/1`	0	739	15859
8	`quasi/2`	0	667	18363
9	`quasi/1`	0	667	18694
10	`rjw/2`	0	609	46941
11	`table2opl/1`	0	599	13536
12	`table2opl/2`	0	598	13273
13	`rjw/1`	0	570	16531
14	`mosar/1`	0	501	18594
15	`EFC/1`	1	566	19949
16	`Biere/1`	>1	377	19894

Table 2. Overall ranking for binary CSPs

The overall rankings for the different categories are listed in Tables 2–4. In these tables the column "Solver" lists the name of the solvers, the column

"Ranking" lists the ranking of the solvers, the column "#Errors" lists the number of wrongly solved problems, the column "#Solved" lists the number of correctly solved problems, and the column "Time" lists the total solution time for the solved problems.

Ranking	Solver	#Errors	#Solved	Time
1	`Abscon/2`	0	99	10243
2	`Abscon/1`	0	98	8038
3	`table2opl/1`	0	90	4096
4	`table2opl/2`	0	90	4197
5	`bordewijk/1`	0	71	2331
6	`bordewijk/2`	0	71	2337
7	`mosar/1`	0	70	1697
8	`EFC/1`	0	67	1708
9	`quasi/1`	0	56	557
10	`quasi/2`	0	55	2141
11	`CSP2SAT4J/1`	0	53	2541
12	`csp2sat+zchaff/1`	0	51	1958
13	`Biere/1`	>0	26	262

Table 3. Overall ranking for non-binary CSPs

Ranking	Solver	#Errors	#Solved	Time
1	`bordewijk/2`	0	894	17153
2	`bordewijk/1`	0	889	19072
3	`Abscon/1`	0	859	27384
4	`Abscon/2`	0	858	29431
5	`csp2sat+zchaff/1`	0	820	10028
6	`CSP2SAT4J/1`	0	792	18398
7	`quasi/1`	0	723	19251
8	`quasi/2`	0	722	20504
9	`table2opl/1`	0	689	17631
10	`table2opl/2`	0	688	17470
11	`mosar/1`	0	571	20291
12	`EFC/1`	1	633	21657
13	`Biere/1`	>1	403	20156

Table 4. Overall ranking for all CSPs

More detailed information about results for individual problem classes and instances may be found in the invited paper entitled "Tables, Barcharts, and Graphs," which may be found at the end of these proceedings.

References

1. M.R.C. van Dongen. 20 000 bytes under the C, a voyage to the centre of a CSP solver. In *Proceedings of the Second International Workshop on Constraint Propagation and Implementation (CPAI'2005)*, volume II, pages 33–47, 2005.

Description and Representation of the Problems selected for the First International Constraint Satisfaction Solver Competition

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Abstract. In this paper, we present the problems that have been selected for the first international competition of CSP solvers. First, we introduce a succinct description of each problem and then, we present the two formats that have been used to represent the CSP instances.

1 Introduction

For the first international competition of CSP solvers which was held as part of the CPAI'2005 workshop (http://cpai.ucc.ie/05/CPAI.html), it has been decided to only deal with constraint networks involving finite domains and constraints defined in extension. It means that each domain corresponds to a finite set of values, and that each constraint is explicitly defined using a list of allowed or unallowed tuples.

In order to avoid any ambiguity, we briefly introduce constraint networks. A constraint network consists of a finite set of variables such that each variable X has an associated domain $\mathrm{dom}(X)$ denoting the set of values allowed for X, and a finite set of constraints such that each constraint C has an associated relation $\mathrm{rel}(C)$ denoting the set of tuples allowed for the variables $\mathrm{vars}(C)$ involved in C. A solution to a constraint network is an assignment of values to all the variables such that all the constraints are satisfied. A constraint network is said to be satisfiable if it admits at least a solution. The Constraint Satisfaction Problem (CSP), whose task is to determine whether or not a given constraint network is satisfiable, is NP-complete. A constraint network is also called CSP instance.

In this paper, we first describe the pool of problems adopted for the competition and then we introduce the formats that have been proposed to represent them. We have to mention the participation of Radoslaw Szymanek, Marc van Dongen and Rick Wallace who kindly provide us with the description of some problems. Also, note that the two formats described in this paper are the results of fruitful discussions by all members of the organizing committee.

2 Pool of problems

The initial problem pool created by organizers contained some amount of diversified problems. This pool has been made available about 6 weeks before the deadline fixed for entering the competition. However, one important task was to introduce instances of which contestants will not be aware, so they can not tune their solvers to the problem pool. This is the reason why it was decided that two independent (not competing) members of the organizing committee, Radoslaw Szymanek and Mark Hennessy, will decide about the shape of the final problem pool. They had to secretly decide what instances will be used in the competition. Therefore, they decided to replace part of the initial pool with some new instances and, in addition, they added instances within new problem classes. Finally, contestants were also allowed to contribute up to ten instances.

Below, we describe the different problems selected for the competition. An *initial* series of instances will refer to a selected series that was down-loadable before the beginning of the competition whereas an *original* series will refer to a secret series that has been generated by Radoslaw Szymanek and Mark Hennessy. The problems that were contributed by the contestants will be referred to as *contestant's* problems.

2.1 Binary problems

First, we introduce (in lexicographic order) the binary problems. Any instance generated from a binary problem only involves binary constraints.

3-SAT A 3-SAT instance is a SAT instance such that each clause contains exactly 3 literals. Two initial series, denoted `ehi-85` and `ehi-90`, have been selected. These series correspond to 2 sets of 100 3-SAT instances (all unsat). These 3-SAT instances, originated in [3], have been converted into CSP instances using the dual method as described in [2].

CRIL F. Boussemart, F. Hemery and C. Lecoutre have submitted 8 contestant instances (5 binary ones, 3 non binary ones). The contestant series, denoted `cril`, is composed of 5 binary instances (all unsat). Two of them, `cril_b_unsat_2` and `cril_b_unsat_3`, are so-called composed random instances (see later in this subsection). Two other ones, `cril_b_unsat_4` and `cril_b_unsat_5`, are instances (called `qk_40_40_5_mul` and `qk_9_9_33_mul`), of the Queens-Knights problem [6]. The last one, `cril_b_unsat_1` has been obtained from an RLFAP instance by removing one minimal unsatisfiable core.

Domino The Domino problem corresponds to an undirected constraint graph with a cycle and a trigger constraint. It has been introduced in [22]. One initial series, denoted `domino1`, of 10 binary instances (all sat) has been selected.

FAPP The Frequency Assignment Problem with Polarization constraints (denoted FAPP) is the problem retained for the ROADEF'2001 challenge (`http://uma.ensta.fr/conf/roadef-2001-challenge/`). It is one extended subject of the CALMA European project (Combinatorial ALgorithms for Military Applications). Two initial series, denoted `fapp01` and `fapp02`, of binary instances have been selected. `fapp01` is composed of 11 instances (7 sat, 4 unsat) and `fapp02` is composed of 11 instances (9 sat, 2 unsat).

Geom The Geometric problem has been proposed by Rick Wallace. The geometric instances are a kind of random instances generated as follows. Instead of a density parameter, a "distance" parameter, dst, is used such that $dst \leq \sqrt{2}$. For each variable, two coordinates are chosen at random so the associated point lies in the unit square. Then for each variable pair, (x,y), if the distance between their associated points is less than or equal to dst, the arc (x,y) is added to the constraint graph. Constraint relations are created in the same way as they are for homogeneous random CSP instances. In the geometric problem generator developed by Rick Wallace, after adding all arcs consistent with the distance criterion, connected components are checked. If there is more than 1 component, a connected graph is iteratively created starting with the component whose variables are labeled "1", finding the 'nearest' variable not in that component, connecting it to the variable that is 'closest' to it, and giving all variables in the new component a label "1". The idea is to create a connected graph that is as close as possible to the original distance criterion. One initial series, denoted `geom`, of 100 binary instances (92 sat, 8 unsat) has been selected.

Job-Shop The job-shop scheduling problem is the task of finding a schedule that minimizes the overall completion time of n jobs that require some shared resources. Four initial series, denoted `js-e0ddr1`, `js-e0ddr2`, `js-enddr1` and `js-ewddr2` of 10 binary instances (all sat) have been selected as well as one initial series, denoted `js-enddr2`, of 6 binary instances (all sat). These instances have been proposed by N. Sadeh and experimented in [18]. Note that we were unluckily unable to collect 14 instances of the original pool (as corresponding files are corrupted).

Latin Square The Latin square problem is the task of putting different values (taken from 0 to n-1) in the cells of a square matrix of size n such that all rows and columns contain different values. One initial series, denoted `lsq-dg1`, of 5 binary instances (2 sat, 3 unsat) has been selected. Note that, for these instances, all diagonals (including broken ones) must also contain different values.

Marc One contestant series, denoted `marc`, of 10 binary instances (5 sat, 5 unsat) has been submitted by Marc van Dongen. These instances were contributed to point out that constraint representation does not come for free. All proposed

instances, which are large but trivially solvable, fall into two categories: satisfiable `sat` and unsatisfiable `unsat`. Within each category, the generated random instances have n variables, $d = n$ values per domain, $m = n(n-1)/2$ binary constraints (corresponding to a complete constraint graph) and a tightness of 0.5 for the satisfiable instances and $0.5 - 1/n^2$ for the unsatisfiable ones. Five classes corresponding to $n \in \{ 80, 84, 88, 92, 96 \}$ have been considered. The largest size had to be 96 because it wasn't possible to convert any larger instances to `XML` due to limitations of the conversion tool. Had it been possible to convert larger instances then larger classes would have been proposed. The satisfiable instances have been generated by picking a random number $r \in \{1, \ldots, n\}$ and by building each binary constraint as follows: the tuple $\langle r, r \rangle$ was first added to the list of supports and then random tuples were added until the tightness was 0.5. This makes $\langle r, \ldots, r \rangle$ a trivial solution. The unsatisfiable instances are also constructed at random and made unsatisfiable by embedding an "unsatisfiable chain."

Pigeons The Pigeons problem is the task of putting n pigeons into n-1 boxes, one pigeon per box. One initial series, denoted `pigeons`, of 20 binary instances (all unsat) has been selected.

QCP / QWH The Quasi-group Completion problem (QCP) is the task of determining whether the remaining entries of the partial Latin square can be filled in such a way that we obtain a complete Latin square, ie. a full multiplication table of a quasi-group [10]. The Quasi-group With Holes problem (QWH) is a variant of the QCP as instances are generated in such a way that they are guaranteed to be satisfiable [10]. Nineteen binary instances (all sat) of two initial series [6], denoted `bqwh15-106` and `bqwh18-141`, of balanced QWH instances have been selected.

To generate original series, a QCP/QWH generator was used. Orders 10, 15, 20, and 25 were chosen in order to vary the difficulty of the instances. Radoslaw Szymanek has implemented in JaCoP (for a related reference about this solver, see [13]) its own model, consisting of permutation constraints with GAC scheme and smallest domain first search to determine the difficulty of the problem instances. Each class originally contained one thousand of randomly generated instances from which the easiest ones and the hardest ones were hand picked for the competition. The initial model consisting of permutation constraints was translated into binary inequality constraints in order to obtain concise extensional representation. This translation makes it harder to recover the initial coarse grain structure of the instance and any solver which can do it efficiently will gain advantage over other solvers.

In addition to QWH/QCP problems, the *perturbated* versions of those problem classes were added. The instances within perturbated classes are easily generated using the generator mentioned above. The perturbation changes the domains of variables. In the original problem, all variables are assumed to have a

domain from 0 to n-1, where n specifies the order of the problem. In the perturbated problem, all variables of unassigned elements are assumed to have a domain from 1 to n. However, if the generator preassigned a square to value zero then such assignment was allowed. This setting transforms some of the permutation constraints into an all-different constraint since the number of values was larger than the number of variables. This small perturbation increases the difficulty noticeably for the model originally used to assess the difficulty of the instances. This increased difficulty can be partially explained by the fact that all-different constraint is less tight than permutation constraint which significantly decreases the amount of propagation done at each search stage. Radoslaw Szymanek and Mark Hennessy decided to use those instances to see if the instances remain hard for different solvers. Unfortunately, some of the orders of perturbated instances could not be included due to time shortage to generate large initial pool of random instances to be used during human selection.

Queen Attacking The Queen Attacking problem is the task of putting a queen and the n^2 numbers 1,...,n^2, on a $n \times n$ chessboard so that no two numbers are on the same cell, any number $i + 1$ is reachable by a knight move from the cell containing i and the number of cells containing a prime number that are not attacked by the queen is 0 (for satisfaction). See prob029 at `http://www.csplib.org`. One initial series, denoted `qa1`, of 8 binary instances (6 sat, 2 unsat) has been selected.

Queens Knights The Queens-Knights problem is the task of putting on a chessboard of size $n \times n$, q queens and k knights such that no two queens can attack each other and all knights form a cycle (when considering knight moves) [6]. In one version of this problem (identified by "add"), a square of the chessboard can be shared by both a queen and a knight and in another one (identified by "mul"), it is not allowed. One initial series, denoted `qk1`, of 18 binary instances (all unsat) has been selected.

Random instances (Model RB) Four "standard" models, denoted A, B, C and D, have been introduced to generate random binary CSP instances. However, [1] have identified a shortcoming of all these models. Indeed, they prove that random instances generated using these models suffer from (trivial) unsatisfiability as the number of variables increases. To overcome the deficiency of these standard models, [20, 21] have proposed two revised models, called RB and RD. Eight initial series, denoted `frbN-D` where `N` and `D` respectively correspond to the number of variables and the uniform size of domains, of 5 binary instances generated following model RB and forced to be satisfiable have been selected. These instances are particularly interesting as they are hard to solve. For more information about model RB and forced satisfiable instances, see [19], and about the selected binary instances, see `http://www.nlsde.buaa.edu.cn/~kexu/benchmarks/benchmarks.htm`.

Random instances (Model B) There were also five original series, denoted `random-N-D-M` where `N`, `D` and `M` respectively correspond to the number of variables, the uniform size of domains and the number of binary constraints, of 10 random instances generated according to Model B. The instances were generated using Marc van Dongen's tool for generating problems in Table format. The tool is based on Frost *et al.*'s random problem generator which can be downloaded from Christian Bessière's website. Given M, the critical tightness T was computed using the formula $T = D^2 \times \left(1 - D^{-1/(M'\,(N-1))}\right)$, where M' is the density on a scale from 0 to 1, i.e. $M' = 2\,M/(N\,(N-1))$. For the competition $N = D \in \{\,23, \ldots, 27\,\}$ and $M = N\,(N-1)/2$ (which corresponds to complete constraint graphs). Within the class `random-N-D-M`, an instance called `random-N-D-M-T-R` was generated using seed R. The seeds were selected by Radoslaw Szymanek.

Random instances (composed) Nine initial series of 10 random binary CSP instances have been selected. The series `composed-25-10-20` contains 10 satisfiable instances whereas all other series contains 10 unsatisfiable instances. Each such generated instance is composed of a main (under-constrained, here) fragment and some auxiliary fragments, each of which being grafted to the main one by introducing some binary constraints. Such classes have been introduced in [14] and related instances have been experimented in [12].

RLFAP The Radio Link Frequency Assignment Problem (RLFAP) is the task of assigning frequencies to a number of radio links in such a manner as to simultaneously satisfy a large number of constraints and use as few distinct frequencies as possible. In 1993, the CELAR (the French "Centre d'Electronique de l'Armement") built a suite of simplified versions of Radio Link Frequency Assignment Problems starting from data on a real network. These benchmarks have been made available to the public in the framework of the European EUCLID project CALMA (Combinatorial Algorithms for Military Applications). For more information, see [7]. Five initial series of binary instances have been selected. The two series, denoted `rlfapScens` and `rlfapGraphs`, respectively contain 11 instances (6 sat, 5 unsat) and 14 instances (8 sat, 6 unsat). The three other ones, denoted `rlfapModScens`, `rlfapModGraphs` and `rlfapScens11`, respectively contain 14 instances (5 sat, 9 unsat), 12 instances (6 sat, 6 unsat) and 9 instances (all unsat), and correspond to instances for which some constraints have been deleted or/and some frequencies removed as described in [4].

Towers of Hanoi The problem of the towers of Hanoi [11, pp. 1–4] is the task of transferring an entire tower represented by n disks initially stacked in increasing size on one of three pegs to one of the two other pegs, moving only one disk at a time and never a larger one onto a smaller. One initial series, denoted `hanoi1`, of 5 binary instances (all sat) has been selected.

2.2 Non binary problems

All-interval Series The all-interval series problem is the task of finding a vector s = $(s_1, \ldots, s_n)$, such that s is a permutation of $\{0, 1, ..., n\text{-}1\}$ and the interval vector v = $(|s_2 - s_1|, |s_3 - s_2|, \ldots |s_n - s_{n-1}|)$ is a permutation of $\{1, 2, ..., n\text{-}1\}$. See prob007 at `http://www.csplib.org`. One initial series, denoted `nb-allSeries1`, of 20 instances (all sat) involving both binary and ternary constraints has been selected.

Black Hole The Black Hole problem is the task of moving all cards of 17 fans of 3 cards each to the center pile, the Black hole, which initially only contains the Ace of Spades. One original series, denoted `BH-4-4`, is composed of 10 binary instances (all sat). To generate these instances (see [9]), as the instances for 52 card deck or 28 card deck using simple extensional oriented constraint model seemed to be out of reach for any reasonable quality solver, we decided to use card decks consisting of only 16 cards, which have much smaller search spaces. We would like to thank Barbara Smith for supplying us with these small instances.

Chessboard Coloration The chessboard coloration problem is the task of coloring all squares of a chessboard composed of r rows and c columns. There are exactly n available colors and the four corners of any rectangle extracted from the chessboard must not be assigned the same color. One initial series, denoted `nb-cc1`, of 11 non binary instances (5 sat, 6 unsat) involving constraints of arity 4 has been selected.

CRIL The contestant series, denoted `nb-cril`, is composed of 3 non binary instances. Two of them, `cril_unsat_nb_6` and `cril_unsat_nb_7`, are instances of the allocation problem defined in [15] and the third one, `cril_sat_nb_0` is an instance of the Radar Surveillance problem as defined in [6].

Golomb Ruler The Golomb Ruler problem is the task of putting n marks on a ruler of length l such that the distance between any two pairs of marks is distinct. See prob006 at `http://www.csplib.org`. One initial series, denoted `nb-gr1`, of 10 instances (5 sat, 5 unsat) involving both binary and ternary constraints has been selected. One original series, denoted `nb-Golomb`, of 20 non binary instances (10 sat, 10 unsat) has also been generated. The optimal Golomb rulers of size 3 to 12 were used to create the new instances. The sat instances were fixed to the optimal value for a given Golomb Ruler while the unsat instances were created in two different ways: either by constraining the length of the ruler to one below the optimal value, or by removing all possible values taken by one of the variables in all optimal rulers. The symmetry breaking constraints were included for the latter method to reduce the amount of values removed from the variable domains.

Ramsey The Ramsey problem is the task of coloring, using k colors, the edges of a complete graph involving n nodes in such a way that there is no monochromatic triangle in the graph (i.e., in any triangle at most two edges have the same color). See prob017 at `http://www.csplib.org`. Two initial series, denoted `nb-ramsey3` and `nb-ramsey4`, of respectively 8 instances (4 sat, 4 unsat) and 5 instances (5 sat) involving ternary constraints have been selected.

Random instances (Model RB) Three initial series of model RB, denoted `nb-random-3-N-D-M-T-forced` where `N`, `D`, `M` and `T` respectively correspond to the number of variables, the uniform size of domains, the number of ternary constraints and the tightness of each constraint, of 10 ternary instances of model RB forced to be satisfiable have been selected. These instances are particularly interesting as they are hard to solve. For more information about model RB and forced satisfiable instances, see [19].

Renault The initial series, denoted `renault`, which is simply composed of 1 non binary satisfiable instance has been selected (after merging constraints with similar scopes). This is a CSP instance from a Renault Megane configuration problem that was converted from symbolic to numeric domains.

Schurr's Lemma The Schurr's lemma problem is the task of putting n balls labeled from 1 to n into 3 boxes so that for any triple of balls (x,y,z) with x+y=z, not all are in the same box. See prob015 at `http://www.csplib.org`. One initial series, denoted `nb-schurr`, of 10 instances (2 sat, 8 unsat) involving ternary constraints has been selected. The modified versions of the series (instances with suffix *mod*) have been introduced in [5].

Travelling Salesperson The Travelling Salesperson problem is the task, given a set of cities, of finding a tour of minimal length that traverses each city (only once). Two original series, denoted `nb-TSP-20-easy` and `nb-TSP-25-easy`, of 5 non binary instances (all sat) have been selected. Also, two original series, denoted `nb-TSP-20-hard` and `nb-TSP-25-hard`, of 10 non binary instances (all sat) have been selected. The number of cities has been set to 20 and 25 and instances have been generated by using a perturbated version of this problem. However, this perturbation made the original problem easier. Due to restrictions of constraint arity and the goal to minimize the size of the file used to describe the problem, it was decided to allow any number of travelling persons to travel between cities. This significantly simplifies the extensional description of the problem. The cost of the whole trip was fixed to the cost of the optimal trip using only one salesperson. A pool of one thousand randomly generated instances was used in selecting instances to the final pool.

3 Format Specification

We have proposed two formats to represent CSP instances:

- a XML format
- a table format

Clearly, these formats are low-level ones. It means that no freedom remains for modeling. More precisely, for each instance, domains, variables, relations and constraints are exhaustively defined. The objective of introducing these formats is to allow comparing different algorithms/solvers without any interaction with modeling and any possible interpretation of the instance (e.g., the order of the variables). It should not be confused with the objective of proposing a powerful modeling language as the high-level proposals dedicated to mathematical programming such as e.g., AMPL (`http://www.ampl.com`) and GAMS (`http://www.gams.com`) or dedicated to constraint programming such as e.g., NCL [23], OPL [17] and ESRA [8]. Remark that the specification language Z (`http://vl.users.org`) has also been used to build nice (high-level) problem models [16].

Current table and XML formats are strongly connected as it is possible to convert any instance from one format to the other one. The advantages of the table format are its simplicity (as it is quite easy to parse) and its conciseness[1]. The advantages of the XML format are its readability (as it allows generating structured documents) and the possibility to benefit from many tools related to XML.

3.1 XML Representation

For the first competition of CSP solvers, we have focused on XML representation of constraint networks involving variables with finite domains and constraints given in extension. In order to manage without any ambiguity different possible extensions of this representation, we identify the current format proposed below with `1.1` (i.e., XML representation of CSP instances, version 1.1). Such extensions will include constraints given in intention, continuous domains, weighted CSP instances, etc. Finally, note that our approach involves using empty elements with several attributes in order to represent a domain, a variable, a relation and a constraint (as described below). Although this approach can be discussed, it has the advantage of being simple and of saving space.

Each CSP instance will be represented following the format given in Figure 1 where q, n, r and m respectively denote the number of distinct domains, the number of variables, the number of distinct relations and the number of constraints. Thus, each instance is defined by an XML element which is called *instance* and which contains five elements described in the following subsections.

[1] On average, the size of representing one instance using this format is about 25% smaller than the size of representing the same instance using the XML format.

```
<instance>
   <presentation
      name = 'put here the instance name'
      description = 'put here the instance description'
      nbSolutions = 'put here the number of solutions'
      solution = 'put here a solution'
      format = 'put here the XML format of the instance'
   />
   <domains nbDomains='q'>
      <domain
         name = 'put here the domain name'
         nbValues = 'put here the number of values'
         values = 'domainDescription'
      />
      ...
   </domains>
   <variables nbVariable='n'>
      <variable
         name = 'put here the variable name'
         domain = 'put here the name of a domain'
      />
      ...
   </variables>
   <relations nbRelations='r'>
       <relation
          name = 'put here the name of the relation'
          domain = 'put here the domain of the relation'
          nbSupports | nbConflicts = 'put here either the number
                    of supports or the number of conflicts'
          supports | conflicts = 'put here either the set
                    of supports or the set of conflicts'
       />
        ...
   </relations>
   <constraints nbConstraints='m'>
      <constraint
         name = 'put here the name of the constraint'
         scope = 'put here the names of the variables
                  involved in the constraint'
         relation = 'put here the name of the relation'
      />
      ...
   </constraints>
</instance>
```

Fig. 1. XML representation of a CSP instance

Presentation The XML element called *presentation* is empty and includes a set of attributes as follows:

```
<presentation
  name = 'put here the instance name'
  description = 'put here the instance description'
  nbSolutions = 'put here the number of solutions'
  solution = 'put here a solution'
  format = 'put here the XML format of the instance'
 />
```

Each attribute of *presentation* is optional and of type string as it only provides human-readable information. The attribute *nbSolutions* can be given an integer value denoting the total number of solutions of the instance, an expression of the form 'at least n' or '?'. For example,

- `nbSolutions = '0'` indicates that the instance is unsatisfiable,
- `nbSolutions = '3'` indicates that the instance has exactly 3 solutions,
- `nbSolutions = 'at least 1'` indicates that the instance has at least 1 solution (and, hence, is satisfiable),
- `nbSolutions = '?'` indicates that it is unknown whether or not the instance is satisfiable,

The attribute *solution* indicates a solution if one exists and has been found.

The attribute *format* indicates which version of XML representation of CSP instances is used. The current version is denoted 1.1.

Remark that, in the context of the competition, the value of the attributes *name*, *description*, *nbSolutions* and *solution* will be set to '?'.

Domains The XML element called *domains* admits an attribute which is called *nbDomains* and contains some occurrences of an element called *domain*, one for each domain associated with at least one variable of the instance. The attribute *nbDomains* is of type integer and its value is equal to the number of occurrences of the element *domain*. Each element *domain* is empty and includes three attributes, called *name*, *nbValues* and *values*, as follows:

```
<domain
  name = 'put here the domain name'
  nbValues = 'put here the number of values'
  values = 'domainDescription'
 />
```

The value of the attribute *name* corresponds to the name of the domain, must not contain space characters and must be unique. The attribute *nbValues* is of type integer and its value is equal to the number of values of the domain. The value of the attribute *values* gives a description of the domain, i.e., the set of integer values that can be assigned to this variable. The description of a domain takes the form:

```
domainDescription ::= domainPiece (' ' domainPiece)*
<domainPiece> ::= integer |
                  integer'..'integer
```

To summarize, a domain is defined from some pieces that correspond to single values and ranges of integer values. For example,

- `values = '1 5 10'` corresponds to the set $\{1, 5, 10\}$ of integer values,
- `values = '1..3 10..14'` corresponds to the set $\{1, 2, 3, 10, 11, 12, 13, 14\}$ of integer values.

Variables The XML element called *variables* admits an attribute which is called *nbVariables* and contains some occurrences of an element called *variable*, one for each variable of the instance. The attribute *nbVariables* is of type integer and its value is equal to the number of occurrences of the element *variable*. Each element *variable* is empty and includes two attributes, called *name* and *domain*, as follows:

```
<variable
  name = 'put here the variable name'
  domain = 'put here the name of a domain'
 />
```

The value of the attribute *name* corresponds to the name of the variable, must not contain space characters and must be unique. The value of the attribute *domain* gives the name of the associated domain. It must correspond to the value of the *name* attribute of a *domain* element.

Relations The XML element called *relations* admits an attribute which is called *nbRelationss* and contains some occurrences of an element called *relation*, one for each relation associated with at least a constraint of the instance. The attribute *nbRelations* is of type integer and its value is equal to the number of occurrences of the element *relation*.

Each element *relation* is empty and includes four attributes, called *name*, *domain*, and either *nbSupports* and *supports* or *nbConflicts* and *conflicts*. The value of the attribute *name* corresponds to the name of the relation, must not contain space characters and must be unique. The value of the attribute *domain* corresponds to a list of domains whose Cartesian product denotes the domain of the relation. It must correspond to a list of domain names where each name corresponds to the value of the *name* attribute of a *domain* element. A space character is used as a separator. The attribute *nbSupports* or *nbConflicts* is of type integer and its value is equal to the number of supports (if supports are given) or the number of conflicts (if conflicts are given) of the relation.

Finally, either we have an attribute called *supports* or an attribute called *conflicts*. The value of such attributes denotes a set of tuples which must be a subset of the Cartesian product denoting the domain of the relation. Note that

no separator is inserted between tuples and that each tuple corresponds to a list of numbers separated by commas and enclosed in parentheses.

A relation defined by its set of supports looks like:

```
<relation
  name = 'put here the name of the relation'
  domain = 'put here the domain of the relation'
  nbSupports = 'put here the number of supports'
  supports = 'put here the set of supports'
 />
```

A relation defined by its set of conflicts looks like:

```
<relation
  name = 'put here the name of the relation'
  domain = 'put here the domain of the relation'
  nbConflicts = 'put here the number of conflicts'
  conflicts = 'put here the set of conflicts'
 />
```

Constraints The XML element called *constraints* admits an attribute which is called *nbConstraints* and contains some occurrences of an element called *constraint*, one for each constraint of the instance. The attribute *nbConstraints* is of type integer and its value is equal to the number of occurrences of the element *constraint*.

Each element *constraint* is empty and includes three attributes, called *name*, *scope* and *relation* as follows:

```
<constraint
  name = 'put here the name of the constraint'
  scope = 'put here the names of the variables
           involved in the constraint'
  relation = 'put here the name of the relation'
 />
```

The value of the attribute *name* corresponds to the name of the constraint, must not contain space characters and must be unique. The value of the attribute *scope* denotes the set of variables involved in the constraint. It must correspond to a list of variable names where each name corresponds to the value of the *name* attribute of a *variable* element. A space character is used as a separator. For example, `scope = 'X0 X4'` corresponds to the variables involved in a binary constraint.

The value of the attribute *relation* corresponds to the name of the relation associated with the constraint. It must correspond to the value of the *name* attribute of a *relation* element.

```
<instance>
  <presentation
     name="4queens"
     description="This problem involves placing 4 queens
                  on a chessboard"
     nbSolutions="at least 1"
     format="1.1"/>

  <domains nbDomains="1">
    <domain name="dom0" nbValues="4" values="1..4"/>
  </domains>

  <variables nbVariables="4">
    <variable name="X0" domain="dom0"/>
    <variable name="X1" domain="dom0"/>
    <variable name="X2" domain="dom0"/>
    <variable name="X3" domain="dom0"/>
  </variables>

  <relations nbRelations="3">
    <relation name="rel0" domain="dom0 dom0" nbConflicts="10"
              conflicts="(1,1)(1,2)(2,1)(2,2)(2,3)(3,2)(3,3)
                         (3,4)(4,3)(4,4)"/>
    <relation name="rel1" domain="dom0 dom0" nbConflicts="8"
              conflicts="(1,1)(1,3)(2,2)(2,4)(3,1)(3,3)(4,2)
                         (4,4)"/>
    <relation name="rel2" domain="dom0 dom0" nbConflicts="6"
              conflicts="(1,1)(1,4)(2,2)(3,3)(4,1)(4,4)"/>
  </relations>

  <constraints nbConstraints="6">
    <constraint name="C0" scope="X0 X1" relation="rel0"/>
    <constraint name="C1" scope="X0 X2" relation="rel1"/>
    <constraint name="C2" scope="X0 X3" relation="rel2"/>
    <constraint name="C3" scope="X1 X2" relation="rel0"/>
    <constraint name="C4" scope="X1 X3" relation="rel1"/>
    <constraint name="C5" scope="X2 X3" relation="rel0"/>
  </constraints>
</instance>
```

Fig. 2. 4 queens (XML format)

```
<instance>
  <presentation
     name="nonBinaryInstance"
     description="Illustrative instance"
     nbSolutions="at least 1"
     format="1.1"/>

  <domains nbDomains="3">
    <domain name="dom0" nbValues="7" values="0..6"/>
    <domain name="dom1" nbValues="3" values="1 5 10"/>
    <domain name="dom2" nbValues="10" values="1..5 11..15"/>
  </domains>

  <variables nbVariables="5">
    <variable name="X0" domain="dom0"/>
    <variable name="X1" domain="dom0"/>
    <variable name="X2" domain="dom1"/>
    <variable name="X3" domain="dom2"/>
    <variable name="X4" domain="dom0"/>
  </variables>

  <relations nbRelations="4">
    <relation name="rel0" domain="dom0 dom0" nbConflicts="7"
              conflicts="(0,0)(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)"/>
    <relation name="rel1" domain="dom2 dom0" nbConflicts="25"
              conflicts="(1,0)(1,1)(1,2)(1,3)(1,4)(1,5)(1,6)(2,1)(2,2)
              (2,3)(2,4)(2,5)(2,6)(3,2)(3,3)(3,4)(3,5)(3,6)(4,3)(4,4)
              (4,5)(4,6)(5,4)(5,5)(5,6)"/>
    <relation name="rel2" domain="dom1 dom0" nbSupports="1"
              supports="(5,3)"/>
    <relation name="rel3" domain="dom0 dom1 dom2" nbSupports="17"
              supports="(0,1,3)(0,5,3)(0,10,12)(1,1,4)(1,5,2)(1,10,13)
              (2,1,5)(2,5,1)(2,10,14)(3,10,5)(3,10,15)(4,5,11)(4,10,4)
              (5,5,12)(5,10,3)(6,5,13)(6,10,2)"/>
  </relations>

  <constraints nbConstraints="5">
    <constraint name="C0" scope="X0 X1" relation="rel0"/>
    <constraint name="C1" scope="X3 X0" relation="rel1"/>
    <constraint name="C2" scope="X2 X0" relation="rel2"/>
    <constraint name="C3" scope="X1 X2 X3" relation="rel3"/>
    <constraint name="C4" scope="X1 X4" relation="rel0"/>
  </constraints>
</instance>
```

Fig. 3. Non binary instance (XML format)

Some examples In Figure 2, one can see the XML representation of the 4 queens instance where constraints are all represented by a set of conflicts. In Figure 3, one can see the XML representation of a CSP instance involving 5 variables and 5 constraints. It illustrates non binary constraints and constraints given by supports or conflicts. These constraints, given in extension, can be respectively more formally expressed by:

$C0$: $X0 \neq X1$
$C1$: $X3 - X0 \geq 2$
$C2$: $X2 - X0 = 2$
$C3$: $X1 + 2 = |X2 - X3|$
$C4$: $X1 \neq X4$

3.2 Table format

Now, we introduce the syntax of the **table** format proposed for the first competition of CSP solvers. Each CSP instance has been represented following the format given in Figure 4. We have just to mention that if the value of <type> is 0 then it means the tuples in the relation correspond to conflicts. If it is 1 then it means all the tuples in the corresponding relation are supports. Also, note that Space (' ': ASCII CODE 32) and Line Feed ('\n': ASCII CODE 10) characters act as separators.

```
<problem name>
<number of domain definitions>
<domain definition number>     <domain size>     <domain values>
 .
 .
<number of variables>
<variable number>     <domain definition number>
.
.
<number of relation definitions>
<relation definition number> <type> <arity> <domain definition numbers>
         <number of tuples> <tuples>
.
.
<number of constraints>
<arity>    <variables involved>    <relation definition number>
.
.
```

Fig. 4. Table representation of a CSP instance

```
4queens
1                          /* Number of domain definitions */
0   4   1 2 3 4
4                          /* Number of variables */
0   0
1   0
2   0
3   0
3                          /* Number of relation definitions */
0   0   2   0  0   10   1 1  1 2  2 1  2 2  2 3  3 2  3 3  3 4  4 3  4 4
1   0   2   0  0    8   1 1  1 3  2 2  2 4  3 1  3 3  4 2  4 4
2   0   2   0  0    6   1 1  1 4  2 2  3 3  4 1  4 4
6                          /* Number of constraints */
2   0  1   0
2   0  2   1
2   0  3   2
2   1  2   0
2   1  3   1
2   2  3   0
```

Fig. 5. 4 queens (Table format)

```
nonBinaryInstance
3                          /* Number of domain lists */
0   7   0 1 2 3 4 5 6
1   3   1 5 10
2  10   1 2 3 4 5 11 12 13 14 15
4                          /* Number of variables */
0   0
1   0
2   1
3   2
4                          /* Number of relation definitions */
0   0   2   0 0   7   0 0  1 1  2 2  2 2  3 3  4 4  5 5  6 6
1   0   2   0 2  25   1 0  1 1  1 2  1 3  1 4  1 5  1 6  2 1  2 2  2 3  2 4
                      2 5  2 6  3 2  3 3  3 4  3 5  3 6  4 3  4 4  4 5  4 6
                      5 4  5 5  5 6
2   1   2   1 0   1   5 3
3   1   3   0 1 2   17   0 1 3  0 5 3  0 10 12  1 1 4  1 5 2  1 10 13
                        2 1 5  2 5 1  2 10 14  3 10 5  3 10 15  4 5 11
                        4 10 4  5 5 12  5 10 3  6 5 13  6 10 2
4                          /* Number of constraints */
2   0  1   0
2   0  3   1
2   2  0   2
3   1  2  3   3
```

Fig. 6. Non binary instance (Table format)

Some examples In Figures 5 and 6, we present the table version of the two small examples introduced in Section 3.1. Note that comments are inserted to make the example more understandable. However, in the proposed table format comments are not allowed.

3.3 Format rules for the competition

Finally, one can notice that it is possible to convert any instance from one format to the other one. We have proposed a program called `checker` that allows validating and converting XML and table representations of CSP instances. In fact, a file representing a CSP instance is valid iff:

1. the number of (types of) domains corresponds to the specified number of domains
2. the number of values in each domain corresponds to the specified number of values (size)
3. each domain is given in ascending order and does not contain several occurrences of the same value
4. the number of variables corresponds to the specified number of variables
5. the domain associated with each variable is defined
6. the number of (types of) relations corresponds to the specified number of relations
7. the domain of each relation is well defined (that is to say, it corresponds to a list that denotes a Cartesian product from (types of) domains that are defined)
8. the number of tuples (supports or conflicts) in each relation corresponds to the specified number of tuples
9. each tuple belongs to the domain of the relation
10. each relation is given in ascending (lexicographic) order and does not contain several occurrences of the same tuple
11. the number of constraints corresponds to the specified number of constraints
12. the scope of each constraint is well defined (that is to say, it corresponds to a list of variables that are defined)
13. the relation associated with each constraint is defined
14. the domain that can be built from the scope of each constraint corresponds to the domain of the associated relation

Furthermore, in the context of the first competition, the following rules have also been adopted:

1. the name of the instance is "?" or only contains letters, digits or characters in {'_','-'}
2. values in each domain are integers which belong to $-2^{14}..2^{14}$
3. variables are numbered from 0 to $n-1$, where n is the number of variables (In XML format, variables are denoted $X_0..X_{n-1}$).
4. variables are given in ascending order of their numbers
5. the arity of each constraint is in the range 2..20
6. the scopes of any two different constraints must differ.

4 Conclusion

For the first international constraint satisfaction solver competition, the organizing committee has collected a large set of random, academic and real-world instances. We hope that this set will be useful to the CSP community as benchmarks for testing new methods/algorithms. On the other hand, we project, in the near future, to extend the current table and XML formats proposed here in order to deal with constraints defined in intention, weighted CSPs, global constraints, optimization etc.

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Behind the Scene (Competition Organisation)

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Abstract. This invited paper describes how the experiments were run and all other issues which have came up during the experiments execution.

This invited paper describes how the experiments were run and all other issues which have came up during the experiments execution.

The final instance pool was divided into binary and non-binary parts. Each part consisted of the number of classes, some of which were divided into sat and unsat parts. In addition, some (un)sat problems were divided into easy and hard sets. Please note, that the division into easy and hard sets is subjective within given class and based on human judgement or one particular choice of the model and search method. First, all solvers attempted to solve all binary problems since not all solvers could handle non-binary problems. Later, all solvers which could handle non-binary problems were executed with all non-binary problems.

The approach taken to solving the problems specified for the solver competition was straightforward and done with a view to being flexible. To control the solving process we created a "Master Script" using the Perl scripting language that took as input a number of configuration files and produced an output result file for each instance attempted. The input configuration files were called, "range", "timeout" and "masterfile". The output result files were given a name generated from the problem instance name and the date and time at which the current run was started. In cases where it was difficult to do something in a robust way using Perl, some C code was written to implement the needed functionality and then this was called from Perl.

The *masterfile* has an entry for each problem instance to be solved. Each entry consists of a unique problem number, the problem location and the arity of the highest arity constraint in the problem. The problems are split into two sets. One set comes from the contestants themselves whose masterfile problem entries were placed first in the masterfile. The second, much larger set, came from a number of sources and their masterfile entries are generated in a deliberately *shuffled* order and placed after the first set. To shuffle these problem instances we take the following approach:

Assume we have N classes of problems whose instances we want to shuffle. Select an instance from each of the N classes and generate a masterfile entry for each one. Then take a second instance from each of the N classes and generate a masterfile entry for these. Continue this process until all instances from each of the N classes are exhausted.

The idea of shuffling the instances was to ensure that each solver got a chance to solve problems from each problem class in case we ran out of time and some problem classes were not attempted at all. It did not turn out to be an issue but this was not known at the beginning of the competition.

The Master Script runs over the masterfile in an order specified by the *range* configuration file which allowed us to specify problem numbers as a range or individually. This allowed us to easily re-run or skip problems as needed during the competition. This also made it easy to stop and to resume the solving process in case something went wrong with a solver. The *timeout* configuration file stated the maximum allowed time a solver could spend solving a problem. This was set to 600 seconds for each solver.

Each day we temporarily stopped the solving process and compiled the results generated from the previous day. The solving process was then resumed.

During the competition, we encountered two major problems. First, the XML description of the unsatisfied Golomb instances were wrongly generated. This mistake transformed instances which were intended to be unsatisfiable into satisfiable ones. This problem was corrected within few days of the discovery. After correction, the unsat Golomb instances were generated as intended. The unsat instances are more difficult than the sat ones and some solvers were not able to solve the corrected instances. The second problem was pointed out by Christophe Lecoutre, who rightly pointed out that there were too many TSP instances in non-binary problem pool. Two members of the organizing committee, which did not enter the competition, defined two possible ways of reducing by factor two the number of TSP instances. After analysis of the results, the solution which minimized impact on the relative ranking between solvers was chosen. All instances of 10 and 15 city TSP were removed. We would like to thank Christophe Lecoutre for pointing out the problem and accepting the solution to the problem since it was his solver that has lost out most in terms of relative ranking.

Questionnaires

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Abstract. This invited paper presents a compilation of the questionnaires that were filled out by the contestants of the solver competition.

1 Introduction

This invited paper presents a compilation of the questionnaires that were filled out by the contestants of the solver competition.

All contestants were asked to fill in the questionnaire. The aim of this questionnaire was to indicate possible future improvements and issues which are important to contestants. We provide below the compilation of answers for each of the questions asked in the questionnaire. There are two parts since the questionnaire itself consisted of two parts. The compilation is based on six questionnaires.

2 About the competition

The first part aimed to get general feedback about the competition. There were eight questions.

- What kind of problem representation should we use for the competition?
  Table/XML format are fine for the first CSP solver competition. However, next editions should extend current representation, so it can preserve as much as possible the semantics of the original problem. One participant also indicated that it should be possible to indicate search strategy information as he feels it is very much part of the modeling process. Interestingly, the other contestant had exactly opposite view since he would like to avoid fine-grain classification so winning would not be due to problem tailored search heuristics. The competition should test the quality of the generic solvers not their fitness against a particular type of problem. An open question is how to explicitly include factors which can potentially have a great effect on search and often are expressed by CP expert such as symmetries.
- Would you like to include constraints defined in intention, that is to say by a predicate whose expression is built from integers, arithmetic operators, logical operators..., into the next edition of the CSP competition?
  All contestants see the need for constraints defined in intention. However, one expressed his concern about increasing the entrance threshold too high for current and/or future contestants. Intentional constraints will simplify problem description, reduce the size of the problems significantly, and make

it easier to parse problem descriptions. The intentional constraints added to the problem description will make the contestants life easier and stress the difference between CP and other techniques. Part of the reason for using CP (as opposed to SAT or MP) is the availability of higher level modeling tools. The current format denies the user this advantage.

- Would you like to deal with weighted CSP into the next edition of the CSP competition?
  The majority of the contestants feel that adding weighted CSP is a good idea and it should be done sooner or later. However, most contestants explicitly suggest to have them as a separate category.
- Would you like to include global constraints into the next edition of the CSP competition? If the answer is YES, then what types of global constraints would you like to introduce?
  The contestants find important to add global constraints, at least the ones which are the most common. However, there is a concern of putting too much development work on the contestants. The addition of global constraints should be done if and only if they are often used in the problems used in the competition. Constraints like alldifferent and gcc are potential candidates. Certainly, there should be a possibility for contestants to choose problem representation which does not use global constraints. Careful extension will increase the problems which could be included in the competition, without danger of reducing the number of contestants significantly. There are at least few solvers which did not enter the competition because the global constraints were not included.
- Is it necessary to classify problems further into categories so that best solver will be selected for each category? (e.g., binary problems, non-binary problem, scheduling problems etc.) If yes, what are the most interesting categories?
  The classification of problems further into categories would be beneficial if they serve a clear purpose. Any additional classification should be done based on opinions of the contestants. The possible categories could be industrial, handmade, random, and academic. One of the contestants expressed his reservation towards classification between binary and non-binary problems, as he views binary problems more of as theoretical problems and not real problems which arise in practice. The extensive classification should be avoided so future contestants could not specialize their solvers towards specific categories.
- What are the benefits (e.g., on solver-related engineering and research, on research in CSP and CP) of the solver competition?
  The contestants expect to receive large benefits from solver competition. It would allow them to compare different approaches in respect to search, data structures, and propagation techniques. The design of an efficient solver is about making the right trade-offs. This competition will help to evaluate different solver designs. In general, it would be beneficial for solver oriented research to have a set of benchmarks against which the new ideas can be tested. The solver competition also gives a chance to determine how good

the various features that have been touted over the years really are. The competition will help to advertise the solvers and indicate possible improvements. In the long run, this competition will help CP community as it will put more stress on implementing efficient solvers based on the research state of the art. These efficient solvers could be used later to evaluate new research ideas.

- What are major concerns in evaluating a solver? What support (documentation, software tools etc.) should be organizer provide for the participants?
  The major concern of the contestants was the need to increase the amount of real-world problems used in the competition. Real world problems often possess structure which can and should be exploited by the solver. In addition, some effort should be made to evaluate solvers based on different criteria, not only time, number of consistency checks, or number of search nodes. A possible criteria would be the scalability and robustness of the solvers.
- What are the major concerns in evaluating a solver? What support (documentation, software tools etc.) should the organizer provide for the participants?
  The solver diagnostics should be well defined. In addition, the solver should be allowed to output any kind of comments to the standard input, so the authors can study the behavior of the solvers later on. There were no complaints to how the evaluation framework was setup, the contestants were satisfied with provided tools. One contestant indicated the benefit of making available the twin machine to the one used in the competition, so anytime tests of contestants solvers and possibly comparison with other solvers could be performed even during competition run.

3 About your solver(s)

The second part of the questionnaire asked specific questions about the solvers which have entered the competition. The aim of this section is to improve the appeal of the competition trough better understanding of what comprise the different solvers. There were ten questions in this part.

- Which of the competition assumptions have had the biggest positive or/and negative influence on the performance for your solver?
  The restriction of extensional constraints only had negative effect on solvers. The extensional representation of the relations, such as x smaller than y forces solver to focus on efficient representation of extensional constraint. The propagation algorithms and other components of the solver may have been of less importance in current setup. The lack of global constraints have also influenced the efficiency of some solvers as they were not given information about the initial structure of the problem. In case of one contestant, the size of the largest instances had the most negative impact.
- Which feature may differentiate your solver from that of other competitors?
  Generally, the solvers were very diverse. They were implemented in different languages such as C++, Java, and Lisp. They were not written with the

competition as the first goal, often their major purpose was to serve as experimental vehicle in contestants research. Some solvers were translating CSP into SAT and SAT solver was solving the translated problem. One solver was learning no-goods during its execution and stored them in available memory, therefore the amount of available memory could influence the size of the search trees. The same solver implemented its own memory manager to manage the memory used by no-goods.

- Is your solver able to solve non-binary CSP's or just binary ones?
  The majority of solvers could solve both binary and non-binary problems.
- Do you use your own memory manager?
  Half of the solvers used standard memory managers available in their language of choice. However, some solvers were limited in their choice of memory management due to their choice of language (e.g. Java).
- Do you deallocate memory if data is no longer needed (do you allow memory leaks on purpose to speed up computation?)
  The contestants intention is always to deallocate non needed memory. However, often the same memory is reused multiple times without repetitive allocation and deallocation. Generally, the contestants try to reduce the number of allocation and deallocation operations.
- Do you use any randomness in your algorithm? Do you use the same seed for generator every time you start a solver?
  If randomness was used then it was always deterministic by using the same seed at the start of the program. One of the solvers could produce different results for the same instance if the solver was given a different amount of memory, since it influenced how many no-goods were stored.
- Given the same instance can your solver yield different size of the search tree?
  The majority of the solvers will produce the same size of the search tree for the same instance.
- What data structures do you use? (e.g. Hash based structures in particular)?
  There are some solvers which use mostly arrays in their implementation. There are two solvers which used hash structures. One of the solvers used a tst (http://www.cs.princeton.edu/ rs/strings/) to store the tuples of the constraints that are represented by conflicts.
- Do you compress original CSP representation? For example if two relations show some similarities in conflict or support tuples, do you use this fact to get more concise representation in memory?
  None of the contestants used any technique to compress the original CSP representation, so more efficient memory representation could be used.
- What representation do you use for a value? Constant number of bits or varied? e.g. will value 10 take less space in memory than value 1000?
  The contestants used standard types available in their language of choice, so standard number of bits were used to represent different values.

20,000 Bytes Under the C,
A Voyage to the Centre of a CSP Solver

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Abstract. This paper describes the implementation, the variable ordering, the value ordering, and other search strategies of two solvers, which have been submitted to the CPAI'2005 solver competition. The first solver, mac, maintains arc consistency during search. The second solver, wsac+mac, maintains arc consistency during search *after* enforcing a weak form of singleton arc consistency. An algorithm for enforcing weak singleton arc consistency is presented. For certain classes of problems the strategy of wsac+mac turns out surprisingly efficient both in checks and time. For all problems that were considered in the preparation of the competition, and using a time limit of 600 seconds, wsac+mac could solve any problem which was solved by mac. The converse was not always true.

1 Introduction

This paper describes some aspects of the bordewijk solver, two variants of which have been submitted to the CPAI solver competition in 2005. It briefly describes its functionality as a constraint programming environment but the main focus of this paper is on describing low-level implementation details.

Throughout this paper it is assumed that the reader is familiar with the notion of a constraint satisfaction problem [Tsang, 1993; Marriot and Stuckey, 1998; Apt, 2003; Dechter, 2003], knows about arc consistency [Mackworth, 1977], knows about the arc consistency algorithm AC-3 [Mackworth, 1977], knows about maintaining arc consistency [Sabin and Freuder, 1994], and knows about singleton arc consistency [Debruyne and Bessière, 1997; 2001; Prosser *et al.*, 2000].

The remainder of this paper is as follows. Section 2 provides a global overview of bordewijk. Details about the language are described in Section 3. Section 4 describes the main aspects of bordewijk's code generator. Details about extensional constraint representation are provided in Section 5. The implementation of bordewijk's default variable and value orderings is discussed in Section 6. The main details about the consistency algorithms are laid out in Section 7. Section 8 studies the advantages of removing effectively universal constraints. Section 9 describes the two solvers that have been submitted to the CPAI'2005 solver competition. Section 10 presents some preliminary results. A conclusion is provided in Section 11.

2 Global Overview

A CSP in bordewijk is specified as a collection of modules which are compiled into object files and linked at execution time. Modules can be compiled independently.

The system allows for user-defined domain, function, and relation definitions. In addition it is possible to specify user-defined dynamic variable and value orderings.

Solving a problem is done by performing search, during which some level of consistency is maintained. At the moment there are several built-in methods, which include maintaining arc consistency [Sabin and Freuder, 1994], and maintaining arc consistency *after* making the problem *weak singleton arc consistent* (WSAC). Here WSAC is a weak form of singleton arc consistency [Debruyne and Bessière, 1997; 2001; Prosser *et al.*, 2000].

Effort has been made to keep the solver's data structures, which are needed to represent and solve the CSP, "small." As a consequence the solver cannot use algorithms which, in the worst case, minimise the number of consistency checks. Instead it uses algorithms which are good on average.

3 The Language

Most of the `bordewijk` syntax is an adaptation of `galileo` [Bowen and Bahler, 1993]. It is straightforward to build a similar system using a different high-level constraint-based language.

At the top-level there is the module `main`. The `main` module associates the variables with their domains, defines the constraints among subsets of the variables, and defines variable and value orderings. The module `main` may also define domains, functions, constraint relations, and dynamic variable and value orders. In addition to the module `main` there may be zero or more library modules, each of which in their turn may recursively depend on auxiliary modules. At the moment auxiliary modules can only export domain, function and constraint relation definitions. Circular dependencies between modules are currently not allowed. Solving a CSP with `bordewijk` consists of the following steps:

- The modules are independently compiled into object files.
- The object files are linked.
- The variables, their domains, and the constraint graph, which is represented as the disjoint union of a binary and a non-binary constraint graph, are initialised.
- The solver is started. The two solver that are described here will always enforce node and arc consistency and may enforce WSAC before search. It always maintains arc consistency during search on its binary constraints.

The `bordewijk` module system is inspired by `haskell` [Peterson *et al.*, 1996].

The code depicted in Figures 1 and 2 implements a CSP for solving a well known puzzle from Smullian. The implementation consists of a module `main`, which is depicted in Figure 1, and a library module `smullian_lib`, which is depicted in Figure 2. The library module has a *qualified export list* for exporting two user-defined domains called `kind` and `human` and a constraint `says`. Note that the domain `bool` and the constraint `truth`, which are used for the implementation of `says`, are not exported; they remain local to `smullian_lib`. The `bordewijk` module system also has *unqualified exports* for exporting *all* concepts which are defined in a module. Likewise, modules can be imported qualified or unqualified. With a qualified import all concepts

```
/**
 * There are three kinds of people: Knights, Knaves, and Normals.
 *
 * Knights never lie.
 * Knaves always lie.
 * Normals sometimes lie.
 *
 * A, B, and C are three different kinds of people.
 * A says: I am normal.
 * B says: That is true. NB: B says that A is normal.
 * C says: I am not normal.
 *
 * Question: Who is who?
 */
module main.

import smullian_lib.

Person[ human ] : kind.

search subject to:
    and( i, j in human : i < j )
       Person[ i ] <> Person[ j ].

    says( Person[ a ], evaluation( Person[ a ] = normal ) ).
    says( Person[ b ], evaluation( Person[ a ] = normal ) ).
    says( Person[ c ], evaluation( Person[ c ] <> normal ) ).
```

Fig. 1. Implementation of `main` module for solving Smullian puzzle

that are imported have to be listed explicitly. With unqualified imports no concept is listed. Note that `bordewijk` allows for intensional and extensional constraints.

The `evaluation` function in the `main` module returns `1` if the evaluation of its argument is true and `0` otherwise. The constraint involving the aggregate operator `and` could also have been implemented using an `all_different` constraint. The magic spell "`search subject to:`" is only needed for software engineering purposes and will, in the long run, disappear.

Constraint definitions like the ones defined in Figure 2 are equivalent to relation definitions in `galileo` [Bowen and Bahler, 1993]. However, most users are not aware of the difference between a constraint relation and a constraint, which is why it was decided to reflect this in the language.

4 Code Generation

The `bordewijk` parser is implemented with `lex` and `yacc`. As mentioned in the previous section all modules are compiled into object code. This is done using `bordewijk`'s code generator which generates intermediate C [Kernighan and Ritchie, 1988], which subsequently is compiled using Fabrice Bellard's `tcc` compiler (`http://fabrice.bellard.free.fr/tcc/`). All constraints (extensional and intensional) are turned into function calls. In the future `tcc` will be replaced by `gcclib`.

The following is part of the code that is generated by `bordewijk`'s code generator from the module `smullian_lib` which is depicted in Figure 2. The code has been slightly modified for readability.

```
module smullian_lib( kind, human, says ).

domain bool =::= { 0, 1 }.
domain kind =::= { knight, knave, normal }.
domain human =::= { a, b, c }.

constraint truth( bool ) =::= { 1 }.

constraint says( kind, int )
   =::= { ( KIND, WHAT_SUCH_KINDS_SAY ) :
          KIND = knight and truth( WHAT_SUCH_KINDS_SAY ) or
          KIND = knave and not truth( WHAT_SUCH_KINDS_SAY ) or
          KIND = normal }.
```

Fig. 2. Implementation of library module called `smullian_lib`

```
static const int _BWK_DOM_kind[ 3 ]  = { 0, 1, 2 };
static const int _BWK_DOM_human[ 3 ] = { 0, 1, 2 };
static const unsigned char c_array_tuples_truth[ 2 ] = { 2,0 };

int _SM_truth( int _BWK_loc_0 ) {
  unsigned char sum = _BWK_loc_0 + 1;
  return _BWK_lin_val_char_search( 0, sum, c_array_tuples_truth  );   }

int _SM_says( int _BWK_loc_0, int _BWK_loc_1 ) {
  int _BWK_loc_KIND = _BWK_loc_0;
  int _BWK_loc_WHAT_SUCH_KINDS_SAY = _BWK_loc_1;
  return ((_BWK_loc_KIND==1) && (_SM_truth( _BWK_loc_WHAT_SUCH_KINDS_SAY ))) ||
         ((_BWK_loc_KIND==0) && (!_SM_truth( _BWK_loc_WHAT_SUCH_KINDS_SAY ))) ||
         (_BWK_loc_KIND==2);    }
```

Note that at the C level all domain values are represented as integers. The intensional constraint `says` from `smullian_lib` corresponds to the C function `_SM_says`. The extensional constraint `truth` from `smullian_lib` corresponds to the C function `_SM_truth`. A predefined function called `_BWK_lin_val_char_search` is used to implement the function. For the moment we will ignore the details about the implementation of this predefined function. More details about it are provided in Section 5.

The following is part of the code that is generated from the module `main`, which is depicted in Figure 1.

```
int _GLOBAL_3( int **_BWK_arg_ ) {
  int _BWK_loc__0_Person  = **_BWK_arg_;
  return (_SM_says( _BWK_loc__0_Person, (_BWK_loc__0_Person==2) ));    }

int _GLOBAL_5( int **_BWK_arg_ ) {
  int _BWK_loc__0_Person  = **_BWK_arg_++;
  int _BWK_loc__2_Person  = **_BWK_arg_;
  return (_BWK_loc__0_Person != _BWK_loc__2_Person);    }
```

The function `_GLOBAL_3` corresponds to the constraint

```
says( Person[ a ], evaluation( Person[ a ] = normal ) ).
```

The function `_GLOBAL_5` implements the part of the aggregate constraint `and` that states that `Person[ a ] <> Person[ c ]`. At this level the arguments of the functions are of type `int**`. Each such argument is an array of pointers to the current values of the relevant CSP variables. The pointer array has one pointer for each CSP variable that is involved in the constraint. For `_GLOBAL_3` there is only one CSP variable

and for _GLOBAL_5 there are two. Regardless of the arity of the constraints this allows the solver to use the same calling mechanism: if the variables are assigned a value then a function call using the pointer array will tell whether this assignment is valid.

The final code generation step is to compile the functions _GLOBAL_* into object code, link the code with the code for the libraries, and store the function pointers corresponding to the functions _GLOBAL_* in the binary and the higher-order constraint graphs.

Consistency checks in bordewijk are currently only carried out for unary constraints, for binary constraints, and for constraints which have become effectively nullary, unary or binary during search. For each binary constraint scope S, there is an *application list* of function pointers corresponding to the top-level constraints in the module main, and an array of pointers to the current values of the variables in S, which effectively represents the join of the constraints on S. To carry out a consistency check among the variables in S the scope S is used to look up the application list in a binary search tree and subsequently the function CONSISTENCY_CHECK is applied to it. This function is listed in the following code fragment.

```
struct _APPLICATION_STRUCT {
  int **pcurr_val;
  CONSTRAINT func_rel;
  struct _APPLICATION_STRUCT *alink;
  /* REST OF DEFINITION OMITTED */
};
typedef struct _APPLICATION_STRUCT *APPLICATION_LIST;

int CONSISTENCY_CHECK( APPLICATION_LIST apps ) {
  consistency_checks++;
  do { if (!apps->func_rel( apps->pcurr_val )) return 0;
  } while ((apps = apps->alink) != NULL);
  return 1;    }
```

The formal parameter apps of the function CONSISTENCY_CHECK is an application list, which is a list of function pointers and pointer arrays to the current domain values. The member func_rel of an application list stores its function pointer, and the member pcurr_val stores its pointer array. The pointer arrays are initialised before search and remain static. Applying the function pointer to the pointer array corresponds to checking the current values of some of the variables against one of the constraints that are defined in the module main. Finally, the member alink of an application list stores the pointer to the next application list in the list

At first glance this implementation seems to have too much overhead for a consistency check. After all, all constraints having the same scope are easily compiled into one function call, thereby making a list unnecessary. The following describes the advantage. During the course of search higher-order constraints may become effectively binary. For example, consider a constraint between three variables, x, y, and z, and assume that backtracking has assigned a value to x, leaving y and z as future variables. Effectively, this leaves us with a binary constraint between y and z, which, using the representation described before, can be combined with all other constraints between y and z. Arc consistency being bordewijk's main inference mechanism, this allows for a very effective way of propagating some of the dependencies between y and z since any consistency check using the combined list now corresponds to the join of all effectively binary constraints between y and z. Space restrictions do not allow to describe the full details of how this is implemented but the mechanism is cheap and also allows for "unlinking" combined lists at the right time without any noticeable overhead.

5 Extensional Constraint Representation

One of the main concerns in developing `bordewijk` has been—and still is—to keep the space complexity of the constraints and the data structures that are required by the solver "low." To this end there are several different representation schemes for extensional constraints, which are described in the remainder of this section. For simplicity it will be assumed that all constraints are defined over numeric domains. Without loss of generality it is assumed that extensional constraints describe the allowed tuples.

5.1 Arrays

One of `bordewijk`'s representations for binary extensional constraints is that of a 2-dimensional `char` array, which is a representation allowing to quickly find out if two values are compatible. However, this representation is chosen only if the size of the resulting array is not "too large." Should the representation "become" too large then a different, less space requiring, representation will be chosen. At the moment some magic hand-picked numbers are used to decide what is too large and what is not, but it is intended to experimentally identify the right tradeoff between space and speed.

The representation works as follows. Consider the following constraint definition:

```
constraint c( dom, dom ) =::= { (1,1), (2,2), (5,3) }.
```

In `bordewijk` checking is used to ensure that the tuples in extentional relations are in the Cartesian product of the domains. Since $(5-1+1)\times(3-1+1)=15$ `char`s is a relatively small size to represent the constraint, it is translated into the following C.

```
static const unsigned char a_array_tuples_c[ 5 ][ 3 ] = {
  {1,0,0},{0,1,0},{0,0,0},{0,0,0},{0,0,1} };

int _LIB_BWK_CONS_c( int _BWK_loc_0, int _BWK_loc_1 ) {
  int _BWK_loc_2, _BWK_loc_3;
  if ((0 > (_BWK_loc_2 = _BWK_loc_0 - 1)) || (_BWK_loc_2 > 4) ||
      (0 > (_BWK_loc_3 = _BWK_loc_1 - 1)) || (_BWK_loc_3 > 2))
    return 0;
  return a_array_tuples_c[ _BWK_loc_2 ][ _BWK_loc_3 ];    }
```

Denote d_i the successor of the difference of the largest and smallest of the i-th members of the allowed tuples in a constraint. If $d_1 \times d_2$ becomes larger (but not too large) then the array representing the allowed values will be *packed* and indexed at the bit-level. For example, consider the following extensional constraint definition:

```
constraint c( dom, dom ) =::= { (1,100),(2,2),(100,100) }.
```

Using the packed representation this constraint is translated as follows:

```
static const int BWK_two_pow[ 8 ] = { 1,2,4,8,16,32,64,128 };

static const unsigned char p_array_tuples_c[ 100 ][ 13 ] =
  {{0,0,0,0,0,0,0,0,0,0,0,4},{1,0,0,0,0,0,0,0,0,0,0,0}, /* Rest omitted */

int _LIB_BWK_CONS_c( int _BWK_loc_0, int _BWK_loc_1 ) {
  int _BWK_loc_2, _BWK_loc_3;
  if ((0 > (_BWK_loc_2 = _BWK_loc_0 - 1)) || (_BWK_loc_2 > 99) ||
      (0 > (_BWK_loc_3 = _BWK_loc_1 - 2)) || (_BWK_loc_3 > 98))
    return 0;
  return (p_array_tuples_c[ _BWK_loc_2 ][ _BWK_loc_3 >> 3 ]) &
         (BWK_two_pow[ _BWK_loc_3 & 7 ]);    }
```

As the size of a constraint increases this may save eight times the space compared to the previous representation at the price of a slightly more expensive check.

5.2 Tight Extensional and Non-binary Extensional Constraints

For tight extensional constraints and non-binary extensional constraints tuples are packed into a "small" canonical representation which is looked up using hashing or binary search. The remainder of this section describes how constraint representation using hashing and binary search are implemented.

Hashing If hashing is used for representing a given extensional constraint $C \subseteq D_1 \times \cdots \times D_k$ then the members of C are partitioned into equivalence classes of "small" size, for which membership can be decided very efficiently using linear search.

First the members of C are encoded as bit sequences. The encoding guarantees that any two different members of $D_1 \times \cdots \times D_k$ will have a different encoding as a bit sequence. Furthermore, any encoding will be a bit sequence which will be greater than the zero sequence. Division by a number M is used to partition the bit sequences into equivalence classes such that each equivalence class has the same remainder upon division by M. The size of the largest equivalence class will be "small enough" for linear search to be efficient to decide membership of that equivalence class.

Within equivalence classes bit sequences are sorted from large to small and are terminated by the zero sequence. An algorithm based on Algorithm T [Knuth, 1998, pp. 398–399] is used for deciding whether a given bit sequence is in a given equivalence.

Binary-search The last constraint representation facilitates binary search. Using this representation, tuples in constraints are compressed to bit sequences as with hashing. The difference with hashing is that the bit sequences are sorted and that binary search is used to determine whether a given bit sequence is in the sorted sequence.

6 Variable and Value Ordering

Variable and value orders in `bordewijk` are user-defined. Currently the language for specifying these orders relies on defining a function which takes two variables (values) and returns a number which defines how they are ordered. If the number is negative then the first argument is the least significant, if it is positive then the second argument is the least significant, and otherwise a tie is broken lexicographically. The following code fragment defines a function implementing the domain over current degree ordering.

```
function dcdeg_variable_ordering( var, var ) -> int
 =::= { (V,W) -> c_deg( V ) * size( W ) - c_deg( W ) * size( V ) }.
```

Once this function is defined it can be used as a variable ordering by adding the statement `order variables using dcdeg_variable_ordering` in the `main`.

The default variable order (it is also used for the competition) is a *binary version* of the *conflict directed* order $dom/wdeg$ [Boussemart *et al.*, 2004b] with a lexicographical tie breaker. Given two variables x and y it compares the ratios $|D(x)|/x_{wdeg}$ and $|D(y)|/y_{wdeg}$ and prefers the variable having the smaller ratio. Here $D(z)$ is the domain of z and z_{wdeg} is its *weighted degree*, which is defined as

$$z_{wdeg} = \sum_{(w,z) \in G} weight(w, z)\,. \tag{1}$$

In this definition G is the restriction of the binary constraint graph to the unassigned variables and $weight(w, z)$ is the number of times the binary constraint between w and z resulted in a wipeout as the result of a call to `revise`, which is repeatedly called by the coarse-grained arc consistency algorithm AC-3 [Mackworth, 1977].

```
/* Initialisation */
For each variable x do:
   weight_sum[ x ] := original degree of x;
.
.
.
/* Search is now in progress */
Select current variable x;
For each future variable y involved with x in a binary constraint do:
   weight_sum[ y ] := weight_sum[ y ] − weight(x, y);
.
.
.
/* More search */
.
.
.
/* Backtracking */
For each future variable y involved with x in a binary constraint do:
   weight_sum[ y ] := weight_sum[ y ] + weight(x, y);
```

Fig. 3. Pseudo code for keeping track of weighted degrees.

Note that it is very expensive to compute the sum in Equation 1 from scratch each time two variables have to be compared. Fortunately, there is a clever way to keep track of this sum. To do this each constraint stores its own number of wipeouts and each variable z stores its own current weighted degree z_{wdeg}, which is initialised to its original degree.[1] The current weighted degree of z is incremented each time a constraint involving z results in a wipeout. To ensure that z_{wdeg} consists of only the sum of the weighted degrees for *unassigned* variables the weights for the future variables are *adjusted* after selecting the next current variable and these weights *restored* upon backtracking. Figure 3 depicts how this is implemented in pseudo code.

The advantage of this implementation is that it avoids recomputing the sum in Equation 1 and allows to compare variables x and y by comparing the sign of the following expression only:

$$weight_sum[\,y\,] \times |\,D(x)\,| - weight_sum[\,x\,] \times |\,D(y)\,|\,.$$

If the sign is negative then x is preferred, if the sign is positive then y is preferred, and otherwise ties are broken lexicographically.

The following describes `bordewijk`'s default value ordering, which is also used for the competition. This ordering is based on the number of supports of the values. The ordering works very well, especially for quasigroup problems with holes. A paper about it has been submitted [Mehta and van Dongen, 2005b].

[1] Strictly speaking this may change the $dom/wdeg$ ordering compared to when weights are initialised to 0. However, experimental results demonstrate that it improves search.

To describe the ordering, let $D^t(x)$ be the domain of variable x at time t. To order two values a and b in the domain of the current variable x we compare the sign of

$$\sum_{(x,y)\in G} |\, D^t(y)\,|^{-1} \times \big(|\, C_{xy} \cap \big(\{\, b\,\} \times D^t(y)\big)\,| - |\, C_{xy} \cap \big(\{\, a\,\} \times D^t(y)\big)\,|\big)\ .$$

Here G is the binary constraint graph and C_{xy} the constraint between x and y. If the sign is positive then b is preferred, if it is negative then a is preferred, and otherwise ties are broken lexicographically. Depending on the search strategy there are different choices for t. If the search strategy demands that the problem be made WSAC then t is the time just after the problem is made WSAC for the first time. Otherwise t is the time just after the problem is made arc consistent for the first time.

Note that this ordering is static and does not change during search. However, since `bordewijk` always orders its values dynamically values are ordered several times during search. This may seem a disadvantage but a comparison of solution times with statically ordering the values before search and repeatedly sorting the values showed almost no difference. The algorithm for sorting the values is heapsort [Knuth, 1998, pp. 144-148]. The worst case time complexity for sorting d values using heapsort is $\mathcal{O}(d\,\log(d))$. The additional space complexity for sorting the values during search is $\mathcal{O}(n\,d)$, where n is the number of variables and d the largest domain size.

7 Consistency Algorithms

Node consistency, arc consistency, and weak singleton arc consistency are the only constraint propagation algorithms used by `bordewijk`. The implementation of node consistency is straightforward. Weak singleton arc consistency is built on top of `bordewijk`'s default arc consistency algorithm. The main implementation details of these algorithms are briefly described in the remainder of this section.

Arc Consistency The arc consistency algorithm used in `bordewijk` is AC-3 [Mackworth, 1977] equipped with a *reverse variable based* revision ordering heuristic [Mehta and van Dongen, 2004; 2005a]. This heuristic forces AC-3 to select a variable, x_1, repeatedly revise the domain of x_1, until this is no longer needed, select another variable, x_2, repeatedly revise the domain of x_2, until this is no longer needed, and so on.

Reverse variable based revision ordering heuristics are very promising. They save many checks compared to variable based heuristics and save much queue maintenance overhead. The criterion for selecting the next variable, x_i, whose domain is to be repeatedly revised is a minimum domain size ordering, breaking ties using a maximum current degree with a lexicographical tie breaker. Once x_i is fixed, the variable against whose domain the domain of x_i is to be revised is selected using a minimum domain size with a lexicographical tie breaker.

A *revision condition* is used to avoid some, but not all, unnecessary revisions. The condition works as follows. Remember that $D^t(x)$ is the domain of x at time t. Let C_{xy} be the binary constraint between variable x and y, and let M^t_{xy} be the minimum number

of supports at time t of any value in the domain of x with respect to y, i.e. let

$$M_{xy}^t = \min_{v \in D^t(x)} \left| \left(\{ v \} \times D^t(y) \right) \cap C_{xy} \right| .$$

Note that all values in $D^T(x)$ are supported by y at time $T > t$ if the minimum number of supports of any member of $D^t(x)$ with $D^t(y)$ is greater than the number of values that are removed from $D^t(y)$ between time t and time T. Therefore, all values in $D^T(x)$ are supported by y if the following condition holds:

$$M_{xy}^t > | D^t(y) | - | D^T(y) | . \tag{2}$$

This is a (special case of a) *revision condition* [Mehta and van Dongen, 2005a], (see also [Boussemart *et al.*, 2004a]). Equation 2 is used by not adding any arc (x, y) to AC-3's queue at time $T > t$ if Equation 2 holds.

The time complexity overhead for computing the counters M_{xy}^t is $\mathcal{O}(e\, d^2)$. This is relatively small compared to the effort required to solve a non-trivial problem. The counters are represented in $\mathcal{O}(e)$ space. In `bordewijk` the counters M_{xy}^t are computed at time t just after the problem is made arc consistent for the first time. If, in addition, the problem is also made WSAC before search then the counters are *recomputed* just before search.

Weak Singleton Arc Consistency As mentioned before, one of the solvers that have been submitted to the CPAI'2005 solver competition, applies a weak form of singleton arc consistency (WSAC), which is weaker than singleton arc consistency [Debruyne and Bessière, 1997; 2001; Prosser *et al.*, 2000] and incomparable to *restricted singleton arc consistency* [Prosser *et al.*, 2000].

Enforcing singleton arc consistency using a SAC-1 style algorithm works by having an outer loop which for each variable has an inner loop to check whether assigning any value in its domain still allows making the resulting CSP arc consistent. The algorithm terminates if this is true. Otherwise, inconsistent values are removed and the outer loop is restarted. One of the main problems of such algorithm is that removing a single value triggers the whole outer loop. The restricted singleton arc consistency algorithm proposed in [Prosser *et al.*, 2000] avoids this triggering by only performing the outer loop once. This paper proposes a different solution.

Figure 4 depicts pseudo code for the WSAC algorithm. It speeds up arc consistency by only considering the neighbourhood of a variable and avoids "triggering the outer loop" by only propagating deletions through the neighbourhood of the variable.

8 Universal Constraints

In the previous section it is explained how to use minimum support counters M_{xy}^t and M_{yx}^t to improve arc consistency algorithms. Once these minimum support counters are available for a given binary constraint between x and y it becomes easy to determine whether this constraint is effectively universal at time t. Indeed, the constraint is universal at time t if and only if $M_{xy}^t = | D^t(y) |$ and $M_{yx}^t = | D^t(x) |$. In `bordewijk` all binary effectively universal constraints (EUCs) are removed just before search.

The main advantage of removing EUCs is that it avoids selecting variables near the root of the search tree that are involved in EUCs only. To see why this is an advantage, note that if the problem is unsatisfiable, if the first variable is only involved in EUCs, and if its domain is not a singleton then the same future sub-problem requires solving several times, whereas postponing the selection of this variable is likely to improve search. Another advantage of removing EUCs is that it simplifies the constraint graph.

Experiments indicate that for certain problems a substantial number of EUCs can be removed before search. For example, each of the 100 binary quasigroup problems with holes `bqwh-18-141` has 966 constraints. On average 101.34 of these constraints are EU after making them arc consistent and 119.88 of them are EU after making them WSAC, which is significant. In the modified graph problems four out of twelve problems have EUCs after making these problems WSAC: 308 for `graph2-f24`, 26 for `graph12-w1`, 1 for `graph13-w1`, and 308 for `graph2-f25`. For RLFAP#4 2397 constraints are EU after making the problem arc consistent and 2905 are EU after making the problem WSAC. Finally, for RLFAP#5 1858 constraints are EU after making the problem arc consistent and 1961 are EU after making the problem WSAC.

9 Competition Related Issues

This section compares the two solvers that have been submitted to the CPAI'2005 solver competition. The first solver maintains arc consistency during search [Sabin and Freuder, 1994]. The second solver first makes the problem WSAC and then maintains arc consistency during search. The arc consistency algorithm is a reverse variable based version of AC-3 [Mehta and van Dongen, 2004; 2005a]. Variables are selected dynamically using a binary version of the the conflict directed variable ordering $dom/wdeg$ [Boussemart *et al.*, 2004b] with a lexicographical tie breaker. Values are selected dynamically using the static value ordering from [Mehta and van Dongen, 2005b]. The variable and value orderings are also descibed in Section 6.

Besides node consistency, arc consistency, and WSAC algorithms no other algorithms are used for support inference. Consistency checks are only carried out for constraints having an effective arity of two or less.

```
X := all variables in the CSP;
WHILE X ≠ ∅ DO
   Select and remove any variable x from X;
   Let icon be the values in the domain of x that are singleton arc inconsistent w.r.t. the neighbourhood of x;
   IF icon is equal to the domain of x THEN
      Return wipeout;
   ELIF icon ≠ ∅ THEN
      Remove values in icon from the domain of x;
      Make CSP arc consistent;
      IF CSP is inconsistent THEN
         Return wipeout;
      FI;
      Add neighbours of x to X;
   FI;
OD;
```

Fig. 4. Algorithm for enforcing weak singleton arc consistency

10 Results

This section presents some results of comparing the two solvers which were submitted to the CPAI solver competition. Graphs in this section are best viewed/printed in colour.

We will use `wsac+mac` for the solver that enforces WSAC followed by maintain arc consistency and `mac` for the solver that maintains arc consistency. The experiments were carried out in `Linux` on a DELL LATITUDE D600 laptop having a 1600 MHz processor and having 500 MB of RAM. The maximum computation time was 600 seconds.

RLFAP Problems The RLFAP problems are described in [Cabon *et al.*, 1999]. Modified RLFAP problems are created from the original problems by removing some of the frequencies [Bessière *et al.*, 2001]. The solution time of the two solvers for the problems `rlfapModScens` is plotted in Figure 5. Enforcing WSAC followed by maintaining arc consistency is an overhead for these problems, which sometimes results in a solution time of up to four times more than that of maintaining arc consistency alone. For the `rlfapGraph` problems `wsac+mac` sometimes requires up to ten times more time than `mac`. For `rlfapModGraphs` the results are similar to the results for `rlfapModScens`. For `rlfapScens11` both solvers perform about equally well.

Quasigroup Problems with Holes Binary quasigroup problems with holes [Boussemart *et al.*, 2004b] have become popular for evaluating constraint satisfaction algorithms. The solution time of the solvers for problems `bqwh18-141-84` is plotted in Figure 6. As can be seen from Figure 6, `mac` and `wsac+mac` perform about equally well.

Forced Random Binary Problems Forced random binary problems are artificial problems which are designed to be difficult, random, but small [Xu *et al.*, 2005]. Figure 7 depicts the solution time for solving problem classes `frb30-15`, `frb35-17`, `frb40-19`, and `frb45-21`. Both `mac` and `wsac+mac` solve these problems about equally efficiently. Both solvers visit the same number of nodes and solve all problems except for `frb45-21-1-bis`. Except for a single problem instance, solving `frb50-23`, `frb56-25`, `frb53-24`, and `frb59-26` proved impossible.

Geometric Problems Figure 8 depicts the solution time for the geometric problems, which originate from Rick Wallace. These problems combine structure and randomness. All but the last eight problems are satisfiable. Overall `wsac+mac` and `mac` perform about equally well.

3-SAT Problems The `ehi` problems consist of two sets of 100 unsatisfiable 3-SAT instances converted to binary CSP instances using the dual method [Bacchus, 2000]. All these problems are unsatisfiable. Figure 9 depicts the solution time with `mac` and `wsac+mac` for problems from the class `ehi-90`. It is clear that `mac` requires significantly more time on average that `wsac+mac`. The reason why `wsac+mac` performes so well for these problems is that WSAC is a decission procedure for the unsatisfiability of any `ehi-90`-instance. The results for `ehi-85` are similar, except that they are solved using less time.

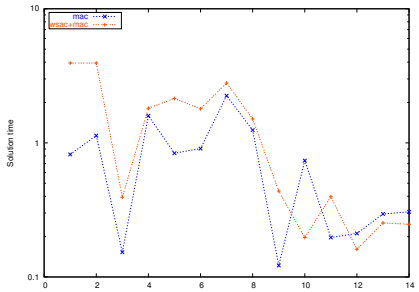

Fig. 5. Solution time in seconds for solving modified RLFAP problems `rlfapModScens`. All problems are solved to completion

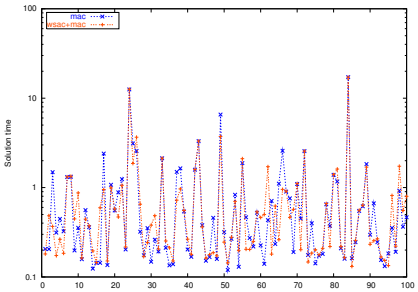

Fig. 6. Solution time in seconds for solving binary quasigroup problems with holes `bqwh-18-141`. All problems are satisfiable and solved to completion

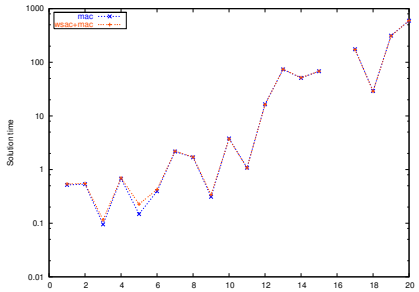

Fig. 7. Solution time in seconds for solving forced random binary problems `frb30-15`, `frb35-17`, `frb40-19`, and `frb45-21`. All problems are satisfiable but one cannot be solved within a time limit of 600 seconds

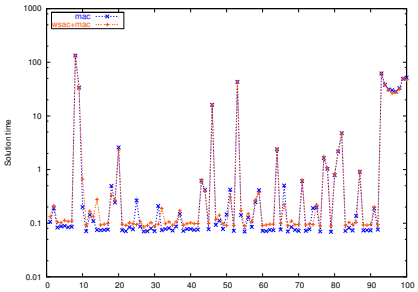

Fig. 8. Solution time in seconds for solving geometric problems. The last eight problems are unsatisfiable. All problems are solved to completion

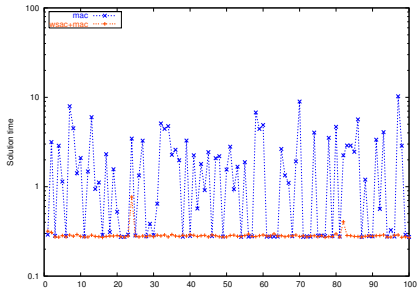

Fig. 9. Solution time in seconds for solving `ehi-90` problems. All problems are unsatisfiable and solved to completion

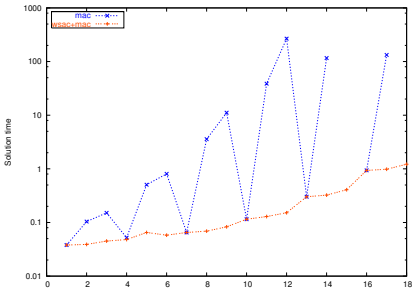

Fig. 10. Solution time in seconds for solving queens-knights problems `qk1`. All problems are unsatisfiable. Within a time limit of 600 seconds `mac` cannot solve two problems

Queens-Knights Problems The queens-knights problems are proposed in [Boussemart *et al.*, 2004b]. Each problem is a combination of an n-queens and a knight's-tour problem. All problems are unsatisfiable. Figure 5 depicts the solution time of the solvers for the problems `qk1`. For these problems too WSAC decides the unsatisfiablity of any `qk1`-instance. For all but one problems `wsac+mac` proves this within one second. For the remaining problem it requires slightly more than one second. This is in sharp contrast with `mac`, which cannot solve `qk_20_20_5_mul` and `qk_25_25_5_mul` within the time limit. For the other problems `mac` requires 50,927 nodes and 875,995,021 checks on average and this results into more solution time.

Summary Both `mac` and `wsac+mac` have their strengths and their weaknesses. For certain classes of problems enforcing WSAC before search translates into a penalty in terms of solution time when compared to maintaining arc consistency. However, using a 600 second time limit, enforcing `wsac+mac` always solved any of the problems that were considered which could be solved by `mac`. The converse was not always true. For certain problem classes the additional effort of enforcing WSAC paid of in terms of number of solved problems and solution time.

11 Conclusions and Future Work

This is work in progress. One of the weaknesses of `bordewijk` is that it does not use any constraint propagation algorithms for non-binary constraints. Adding such algorithms should improve its solving capabilities. The results for the solver that enforces weak singleton arc consistency (WSAC) before starting search are promising. It should be interesting to further investigating the use of WSAC.

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Translating CSP to SMV and then to SAT for the CSP'05 Competition

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Abstract. The CSP table file format used by the CSP'05 competition allows a straightforward translation into the input format of the SMV model checker. For bounded model checking many translators of SMV models into CNF exist. This allows the application of SAT solvers to these CSP problems.

Introduction

The table file format used by the CSP'05 competition forces relations to be specified explicitly. Either the relation is approximated from above by listing combinations of arguments for which the relation is not supposed to hold, or it is approximated from below, by listing all the valid combinations of arguments. Furthermore domains consist of finite sets of integers. This explicit representation allows an easy translation from CSP problems in the table format into modelling languages supporting enumeration types over integers. This includes the input language of the SMV model checker [7], which is one of the most widely used input languages for symbolic model checking and goes back to the original work on symbolic model checking [7]. Several academic and industrial tools exist that work with this language. In general, the main application is model checking which involves state space exploration of interacting state machines described by modules. In the context of this work only the static part of the SMV input language is used.

CSP2SMV

Constraints in the table format are instantiations of relations over finite sets of integers. Since the SMV input format [7] allows arbitrary instantiations of modules it is natural to translate each relation of the table format into one SMV module. This is a common pattern for SMV models, since SMV does not support structured types, but a module without state information can be used for the same purpose. Therefore the translation of the constraint part of the CSP problem is linear.

As running example, consider the following 3-Queens CSP problem in table format:

```
3queens
1
0 3 1 2 3
```

```
3
0 0
1 0
2 0
2
0 0 2 0 0  7  1 1  1 2  2 2  2 1  2 3  3 3  3 2
1 0 2 0 0  5  1 1  1 3  2 2  3 3  3 1
3
2 0 1 0
2 0 2 1
2 1 2 0
```

The table format allows sharing of domains, which implies that common domains of variables only need to be specified once. In principle this could also be achieved in the SMV model by again defining a single module for each domain. In order to simplify our CSP to SMV translator, we copy each domain when specifying a variable. This may result in a quadratically larger variable declaration part in the SMV model, if many variables share the same domain. The translation by `csp2smv` results in the following SMV model:

```
MODULE rel0(p0,p1)
INIT !(p0=1&p1=1 | p0=1&p1=2 | p0=2&p1=2 | p0=2&p1=1 |
       p0=2&p1=3 | p0=3&p1=3 | p0=3&p1=2)
MODULE rel1(p0,p1)
INIT !(p0=1&p1=1 | p0=1&p1=3 | p0=2&p1=2 | p0=3&p1=3 |
       p0=3&p1=1)
MODULE main
VAR
x0 : {1,2,3};
x1 : {1,2,3};
x2 : {1,2,3};
VAR
c0 : rel0(x0,x1);
c1 : rel1(x0,x2);
c2 : rel0(x1,x2);
SPEC 0
```

The relations 1 and 2 of the table format are represented by the modules `rel0` and `rel1` respectively and are encoded as initial state constraints. In this particular example the relations are approximated from above. A relation approximated from below would result in a similar initial state constraint without negation ('`!`'). The domains for the variables in the SMV program are not shared. The constraints are represented by multiple instantiations of corresponding relation modules with appropriate variables as arguments. Finally, the specification `SPEC 0` is only valid if the original CSP problem can not be satisfied. A counter example to the SMV specification gives a satisfying assignment for the original CSP problem.

SMV2SAT

Beginning with the original bounded model checking encoder [5], we have been working on various translators for bounded model checking of SMV models. The translator we use for the CSP'05 competition is based on the flattener and boolean encoder SMVFlatten [2] and the CNF encoder LiMC, which uses the FlatSMV library [1] to read flat boolean SMV programs and produce word level counter example traces in terms of the original finite domain variables if an assignment satisfying the CNF of the backend SAT solver is found. As SAT backend we use our QBF solver Quantor [4] as preprocessor and hand the simplified CNF to the SAT solver CompSAT [3]. As the recent SAT'05 SAT solver competition showed, the performance of the employed version of CompSAT is close to the best state-of-the-art solvers,

If CompSAT finds a satisfying assignment, then it is first lifted to a full assignment of the unsimplified CNF by Quantor, which then in turn is used by LiMC to provide a word level counter example with the help of counter example generation procedures provided by FlatSMV. The output of LiMC almost matches the competition requirements. For the above example with default simplification level the following boolean and flat SMV model is generated by SMVFlatten:

```
MODULE main
VAR
  x0@1 : boolean; --TYPE-- 1..3
  x0@0 : boolean;
  x1@1 : boolean; --TYPE-- 1..3
  x1@0 : boolean;
  x2@1 : boolean; --TYPE-- 1..3
  x2@0 : boolean;
DEFINE
  .MACRO0 := !x1@1 | x1@0;
  .MACRO1 := !x0@1 | x0@0;
  .MACRO2 := x2@1 | !x2@0;
  .MACRO3 := !x2@1 | x2@0;
INIT
  (x0@1 | (x1@1 | x0@0 & (!x0@0 | !x1@0) & (!x0@0 | x1@0)) &
    (!x0@0 | .MACRO0)) &
  (.MACRO0 | .MACRO1) &
  (.MACRO1 | x1@1 | !x1@0) &
  (x0@1 | (x0@0 | x2@0) & (!x0@0 | .MACRO2)) &
  (.MACRO1 | .MACRO3) &
  (.MACRO1 | x2@1 | x2@0) &
  (x1@1 | (x2@1 | x1@0 & (!x1@0 | !x2@0) & (!x1@0 | x2@0)) &
    (!x1@0 | .MACRO3)) &
  (.MACRO0 | .MACRO3) &
  (.MACRO0 | .MACRO2)
INVAR
  (!x0@1 | !x0@0) &
  (!x1@1 | !x1@0) &
  (!x2@1 | !x2@0)
SPEC
```

```
0
```

The result contains additional `INVAR` constraints, which restrict the binary encoded variable domains to three values. This is not necessarily the best way to encode finite domain relations into boolean logic. As in the design of digital circuits multiple alternatives exists. For instance using one boolean variable for each variable value combination, also called *one-hot encoding* in digital design, might be superior, but is not supported by our tool flow yet.

Unfortunately, it turns out that the default simplification level of SMVFlatten for many translated CSP problems is too expensive and we had to disable any simplification within SMVFlatten. This results in rather large and redundant CNF files, which however are effectively reduced by the CNF simplification techniques implemented in Quantor [4, 6]. Finally, our translator `csp2smv` does not handle negative integers, though the SMV modelling language supports them.

Conclusion

The whole tool flow is described by the following script:

```
#!/bin/sh
csp2smv | smvflatten -simp0 | limc --solver=quantor | \
awk -f smvcex2csp.awk
```

In the future we want to compare the binary encoding as provided by SMVFlatten with a direct one-hot encoding of the table format into CNF and also extend the tool flow to negative integers and arithmetic constraints. Another important direction is to use faster SAT solvers.

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EFC

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Abstract. We present EFC, a CSP solver written in C++ with the goal of flexibility in implementing new algorithms. We discuss its architecture and the major feature that has driven its development, generalized nogood learning. Nogood learning can greatly reduce the size of the explored search space, but care must be taken in the implementation so that the overhead does not eclipse these savings. Specifically, we show how to efficiently implement unit propagation and learning nogoods from constraint propagators.

1 Introduction

Most backtracking search algorithms can be described as a process of discovering and using nogoods [1]. Besides providing an interesting theoretical framework for dealing with these algorithms, this also allows us added flexibility in designing a CSP solver as a combination of components that produce or use nogoods. EFC is a solver written in C++ that has been designed this way, with the purpose of allowing maximum flexibility in the implementation of new algorithms. At the same time EFC implements the major features found in modern CSP solvers such as global constraints with specialized propagators and symmetry breaking.

One of the major motivations in the implementation of EFC was to support research on applying to CSP techniques currently used only in SAT solvers, chiefly the use of clause learning. Since clauses are the equivalent to nogoods, our aim is to show that similar gains can be achieved by extensive use of nogoods in CSP solving. During this research it was found that the notion of nogood as defined in the CSP literature actually corresponded to a limited form of clause which significantly restricts the power of nogood learning algorithms. As a result, a suitable generalization of nogoods was developed [3] to make them equivalent to unrestricted clauses and regain the advantages expected of nogoods. Here, we will first shortly describe how we generalized nogoods and then focus on the aspects of EFC most relevant to using them.

2 Generalized Nogoods

A standard nogood is a set of assignments that cannot be extended to a solution. An algorithm that discovers and learns nogoods can avoid visiting branches of the search

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tree that contain known nogoods, since the branches cannot lead to a solution. Knowing all possible nogoods would allow a solver to avoid all solution-free subtrees, arriving at a solution immediately. However, the number of nogoods in exponential in the size of the problem and deciding whether a given set of assignments is a nogood is coNP-hard. Thus, nogood learning algorithms typically restrict themselves to learning either *base* nogoods which are sets of assignments that directly violate a constraint, or new nogoods that arise from a process of resolving together previously learned nogoods.

Consider the constraint $X + Y < Z$ with $Dom[X] = Dom[Y] = \{0, 1, 2\}$, and $Dom[Z] = \{1, 2, 3\}$. This constraint is violated by the assignment set $A = \{X{=}0, Y{=}1, Z{=}1\}$, thus A is a nogood. It is also impossible to satisfy C if we assign $Z{=}1$ and at the same time prune 0 from the domain of X. However, this condition cannot be expressed as a standard nogood, as we haven't actually assigned a value to X.

We can generalize nogoods so that they can express such conditions by allowing nogoods to contain either assignments or non-assignments. Non-assignments correspond to pruned values—once the a is pruned from the domain of V we can no longer make the assignment $V{=}a$. With generalized nogoods we can then express the above condition with the set $\{X \neq 0, Z{=}1\}$.

It turns out that search with generalized nogood learning can be superpolynomially more powerful than search with standard nogood learning [3]. We note here two things about generalized nogoods. First they can compactly represent a possibly exponentially sized set of standard nogoods. For example, the above generalized nogood compactly captures the nogoods $\{X{=}1, Z{=}1\}$ and $\{X{=}2, Z{=}1\}$. When the generalized nogood contains multiple non-assignments the set of standard nogoods it covers grows exponentially. For example, if all of the variables $V_1, \ldots, V_{10}$ have domain $\{0, 1, 2, 3, 4, 5\}$, then the generalized nogood $\{X{=}1, V_1 \neq 0, \ldots V_{10} \neq 0\}$ captures $6^{10} - 1$ different standard nogoods. Second, a generalized nogood can prune paths in the search tree that the set of standard nogoods it captures cannot. For example, $\{X{=}1, V_1 \neq 0, \ldots V_{10} \neq 0\}$ can prune paths where none of the V_i have yet been assigned, while none of the $10^6 - 1$ standard nogoods it captures can be activated without instantiating all but one of its elements and then performing nogood propagation.

3 Algorithm

EFC is designed to allow the implementation of different algorithms using the same basic infrastructure. This is achieved by allowing the programmer to customize the behaviour of the algorithm by providing functions that are called during search in the form of policies for a generic main loop. Of interest in this context are the functions **propagate** and **resolve_conflicts**. To make this more conrete, consider the main loop of EFC, shown in table 1.

The function **EFC_MainLoop** in called with an argument of 1 initially. It uses a variable ordering heuristic to find a variable to instantiate and then iterates over all values in the current domain of that variable, assigning to it each one of them in turn. After making the assignment, it performs constraint and unit propagation. If no conflict has been found, it calls itself recursively to search the subtree at the current node. The recursive call can either return to level L, in which case it tries another value for

```
int EFC_MainLoop(Level)
1.  If all variables assigned, report solution and exit.
2.  choose next variable V.
3.  foreach d∈Dom(V) s.t. d is not pruned
4.    V= d
5.    propagate()
6.    if conflict
7.      btL = resolve_conflicts(Level)
8.      return btL
9.    elseif ((btL = EFC_MainLoop(Level+1)) < Level)
10.     undo(V= d) and return(btL)
11.   else undo(V= d)
```

Table 1. The main loop of EFC

V, or it can directly jump further back. If, however, a conflict is found, the function **resolve_conflicts** is called to discover new nogoods and possibly jump back. To implement an algorithm that does not perform any intelligent backtracking, we would simply implement **resolve_conflicts** as a function that always returns $Level-1$. It is more interesting to examine the specialization for a generalized nogood learning algorithm, which examines each conflict in turn and calls **resolve_single_conflict**, which implements the 1-Decision scheme [3]. Note that new nogoods will initially be true, therefore the call to **propagate** will make at least one (non-)assignment false. As a result there may be more unit propagations or constraint propagations and it is possible that more nogoods will be added to the list of conflicts during the loop.

```
int resolve_single_conflict(Ng)
1. NewNG = Ng
2. do
3.   X⇌a = deepest (non)-assignment in NewNG
4.   if X⇌a is not a decision assignment
5.     NewNG = NewNG ∪ (NG[a,X]−{X⇌a})
6.   until X⇌a is a decision assignment
7. record(Ng)
8. propagate()
9. return lvl(deepest (non)-assignment in NewNG)
```

Table 2. Resolving a single conflict

Propagation and nogoods It is not hard to see that an easy way to integrate unit propagation and GAC is to have a global constraint with high priority that performs UP. This way we do not need to complicate the rest of the implementation by interleaving UP

and GAC or with performance issues that arise from the fact that GAC is typically much slower than UP.

However, there are two issues in integrating nogood learning techniques and constraint propagation. The first is that for the function **resolve_single_conflict** to work, a nogood must be associated with every value pruning. Values can be pruned either by unit propagation of stored constraints or by enforcing GAC on constraints. In the first case, we simply store a pointer to the nogood that caused the unit propagation. In the second case, we can generate a generalized nogood as described in [3]. We store these nogoods only temporarily, because they may be used to generate other nogoods later (in resolve_single_conflict), but cannot cause any more prunings than enforcing GAC on the constraint. Furthermore, whenever a deadend is detected, at least one nogood must be identified that has become true, i.e. all its (non-)assignments have become true. In the case of unit propagation it is a matter of recording such nogoods as they are encountered. In the case of enforcing GAC, the propagator must identify a variable whose domain has been wiped out and choose its corresponding "must have a value" nogood as the one that has become true.

4 Unit propagation.

Recording one nogood for each conflict encountered means that the total number of nogoods recorded will be exponential in the size of the problem. This introduces two problems: first, that there will not be enough memory to store them; second, that the overhead of performing unit propagation on such a large number of nogoods will eliminate any search space pruning benefits.

The first concern is addressed by periodically pruning the nogood database. EFC simply discards a part of the database when it reaches a predefined maximum size. Because the database only grows linearly with the number of nodes visited, this will not occur too often.

The second concern is addressed by using the efficient data structures developed in SAT for unit propagation [4]. The storage of nogoods must be cache-friendly. As such, they are stored in continuous areas of memory. Each (non-)assignment is a pointer to the value it refers to. Because of the alignment requirements of modern processors, we are assured that some of the least significant bits of the pointers are always 0, so we utilise the least significant bit to indicate whether the pointee should be treated as an assignment or a non-assignment.

The solver must detect when a nogood has become unit. The obvious approach is to keep a counter of non-true assignments for each clause and a flag that indicates whether the nogood has become false. When that counter reaches 1 and the nogood is not false, the remaining assignment is forced to false. However, this has proven inefficient and the current technique used in modern SAT solvers is to maintain two watch assignments for each nogood. Each watch must be non-true. The solver ignores what happens to assignments that are not being watched. When a watch becomes true, a replacement is found. If none is available, the nogood has become unit and the remaining watch must be made false. The advantage of using watch assignments is twofold: first, less work must be done every time an assignment is made true, as we do not have to examine

each nogood it appears in; second, no work must be done on backtracking, as watches remain valid as assignments are undone.

EFC also improves on the watch literal techniques by choosing better watch literals. After it finds a suitable watch replacement, it keeps on searching to find a better watch. A watch w_2' is defined to be better than w_2 if w_2 is non-true but w_2' is false or if w_2 was made false at level k and w_2' was made false at level $k' < k$. This increases the average number of literals that need to be examined every time we process a nogood, but reduces the number of nogoods that need to be examined over the entire search.

In addition, if a nogood is reduced to a collection of non-assignments to the same variable, we immediately prune all other values from the variable's domain. For example, if we have reduced a nogood to the set $\{V \neq a, V \neq b, V \neq d\}$, where the domain of V is $\{a, b, c, d, e\}$, then we can immediately prune c and e from the domain of V (the original, unreduced, nogood is set as the reason for these prunings). [1] This is achieved by making sure that the assignments chosen for watches belong to different variables if possible. If it is not possible, then the nogood has been reduced to a single-variable nogood.

Competition constraints The constraint propagators for constraints that are defined either by conflicting tuples or supporting tuples is the same, a simplified version of GAC-Schema. To satisfy the requirements of the algorithm, however, the propagators need to be able to associate a nogood with each pruning. The standard method to do that, described in [5] reports a nogood that is the union of the reasons for all pruned values of variables in the constraint. These nogoods, however, are not effective: as the arity of the constraints increases, it is more and more likely that the nogoods reported will be saturated, i.e. they will contain all the assignments in the current prefix. Once again, we take advantage of the increased expressiveness of generalized nogoods. The reasons reported by EFC are the union of all the prunings of variables in the constraint *as non-assignments*. This is a significant improvement, as the reported nogoods are now always local to the constraint, thus capture the conflict better. Further, there is no issue of getting saturated nogoods, as that would require involving variables not in the constraint, which does not happen in this case. Empirical results in [3] suggest that this improvement is crucial in getting worthwhile results when learning generalized nogoods.

Variable ordering One area that has not yet been explored in EFC is the use of variable ordering heuristics that guide the search in order to maximize the benefit of the known nogoods. Currently, the DVO used is `dom+deg`, which chooses for instantiation the variable with the minimum current domain size and breaks ties by choosing the variable with maximum degree and assigns it its values in lexicographic order.

Availability. The source code for EFC can be downloaded at `http://www.cs.toronto.edu/~gkatsi/efc/`

[1] This corresponds to a Hyper-Binary resolution step [2] where we resolve the nogood against a set of "only-one value" nogoods. For example, we resolve $\{V \neq a, V \neq b, V \neq d\}$ against $\{V = e, V = a\}$, $\{V = e, V = b\}$, and $\{V = e, V = d\}$, to derive $V \neq e$. This case cannot be captured by simply unit propagating the implicit "must have a value" and "only-one-value" nogoods.

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CSP2SAT4J: A Simple CSP to SAT translator

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Abstract. SAT solvers can now handle very large SAT instances. As a consequence, many translations into SAT have been shown successful in recent years: Planning and Bounded Model Checking are two examples of applications in which SAT engines are reported to be as good as or even better than dedicated software.
The idea of CSP2SAT4J is to see how a SAT solver could compete against a CSP solver. The translation from CSP to SAT is very basic, and the SAT solver used is not the fastest available, but it has the good property to handle cardinality constraints, which minimises the number of constraints used in the translation. The results obtained by the solver should provide an idea about the efficiency of a "brute force" translation from CSP into SAT.

1 Introduction

The SATisfiability problem (SAT) gained interest from the industry a few years ago when SAT solvers where used to solve Bounded Model Checking problems [4] instead of BDDs. That interest pushed people to design solvers for those particular types of problems.

One of the particularities of those benchmarks is their size: they are"huge" compared to the classical pathological pigeon hole or random k-SAT problems. One of the consequence of having a huge input problem is that algorithmic becomes even more important. That observation was the origin of the design of the head-tail lazy data structure in SATO, and the Watched Literals in Chaff [13, 23].

Another particularity of SAT instances coming from BMC, or more generally practical problems translated into SAT compared to the seminal 3-CNF instances is the lack of real characterisation of those SAT instances: while the theory around 3-CNF allows to build powerful heuristics-based SAT solvers for 3-SAT (TABLEAU, CSAT, POSIT, SATZ, CNFS, etc), non-chronological backtracking and learning looks like the best approach to tackle SAT-encoded problems (SATO,RELSAT,GRASP). Note that usually non-chronological backtracking and learning is useless if the heuristics is good enough, which explains why solvers using those techniques are outperformed on random 3-SAT instances by

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heuristics based solvers. On the other hand, non-chronological backtracking can repair mistakes made by the heuristics by analysing conflicts.

Furthermore, all the parts of a SAT solver received a huge interest from both an algorithmic and an implementation point of view so current SAT solvers are now heavily tuned and they should not be considered as prototype software but rather as production software.

In the rest of the paper, we first describe how our SAT library follows the current trend to generalise SAT solvers to handle constraints more general than clauses. Then we explain the basic CSP to SAT encoding used in our solver and provide some experimental results taken from the SAT and CSP competitions. Finally, we propose some improvements to our solver performed after the submission to the competition.

2 From clauses to more general constraints

Researchers are pushing the limit beyond SAT: Quantified Boolean Formulas (QBF) and Stochastic SATisfiability (SSAT) for instance are two extensions of SAT being studied recently. Another extension of SAT received some attention a decade ago: using pseudo boolean constraints instead of plain clauses [1, 2]. Most of the solvers for those extensions to SAT are developed using techniques that were demonstrated powerful for SAT. Those solvers in the early 90s were based on DPLL[7, 6] while the solvers developed today are often related to Chaff-like solvers.

This is especially true for pseudo boolean solvers: Barth first developed a DPLL version of a pseudo boolean solver [2]. Walser [21] and later Prestwich [15, 16] developed local search or hybrid pseudo boolean solvers. Aloul et al [19] developed a version of Chaff handling pseudo boolean constraints instead of clauses as input, plus symmetry breaking predicates, with clause learning (same thing for the recent MiniSAT [8]). Dixon and Ginsberg[10] developed a pseudo boolean version of Relsat (PRS), which was the first pseudo boolean solver including true pseudo boolean learning. They developed a pseudo boolean version of Chaff (PBChaff[11]) in the same spirit while Chai and Kuehlmann [5] did extended all Chaff techniques (learning scheme and data structures) in the pseudo boolean solver Galena. Recent work from Dixon et al [14] describe a generic conflict driven constraint learning solver based on group theory while Thiffault et al [20] describe a conflict driven clause learning solver working with arbitrary boolean gates.

Very recently, the translation from pseudo boolean into SAT was shown competitive and sometimes better than dedicated solvers during the PB05 evaluation [17].

SAT4J uses some principles taken from both Chai and Kuehlmann and Dixon to allow his solver to use cutting planes instead of resolution when using linear pseudo boolean constraints. As a result, the solver can solve in linear time problems such as the pigeon hole when they are expressed by linear pseudo boolean constraints, which is not possible with a solver based only on resolution. How-

ever, from our experience, using cutting planes reasoning might not be in practice the best way to extend current SAT solvers to design efficient pseudo boolean solvers [12].

3 From CSP to SAT

The translation from CSP to SAT is very basic, and is called "direct encoding" in [22]. The only difference is that we use a single cardinality constraint instead of using binary clauses to express that no more than one value can be chosen. The translator takes the textual "table" representation of the problem as input and outputs a set of constraints (mixing clauses and cardinality constraints) to feed our extended SAT solver.

Variables For each variable $v_i \in V$, and each domain value $d_j \in Domain(v_i)$, a propositional variable $p_{i,j}$ is created.

Domains For each variable $v_i \in V$, a cardinality constraint denotes that only one value from the domain can be chosen: $\sum_x p_{i,x} = 1$.

Forbidden tuples (nogoods) Each tuple representing a forbidden combination of values is represented by a propositional clause composed by the negation of the propositional variables representing those values. So the length of the generated clause is the arity of the constraint. Note that in case of binary constraints, binary clauses will be generated.

Allowed tuples (supports) When a relation is represented by allowed tuples, we deduce all the forbidden tuples and translate them into clauses as described above.

The main drawback of that translation is the translation of the allowed tuples. It can take a lot of time to generate them when the arity of the constraint increases.

4 The SAT solver

The backend SAT solver is a common Chaff-Like solver, able to manage efficiently a huge number of variables and clauses. The solver is based on the MiniSAT specification [8]. The specific implementation we use is based on the SAT4J library [3], a library of SAT solvers in Java.

The solver can handle clauses but also cardinality constraints and the more general case of pseudo-boolean constraints as stated above. Note that the solver does not use cutting planes as inference rule but simple resolution: as a consequence, the benefit of using cardinality constraints is only to reduce the number of constraints to deal with.

A specific data structure proposed by Lawrence Ryan [18] is used to handle binary clauses because the translation is likely to produce many of them.

5 Example

```
3queens
1                   /* only one domain */
0 3 1 2 3      /* with 3 values */
3                   /* 3 variables */
0 0   /* values will map to   v01 v02 v03 */
1 0   /* values will map to   v10 v12 v23 */
2 0   /* values will map to   v20 v12 v23 */
2     /* 2 relations defining forbidden tuples */
0 0 2 0 0 7  11  12   22  21  23  33  32
1 0 2 0 0 5  11  13   22  33  31
3
2 0 1 0
2 0 1 1
2 1 2 0
```

From the definition of the variables we produce 3 cardinality constraints: $v_{01} + v_{02} + v_{03} = 1, v_{11} + v_{12} + v_{13} = 1, v_{21} + v_{22} + v_{23} = 1$.

From the first constraint we produce 9 binary clauses: $\neg v_{01} \vee \neg v_{11}, \neg v_{01} \vee \neg v_{12}, \neg v_{02} \vee \neg v_{12}, \neg v_{02} \vee \neg v_{11}, \neg v_{02} \vee \neg v_{13}, \neg v_{03} \vee \neg v_{13}, \neg v_{03} \vee \neg v_{12}$

From the constraint we produce 5 binary clauses: $\neg v_{01} \vee \neg v_{11}, \neg v_{01} \vee \neg v_{13}, \neg v_{02} \vee \neg v_{12}, \neg v_{03} \vee \neg v_{13}, \neg v_{03} \vee \neg v_{11}$

From the third constraint we produce 9 binary clauses: $\neg v_{11} \vee \neg v_{21}, \neg v_{11} \vee \neg v_{22}, \neg v_{12} \vee \neg v_{22}, \neg v_{12} \vee \neg v_{21}, \neg v_{12} \vee \neg v_{23}, \neg v_{13} \vee \neg v_{23}, \neg v_{13} \vee \neg v_{22}$

6 A few experimental results

Here are the results both in number of benchmarks solved and CPU time **in the industrial category** of the solver MiniLearning2 as submitted to the SAT 2005 competition, compared to the winner SatELite, the latest version of MiniSAT, the famous zChaff and the very efficient Siege[1].

	MiniLearning2	zChaff	Siege	MiniSat	SatELite
Instances solved (/296)	**180**	197	250	250	267
CPU time (in s)	**1 506 298**	1 444 447	878 618	807 385	592 777

Note that the latest version of MiniLearning2, as submitted to the CSP competition, contains some improvements proposed in the latest MiniSat added after the SAT 2005 competition. That new version solved 200 benchmarks (instead of 180) under the SAT competition conditions (same computers). So the solver should be considered comparable to zChaff.

[1] See `http://www.satcompetition.org/2005/` for details.

The CSP translator was not tested on CSP benchmarks before the CSP competition. As a consequence, we reproduce here some partial results obtained during the CSP competition[2]. We focus on some families of benchmarks that were not solved by all the top solvers.

Family name	# instances	# solved	maximum solved
QCP-20	5	5	5
QCP-25-easy	3	1	1
QCP-25-hard	9	3	3
QCP-25	5	3	3
QWH-25-hard	11	11	11
cril	5	2	5
domino1	10	5	10
fapp01	11	4	11
fapp02	11	0	11
geom	100	84	100
hanoi1	5	3	5
marc	10	0	10
pigeons	20	5	9
qk1	18	0	18

The first surprise is that our solver performs reasonably on most benchmarks. On some families, the top ones in the table, our solver was among the best solvers. Note that for 8 instances from QCP and QWH families, our solver was the only one able to conquer them.

On other families, such as fapp*, the instances are huge so the translation of the allowed tuples into clauses takes a lot of time. And a lot of memory is needed to keep generated forbidden tuples. In that case, it is unlikely that a translation into SAT can be really effective.

For the remaining families, the encoding looks like one of the issue. We already addressed that issue in our new version of the solver.

7 Possible and real improvements

The constraint $\sum_x p_{i,x} = 1$ used to pick exactly one value from a domain is represented in the solver by two cardinality constraints, namely $\sum_x p_{i,x} \leq 1$ and $\sum_x p_{i,x} \geq 1$ because the solver only manages normalized constraints of the form $\sum_x p_{i,x} \geq d$ where d is the degree of the constraint. It might be better to use a specific kind of constraint to manage it.

The translation of relations expressed by allowed tuples may result in a huge number of clauses. Even if SAT solvers are able to handle millions of clauses nowadays, the time needed to generate them is a problem (quadratic for binary constraints). We can use the "support" encoding proposed by [9] as an alternative for **binary constraints**.

[2] Many thanks to Marc van Dongen and Deepak Mehta for organizing the event and providing us intermediate results on demand.

We implemented it in our framework. Some of the problems that were hard for the direct encoding became easier with the support encoding. The following table provides a comparison of the solving time (in seconds) between the direct encoding and the support encoding on hanoi1 benchmarks, on an iBook G4 1.2GHz with 768 MB of RAM running Mac Os 10.4.2 with Java 1.5.0_02. The translation time of the direct encoding is provided as well.

	Direct	translation time	Support
hanoi3	1	<1	1
hanoi4	18	1	2
hanoi5	731	33	2
hanoi6	-	1840	7
hanoi7	-	-	22

Fig. 1. The - denotes that the solver was not able to answer in reasonable time.

Furthermore, on qk1 benchmarks on which the direct encoding performed badly during the competition (none of the 18 instances solved), all of them are found unsatisfiable in a total time of 1mn47s with the support encoding.

Unfortunately, the support encoding only works for binary constraints. We do not have any solution for improving the representation of n-ary constraints yet.

8 Conclusion

We submitted a brute force SAT-based CSP solver to the CSP competition. The SAT to CSP encoding is the simplest possible (so-called "direct encoding"). The solver did not solve any other CSP benchmarks than the ones needed to check the translator before the CSP competition. Many parts of the translator code needed some improvements. The backend SAT solver is not the fastest available. Nevertheless, at the time of this writing, our solver is among the top solvers on CSP benchmarks with binary constraints.

After those promising results, we took a closer look to our translator and improved it in two ways:

SAT encoding Using the support encoding instead of the direct encoding for allowed tuples does improve the behavior of the solver on many benchmarks (hanoi,qk1, etc).

Programming We improved the memory management to speed up the translation into SAT and we improved the SAT to CSP decoding as well.

As a consequence, we believe that our SAT-based solver is currently among the state-of-the-art CSP solvers for CSP problems with binary constraints given

in extension. Since the solver is freely available from `www.sat4j.org`, we encourage people to use our solver for the evaluation of new CSP techniques.

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Abscon 2005

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Abstract. This paper describes the algorithms, heuristics and strategies used by the two solvers which have been elaborated from the *Abscon* platform and submitted to the first CSP solver competition. Both solvers maintain arc consistency during search, explore the search space using a conflict-directed variable ordering heuristic and integrate a restart strategy. At preprocessing, the first solver establishes arc consistency whereas the second one establishes a partial form of a consistency which is stronger than singleton arc consistency.

1 Introduction

A constraint network is simply composed of a set of variables and a set of constraints. Finding a solution to a constraint network involves assigning a value to each variable such that all constraints are satisfied. The Constraint Satisfaction Problem (CSP) is the task to determine whether or not a given constraint network, also called CSP instance, is satisfiable (i.e. admits a solution).

A CSP solver is a program which deals with satisfiability of CSP instances. It is said complete when it can prove that an instance is either satisfiable or unsatisfiable. Most of the CSP solvers are composed of two main components: Inference and Search. Inference is used to transform an instance into an equivalent form which is simpler than the original one while search is used to traverse the search space of the instance in order to find a solution. For (most of the) complete CSP solvers, it respectively corresponds to constraint propagation and depth-first search with backtracking guided by some heuristics.

In this document, we quickly introduce constraint propagation (Section 2), search heuristics (Section 3) and restart strategies (Section 4) before presenting the main implementation details of the two solvers that we have presented at the first CSP solver competition (Section 5).

2 Constraint Propagation

Many works in the area of Constraint Programming have focused on inference, and more precisely, on filtering methods based on properties of constraint networks. The idea is to exploit such properties in order to identify some no-goods

where a no-good corresponds to a partial assignment (i.e. a set of variable assignments) that can not lead to any solution. Properties that allow identifying no-goods of size 1 are called domain filtering consistencies [9]. The interest of exploiting domain filtering consistencies is that it is quite easy to deal with no-goods of size 1. Indeed, as such no-goods correspond to inconsistent values, it suffices to remove them from domains of variables.

Arc consistency (AC) is one domain filtering consistency which guarantees that each value admits at least a support in each constraint. AC remains a fundamental property of constraint networks as MAC, i.e. the algorithm which maintains AC during search, is still considered as one of the most efficient complete approach to solve CSP instances. Recent works have shown that there exist promising alternatives to AC, namely, max-restricted path consistency (Max-RPC) [7] and singleton arc consistency (SAC) [8]. Max-RPC and SAC are domain filtering consistencies that are stronger than AC, that is to say, they allow identifying more inconsistent values than AC does. Max-RPC holds when all values have at least one path consistent support on each constraint whereas SAC holds when the constraint network can be made arc consistent after any variable assignment. It can be useful to establish Max-RPC or SAC at pre-processing time (i.e. before search) [20, 9], but it seems that maintaining such a strong consistency during search do require some control about the effort performed at each step.

3 Search heuristics

The order in which variables are assigned by a backtracking search algorithm such as MAC has been recognized as a key issue for a long time. Using different variable ordering heuristics to solve a CSP can lead to drastically different results in terms of efficiency. Traditional dynamic variable ordering heuristics benefit from information about the current state of the search such as current domain sizes and current variable degrees. For instance, *dom/ddeg* [2] involves selecting first the variable with the smallest ratio current domain size to current dynamic degree. One limitation of this approach is that no information about previous states of the search is exploited.

In [3], inspired from [19, 21, 17, 22, 6], it is proposed to record such information by associating a counter with any constraint of the problem. These counters are used as constraint weighting. Whenever a constraint is shown to be unsatisfied (during the constraint propagation process), its weight is incremented by 1. Using these counters, it is possible to define a new variable ordering heuristic, denoted *wdeg*, that gives an evaluation called weighted degree of any variable. The weighted degree of a variable V corresponds to the sum of the weights of the constraints involving V and at least another uninstantiated variable. In order to benefit, at the beginning of the search, from relevant information about current variable degrees, all counters are initially set to 1. Finally, combining weighted degrees and domain sizes yields *dom/wdeg*, an heuristic that selects first the variable with the smallest ratio current domain size to current weighted degree.

The experimental results of [3, 14] show that MAC-*wdeg* and MAC-*dom*/*wdeg*, i.e., MAC combined with *wdeg* or *dom*/*wdeg* (called conflict-directed heuristics), is a generic backtracking approach which is quite stable to solve static constraint networks.

Value-ordering heuristics have received less attention than variable ordering heuristics. Apart from *lexico*, *mc* [10] (see also [18, 11]) is certainly the most employed heuristic. It involves selecting the value which has the highest number of compatible values in the domains of other variables.

4 Restarts

In [12], Gomez et al. have shown that runtime distributions of backtrack search algorithms exhibit on some instances a large variability in performance and are characterized by heavy tails. They also show that it is possible to boost search by introducing randomization and restarts. The principle is that if the search algorithm does not terminate within some number of backtracks (or any other related criterion), referred as the cutoff, the current run is stopped and a new run is started. Introducing randomization allows that runs behave differently. It can be used when breaking ties of variables to be selected, for example, and initialized with a random seed associated with each run. It is important to note that the cutoff value can be updated from one run to the next one. In particular, when it is systematically increased, the backtrack search algorithm becomes complete.

Using weighted degrees of variables is an alternative to randomization. Indeed, it suffices to keep the weighted degrees from one run to the next one. When restarting, one can expect to solve the instance with more facility when the hard part of the instance, i.e. the back-door, do correspond to variables with highest weighted degrees.

5 Abscon

Abscon is a constraint programming platform which has been developed in Java (J2SE 5.0). The main interest of Java is that it renders easy, quick and robust development. The main drawback is that the runtime of a Java program is usually slow.

5.1 Submitted solvers

We have submitted two solvers, called *Abscon*1 and *Abscon*2, to the first CSP solver competition. This competition is part of the CPAI'05 workshop which is held in conjunction with CP'05. Both solvers can tackle binary and non binary instances.

At preprocessing stage, *Abscon*1 establishes AC (called GAC when instances involve non binary constraints). The algorithm that we have used to establish (G)AC is the coarse-grained algorithm (G)AC3.2 [13] with a variable-oriented

propagation scheme [4] and *dom* as a revision ordering heuristic [4]. We have not used the promising variant (G)AC3.2^{R1} [5] which allows avoiding useless revisions as, due to lack of time, we have not tested its impact on large series of instances.

At preprocessing stage, *Abscon*2 establishes a limited form of SPACE (note that when the number of values in one instance is too large, i.e. greater than 50000, AC is established at preprocessing stage instead of SPACE). SPACE is an extension of SPAC (Singleton Propagated Arc Consistency) [1] which is itself an extension of SAC. SPACE allows removing no-goods of size 2. More precisely, let us consider (G)AC established after performing a variable assignment (X,a). If a domain wipeout occurs, then a corresponds to an inconsistent value which can be removed from the domain of X. Otherwise, some inconsistent pairs of values can be detected. For example, if b has been removed from the domain of Y then we know that $((X,a),(Y,b))$ is a no-good. In our implementation, we have considered all variable assignments in turn (in a single pass), established (G)AC and removed inconsistent values as well as inconsistent pairs of values from existing relations. More information can be found in [15]. Remark that establishing SAC at preprocessing stage using an algorithm such as SAC-3 [16] is an alternative that could have been proposed.

At search stage, both solvers maintain (G)AC3.2 and use binary branching. At each node of the tree, two alternatives are tried: the first one corresponds to an assignment while the second one corresponds to the refutation of the assignment. The variable ordering heuristic that has been used is *dom/wdeg*. The value ordering heuristic that have been used is a static variant of *mc*. It means that an ordering of values is computed for each variable before search. A mechanism of restarts has been used. Whatever the instance, the cutoff value is initially set to 20 backtracks and is increased at each new run by 50%. From one run to the next one, weighted degrees are not reinitialized.

It is important to note that the algorithm (G)AC3 is used instead of (G)AC3.2 when the instance is considered as too large (i.e. when the loaded file has a size greater than 10Mbytes or the number of values is greater than 200000).

5.2 Representation of a constraint network

In *Abscon*, any domain composed of d values requires 4 arrays of size d to be represented. The first one is an array of integers which allows determining if a given value is currently present in the domain, and if it is not the case, at which level of the search it has been removed. The second (third) one is an array of integers which allows reaching in O(1) the smallest (greatest) value of the current domain which is strictly greater (smaller) than a given value. The fourth one is an array of integers which allows reaching in O(1) the oldest removed value different from a given value.

In *Abscon*, any constraint which is defined in extension is represented by using a multidimensional array of booleans whose dimension corresponds to the arity of the constraint. However, if the arity of the constraint is too large (> 4)

or if the number of elements of the array is too large (> 50000), the constraint is simply represented by using a list of allowed or unallowed tuples.

5.3 Performance issue

We do have to admit that *Abscon* is quite slow. We have identified the following reasons.

- It is well known that Java is slow compared to languages such as C/C++. In particular, Java is slow to start as some libraries are unzipped and some classes loaded, and slow to execute since byte-code must be interpreted.
- We do not search to optimize the code at any price as we try to preserve simplicity and generality. *Abscon* is conceived to deal with instances involving constraints of any arity. It means for example that for binary constraints, a constraint check is always performed on the basis of a tuple (array) instead of a simple value.
- For the competition, we have used the Java command line option -server. This option extends the amount of analysis that is done at startup time in order to perform some optimizations. This option allows improving performances when the program is sufficiently long to execute. However, for a program whose runtime is short, it is penalizing.

6 Conclusion

In this paper, we have described the main implementation details of the two solvers that we have submitted to the first CSP solver competition. Although these solvers will certainly not be the quickest ones, we believe that they should have a stable and robust behaviour.

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Description of the Solver BSol

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Abstract. Constraint Satisfaction Problems (CSPs) are pervasive in Artificial Intelligence. In this paper, we shall describe some aspects of the solver, so-called *BSol*, submitted for the first CSP solver competition, as part of the CPAI'05 (Constraint Programming And Implementation) workshop, which is held in conjunction with CP'05. This paper describes the basic algorithms, heuristics and a few important data structures used by *BSol*.

1 Introduction

Constraint Satisfaction Problems (CSPs) are pervasive in Artificial Intelligence. They involve assigning values to variables such that they satisfy all constraints among them. The worst-case time complexity of finding a solution for a CSP is exponential *i.e.* d^n, where d is the maximum domain size and n is the number of variables. Nevertheless, many algorithms and heuristics have been developed to find the solution effectively.

This paper describes some aspects of the solver, so-called *BSol*, submitted for the CSP solver competition, as part of the CPAI'05 (Constraint Programming And Implementation) workshop, which is held in conjunction with CP'05. More specifically, it describes the basic algorithms, heuristics and a few important data structures used by *BSol*.

The experimental solver, *BSol*, is written in C and is designed to run on a linux machine. It is divided into many modules. The compiler *gcc* is required to compile the modules and to link them during execution. Currently, the solver only allows to solve binary constraint satisfaction problems, where the constraints involve two variables. For the purpose of the competition, the solver, *BSol*, assumes that the input CSP is represented in the table format[1]. The solver further assumes that the constraints are represented as extensional relations (consisting of a list of the valid/invalid combinations of values for a pair of variables) defined over numeric domains.

The basic search algorithm employed in *BSol* to solve CSPs is a systematic backtrack algorithm MAC [10] (k-way branching). Before starting search, MAC transforms the input CSP to its arc-consistent equivalent. The search process involves repeated selection of an unassigned variable, assigning a value from its domain, and making the sub-problem arc-consistent or backtracking in case of failure, until a solution is found or all possible sets of assignments have been tried. Efforts have been made to use the heuristics and algorithms which are efficient and at the same do not require costly data structures and heavy maintenance to allow *BSol* to solve CSPs efficiently.

[1] http://cpai.ucc.ie/05/table.html

The remainder of this paper is organised as follows: Section 2 describes the background information and the notations used in the rest of the paper. Section 3 describes the variable ordering heuristic used by *BSol*. Section 4 explains the value ordering heuristic employed by *BSol* which is used to select a value from the domain of a variable to instantiate the selected variable. Section 5 explains the arc consistency algorithm implemented in *BSol* which helps to reduce the search space of constraint satisfaction problems. Section 5 explains the pseudo-code of the search algorithm of *BSol*. Conclusion and possible future work is presented in Section 7.

2 Preliminaries

A *Constraint Satisfaction Problem* is defined as a set $\mathcal{V}$ of n variables, a non-empty domain $D(x)$ for each variable $x \in \mathcal{V}$ and a set of e constraints among subsets of variables of $\mathcal{V}$. A binary constraint C_{xy} between variables x and y is a subset of the Cartesian product of $D(x)$ and $D(y)$ that specifies the allowed pairs of values for x and y. We only consider CSPs whose constraints are binary. A *solution* is an assignment of values to all the variables such that no constraint is violated. A problem is said to be satisfiable (or consistent) if it has a solution, and unsatisfiable otherwise.

A value $b \in D(y)$ is called a *support* for $a \in D(x)$ if $(a, b) \in C_{xy}$. Similarly $a \in D(x)$ is called a support for $b \in D(y)$ if $(a, b) \in C_{xy}$. A *support check* (consistency check) is a test to find if two values support each other. The *support count* of $a \in D(x)$ with respect to y, is the number of values in the domain of y supporting a. A value $a \in D(x)$ is called *viable* if for every variable y constraining x the value a is supported by some value in $D(y)$. A CSP is called *arc-consistent* if for every variable $x \in \mathcal{V}$, each value $a \in D(x)$ is viable.

Before starting search *BSol* transforms the input CSP to its arc-consistent equivalent. We call the domain of a variable in this arc-consistent equivalent the *arc-consistent* domain of that variable. For the remainder of this paper for any variable x, we use $D_o(x)$ for the original domain of x, $D_{ac}(x)$ for the arc-consistent domain of x, and $D(x)$ for the current domain of x. The *degree* of a variable is the number of constraints involving that variable. The *directed constraint graph* of a given CSP is a directed graph having an arc (x, y) for each combination of two mutually constraining variables x and y. We will use G to denote the directed constraint graph of the input CSP.

We shall use the notation proposed in [11] for describing and composing heuristics for selecting variables and arcs. Let $\delta_o(v)$ be the original degree of v, let $\delta_c(v)$ be the current degree of v, let $\delta_w(v)$ be the weighted degree [2] of v, let $\#(v)$ be a unique number for v, and let $s(v)$ be the current domain size of v. Finally, let $\pi_i((v_1, \ldots, v_n)) = v_i$ denote the *i-th projection operator*. The *composition* of order $\preceq_2$ and linear quasi-order $\preceq_1$ is denoted by $\preceq_2 \bullet \preceq_1$. Selection is done using $\preceq_1$ and ties are broken using $\preceq_2$. Composition associates to the left. The result of *lifting* linear quasi-order $\preceq$ and function *f* is denoted $\otimes^f_{\preceq}$. It is the linear quasi-order such that $v \otimes^f_{\preceq} w$ if and only if $f(v) \preceq f(w)$. For example, using this notation the dom/deg variable ordering heuristic with a lexicographical tie breaker can be described as $\otimes^{\#}_{\leq} \bullet \otimes^f_{\leq}$, where $f(v) = s(v)/\delta_c(v)$. The lexicographical arc selection heuristic can be described as $\otimes^{\#\circ\pi_2}_{\leq} \bullet \otimes^{\#\circ\pi_1}_{\geq}$. The reader is referred to [11] for more examples and further details.

3 Variable Ordering Heuristic

It is well-known that the order in which variables are instantiated can make a significant difference in the effort required to solve a problem. Conflict-directed heuristics have been shown very stable and efficient when used with MAC algorithms in [2, 4]. They learn from encountered failures to exploit locally inconsistent or hard part of CSPs as soon as possible.

The solver *BSol* uses a conflict-directed variable ordering heuristic *dom/wdeg* [2], where *dom* is the domain size and *wdeg* is the weighted degree of a variable with a lexicographical tie breaker. Using the notations, as explained in Section 2, this heuristic can be described as $\otimes^{\#}_{\leq} \bullet \otimes^{f}_{\leq}$, where $f(v) = s(v)/\delta_w(v)$. Weighted degree of a variable x can be defined as follows:

$$x_{wdeg} = \sum_{(x,y) \in G} warc[\,x, y\,],$$

where $warc[\,x, y\,]$ is a counter associated with each arc, which is initialised to 1 prior to search. During search these counters are incremented whenever a domain wipe-out occurs. In systematic solvers such as *BSol*, the domain wipe-out may occur after revising the domain of a variable as shown in Figure 3. Note that in Figure 3, after revising $D(x)$ against $D(y)$, if $D(x)$ becomes empty then both $warc[\,x, y\,]$ and $warc[\,y, x\,]$ are incremented, since at that very moment the revision of $D(y)$ against $D(x)$ would also have resulted in the domain wipe-out of y. A two dimensional array is used to represent $warc[\,\cdot, \cdot\,]$.

4 Value Ordering Heuristic

Value ordering heuristics are used to select a value from the domain a variable to instantiate the selected variable during search. If the value selected has a higher probability of being part of a solution then selecting this value can make a significant difference in finding the first solution more efficiently in terms of checks and time. The solver *BSol* uses a static value ordering heuristic [9] to improve the ordering of values. The basic idea of static value ordering heuristics is to rearrange the values in their respective domains prior to search. More specifically, each value is assigned some weight based on some reasonable criterion and then values are sorted based on their weights. The rankings among the values of the domains are established only once, prior to search and they remain static throughout the search. Therefore, the selection of the best value only requires $\mathcal{O}(1)$ time-complexity during search.

There may exist many possible ways to compute the weight for a value. However, we exploit the knowledge of support counts to compute the weight for each value to improve the ordering of values. Let $a \in D(x)$ (also denoted as (x, a)), and let *scount*$[\,x, y, a\,]$ be the number of supports of (x, a) in $D_{ac}(y)$. Let *weight*$[\,x, a\,]$ be the weight of (x, a) which is computed by using the following:

$$weight[\,x, a\,] = \sum_{(x,y) \in G} scount[\,x, y, a\,]. \tag{1}$$

The Equation (1) associates a weight with (x, a) which is equal to the sum of the number of supports in $D_{ac}(y)$ for each y by which it is constrained. The pseudo-code to compute the support count for each arc-value pair involving the arc (x, y) and the value a in $D(x)$. is shown in Figure 1. Note that the algorithm uses the bidirectional property of the constraints to compute the support counts. The pseudo-code to order the values in the domains prior to search is depicted in Figure 2. The domain operations in *BSol* are implemented by employing a single-linked list.

Function compute_support_counts ( )

```
begin
   for each (x, y) ∈ G such that x < y do
      for each a ∈ D_ac(x) do
         for each b ∈ D_ac(y) do
            if (a, b) ∈ C_xy then
               scount[x, y, a] := scount[x, y, a] + 1
               scount[y, x, b] := scount[y, x, b] + 1
            endif
   for each (x, y) ∈ G do
      scount[x, y] := min(scount[x, y, a] : a ∈ D_ac(x))
end;
```

Fig. 1. Algorithm to compute the support count for each arc-value pair and each arc

Function order_values ( )

```
begin
   for each x ∈ 𝒱 do
      for each a ∈ D_ac(x) do
         weight[x, a] = Σ_{(x,y)∈G} scount[x, y, a]
      sort D_ac(x) in the decreasing order of weights
end;
```

Fig. 2. Algorithm to order the values prior to search

Arranging the values in the decreasing order of their weights (which is computed by using Equation (1)), in some sense can be seen as arranging the values in the increasing order of their constrainedness. This can be advantageous while revising the domains of the variables. Putting the least constrained value at the beginning of the domain list may help values to find their support more quickly during revision. This may allow to save a few negative checks. The further the first support is away from the start, the more negative checks are required to find it. Ordering of values in the increasing order of their constrainedness is a novel approach to reduce support checks during revisions. This may also allow to save support checks for the problems which has no solution or if all solutions have to be searched.

5 Arc Consistency

5.1 Introduction

Arc consistency [6] algorithms are widely used to prune the search space of constraint satisfaction problems. Arc consistency ensures that each value in the domain of each variable is supported by at least one value in the domain of every variable by which it is constrained. Coarse-grained arc consistency algorithms such as AC-3 [6], AC-2001 [1], and AC-3_d [11] are efficient when it comes to transforming a CSP to its arc-consistent equivalent. These algorithms repeatedly revise the domains to remove all unsupported values. Here to *revise* $D(x)$ against $D(y)$ means removing all values from $D(x)$ that are not supported by any value of $D(y)$. They use *revision ordering heuristics* [13, 5, 11], to select an arc from a data structure called a queue (a set really). When an arc, (x, y), is selected from the queue, $D(x)$ is *revised* against $D(y)$. Revision ordering heuristics can influence the performance of arc consistency algorithms.

5.2 AC-3_{BSol}

For the purpose of competition, AC-3 with a *support condition* [8] and a static version of *revision condition* [8] is employed as an arc-consistency component in the solver *BSol*. We refer AC-3_{BSol} to the arc-consistent component of *BSol*. The basic idea presented in [8] is to avoid looking for a support if the support condition holds and to avoid a candidate revision if the revision condition holds. AC-3_{BSol} inherits its $\mathcal{O}(e\,d^3)$ worst case time-complexity from AC-3. Pseudo-code for AC-3_{BSol} is depicted in Figure 3. The *revise* function upon which AC-3_{BSol} depends is depicted in Figure 4.

AC-3_{BSol} is equipped with a reverse variable based revision ordering heuristic [7]. Reverse variable based revision ordering heuristics first select a variable x and repeatedly select arcs of the form (x, y) to determine the next revision until there are no more such arcs or $D(x)$ becomes empty as shown in Figure 3. Selecting a variable x and revising it against all its neighbours y such that (x, y) is currently present in the queue, we call a *complete relaxation* of x. Let $comp$ be the variable selection order $\otimes_{\leq}^{\#} \bullet \otimes_{\geq}^{\delta_c} \bullet \otimes_{\leq}^{s}$ then the reverse variable based heuristic employed in AC-3_{BSol} can be described by $\otimes_{\leq}^{\#\circ\pi_2} \bullet \otimes_{\leq}^{s\circ\pi_2} \bullet \otimes_{comp}^{\pi_1}$.

A queue based on linear probing [12, 11] is used in AC-3_{BSol}. Here selecting and removing the optimal arc requires fewer than $2n$ comparisons, where n is the number of variables. The space-complexity of Q is in $\mathcal{O}(e)$ since there can be maximum $2e$ arcs in the queue.

5.3 Support Condition

AC-3_{BSol} uses a special version of a support condition [8] (see also [3]). Support condition guarantees that a value has some support without identifying it. It is a finer-check which may avoid a sequence of support checks eventually leading to a support. Let C_{xy} be the constraint between x and y, let $a \in D(x)$ and let *scount*$[\,x, y, a\,]$ be the number of supports of (x, a) in $D_{ac}(y)$. A value $a \in D(x)$ is supported by y if it has at least one support in $D(y)$. Furthermore if $R(y) = D_{ac}(y) \setminus D(y)$ are the removed values

Function AC-3$_{BSol}$(in Q: set): **Boolean**;

```
begin
   while Q not empty do begin
      select any x from {x : (x, y) ∈ Q }
      effective_revisions := 0
      for each y such that (x, y) ∈ Q do
         remove (x, y) from Q
         revise(x, y, change_x)
         if D(x) = ∅ then
            increment warc[ x, y ] by 1
            increment warc[ y, x ] by 1
            return False
         else if change_x then
            effective_revisions := effective_revisions + 1
            y'' := y;
      if effective_revisions = 1 then
         Q := Q ∪ { (y', x) ∈ G : y' ≠ y'', scount[y', x] ≤ |R(x)| }
      else if effective_revisions > 1 then
         Q := Q ∪ { (y', x) ∈ G : scount[y', x] ≤ |R(x)| }
   return True;
end;
```

Fig. 3. AC-3$_{BSol}$

Function $revise(x, y,$ **var** $change_x)$

```
begin
   change_x := False
   for each a ∈ D(x) do
      if scount[ x, y, a ] > |R(y)| then
         skip /* a is supported */
      else if ∄b ∈ D(y) such that b supports a then
         D(x) := D(x) \ { a }
         change_x := True
end
```

Fig. 4. Algorithm *revise* of AC-3$_{BSol}$.

from the arc-consistent domain of y then $|\,R(y)\,|$ is an upper bound on the number of lost supports of (x, a) in y. Therefore, if the following condition is true then (x, a) is supported by y:

$$\textit{scount}[\,x, y, a\,] > |\,R(y)\,| \tag{2}$$

The Equation (2) is called a (special version of what is called a) support condition in [8]. Note that in the revise function of AC-3$_{BSol}$ if support condition holds then the process of seeking a support is skipped. A three dimensional array is used to store the support count for each arc-value pair.

5.4 Revision Condition

AC-3$_{BSol}$ uses a special version of a revision condition [8] (see also [3]). Revision condition guarantees that all values in a domain have some support without identifying it. It is a coarser-check which avoids a candidate revision. For a given arc, (x, y), let the *support count* of x with respect to y, denoted $scount[x, y]$, is defined by $scount[\,x, y\,] = min(scount[\,x, y, a\,] : a \in D_{ac}(x))$. Therefore, if the following condition holds then any value in $D(x)$ is supported by y:

$$scount[\,x, y\,] > |R(y)|.$$

The condition in Equation (5.4) is a (special version of what is called a) *Revision Condition* in [8]. Note that in Figure 3. arcs are only added in AC-3$_{BSol}$ if Equation (2) does not hold. A two dimensional array is used to store support count for each arc.

The algorithm to compute the support count for each arc-value pair and each arc is depicted in Figure 1. Note that these support counts are computed prior to search and they remain static during the course of search. Hence, the space-complexity of storing support counts is in $\mathcal{O}(ed+e) = \mathcal{O}(ed)$. The space complexity of AC-3$_{BSol}$ is bounded by the size of Q and *scount*. This gives a $\mathcal{O}(ed)$ as the overall space-complexity of AC-3$_{BSol}$.

6 Search Algorithm

When the solver starts, it first reads the variables, their domains and the constraints among the variables of the given input CSP. Global data structures are used to maintain lists of variables, domains, extensional constraints and constraint graph. Domain values of a variable are kept in a single linked-list. The holes are removed from the domains, if they exist. For example, if the domain of a variable is {1,5,10} then it is replaced by {1,2,3}. Extensional constraints in *BSol* are represented as 2-dimensional *char* array. While reading the extensional constraints, character '1' is set for the allowed tuples and character '0' for the conflict tuples. This representation of the constraints allows to have a cheap lookup operation for quickly finding out if two values are compatible. Graph is represented as a set of adjacency lists, which are lists of variables adjacent to a given variable in the constraint graph.

The solver basically implements MAC [10] as a search algorithm, which maintains arc consistency during search. Maintaining arc consistency during search reduces the

```
Function MAC_BSol( ): Boolean

begin
   for each (x, y) ∈ G do
      warc[x, y] := 1
      scount[x, y] := 0
   for each (x, y) ∈ G and a ∈ D_o(x) do
      scount[x, y, a] := 0
   Q := G
   if AC_BSol( Q ) then
      compute_support_counts( )
      order_values( )
      return solve( 0 )
   else
      return False ;
end
```

Fig. 5. Algorithm MAC-3$_{BSol}$

thrashing behaviour of a backtrack algorithm, which usually fails many times as a result of the same local inconsistencies. We will refer MAC-3$_{BSol}$ to the MAC algorithm of *BSol*. Before starting search, MAC-3$_{BSol}$ creates and initialises a few data structures. After the initialisation, it transforms the input CSP to its arc consistent equivalent. Note that the support count for each arc-value pair and each arc is initialised to 0 which facilitates AC-3$_{BSol}$ to act as a normal AC-3 prior to search.

If the problem is made arc-consistent then the support count is computed for each arc-value pair and each arc using the function *compute_support_counts*. Next, using a static value ordering heuristic as explained in Section 4, values are rearranged in their respective domains. Finally, the function *solve* is called, a recursive function, to search for a solution. Until a solution is found or the insolubility of the problem is detected, backtrack search continues. During backtrack search, variables are chosen using the conflict-directed heuristic *dom/wdeg*. The selected variable is instantiated with the next untried value from its domain. MAC-3$_{BSol}$ maintains arc consistency during search after every variable assignment. To re-establish arc consistency following the instantiation of a variable x, the Q is initialised to all arcs incident to x. More specifically, all arcs of the form (y, x) are added to the queue where y is a future variable constraining x. In the actual implementation code, if the variable selected has only one value then the process of maintaining arc consistency is skipped. If the sub-problem is made arc-consistent then the function *solve* is invoked again, otherwise the problem is restored to its previous state.

7 Conclusion and Future Work

It would be interesting to see the performance of the solver *BSol* against other solvers submitted for the CSP solver competition. One of the drawback of *BSol* is that the memory allocated to solve any given CSP is fixed. If the problem is very very large then the behaviour is unpredictable. This will be something on which we would like to work in

```
Function solve ( var level ): Boolean

begin
   if level > n then
      return True
   else
      select any unassigned variable x
      repeat
         select next untried value a ∈ D(x) and assign it to x
         Q := { (y, x) ∈ G}
         if AC_BSol( Q ) then
            solve (level + 1)
         restore values removed in this level
      until all values are tried
      return False
end
```

Fig. 6. Algorithm $solve$

future to allow the solver to dynamically change the scheme of allocating the memory depending upon the problem size.

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Some notes on the implementation of *csp2sat+zchaff*, a simple translator from CSP to SAT

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Abstract. This short paper gives some details on the implementation of *csp2sat+zchaff*, an experimental CSP solver which transforms a CSP instance with constraints given in extension into a SAT instance which is then solved by a classical SAT solver (zchaff).

1 Introduction

csp2sat+zchaff is an experimental solver which solves a CSP instance by translating it to a SAT instance which is then solved by a conventional SAT solver. The goal of this solver is to experiment with the differences and similarities between the CSP and the SAT problem.

In our opinion, the SAT and the CSP problems (when constraints are given in extension) are essentially the same problem and the difference between them is only syntactical. To support this point of view, [4] presents a transformation of a SAT instance into a CSP instance where solving a SAT instance is seen as a search of local models followed by a step where local models (models of a subformula) are assembled into global models (models of the whole formula). This last step is essentially the resolution of a CSP instance. Of course, solving a SAT instance in this way in neither classical nor the most efficient method. However, this kind of approach seems general enough to fit any SAT solver, at least from a conceptual point of view. Once some kind of local models have been identified, a SAT solver must assemble them to form a global model. To stress the similarity with the CSP model, we can identify subformulae to some sort of CSP variable, a local model to a value of the domain of this CSP variable and there are some constraints which express which local models are compatible together. Therefore, we may consider that the resolution of a CSP instance is implicitly included into the resolution of a SAT instance.

For these reasons, it should be possible to write a solver which can solve with the same efficiency a SAT instance or a CSP instance with constraints given in extension. Yet, when current SAT and CSP solvers are experimented on the same instances (same encoding, the only difference being the syntax used), it can be noticed that sometimes

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SAT solvers are much more efficient than CSP solvers, sometimes CSP solvers are much more efficient than SAT solvers and sometimes CSP and SAT solvers have comparable efficiencies. This last sentence is of course a tautology but what should be kept in mind is that both CSP and SAT solvers have interesting features that we should try to mix together. *csp2sat+zchaff* is a very first step toward this goal.

In fact this solver has been written very quickly (in less than 3 days) and was not actually tested before its submission to the CSP competition. We can expect that bugs or wrong technical choices will severely impact its performances (or even its completeness and correctness).

All in all, *csp2sat+zchaff* uses a very conventional and straightforward translation of the CSP instance into a SAT instance. Maybe the only innovative point is that it includes a knowledge compilation which will let unit propagation on the SAT instance maintain arc-consistency on the CSP problem. To solve the SAT instance, a well known SAT solver has been used: zchaff [3]. This solver might not be the most efficient solver today but our goal is less to get a faster CSP solver than to experiment with new techniques.

The following sections will present how a CSP instance where constraints are given in extension is translated into a SAT instance. It should be kept in mind that most decisions where taken a priori without any experimental evaluation of their impact on the performances of the solver. The result of this experimental solver in the competition will be the first feedback on the validity of these choices.

2 Translation of variables

A CSP variable X_i with domain $D_i = \{a_1, a_2, \ldots, a_n\}$ is translated to a clause using n new propositional variables (one for each possible value of the domain). We denote by a' the propositional variable associated to the value a that a CSP variable X can take. With this notation, for each variable X_i we generate a clause

$$a'_1 \vee a'_2 \vee \ldots \vee a'_n$$

We insist on the fact that another CSP variable (possibly with the same domain) will use brand new propositional variables when translated to SAT.

This clause states that X_i must take at least one value in D_i. However, it doesn't state that X_i can take only one value. This last constraint has no influence on the satisfiability of the translated formula but it has a great impact on the performances of a SAT solver. If we don't force the SAT solver to satisfy only one literal in the clause, it will waste time trying to satisfy a clause with several literals even if this is forbidden in the CSP model.

Ideally, this restriction should be imposed inside the solver by a special enumeration procedure. However, we don't want to modify the SAT solver in our approach so we have to encode this restriction inside the SAT formula.

A classical way to force a SAT clause $a_1 \vee a_2 \vee \ldots \vee a_n$ to be satisfied by at most one literal is to write the set of exclusion clauses

$$\bigwedge_{i \neq j} \neg a_i \vee \neg a_j$$

However this translation has a quadratic complexity. *csp2sat+zchaff* uses a linear encoding to enforce that the clause be satisfied by one single literal. The idea is to count the number of variables which are set to true in the clause and, as soon as this number is greater than one, force the other variables to false. This kind of idea is used in the translation of cardinality constraints to SAT (see [1]). In our case, the counter has only one bit and the translation is extremely simple.

For the clause $a_1 \vee a_2 \vee \ldots \vee a_n$, we write

$$\bigwedge_{i=1..n-1} \neg a_i \vee c_{i+1}$$
$$\bigwedge_{i=1..n-1} \neg c_i \vee c_{i+1}$$
$$\bigwedge_{i=1..n} \neg a_i \vee \neg c_i$$

When a literal a_i is set to true, all c_j with $j > i$ will be set to true and therefore a_j will be set to false (if not already assigned). Therefore this set of clauses enforces that at most one variable of the clause will be set to true (otherwise, a contradiction will be discovered). These clauses propagate values from the first literals of the clause toward the last ones. Although this is not required to enforce mutual exclusion, we also generate clauses which propagate values from the last literals of the clause toward the first ones.

$$\bigwedge_{i=2..n} \neg a_i \vee d_{i-1}$$
$$\bigwedge_{i=2..n} \neg d_i \vee d_{i-1}$$
$$\bigwedge_{i=1..n} \neg a_i \vee \neg d_i$$

This second set of clauses is useful because, without them, a solver would try to set to true the literals which appear in the clause before a literal previously set to true. It would fail of course because the first set of clauses forbids this instanciation, but we'd rather avoid this waste of time.

All these clauses encode in a simple way a cardinality constraint which states that exactly one literal of the clause is set to true. The key point of this encoding is that it is linear and that unit propagation is sufficient to enforce this cardinality constraint. In this simple case, there's no need to extend the SAT solver with specific constraints.

3 Translation of binary constraints

A binary constraint in a CSP problem where constraints are given in extension is a set of pairs of values of two variables which are either forbidden (conflict tuples) or the only ones to be authorized (support tuples).

When constraints are described as conflict tuples $\{(a_i, b_j)\}$ with $a_i \in domain(X_a)$ and $b_i \in domain(X_b)$, each conflict tuple (a_i, b_j) is translated to a clause $\neg a'_i \vee \neg b'_j$ which forbids this conflicting valuation.

When constraints are described as support tuples, we first compute the set of conflict tuples by enumerating all possible tuples and translating to clause the ones which are not in the support set. This step has quadratic complexity.

4 Translation of non binary constraints

4.1 With conflict tuples

When constraints of arity n are described as conflict tuples $\{(a^1_{i_1}, a^2_{i_2}, \ldots, a^n_{i_n})\}$ with $a^i_{k_i} \in domain(X_i)$, each conflict tuple is translated to a clause $\neg a'^1_{i_1} \vee \neg a'^2_{i_2} \vee \ldots \neg a'^n_{i_n}$ which forbids this conflicting valuation.

Example 1. Suppose that X_1 has domain $\{a, b, c\}$, X_2 has domain $\{d, e, f\}$ and X_3 has domain $\{g, h, i\}$ and we have to encode a ternary constraint between these three variables which is defined by the following set of conflict tuples:

$$\{(a, d, g), (b, e, h), (c, f, i)\}$$

We add the following three clauses to encode this constraint: $\neg a' \vee \neg d' \vee \neg g'$, $\neg b' \vee \neg e' \vee \neg h'$ and $\neg c' \vee \neg f' \vee \neg i'$

4.2 With support tuples

When constraints of arity n are described as support tuples, we don't want to compute the set of conflicts by complementing the set of support because this would have an $O(d^n)$ complexity (where d is the size of domains). Instead, we use a well known CSP binarization technique and introduce a new CSP variable Y which can take as value one of the support tuple of the constraint. This new variable is linked to the other variables by a binary constraint which enforces that variable X_i takes the same value as in the tuple to which Y is instantiated.

Example 2. Suppose that X_1 has domain $\{a, b, c\}$, X_2 has domain $\{d, e, f\}$ and X_3 has domain $\{g, h, i\}$ and we have to encode a ternary constraint between these three variables which is defined by the following set of support tuples:

$$\{(a, d, g), (b, e, h), (c, f, i)\}$$

We create a new CSP variable Y with domain $\{1, 2, 3\}$ where 1 represents the tuple (a, d, g), 2 represents the tuple (b, e, h), and 3 represents the tuple (c, f, i). Then, we create binary constraints between Y and X_1 (with support tuples $\{(1, a), (2, b), (3, c)\}$), between Y and X_2 (with support tuples $\{(1, d), (2, e), (3, f)\}$) and the last one between Y and X_3 (with support tuples $\{(1, g), (2, h), (3, i)\}$).

5 Knowledge compilation

In general, unit propagation does not maintain k-consistency but we just need to add some implicates of the formula to let unit propagation maintain k-consistency. This can be done by a knowledge compilation (see [4]).

This version of *csp2sat+zchaff* performs a knowledge compilation so that unit propagation will maintain arc-consistency. Other versions of the solver will try to compile the formula to maintain other forms of local consistencies.

Compilation to let unit propagation maintain arc-consistency is extremely easy. For each clause $a_1 \vee a_2 \vee \ldots \vee a_n$ corresponding to a variable X_i and the greatest set of clauses $\{\neg a_i \vee \neg l\}_{i \in 1..k}$ found in the formula ($\neg l$ being one literal shared by each of these binary clauses), we generate by resolution the clause $\neg l \vee a_{k+1} \vee \ldots \vee a_n$. This clause is an implicate of the formula and lets unit propagation generate $\neg l$ when all a_j with $j \in k+1..n$ are set to false. Without this clause, and because $\neg l$ is a merge literal in the resolvent, unit propagation wouldn't be able to generate $\neg l$ which is the kind of inference required to maintain arc-consistency. Note that when there's only one binary clause corresponding to the pattern $\neg a_i \vee \neg l$, the implicate is useless since the resolvent does not contain any merge literal.

Example 3. Let A and B be two CSP variables with domain $1, 2, 3$ and the constraint $A < B$. A direct encoding of this CSP in PHNF gives $a_1 \vee a_2 \vee a_3, b_1 \vee b_2 \vee b_3, \neg a_1 \vee \neg b_1, \neg a_2 \vee \neg b_1, \neg a_2 \vee \neg b_2, \neg a_3 \vee \neg b_1, \neg a_3 \vee \neg b_2, \neg a_3 \vee \neg b_3$. Unit propagation on this formula doesn't ensure arc-consistency (it doesn't prove $\neg a_3$ for example). The proposed knowledge compilation adds two clauses which are $\neg a_3, \neg a_2 \vee b_3$. These are the only merge resolvents we need. Now, $\neg a_3$ is directly proved which means that $A = 3$ has no support on B.

[2] proposes to maintain arc-consistency in a SAT formula corresponding to a CSP problem by using the so-called support encoding. The example we've given above corresponds to the core of the example in that paper. We can see that the clauses we add are a subset of the clauses used for the support encoding ($b_2 \vee b_3 \vee \neg a_1$ added in [2] is useless in our transformation because we've kept the binary clauses (conflict clauses)). In fact the knowledge compilation we propose for maintaining arc-consistency does the same thing as the support encoding. This sheds a new light on that support encoding which is not "magic" at all but simply results from a form of knowledge compilation to make unit propagation more complete.

For the sake of simplicity, this knowledge compilation has been only applied to binary clauses. Therefore, the current version of the solver does not maintain arc-consistency on n-ary constraints.

6 Conclusion

csp2sat+zchaff is a very first attempt at trying to fill the gap between SAT and CSP solvers. It's too early to draw conclusion on this solver, even if the first results of the CSP competition seem to be encouraging. We expect that the first experiments will bring interesting informations on which techniques may be useful in a future solver.

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An Object-Oriented Implementation of a Finite-Domain Integer CSP Solver

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Abstract. This paper describes a C++-based implementation of a integer finite-domain CSP solver. The solver provides classes for CSP entities like variables, constraints and mechanisms for expressing search trees in terms of conjunctions and disjunctions of goals. The implementation includes some well-known propagation algorithms, namely AC-5 [4] and AC-3 [6]. The design emphasizes in extensibility. It is shown throughout this work that a user can easily extend the current implementation by adding new constraints, variable implementations, search methods and propagation algorithms.

1 Introduction

Many interesting research and practical problems can be expressively modelled and efficiently solved as constraint satisfaction problems (CSPs). For experimentation purposes one might need an open-source solver engine. Such a solver however should also be reasonably efficient in order to allow for its eventual application in real problems and easy to use as a higher-level solver. Its design should be extensible.

This paper describes such an implementation. The solver was not implemented on a logic-based language for several reasons [8]. It is implemented in C++, a language which allows for efficient implementations of algorithms and constraints. Its design and implementation which is described in the next section allows for easily implemented extensions.

2 Implementation

Most objects like variables and constraints are accessed through handles in order to ease argument passing without the use of pointers and without the need to copy large pieces of memory. Numbers are of constant size which can be changed at compile time. All data that could change during search but in a reversible way to allow backtracks, are allocated in a continuous piece of memory allocated by a non-default memory allocator. The fact that these reversible memory pieces are continuous allows for faster pushing and poping of search states. The basic classes of the solver are described below.

2.1 Variables

Variables are represented by the class `IntVariable`. This contains among others the domain of the variable which is represented as a bit vector. The most interesting methods are those that allow the programmer to modify the domain of the variable, namely `setValue` and `removeValue` to narrow the domain to a single value or remove one value from it, `setRange` and `removeRange` to limit the values of a variable to a specific range or to exclude one from the domain, `setMin` and `setMax` to set the least and greatest values of the domain respectively. The above methods are supposed to initiate modification *events* on variables. The user can specify whether these events will immediately lead to a propagation procedure or they will be pushed to a queue (or other propagation algorithm dependent structure) in order to be processed later.

Access to the variable's domain is achieved by value iterators and other accessor methods. Each variable also holds a list of the constraints which are posted upon it.

The `IntVariable` class is a handle to an implementation class with the above characteristics. The user can program any other integer variable implementation class (like one with a list based domain instead of a bit vector one) and use it along the default one.

2.2 Constraints

Constraint implementation classes are subclasses of an abstract base class. Its members are the variables of the constraint and it provides three basic methods: `valid(tuple)` which answers whether an ordered tuple of values is allowed by the constraint or not, `cons(variable,...)` which returns the values that must be removed from a variable's domain in order for it to be arc-consistent wrt the constraint and `localcons(variable,delta)` which returns the values that must be removed in order to achieve arc-consistency following the modification `delta` of some other variable of the constraint. The methods `cons` and `localcons` correspond to AC-5's ARCCONS and LOCALARCCONS respectively and suffice for supporting AC-5 as long as most documented propagation algorithms. Intensional constraints can be implemented by creating subclasses of the abstract base class and overriding the above methods. Basic arithmetic constraints like $=, \neq, <, \leq, >, \geq$ have already been implemented as long as AllDiff, linear constraints and others. Extensional binary and n-ary constraints are also implemented in which case the constraint is represented as a bit-matrix.

Constraints can be posted or unposted either before or during search for example whenever a constraint becomes satisfied. Constraints are crisp. Constraints do not have anything to do with the propagation procedure. They are just objects which can be queried.

2.3 Propagation Algorithms

The main implemented propagation algorithm is AC-5 because implementation of the solver started with semantically well-behaved constraints in mind. How-

ever, AC-3 is also implemented for testing and experimental purposes. It is the author's opinion that other algorithms can be easily implemented. AC-2000 [1] for example can be easily implemented based on AC-3. Although AC-2001 is not directly implemented, a support storage and retrieval class has been implemented which allowed supports to be stored and retrieved for extensional constraints with no defined semantics within the framework of the AC-5 algorithm. It is also apparent that although other algorithms might demand bigger programming effort, the design of the solver is not a problem for further development.

2.4 Search

Each node in the search tree is, physically speaking, described by the contents of the memory occupied by the solver's data structures when the node is examined. Storing a node is achieved by copying the memory used by these structures in a place for later retrieval. In order to achieve faster storage and retrieval all data structures that might be affected by this procedure occupy memory chunks allocated by a special memory allocation object. This object takes care for all these data to be consecutive in memory. Thus, pushing or poping a node is achieved by copying one and only one piece of memory.

One abstract class of type `Store` is responsible for such push and pop operations. An object of that class is connected to the above mentioned memory allocation unit and thus can either safekeep a node or copy a stored node over the problem's data structures. The push method of the `Store` class needs a `label` parameter assigned to each node. This parameter controls the order by which nodes will be later poped. Within this framework many backtracking-based search methods can be implemented. For example a chronological backtracker was implemented as a subclass of the above abstract class by using a stack to store pushed states regardless of their labels. A BFS method could be implemented by using a priority queue and assigning each pushed state a label expressing the quality of a node. Pop would then return the state with the highest label.

The `Store` class and its descendants are enough to support the technical part of a search procedure but not expressive at all. In order to allow the user to define search in an expressive manner, a `Node` abstract class was defined which allows for a search tree to be defined in terms of an hierarchy of nodes. More specifically, each time a node is visited the corresponding `Node` object is queried for its children nodes which are in turn visited and thus a tree-like structure is recursively defined.

3 Application

The solver was verified on the benchmark problems of the First International Constraint Satisfaction Solver Competition. Tables 1 and 2 summarize execution times for the binary and n-ary benchmark families respectively and for

various variable/value ordering heuristics. All measurements were conducted on an Athlon XP 2600+ with a time limit of 300 seconds. In all cases the search tree was traversed in a depth first manner. Execution times include the time needed to read the input which was formated in the competition's standard text format. The variable ordering heuristics used wereBrelaz [2] and E(N) [3]. The value ordering heuristics used were minimum-value-first (Min) and TPS which selects the value that maximizes the product of its supports over the constraints applied on the varibale, weighted by the tightness of the corresponding constraint. No revision-ordering heuristic was implemented. Due to technical problems the solver was not applied on any `fapp` instance. Max(min)-closed constraints are detected and appropriately solved. If the constraint graph is full and all the constraint are all Not-Equal constraints they are substituted by an All-Different. In some cases one symmetry-breaking constraint might be added but no other symmetry-breaking is implemented.

		E(N)-TPS		E(N)-Min		Br-Min	
Name	#inst.	#sol	Mean time	#sol	Mean time	#sol	Mean time
bqwh	200	200	1.23	200	2.91	200	7.23
bqwh	200	200	1.23	197	8.84	200	7.23
composed	90	90	0.03	90	3.46	86	0.48
domino1	10	10	0.06	10	0.06	10	0.06
ehi	200	200	5.31	196	67.32	182	43.33
fapp	22	—	—	—	—	—	—
frb	40	17	35.38	18	48.74	16	42.67
hanoi1	5	5	1.13	5	1.13	5	1.13
js	46	42	3.30	37	2.24	32	7.63
lsq	10	5	0.00	5	0.00	5	0.00
pigeons	20	20	0.00	20	0.00	20	0.00
qa1	8	4	0.24	4	14.66	3	4.18
qk1	18	18	0.95	18	0.69	10	3.69
rlfapGraphs	14	13	11.83	11	1.44	14	1.42
rlfapModGraphs	12	6	52.83	5	1.24	3	0.12
rlfapModScens	14	9	28.17	5	0.51	5	3.02
rlfapScens	11	10	1.43	11	1.34	10	1.36
rlfapScens11	10	1	20.90	6	36.92	0	—
Total	730	650		641		601	

Table 1. Execution times and number of solved binary problems for various variable/value ordering heuristics within a 300 seconds time limit.

4 Future Work

The presented solver was motivated by the timetabling problem of a university department. Since the problem's constraints are semantically well-defined

		Brelaz-Min		E(N)-TPS		E(N)-Min	
Name	#inst.	#sol	Mean time	#sol	Mean time	#sol	Mean time
allSeries	20	20	0.02	10	39.37	10	36.95
cc1	14	12	0.28	13	10.08	12	0.04
gr1	10	7	5.37	8	46.02	8	44.49
ramsey3	8	2	0.00	4	1.35	3	25.91
ramsey4	8	2	0.18	5	9.85	3	0.92
random	30	10	44.70	13	85.04	11	61.26
renault	1	—	—	—	—	1	92.98
schurr	10	8	48.90	6	27.62	7	43.48
Total	101	61		59		55	

Table 2. Execution times and number of solved n-ary problems for various variable/value ordering heuristics within a 300 seconds time limit.

the propagation algorithm of choice was AC-5. One of the nearest priorities in extending the solver is to implement support-maintenance algorithms. Some preliminary steps have been realized in the case of AC-2001.

Each constraint has to be implemented by itself. It is desirable to allow for constraint combinators [5, 7] to be used in order to create new constraints from existing ones without having to implement new ones.

In a not so near future, non-crisp constraints could also be added.

Finally, as implied through the paper, the solver is intended to be open-source. Thus, one eminent priority is to freely release the solver when a reasonably stable and efficient state is reached.

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A Simple Constraint Solver in Action Rules for the CP'05 Solver Competition

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Abstract. This short paper describes a simple solver, called *Mosar*, implemented in AR *Action Rules* for the the CP'05 Solver Competition. Mosar performs forward checking for unary constraints, maintains a weak-form of interval consistency for non-binary support constraints, and maintains arc-consistency for binary support constraints. Thanks to the high descriptive power of action rules, the solver, which consists of only about 200 lines of AR and Prolog code, was completed in only one day. Because of lack of optimizations, the solver is not yet competitive with specialized solvers implemented in C or C++. Nevertheless, it has had some interesting results. For example, it is among the top in the competition on non-binary CSPs.

1 Introduction

In response to the call for solvers by the CPAI'05 solver competition organizing committee, we implemented a constraint solver, called *Mosar*, using action rules (AR) in B-Prolog [3] particularly for this competition. The problem format used in the competition is very different from those used by practical solvers. For example, constraints are extensional numeric relations not implicit relations, and only support and conflict constraints are allowed. Our goal was to build a working solver very quickly (in one or two days) rather than to implement a winning solver. Therefore, no optimization is implemented at all.

Mosar is a very simple solver. It performs forward checking for unary constraints, maintains a weak-form of interval consistency for non-binary support constraints, and maintains arc-consistency for binary support constraints. Thanks to the high descriptive power of action rules, the solver, which consists of only about 200 lines of AR and Prolog code, was completed in only one day. As there is no solver of this type available for comparison, the performance of Mosar is unclear. Mosar has successfully solved most of the sample benchmarks including the quasi-group, Domino, and all-interval series problems collected by the organizing committee.

This note describes the solver and reports on the performance. It also gives several optimizations that could lead to better performance. The source code of the solver is available at: *www.probp.com/mosar*.

2 Action Rules

The AR (*Action Rules*) language is designed to facilitate the specification of event-driven functionality needed by applications such as constraint propagators and graphical user interfaces where interactions of multiple entities are essential [3]. An action rule takes the following form:

$$Agent, Condition, \{Event\} => Action$$

where *Agent* is an atomic formula that represents a pattern for agents, *Condition* is a conjunction of conditions on the agents, *Event* is a non-empty disjunction of patterns for events that can activate the agents, and *Action* is a sequence of arbitrary subgoals. An action rule degenerates into a *commitment rule* if *Event* together with the enclosing braces are missing. The reader is referred to [3] for a detailed description of the language.

AR has been successfully used to implement several efficient constraint solvers in B-Prolog, including the ones over finite domains, Boolean, trees, and finite sets. So it is not surprising that AR can be used to easily implement propagators for support and conflict constraints. As an example, a naive propagator for conflict constraints can be implemented as follows:

```
conflict_constraint(Rel,Constr),
   no_vars_gt(1,0),{ins(Constr)}
   =>
   true.
conflict_constraint(Rel,Constr)
   =>
   not member(Constr,Rel).
```

where `Rel` is the list of tuples in the relation and `Constr` is the list of variables in a constraint. When the constraint contains at least one variable (i.e., when the condition `no_vars_gt(1,0)` succeeds)[3], the propagator is suspended waiting for a variable in `Constr` to be instantiated; and when the constraint becomes ground, the test `not member(Constr,Rel)` is performed to ensure that the valuation of the variables in `Constr` is not a tuple in the relation.

3 The Mosar Solver

This section describes the propagators for conflict and support constraints. Mosar adopts the *first-fail principle*[4] as the labeling strategy for ordering variables. As mentioned in the section on Future Improvements, a sophisticated labeling strategy is normally needed to solve hard problems.

[3] In general, the condition `no_vars_gt(m,n)` succeeds if the number of variables in the last `m` arguments of the agent is greater than `n`.

[4] Selecting a variable with the minimum domain size, breaking the tie by selecting a variable involved in the largest number of constraints.

3.1 Conflict constraints

A conflict relation is represented as a hashtable. Let $R = [T_1, \ldots, T_n]$ be a conflict relation where $T_1, \ldots, T_n$ are the tuples, and let R_i be the projection of R onto the columns except for column i. For each column i and for each tuple T in R_i, there is an element in the hashtable with the key $k(i, T)$ and the value $[A_1, \ldots, A_k]$ which is a list of no-good values for column i if T is a partial solution.

The propagator for a conflict constraint is implemented as follows:

```
conflict_constraint(Rel,Constr),
    no_vars_gt(1,1),{ins(Constr)}
    =>
    true.
conflict_constraint(Rel,Constr)
    =>
    project_constr_on_one_arg(Constr,T,I,Xi),
    conflict_constraint_action(Rel,k(I,T),Xi).
```

where `Rel` is the conflict relation represented as a hashtable and `Constr` is the list of variables of a constraint. The propagator is suspended if there are more than one free variables in the constraint. The second rule is executed if the constraint contains at most one variable. The call `project_constr_on_one_arg (Constr,T,I,Xi)` extracts the free variable `Xi`, its column number `I`, and the list of ground arguments `T` from `Constr`, and the call `conflict_constraint_action (Rel,k(I,T),Xi)` retrieves the no-good values for `Xi` from `Rel` and excludes them from the domain of `Xi`.

3.2 Support constraints

Given a support relation, we extract the following information from it: (1) *static bounds information*: the minimum and maximum elements in each column; (2) *dynamic bounds information*: for each value x in each column i, the minimum and maximum support elements in each column j ($j \neq i$); and (3) *projected binary relations*: the projected binary relations of the original relation onto each two columns. Each projected binary relation is represented as a hashtable, so that for each value in a column we can retrieve its support values in the other column in the binary relation.

For a support constraint on variables $[V_1, \ldots, V_m]$, the collected information from its relation is used in the following way:

- Static bounds information is used to preprocess the support constraint. Let V_i be the variable in column i, and L_i and U_i be the minimum and maximum elements in the column, the domain constraint $V_i :: L_i..U_i$ is posted in the preprocessing phase.
- Dynamic bounds information is used to maintain a weak-form of interval consistency. Whenever the variable V_i in column i is bound to a value x, let

L_j and U_j be the minimum and maximum of the elements in column j that support x, the domain constraint $V_j :: L_j..U_j$ is enforced.

– The projected binary relations are used to maintain arc consistency. Whenever a support constraint becomes binary, say on variables V_i and V_j, we set up a counter for each value in each column for counting the support elements in the other column. Whenever the counter of an element becomes zero, the element is excluded from its domain.

Let `BinaryRelation` be a projected binary relation on $\widehat{\text{Vi}}$ and Vj. The propagator that maintains the counters is implemented as follows:

```
arc_propagator(Counters,BinaryRelation,I,Vi,J,Vj),
    var(Vi),var(Vj),
    {dom(Vi,Ei)}
    =>
    get_support_elements(BinaryRelation,k(I,Ei),SupportEi),
    decrement_counters(Counters,J,SupportEi,Vj).
arc_propagator(Counters,BinaryRelation,I,Vi,J,Vj) => true.
```

Whenever an element `Ei` is excluded from the domain of `Vi`, the counters of the elements in the domain of `Vj` supported by `Ei` is decremented. If the counter of an element becomes zero, the element is excluded from the domain of `Vj`.

In B-Prolog, the constraint $X \neq E$, where X is a domain variable and E is a constant, does not post the $dom(X, E)$ event if E happens to be a bound of the domain of X. For implicitly represented relations, this is not a problem because there are separate propagators for handling exclusions of inner elements and updates of bounds. In Mosar, however, in order to maintain arc consistency, the solver must post a $dom(X, E)$ event even if E is a bound. For this reason, we change the implementation of $X \neq E$ into the following:

```
v_neq_c(X,E):-
    fd_min_max(V,Min,Max),
    exclude_value(X,E),
    (nonvar(X)->true;
     E==Min->post(dom(X,E));
     E==Max->post(dom(X,E));
     true).
```

4 Performance

We have tested Mosar using part of the benchmarks made available by the organizing committee. Mosar has successfully solved many problems we used. For example, it solved all the problem instances of the quasi-group, Domino, and all-interval series benchmarks. Table 1 shows the times taken to solve the hardest problem instances in these benchmark groups on a 2GHz Linux machine. We have also confirmed that Mosar failed to solve many other benchmark problems within a reasonable time limit, such as the Latin Square problem ($N \geq 8$),

the Pigeons problem ($N \geq 14$), and the Job-shop scheduling problem. Most of the hard problems are unsatisfiable problems and some of the problems such as the Job-shop scheduling problem are known to require sophisticated labeling strategies.

Table 1. Benchmarking results.

Problem	Instance	Time
All interval series	`series50`	0.72s
Domino	`domino-500-300`	56.39s
Quasi-group	`bqwh-15-106-99`	0.48s

5 Future Improvements

The following improvements could lead to significant speed-ups of Mosar:

1. *More efficient data structures.* Currently, hashtables are used to represent relations. Multi-dimensional arrays should be better than hashtables if the domains of variables are not sparse.
2. *Handling specific constraints.* For specific constraints such as functional, anti-functional, and monotonic relations [2], more efficient representations and propagators can be used. For relations that can be represented implicitly as equality, inequality, and disequality ones, existing propagators in B-Prolog should be used.
3. *Other consistency algorithms.* Currently, the propagator implemented in Mosar for support constraints is based on the AC-4 algorithm. Along the line of using optimized propagators for specific constraints, the algorithm should be optimized to exploit special characteristics of constraints, such as bidirectionality [1], to archive better performance. Also, for certain relations path consistency should be considered to reduce the search space.
4. *Labeling strategies.* No labeling strategy is known to work for every problem. A labeling strategy should make use of the probabilistic features of constraint networks. In addition, labeling should be performed in several stages if a given problem can be decomposed into independent subproblems.

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Description of a CSP Solver

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Abstract. This paper outlines the major features of a solver entered in this year's CPAI competition, including coding, data structures, algorithm and variable ordering heuristics.

1 Introduction

The solver that I entered in this year's CPAI competition is an implementation of a classical treesearch algorithm for solving CSPs, consisting of backtracking plus lookahead (using MAC-3 for consistency maintenance). In other words, it is a complete algorithm that uses a depth-first backtracking interleaved with propagation. Currently, it is restricted to binary constraints; in addition, the version described here assumes that constraint relations are represented in extensional form.

This solver is designed for experimentation. The features that have received the most attention are, therefore, related to this aim. Of course, efficiency is always an issue, since poor efficiency limits the experiments I can do. The present version represents fairly mature code, and it has not been changed in any fundamental way during the past few years. (However, thanks to this competition I may be inspired to add some improvements, especially to the MAC implementation, that I never quite got around to until now.)

2 Basic Features

The solver is implemented in Common Lisp, and is designed to run on a Unix machine. Since many lisp compilers (Clisp, Xlisp) only compile into a kind of intermediate code, the program cannot run with the speed of a C or C++ program.

The present version has a 'backbone' that is a recursive procedure (which naturally limits the size of the problems that can be handled). The basic structure is shown in Figure 1; as indicated, it uses recursion to run through a list of variables and a list of values in the domain of the current variable.

In the actual code, this structure is elaborated to:

- heuristically choose the next variable (in clause 3)
- set up data structures for handling preclusion and arc consistency (in clause 3). (These are reset in clause 2, as indicated.)
- handle all-solutions as well as one-solution search.

```
search (variables, domain, solution)
    if variables == nil                 /* clause 1 */
        save-solution
        return t
    else if domain == nil               /* clause 2 */
        reset data structures
        return nil                      /* backtrack */
    else if                             /* clause 3 */
        preclude(next-variable, next-domain-value) returns t
            and
        arc-consistency(remaining-variable) returns t
            and
        search (remaining-variables, new-domain, solution+next-assignment) returns t
    else                                /* clause 4 */
        return (search (remaining-variables, remaining-domain, solution))
```

Fig. 1. Basic recursive structure underlying tree search in the present solver.

In addition, the MAC solver tests for singleton domains and only does arc consistency when the current domain has more than one value. Incidently, during search consistency maintenance is only carried out following each new instantiation (i.e. not after a value has been discarded). A full arc consistency is, of course, also carried out prior to search.

3 Data Structures

Domain values are kept in simple lisp lists, accessed via an array. A list of variables is also used, as indicated in Figure 1. The current (partial) assignment is stored as an array, with nil values for currently unassigned variables. This array is accessed by variable-numbers, so it accomodates dynamic variable ordering. (Hence, the reseting in clause 2 in Figure 1 includes setting the value for the current variable to nil.)

In the present implementation, constraint relations are represented as arrays of binary values; the size is set by the size of the largest domain. The arrays themselves are accessed via a hash table, where the hash key is based on the two variable-numbers. Two arrays are stored for each relation, so the program does not have to put the variables in any particular order when computing the hash key.

The constraint representation is a global data structure that can be accessed by any function in connection with search or heuristic selection. This is also true for the current assignment. Global structures are also used to maintain a list of the original variables and the original domains.

Another important global data structure is the set of adjacency lists, which are lists of variables adjacent to a given variable in the constraint graph. Again, these are kept in an array so they can be accessed by variable-numbers. There are also data structures for certain parametric features like the degree of each variable, and the current domain sizes, and the original tightness of each constraint, which are used by certain heuristics.

A critical data structure used in connection with propagation stores current domains during search. The basic strategy (remember that this is lisp) is to maintain lists of lists within an array. Each list of lists is handled as a stack, with the current domain at the top. Using an array allows the program to access the current domain via the variable-number.

In order to use this structure during recursive search, the setup function (in clause 3 in Figure 1) adds a duplicate of the current domain to the top of each stack. (For forward checking this need only be the domains of variables adjacent to the current variable.) As successive assignments are made at a given level of search, the preclusion or arc consistency functions take the domain just below the top of the stack before support testing and replace the top-most list with the adjusted domain afterwards. This means that no special (setting-up) code is required for this purpose when re-assigning a variable. If the program backtracks from a given level of search (clause 2 in Figure 1), the stacks are cut back so the domains are as they were when this level was entered.

(Incidently, if lookahead value ordering heuristics are used [which is not done by the solver entered in this competition], then d entries are made in these lists in the course of support checking - in the order in which values are to be assigned. This avoids any further forward checking at this level of search.)

4 Heuristics

One of the major uses to which this solver has been put in the last few years has been the experimental study of variable ordering heuristics. So there are a large number of heuristics - and anti-heuristics coded. These are organized in an elaborate but tedious manner for selecting a particular heuristic during a given run of the program.

For the competition, I used two different heuristics - this was the only difference in my two solvers. In this case, I put the code in the same file as the search code and called the particular heuristic directly. The heuristics were FF4 of Smith and Grant [SG98] and a domain over forward-degree heuristic using the weighted degree strategy of Boussemart et al. [BHLS04]. The FF4 heuristic was not originally designed to be a ‘real’ heuristic but rather a tool for analyzing heuristic principles such as fail-firstness. (In this connection, I tend to think of it as a ‘flawed oracle’.) Hence, one does not normally count the constraint checks used in heuristic selection in gauging performance. But, here, since I am using it as a real heuristic, I have added in these constraint checks as well. (Because of time constraints, I did not have time to determine whether some of the consequent redundancy in constraint checking could be avoided.) Incidently, this heuristic was chosen because it, in fact, works quite well with MAC (it was originally used with forward checking, where it is not so impressive [SG98] [BPW04]), and it seems to handle problems that pose difficulties for classical heuristics quite well. (Perhaps because it is not as easily fooled.)

5 Environment and I/O

The solver normally runs either interactively or in batch mode, where it takes the same instructions from a command file. There is an i/o module that currently accepts two

kinds of problem formats, both involving extensional constraints. The top-level of the program (not used in the competition) is a menu-driven system. Different top-level commands either read in the next problem (and set up most of the global data structures), or generate the next problem, or call for a solver of some generic type (e.g. backtrack, hybrid tree search, local search). During this interactive process, after an algorithm is selected, further menu options allow the heuristic to be selected for the run.

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Tables, Barcharts, and Graphs

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Abstract. This invited paper presents detailed results for all problem classes and problem instances that were used during the First International CSP Solver Competition. It presents grand totals for all problems in a variety of different formats. It also presents tables, barcharts and graphs per problem class.

1 Introduction

This invited paper presents grand totals for all problems in a variety of different formats. It also presents tables, barcharts and graphs per problem class.

The paper is not intended to be a fine example of beautiful prose. Its only purpose is to list the results from the competition in a variety of different formats. All graphs and barcharts were generated using a hanfull of C programs and shell scripts. Most tables were also generated. Finally, the running text in this paper was generated using LaTeX macros.

Results in most tables, barcharts and graphs are listed for *solved* problems only. For example, a barchart listing the total solution time only lists the total solution time for solved problems. The only exception are barcharts listing the number of unsolved problems.

A description of the problems and how the problems were evaluated may be found elsewhere in these proceedings.

Grand totals for all problems are presented in section 2, tables with results per problem class may be found in section 3, barcharts with results per problem class may be found in section 4, and graphs with results per problem class may be found in section 5.

2 Overall Results

This section presents the overall results.

Grand totals Table 1 Presents the grand totals in table form for non-binary problems. For binary problems these results may be found in Table 2.

Tables Tables with information about solved problems per problem and problem class may be found in subsection 2.1.

SOTACs Tables with information about problem instances which were only solved by one solver may be found in subsection 2.2.

Barcharts Barcharts listing information per problem class may be found in subsection 2.3.

Graphs Graphs depicting the overall results may be found in subsection 2.4.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
Solved problems	98	99	26	53	67	71	71	51	70	56	55	90	90
Unsolved problems	50	49	122	95	81	77	77	97	78	92	93	58	58
Solution time	8038	10243	262	2541	1708	2331	2337	1958	1697	557	2141	4096	4197
Visited nodes	5703 E3	5822 E3	—	—	—	33680 E3	33680 E3	—	—	—	—	—	—
Consistency checks	7138 E6	10113 E6	—	—	—	13542 E6	13680 E6	—	—	—	—	—	—
Removed constraints	—	—	—	—	—	31	31	—	—	—	—	—	—

Table 1. Total results for solving all non-binary problems. The solution time is the total solution time for *solved* instances, the number of visited nodes is the total number of visited nodes for *solved* instances, the number of consistency checks is the total number of consistency checks for *solved* instances, and the number of removed constraints is the total number of removed universal constraints before search for *solved* instances. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
Solved problems	761	759	377	829	739	566	818	823	769	501	667	667	570	609	599	598
Unsolved problems	174	176	558	106	196	369	117	112	166	434	268	268	365	326	336	337
Solution time	19346	19188	19894	14083	15859	19949	16741	14816	8070	18594	18693	18363	16531	46941	13536	13273
Visited nodes	10438 E3	10002 E3	—	239321 E3	—	—	198235 E3	189697 E3	—	—	—	—	1224 E3	8083 E3	—	—
Consistency checks	2485 E6	3043 E6	—	115607 E6	—	—	87860 E6	72953 E6	—	—	—	—	10949 E6	8975 E6	—	—
Removed constraints	—	—	—	—	—	—	470965	487430	—	—	—	—	—	—	—	—

Table 2. Total results for solving all binary problems. The solution time is the total solution time for *solved* instances, the number of visited nodes is the total number of visited nodes for *solved* instances, the number of consistency checks is the total number of consistency checks for *solved* instances, and the number of removed constraints is the total number of removed universal constraints before search for *solved* instances. The maximum solution time was set to 600 seconds.

2.1 Tables with Coarse-grained Results

This section provides tables with coarse-grained results per problem class.

Solved Instances Results about the total number of solved instances per problem class may be found in Table 3 for non-binary problems and in Table 7–11 for binary problems.

Solution Time Results about the total solution time for solved instances per problem class may be found in Table 4 for non-binary problems and in Table 12–16 for binary problems.

Visited nodes Results about the total number of visited nodes for solved instances per problem class may be found in Table 5 for non-binary problems and in Table 17–21 for binary problems.

Consistency Checks Results about the total number of consistency checks for solved instances per problem class may be found in Table 6 for non-binary problems and in Table 22–26 for binary problems.

	#instances	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb-Golomb`	20	15	15	4	10	13	17	17	11	15	10	11	15	15
`nb-TSP-20-easy`	5	5	5	—	—	4	—	—	—	2	—	—	5	5
`nb-TSP-20-hard`	10	9	9	—	—	—	—	—	—	—	—	—	10	10
`nb-TSP-25-easy`	5	5	5	—	—	—	—	—	—	—	—	—	5	5
`nb-TSP-25-hard`	10	4	5	—	—	—	—	—	—	—	—	—	8	8
`nb-allSeries1`	20	11	11	10	12	20	11	11	13	20	20	19	20	20
`nb-cc1`	11	11	11	6	11	8	9	9	11	9	9	9	8	8
`nb-cril`	3	3	3	—	3	2	1	1	3	—	—	—	—	—
`nb-gr1`	10	8	8	3	4	6	9	9	5	8	6	7	6	6
`nb-ramsey3`	8	4	4	—	4	3	2	2	4	3	3	2	3	3
`nb-ramsey4`	5	5	5	2	5	4	—	—	2	1	—	—	1	1
`nb-random-3-20-20-60-632-forced`	10	10	10	—	2	2	10	10	—	3	—	—	1	1
`nb-random-3-24-24-76-632-forced`	10	1	1	—	—	—	4	4	—	—	—	—	—	—
`nb-random-3-28-28-93-632-forced`	10	—	—	—	—	—	—	—	—	—	—	—	—	—
`nb-renault`	1	1	1	—	—	1	1	1	—	—	—	—	1	1
`nb-schurr`	10	6	6	1	2	4	7	7	2	9	8	7	7	7
Grand total:		98	99	26	53	67	71	71	51	70	56	55	90	90

Table 3. Total number of solved instances per problem class. Class range: `nb-Golomb`–`nb-schurr`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb-Golomb`	20	962.53	1166.51	67.48	306.66	67.70	393.54	403.55	212.94	340.48	91.30	138.77	509.32	507.87
`nb-TSP-20-easy`	5	58.99	158.93	—	—	29.02	—	—	—	298.55	—	—	4.59	4.62
`nb-TSP-20-hard`	10	1488.58	1997.86	—	—	—	—	—	—	—	—	—	608.52	614.11
`nb-TSP-25-easy`	5	173.29	339.30	—	—	—	—	—	—	—	—	—	74.32	74.13
`nb-TSP-25-hard`	10	919.80	1805.75	—	—	—	—	—	—	—	—	—	1043.17	1051.56
`nb-allSeries1`	20	513.00	571.07	52.23	280.87	13.29	179.92	176.20	1112.33	7.25	61.73	389.60	9.50	9.28
`nb-cc1`	11	147.60	159.96	4.99	21.21	56.82	32.46	31.73	1.79	67.27	29.73	126.68	325.37	342.10
`nb-cril`	3	481.94	492.26	—	224.91	436.60	0.08	0.08	9.69	—	—	—	—	—
`nb-gr1`	10	393.80	512.12	99.16	1021.69	175.99	394.17	397.80	615.43	165.83	5.59	258.02	64.80	65.03
`nb-ramsey3`	8	31.16	27.75	—	6.60	30.19	0.34	0.35	4.65	28.88	40.02	477.21	344.64	402.86
`nb-ramsey4`	5	177.53	203.36	38.08	33.47	6.44	—	—	0.38	0.65	—	—	6.56	7.12
`nb-random-3-20-20-60-632-forced`	10	1698.56	1686.13	—	639.17	317.22	262.89	257.02	—	692.77	—	—	302.88	303.71
`nb-random-3-24-24-76-632-forced`	10	313.01	315.49	—	—	—	775.87	775.75	—	—	—	—	—	—
`nb-random-3-28-28-93-632-forced`	10	—	—	—	—	—	—	—	—	—	—	—	—	—
`nb-renault`	1	50.90	78.24	—	—	4.58	0.67	0.44	—	—	—	—	9.26	6.25
`nb-schurr`	10	627.19	728.60	0.46	5.93	570.00	290.64	294.35	0.37	94.83	328.63	751.14	792.98	808.42
Grand total:		8037.91	10243.36	262.40	2540.52	1707.86	2330.57	2337.28	1957.60	1696.50	557.01	2141.42	4095.89	4197.04

Table 4. Total solution time required for solved instances per problem class. Class range: `nb-Golomb`–`nb-schurr`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb-Golomb`	20	99403	103611	—	—	—	1637533	1637533	—	—	—	—	—	—
`nb-TSP-20-easy`	5	1295	670	—	—	—	—	—	—	—	—	—	—	—
`nb-TSP-20-hard`	10	128555	155298	—	—	—	—	—	—	—	—	—	—	—
`nb-TSP-25-easy`	5	8865	18366	—	—	—	—	—	—	—	—	—	—	—
`nb-TSP-25-hard`	10	78716	158670	—	—	—	—	—	—	—	—	—	—	—
`nb-allSeries1`	20	703193	703193	—	—	—	18815383	18815383	—	—	—	—	—	—
`nb-cc1`	11	52700	52700	—	—	—	388813	388813	—	—	—	—	—	—
`nb-cril`	3	2173547	2173508	—	—	—	602	602	—	—	—	—	—	—
`nb-gr1`	10	33258	32219	—	—	—	1708753	1708753	—	—	—	—	—	—
`nb-ramsey3`	8	1287	1287	—	—	—	9245	9245	—	—	—	—	—	—
`nb-ramsey4`	5	22644	22644	—	—	—	—	—	—	—	—	—	—	—
`nb-random-3-20-20-60-632-forced`	10	1025808	1025808	—	—	—	2490600	2490600	—	—	—	—	—	—
`nb-random-3-24-24-76-632-forced`	10	106226	106226	—	—	—	5427711	5427711	—	—	—	—	—	—
`nb-random-3-28-28-93-632-forced`	10	—	—	—	—	—	—	—	—	—	—	—	—	—
`nb-renault`	1	101	101	—	—	—	15909	15909	—	—	—	—	—	—
`nb-schurr`	10	1267608	1267608	—	—	—	3184962	3184962	—	—	—	—	—	—
Grand total:		5703206	5821909	—	—	—	33679511	33679511	—	—	—	—	—	—

Table 5. Total number of visited node required for solved instances per problem class. Class range: `nb-Golomb`–`nb-schurr`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb-Golomb	20	632291685	842348717	—	—	—	3616343721	3722517893	—	—	—	—	—	—
nb-TSP-20-easy	5	39014399	214814876	—	—	—	—	—	—	—	—	—	—	—
nb-TSP-20-hard	10	2263159063	3071490251	—	—	—	—	—	—	—	—	—	—	—
nb-TSP-25-easy	5	171639483	476829900	—	—	—	—	—	—	—	—	—	—	—
nb-TSP-25-hard	10	1307129449	2547451808	—	—	—	—	—	—	—	—	—	—	—
nb-allSeries1	20	294827363	296507210	—	—	—	1055009841	1055280111	—	—	—	—	—	—
nb-cc1	11	10470896	10743005	—	—	—	34012376	34012376	—	—	—	—	—	—
nb-cril	3	395060430	395212713	—	—	—	4237	4243	—	—	—	—	—	—
nb-gr1	10	265269557	433314303	—	—	—	3081156090	3112526799	—	—	—	—	—	—
nb-ramsey3	8	73476	122674	—	—	—	293318	293318	—	—	—	—	—	—
nb-ramsey4	5	5117337	6490671	—	—	—	—	—	—	—	—	—	—	—
nb-random-3-20-20-60-632-forced	10	1065767570	1069037449	—	—	—	1333775512	1333775512	—	—	—	—	—	—
nb-random-3-24-24-76-632-forced	10	194301612	194901439	—	—	—	3590906839	3590906839	—	—	—	—	—	—
nb-random-3-28-28-93-632-forced	10	—	—	—	—	—	—	—	—	—	—	—	—	—
nb-renault	1	78646203	137429911	—	—	—	652285	653882	—	—	—	—	—	—
nb-schurr	10	415419691	416515944	—	—	—	829682753	829682753	—	—	—	—	—	—
Grand total:		7138188214	10113210871	—	—	—	13541836972	13679653726	—	—	—	—	—	—

Table 6. Total number of consistency checks required for solved instances per problem class. Class range: `nb-Golomb`–`nb-schurr`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
BH-4-4	10	10	10	10	10	10	10	10	10	10	—	—	—	—	10	—	—
QCP-10-easy	5	5	5	—	5	5	—	5	5	5	5	5	5	5	5	5	5
QCP-10-hard	5	5	5	—	5	5	—	5	5	5	5	5	5	4	5	5	5
QCP-10	5	5	5	5	5	5	—	5	5	5	3	3	3	2	5	5	5
QCP-15-easy	5	5	5	—	5	5	—	5	5	5	4	4	4	2	4	4	4
QCP-15-hard	10	10	10	—	10	10	—	10	10	10	6	6	6	3	5	4	4
QCP-15	5	4	4	5	5	5	—	5	5	5	—	—	—	1	3	—	—
QCP-20-easy	5	2	2	—	3	5	—	3	3	5	—	—	—	1	—	—	—
QCP-20-hard	10	—	—	—	3	10	—	3	3	8	—	—	—	—	—	—	—
QCP-20	5	1	1	4	1	5	—	1	1	5	—	—	—	—	—	—	—
QCP-25-easy	3	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
QCP-25-hard	9	—	—	—	—	3	—	—	—	1	—	—	—	—	—	—	—
QCP-25	5	1	1	—	1	3	—	1	1	3	—	—	—	—	—	—	—
QCPp-10-easy	5	5	5	—	5	5	—	5	5	5	5	5	5	5	5	5	5
QCPp-10-hard	10	10	10	—	10	10	—	10	10	10	9	10	10	10	10	7	7
QCPp-10	5	5	5	5	5	5	—	5	5	5	1	2	2	1	5	1	1
QCPp-15-easy	5	5	5	—	5	5	—	5	5	5	4	2	2	5	4	4	4
QCPp-15-hard	6	6	6	—	6	6	—	6	6	6	4	2	2	2	5	5	4
QCPp-15	5	5	5	5	5	5	—	5	5	5	1	1	1	1	4	1	1
QCPp-20-easy	5	4	4	—	5	5	—	4	4	5	—	2	2	1	2	1	1

Table 7. Total number of solved instances per problem class. Class range: BH-4-4–QCPp-20-easy. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
QCPp-20-hard	5	5	5	—	5	5	—	4	4	5	—	—	—	2	5	2	2
QCPp-20	4	4	4	4	4	4	—	4	4	4	—	—	—	—	3	—	—
QWH-10-easy	5	5	5	—	5	5	—	5	5	5	5	5	5	5	5	5	5
QWH-10-hard	5	5	5	—	5	5	—	5	5	5	5	5	5	5	5	5	5
QWH-15-easy	5	5	5	—	5	5	—	5	5	5	5	5	5	5	5	5	5
QWH-15-hard	9	9	9	—	9	9	—	9	9	9	9	9	9	8	8	9	9
QWH-20-easy	5	5	5	—	5	5	—	5	5	5	4	3	3	2	3	2	2
QWH-20-hard	10	4	4	—	10	10	—	10	10	10	2	2	2	—	—	—	—
QWH-25-easy	5	2	—	—	4	5	—	3	4	5	—	1	1	—	—	—	—
QWH-25-hard	11	—	—	—	—	11	—	—	—	8	—	—	—	—	—	—	—
QWHp-10-easy	5	5	5	—	5	5	—	5	5	5	5	5	5	5	5	5	5
QWHp-10-hard	10	10	10	—	10	10	—	10	10	10	10	10	10	10	10	10	10
QWHp-15-easy	5	5	5	—	5	5	—	5	5	5	2	3	3	4	5	4	4
QWHp-15-hard	1	1	1	—	1	1	—	1	1	1	1	1	1	1	1	—	—
bqwh15-106	19	19	19	—	19	19	19	19	19	19	19	19	19	19	19	19	19
bqwh18-141	19	19	19	—	19	19	15	19	19	19	19	17	17	16	16	14	14
composed-25-1-25	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
composed-25-1-2	10	10	10	10	10	10	10	10	10	10	8	10	10	10	10	10	10
composed-25-1-40	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
composed-25-1-80	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Table 8. Total number of solved instances per problem class. Class range: `QCPp-20-hard`–`composed-25-1-80`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-10-20	10	10	10	10	10	10	9	10	10	10	6	9	9	9	10	5	5
composed-75-1-25	10	10	10	10	10	10	10	10	10	10	7	10	10	10	10	10	10
composed-75-1-2	10	10	10	10	10	10	10	10	10	10	7	10	10	10	10	10	10
composed-75-1-40	10	10	10	10	10	10	10	10	10	10	9	10	10	10	10	10	10
composed-75-1-80	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
cril	5	5	5	2	2	3	1	2	5	4	—	1	1	2	—	1	1
domino1	10	10	10	5	10	9	10	10	10	5	10	10	10	5	5	10	10
ehi-85	100	100	100	100	100	100	95	100	100	100	55	96	96	96	99	94	94
ehi-90	100	100	100	100	100	100	91	100	100	100	49	98	98	99	97	95	95
fapp01	11	11	11	—	11	4	11	11	11	—	—	—	—	—	—	—	—
fapp02	11	—	—	—	11	—	9	11	11	—	—	—	—	—	—	—	—
frb30-15	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5
frb35-17	5	5	5	1	5	2	2	5	5	5	5	5	5	5	4	5	5
frb40-19	5	5	5	—	5	—	—	5	5	1	5	4	4	—	—	—	—
frb45-21	5	1	1	—	5	—	—	3	2	—	—	1	1	—	—	1	1
frb50-23	5	—	—	—	1	—	—	1	1	—	—	—	—	—	—	—	—
frb53-24	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb56-25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb59-26	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
geom	100	92	92	—	100	84	85	100	100	88	86	83	83	78	86	79	79

Table 9. Total number of solved instances per problem class. Class range: `composed-25-10-20`–`geom`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi1`	5	5	5	—	5	3	5	5	5	3	4	4	4	4	4	5	5
`js-e0ddr1`	10	10	10	—	9	9	5	7	7	10	4	6	6	6	4	3	3
`js-e0ddr2`	10	10	10	—	7	5	5	7	7	10	4	5	5	7	4	5	5
`js-enddr1`	10	10	10	—	10	10	9	9	9	10	9	9	9	9	8	9	9
`js-enddr2`	6	6	6	—	5	6	5	4	4	6	2	5	5	5	3	4	4
`js-ewddr2`	10	10	10	—	10	10	10	10	10	10	—	10	10	10	10	9	9
`lsq-dg1`	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
`marc`	10	—	—	—	10	—	10	10	10	—	—	10	10	—	—	—	—
`pigeons`	20	7	7	9	8	5	9	8	8	9	8	20	20	6	7	7	7
`qa1`	8	3	3	3	4	3	2	4	4	4	3	3	3	3	3	3	3
`qk1`	18	18	18	3	14	—	15	16	18	18	10	10	10	10	12	10	10
`random-23-23-253`	10	1	1	—	10	—	—	10	10	1	1	10	10	1	1	1	1
`random-24-24-276`	10	2	2	—	10	—	—	10	10	—	—	10	10	—	—	2	2
`random-25-25-300`	10	2	2	—	10	—	—	10	10	—	—	3	3	—	—	—	—
`random-26-26-325`	10	1	1	—	4	—	—	2	2	—	—	—	—	—	—	—	—
`random-27-27-351`	10	—	—	—	3	—	—	1	1	—	—	—	—	—	—	—	—
`rlfapGraphs`	14	14	14	2	14	11	14	14	14	14	7	14	14	—	—	14	14
`rlfapModGraphs`	12	12	12	7	12	9	6	12	12	11	3	2	2	—	—	3	3
`rlfapModScens`	14	14	14	7	14	14	13	14	14	14	5	6	6	—	—	7	7
`rlfapScens11`	9	5	5	—	4	5	—	4	4	7	—	—	—	—	—	—	—

Table 10. Total number of solved instances per problem class. Class range: `hanoi1`–`rlfapScens11`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`rlfapScens`	11	11	11	1	11	11	11	11	11	11	11	11	11	—	—	10	10
Grand total:		761	759	377	829	739	566	818	823	769	501	667	667	570	609	599	598

Table 11. Total number of solved instances per problem class. Class range: `BH-4-4`–`rlfapScens`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
BH-4-4	10	196.46	198.52	30.21	2.25	52.83	46.25	1.69	1.79	2.76	—	—	—	—	752.58	—	—
QCP-10-easy	5	33.06	38.60	—	0.50	6.78	—	0.75	0.84	0.21	1.02	0.76	0.75	10.49	8.13	0.83	0.83
QCP-10-hard	5	35.34	39.53	—	0.57	11.22	—	1.39	0.97	0.50	0.88	4.59	4.49	24.58	8.36	3.34	3.62
QCP-10	5	34.59	41.10	7.34	0.50	7.10	—	0.74	0.84	0.23	7.16	78.53	77.49	3.13	19.50	450.60	480.41
QCP-15-easy	5	298.66	269.55	—	5.54	15.26	—	3.60	4.84	2.95	49.58	744.13	715.24	486.36	172.99	430.59	445.94
QCP-15-hard	10	907.79	771.76	—	102.50	40.33	—	473.83	482.08	16.17	472.56	755.82	720.56	715.42	574.71	307.28	321.81
QCP-15	5	506.40	506.60	27.98	491.22	14.94	—	32.71	34.51	3.10	—	—	—	21.83	77.20	—	—
QCP-20-easy	5	319.59	337.44	—	56.20	36.34	—	117.54	122.46	108.48	—	—	—	434.06	—	—	—
QCP-20-hard	10	—	—	—	923.48	165.19	—	992.22	986.97	545.15	—	—	—	—	—	—	—
QCP-20	5	73.60	41.66	981.11	0.49	479.79	—	1.22	4.87	209.78	—	—	—	—	—	—	—
QCP-25-easy	3	—	—	—	—	129.36	—	—	—	—	—	—	—	—	—	—	—
QCP-25-hard	9	—	—	—	—	915.02	—	—	—	105.62	—	—	—	—	—	—	—
QCP-25	5	92.37	101.10	—	1.50	17.93	—	2.75	7.55	4.24	—	—	—	—	—	—	—
QCPp-10-easy	5	35.40	38.49	—	0.50	6.83	—	0.76	0.86	0.20	0.55	37.54	35.32	9.79	8.27	1.02	1.05
QCPp-10-hard	10	69.77	78.48	—	1.22	13.05	—	1.50	1.67	0.37	517.83	232.29	228.23	20.37	14.72	2.95	3.07
QCPp-10	5	36.18	42.51	6.97	0.51	7.01	—	0.77	0.86	0.21	45.08	152.72	148.42	1.61	34.64	141.17	150.97
QCPp-15-easy	5	66.11	80.81	—	0.74	13.09	—	7.50	9.17	0.81	504.91	0.93	0.91	155.21	609.53	8.92	9.31
QCPp-15-hard	6	84.57	103.08	—	106.06	16.30	—	150.78	151.71	1.46	58.20	98.70	90.19	152.24	184.30	970.58	390.77
QCPp-15	5	197.07	206.20	23.04	4.59	13.01	—	4.90	6.35	0.58	0.14	0.29	0.31	14.84	233.13	0.45	0.45
QCPp-20-easy	5	213.55	239.46	—	89.08	21.01	—	6.92	12.67	148.37	—	220.25	208.98	196.39	399.20	36.74	37.79

Table 12. Total solution time required for solved instances per problem class. Class range: `BH-4-4`–`QCPp-20-easy`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
QCPp-20-hard	5	155.00	187.15	—	1.51	20.40	—	4.77	10.99	11.57	—	—	—	412.25	1216.67	108.21	111.09
QCPp-20	4	88.03	113.33	49.47	1.67	14.24	—	4.47	10.27	1.11	—	—	—	—	994.12	—	—
QWH-10-easy	5	36.72	38.37	—	0.56	12.30	—	1.56	0.89	0.52	0.40	0.41	0.41	8.49	6.92	1.63	3.97
QWH-10-hard	5	35.98	37.70	—	0.58	13.79	—	1.70	0.85	0.61	0.39	0.43	0.52	8.57	9.76	0.94	0.93
QWH-15-easy	5	70.02	82.11	—	0.82	13.50	—	2.20	3.92	0.76	2.15	2.77	2.68	374.30	100.21	7.37	7.73
QWH-15-hard	9	165.12	239.38	—	2.78	26.92	—	5.84	8.59	2.91	123.88	45.21	43.52	1135.03	456.88	1319.56	1377.62
QWH-20-easy	5	767.38	990.87	—	2.88	19.27	—	13.43	17.87	2.57	324.34	146.55	141.73	476.17	724.22	387.83	400.19
QWH-20-hard	10	554.97	469.56	—	449.60	70.46	—	908.48	525.42	43.22	562.97	722.45	697.56	—	—	—	—
QWH-25-easy	5	1083.55	—	—	603.63	33.34	—	573.60	588.55	13.39	—	389.47	371.65	—	—	—	—
QWH-25-hard	11	—	—	—	—	1306.40	—	—	—	1238.53	—	—	—	—	—	—	—
QWHp-10-easy	5	34.43	39.00	—	0.48	6.59	—	0.76	0.86	0.17	0.39	0.31	0.29	18.68	5.85	3.31	6.40
QWHp-10-hard	10	64.46	75.66	—	0.96	12.46	—	1.50	1.70	0.34	1.35	0.42	0.42	226.11	11.14	124.94	135.01
QWHp-15-easy	5	63.90	76.63	—	0.74	12.69	—	2.15	3.63	0.61	5.99	1.97	2.31	93.75	120.88	99.95	104.41
QWHp-15-hard	1	12.99	15.00	—	0.14	2.37	—	0.41	0.75	0.11	3.22	144.05	138.21	18.01	12.98	—	—
bqwh15-106	19	187.90	187.00	—	2.36	38.23	56.71	3.94	3.85	0.89	15.83	30.45	29.43	201.84	293.33	161.20	177.59
bqwh18-141	19	571.39	347.81	—	13.31	49.33	813.05	37.36	25.35	2.53	843.24	1328.33	1280.33	1519.26	2749.63	1955.31	2147.36
composed-25-1-25	10	63.34	68.42	16.37	0.98	19.17	0.80	1.06	0.96	0.44	1.25	0.37	0.37	2.07	19.67	1.61	1.60
composed-25-1-2	10	51.00	71.18	15.18	0.96	18.71	0.74	1.01	0.92	0.42	0.96	0.35	0.36	1.88	19.40	1.63	1.52
composed-25-1-40	10	67.50	69.22	16.92	0.99	19.26	0.82	1.10	0.98	0.45	1.27	0.38	0.38	2.09	18.93	1.70	1.67
composed-25-1-80	10	65.06	74.98	17.18	1.01	19.85	0.92	1.16	1.04	0.46	1.32	0.42	0.41	2.41	18.52	1.81	1.80

Table 13. Total solution time required for solved instances per problem class. Class range: QCPp-20-hard–composed-25-1-80. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-10-20	10	108.08	125.34	1631.63	1.15	31.87	2.68	1.71	2.09	1.36	6.44	53.61	54.56	27.83	72.88	7.32	7.82
composed-75-1-25	10	87.56	99.57	37.54	1.25	22.71	1.70	1.85	1.54	1.04	1.72	0.83	0.82	5.05	129.86	3.23	3.20
composed-75-1-2	10	95.07	104.02	35.99	1.21	22.78	1.65	1.71	1.52	1.01	1.71	0.80	0.80	4.95	131.48	3.21	3.12
composed-75-1-40	10	91.51	106.74	37.71	1.28	22.80	1.75	1.93	1.57	1.04	2.24	0.82	0.84	5.12	125.11	6.29	3.26
composed-75-1-80	10	87.86	124.41	37.45	1.30	22.72	1.83	1.98	1.86	1.05	2.54	0.86	0.87	5.58	93.29	3.41	3.41
cril	5	538.91	479.00	17.17	73.57	66.84	0.40	107.86	123.96	175.31	—	0.19	0.19	3.41	—	0.78	0.75
domino1	10	194.70	189.71	451.26	41.12	1340.09	107.21	185.17	185.54	115.53	385.60	2.65	1.29	729.40	731.33	4.93	5.66
ehi-85	100	1413.00	1323.00	5307.12	251.07	330.57	5432.31	470.10	51.88	95.86	5593.62	1080.58	1094.63	671.37	15150.71	718.79	740.98
ehi-90	100	1467.20	1347.00	5640.38	250.79	322.39	4212.17	487.09	54.85	103.57	1997.68	1355.74	1356.31	745.10	14918.64	47.65	47.90
fapp01	11	331.57	435.20	—	64.55	1685.94	739.38	23.04	91.97	—	—	—	—	—	—	—	—
fapp02	11	—	—	—	638.91	—	1725.35	228.37	262.28	—	—	—	—	—	—	—	—
frb30-15	5	47.16	51.50	383.79	1.26	179.33	138.18	3.94	3.26	49.27	7.27	22.09	20.85	312.47	126.11	154.33	116.32
frb35-17	5	227.59	230.70	46.36	7.95	186.49	328.35	13.92	14.13	619.85	77.21	58.86	59.33	750.74	972.21	379.55	378.93
frb40-19	5	651.82	658.17	—	95.89	—	—	378.75	363.63	7.29	1018.04	974.80	993.63	—	—	—	—
frb45-21	5	100.58	100.43	—	932.35	—	—	962.35	390.67	—	—	87.35	86.68	—	—	516.03	510.85
frb50-23	5	—	—	—	43.78	—	—	182.92	187.05	—	—	—	—	—	—	—	—
frb53-24	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb56-25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb59-26	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
geom	100	2583.13	2835.44	—	557.42	830.06	1491.61	1130.83	1141.38	2030.24	3186.04	1281.93	1318.66	2738.91	2572.52	1726.28	1730.55

Table 14. Total solution time required for solved instances per problem class. Class range: `composed-25-10-20`–`geom`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi1`	5	71.91	72.40	—	166.30	356.60	234.93	5.17	4.99	6.61	0.77	23.78	24.14	32.70	31.28	1.63	1.58
`js-e0ddr1`	10	107.00	156.01	—	993.37	320.61	61.49	401.58	406.05	76.67	36.59	263.49	263.00	230.76	26.74	36.87	23.75
`js-e0ddr2`	10	103.09	155.85	—	7.55	936.70	304.24	215.59	217.08	185.53	54.67	27.19	27.04	365.89	36.62	72.61	64.35
`js-enddr1`	10	96.57	146.83	—	180.17	174.11	122.22	6.34	8.38	63.59	93.10	37.88	37.72	371.63	285.95	97.45	97.36
`js-enddr2`	6	59.95	94.51	—	44.63	960.74	73.78	196.83	198.15	52.35	81.03	51.32	50.82	280.94	30.23	154.09	152.34
`js-ewddr2`	10	100.76	156.30	—	12.04	652.60	154.30	25.83	29.64	82.26	—	57.75	59.02	597.92	110.54	167.58	136.40
`lsq-dg1`	5	23.58	27.13	3.26	0.46	5.27	4.63	0.47	0.49	0.15	1.38	0.13	0.12	15.97	23.89	15.66	14.12
`marc`	10	—	—	—	170.74	—	1631.65	17.42	16.45	—	—	854.27	843.89	—	—	—	—
`pigeons`	20	287.67	279.03	457.50	82.56	316.67	618.82	139.26	140.36	563.59	373.69	0.38	0.36	71.83	467.14	524.07	544.92
`qa1`	8	95.60	113.61	9.84	78.90	35.09	0.72	154.77	210.26	29.83	30.59	15.98	15.89	366.40	370.91	475.21	484.05
`qk1`	18	217.45	178.12	1709.77	77.82	—	1301.38	623.86	7.02	109.85	210.33	194.81	198.91	1106.21	399.37	511.57	509.92
`random-23-23-253`	10	17.80	20.02	—	387.50	—	—	632.51	626.71	153.45	229.08	1983.65	1927.82	343.24	257.71	119.44	119.84
`random-24-24-276`	10	123.81	127.39	—	978.45	—	—	1695.80	1701.62	—	—	4202.80	4207.13	—	—	984.02	990.06
`random-25-25-300`	10	774.94	760.69	—	2085.99	—	—	4200.26	4271.87	—	—	814.51	671.31	—	—	—	—
`random-26-26-325`	10	588.46	573.86	—	1252.46	—	—	340.30	339.22	—	—	—	—	—	—	—	—
`random-27-27-351`	10	—	—	—	1229.44	—	—	157.26	158.86	—	—	—	—	—	—	—	—
`rlfapGraphs`	14	228.66	359.02	93.43	9.50	928.44	43.16	14.43	112.64	123.48	11.38	48.96	50.02	—	—	75.85	47.22
`rlfapModGraphs`	12	352.96	529.78	1257.13	13.40	889.34	55.12	19.68	39.93	117.35	1.28	0.49	0.49	—	—	1.73	2.26
`rlfapModScens`	14	217.45	292.29	1484.87	12.58	872.52	57.64	19.57	33.75	42.26	106.96	7.24	7.19	—	—	170.28	182.57
`rlfapScens11`	9	321.14	373.55	—	452.29	193.45	—	312.12	325.59	643.06	—	—	—	—	—	—	—

Table 15. Total solution time required for solved instances per problem class. Class range: `hanoi1`–`rlfapScens11`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`rlfapScens`	11	191.72	242.74	59.78	8.12	440.24	181.31	10.44	49.73	144.46	1536.42	47.16	47.64	—	—	24.39	24.78
Grand total:		19345.52	19187.61	19893.74	14082.53	15858.66	19949.23	16741.11	14816.39	8069.71	18594.25	18693.75	18363.48	16530.64	46940.88	13535.73	13273.20

Table 16. Total solution time required for solved instances per problem class. Class range: `BH-4-4`–`rlfapScens`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
BH-4-4	10	92530	92530	—	86610	—	—	144680	144680	—	—	—	—	—	86610	—	—
QCP-10-easy	5	727	727	—	611	—	—	363	363	—	—	—	—	522	842	—	—
QCP-10-hard	5	684	684	—	1123	—	—	11663	11663	—	—	—	—	1053	838	—	—
QCP-10	5	1641	1641	—	1514	—	—	1660	1660	—	—	—	—	39	1611	—	—
QCP-15-easy	5	71868	71868	—	100983	—	—	35341	35341	—	—	—	—	4139	7817	—	—
QCP-15-hard	10	264337	219420	—	2040831	—	—	11140057	11143506	—	—	—	—	5960	26911	—	—
QCP-15	5	137757	137757	—	12190508	—	—	831218	831218	—	—	—	—	78	1687	—	—
QCP-20-easy	5	56905	56905	—	656010	—	—	1859604	1859604	—	—	—	—	1328	—	—	—
QCP-20-hard	10	—	—	—	9533728	—	—	14744654	14744654	—	—	—	—	—	—	—	—
QCP-20	5	13585	5369	—	8017	—	—	4291	29421	—	—	—	—	—	—	—	—
QCP-25-easy	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
QCP-25-hard	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
QCP-25	5	9827	9827	—	18518	—	—	7021	7021	—	—	—	—	—	—	—	—
QCPp-10-easy	5	722	722	—	560	—	—	1528	1528	—	—	—	—	520	890	—	—
QCPp-10-hard	10	1506	1506	—	34828	—	—	1123	1123	—	—	—	—	1027	1493	—	—
QCPp-10	5	1672	1672	—	4614	—	—	4432	4432	—	—	—	—	19	3426	—	—
QCPp-15-easy	5	3920	3920	—	2940	—	—	221193	221193	—	—	—	—	1647	38164	—	—
QCPp-15-hard	6	7449	7449	—	5537669	—	—	6969106	6969106	—	—	—	—	1426	8395	—	—
QCPp-15	5	44539	44523	—	266915	—	—	179018	179004	—	—	—	—	31	6102	—	—
QCPp-20-easy	5	37280	37280	—	1722681	—	—	72677	72677	—	—	—	—	650	4179	—	—

Table 17. Total number of visited node required for solved instances per problem class. Class range: BH-4-4–QCPp-20-easy. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
QCPp-20-hard	5	20998	20998	—	9354	—	—	13121	13121	—	—	—	—	1418	10500	—	—
QCPp-20	4	5126	5126	—	29011	—	—	13613	13613	—	—	—	—	—	6586	—	—
QWH-10-easy	5	849	760	—	736	—	—	406	333	—	—	—	—	529	864	—	—
QWH-10-hard	5	787	789	—	657	—	—	559	417	—	—	—	—	527	1426	—	—
QWH-15-easy	5	7136	6385	—	5565	—	—	3462	4263	—	—	—	—	3301	4249	—	—
QWH-15-hard	9	27267	46664	—	47970	—	—	47532	60559	—	—	—	—	9655	23180	—	—
QWH-20-easy	5	117357	140141	—	31941	—	—	124921	41655	—	—	—	—	1482	8709	—	—
QWH-20-hard	10	91458	76082	—	4910702	—	—	13551127	7454877	—	—	—	—	—	—	—	—
QWH-25-easy	5	101552	—	—	4207057	—	—	6163638	6680136	—	—	—	—	—	—	—	—
QWH-25-hard	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
QWHp-10-easy	5	598	734	—	636	—	—	1279	425	—	—	—	—	918	595	—	—
QWHp-10-hard	10	1036	1043	—	1789	—	—	571	573	—	—	—	—	10254	1044	—	—
QWHp-15-easy	5	2443	2395	—	4305	—	—	4084	4118	—	—	—	—	1162	5987	—	—
QWHp-15-hard	1	508	238	—	294	—	—	187	120	—	—	—	—	225	454	—	—
bqwh15-106	19	28119	22088	—	28371	—	—	29307	20228	—	—	—	—	8536	28678	—	—
bqwh18-141	19	340231	137719	—	256942	—	—	714909	462274	—	—	—	—	36338	143278	—	—
composed-25-1-25	10	686	0	—	5811	—	—	4240	0	—	—	—	—	86	4327	—	—
composed-25-1-2	10	900	0	—	6993	—	—	5316	0	—	—	—	—	86	5179	—	—
composed-25-1-40	10	748	0	—	5376	—	—	3954	0	—	—	—	—	86	4101	—	—
composed-25-1-80	10	566	0	—	3550	—	—	2451	0	—	—	—	—	86	2888	—	—

Table 18. Total number of visited node required for solved instances per problem class. Class range: `QCPp-20-hard`–`composed-25-1-80`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-10-20	10	2350	1102	—	3575	—	—	7234	2781	—	—	—	—	1394	6818	—	—
composed-75-1-25	10	1599	0	—	15272	—	—	11023	0	—	—	—	—	86	10043	—	—
composed-75-1-2	10	1724	0	—	17636	—	—	12234	0	—	—	—	—	86	10919	—	—
composed-75-1-40	10	1085	0	—	13476	—	—	9719	0	—	—	—	—	86	8763	—	—
composed-75-1-80	10	638	0	—	7360	—	—	5712	0	—	—	—	—	86	5298	—	—
cril	5	33811	32025	—	1652088	—	—	1072090	1198138	—	—	—	—	17	—	—	—
domino1	10	3700	3700	—	3690	—	—	0	0	—	—	—	—	900	900	—	—
ehi-85	100	34316	0	—	177237	—	—	229943	6	—	—	—	—	707	119582	—	—
ehi-90	100	32780	0	—	167291	—	—	219113	6	—	—	—	—	721	93282	—	—
fapp01	11	1733	1726	—	1336	—	—	1300	1301	—	—	—	—	—	—	—	—
fapp02	11	—	—	—	148857	—	—	23553	4280	—	—	—	—	—	—	—	—
frb30-15	5	7691	7691	—	10622	—	—	20468	20468	—	—	—	—	27876	17043	—	—
frb35-17	5	108285	108285	—	85499	—	—	80617	80617	—	—	—	—	56459	110897	—	—
frb40-19	5	322952	322952	—	842684	—	—	1860025	1860025	—	—	—	—	—	—	—	—
frb45-21	5	38348	38348	—	5768765	—	—	4011402	1613184	—	—	—	—	—	—	—	—
frb50-23	5	—	—	—	243313	—	—	664381	664381	—	—	—	—	—	—	—	—
frb53-24	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb56-25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb59-26	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
geom	100	571938	571938	—	3049803	—	—	3863166	3863166	—	—	—	—	86354	117814	—	—

Table 19. Total number of visited node required for solved instances per problem class. Class range: `composed-25-10-20`–`geom`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi1`	5	238	238	—	228	—	—	0	0	—	—	—	—	112	112	—	—
`js-e0ddr1`	10	5224	5224	—	50452139	—	—	5861617	5861617	—	—	—	—	300	200	—	—
`js-e0ddr2`	10	1796	1796	—	10132	—	—	3581086	3581086	—	—	—	—	358	200	—	—
`js-enddr1`	10	1446	1446	—	5880778	—	—	24766	24766	—	—	—	—	450	17564	—	—
`js-enddr2`	6	683	683	—	1720205	—	—	2052246	2052246	—	—	—	—	250	150	—	—
`js-ewddr2`	10	566	566	—	618	—	—	213831	213831	—	—	—	—	500	500	—	—
`lsq-dg1`	5	1433	1433	—	4404	—	—	4421	4421	—	—	—	—	1368	4028	—	—
`marc`	10	—	—	—	875	—	—	440	0	—	—	—	—	—	—	—	—
`pigeons`	20	6969227	6969227	—	75526560	—	—	75526560	75526560	—	—	—	—	702949	6938249	—	—
`qa1`	8	88118	88118	—	1391203	—	—	2644695	3641779	—	—	—	—	50873	99876	—	—
`qk1`	18	18976	5908	—	453489	—	—	814838	0	—	—	—	—	159654	38907	—	—
`random-23-23-253`	10	5427	5427	—	3914354	—	—	3918401	3918401	—	—	—	—	38990	41181	—	—
`random-24-24-276`	10	49516	49516	—	8766394	—	—	9639567	9639567	—	—	—	—	—	—	—	—
`random-25-25-300`	10	325901	325901	—	16392168	—	—	20964172	20964172	—	—	—	—	—	—	—	—
`random-26-26-325`	10	228411	228411	—	8631113	—	—	1541077	1541077	—	—	—	—	—	—	—	—
`random-27-27-351`	10	—	—	—	7740619	—	—	659989	659989	—	—	—	—	—	—	—	—
`rlfapGraphs`	14	4395	4396	—	4033	—	—	4531	5493	—	—	—	—	—	—	—	—
`rlfapModGraphs`	12	32593	25955	—	109974	—	—	96754	56076	—	—	—	—	—	—	—	—
`rlfapModScens`	14	5467	4828	—	151650	—	—	103792	106859	—	—	—	—	—	—	—	—
`rlfapScens11`	9	35144	35144	—	4187780	—	—	1571948	1572736	—	—	—	—	—	—	—	—

Table 20. Total number of visited node required for solved instances per problem class. Class range: `hanoi1`–`rlfapScens11`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`rlfapScens`	11	5466	4572	—	7842	—	—	3678	3525	—	—	—	—	—	—	—	—
Grand total:		10438291	10001518	—	239320782	—	—	198234695	189697460	—	—	—	—	1223704	8083336	—	—

Table 21. Total number of visited node required for solved instances per problem class. Class range: `BH-4-4`–`rlfapScens`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
BH-4-4	10	56767688	57443285	—	2293452	—	—	2549274	3075534	—	—	—	—	—	294819597	—	—
QCP-10-easy	5	55080	207686	—	109535	—	—	93191	194437	—	—	—	—	2033897	542234	—	—
QCP-10-hard	5	53610	224189	—	124072	—	—	411791	519962	—	—	—	—	5944029	728506	—	—
QCP-10	5	156764	316337	—	125460	—	—	131843	249658	—	—	—	—	554813	2763132	—	—
QCP-15-easy	5	6823138	7131798	—	4249300	—	—	2183958	2424445	—	—	—	—	64629649	13056574	—	—
QCP-15-hard	10	31383723	26304595	—	82346140	—	—	670019157	670737513	—	—	—	—	97774911	53101936	—	—
QCP-15	5	17442991	17688476	—	438345357	—	—	47187674	47422297	—	—	—	—	2493705	5197468	—	—
QCP-20-easy	5	6515279	6770002	—	29009504	—	—	124511473	124827840	—	—	—	—	59101512	—	—	—
QCP-20-hard	10	—	—	—	462728462	—	—	1019018271	1019322142	—	—	—	—	—	—	—	—
QCP-20	5	1392516	590435	—	326569	—	—	365891	2304102	—	—	—	—	—	—	—	—
QCP-25-easy	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
QCP-25-hard	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
QCP-25	5	1049944	1182423	—	765209	—	—	659951	854395	—	—	—	—	—	—	—	—
QCPp-10-easy	5	49147	189028	—	103388	—	—	130528	227796	—	—	—	—	1939046	681160	—	—
QCPp-10-hard	10	109719	418261	—	895372	—	—	199318	409355	—	—	—	—	4523605	1136247	—	—
QCPp-10	5	151680	304353	—	175978	—	—	185763	283358	—	—	—	—	270858	6567896	—	—
QCPp-15-easy	5	292938	707373	—	370485	—	—	10525316	10827102	—	—	—	—	21150843	53442090	—	—
QCPp-15-hard	6	553152	1040577	—	151775409	—	—	285116943	285478468	—	—	—	—	19777527	12428647	—	—
QCPp-15	5	6287299	6692761	—	5968784	—	—	6434254	6774986	—	—	—	—	1392805	29491676	—	—
QCPp-20-easy	5	3145251	3797594	—	70936014	—	—	4207080	4739705	—	—	—	—	14479559	8222205	—	—

Table 22. Total number of consistency checks required for solved instances per problem class. Class range: BH-4-4–QCPp-20-easy. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
QCPp-20-hard	5	1614694	2389744	—	942776	—	—	1194951	1715721	—	—	—	—	34506745	41370279	—	—
QCPp-20	4	588050	1236456	—	1266411	—	—	1186489	1706761	—	—	—	—	—	62466606	—	—
QWH-10-easy	5	39993	113185	—	71907	—	—	64357	156101	—	—	—	—	873745	341786	—	—
QWH-10-hard	5	39144	117704	—	71729	—	—	75692	142853	—	—	—	—	937065	718654	—	—
QWH-15-easy	5	401601	558531	—	319965	—	—	395799	661913	—	—	—	—	43141192	4498917	—	—
QWH-15-hard	9	2047731	4545721	—	1703054	—	—	2982951	3999613	—	—	—	—	142735627	35554447	—	—
QWH-20-easy	5	14894720	20409861	—	1336485	—	—	9092759	4017119	—	—	—	—	36755361	22959891	—	—
QWH-20-hard	10	9881001	8328638	—	225876363	—	—	894628152	501654374	—	—	—	—	—	—	—	—
QWH-25-easy	5	13306247	—	—	216558129	—	—	445762304	446285120	—	—	—	—	—	—	—	—
QWH-25-hard	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
QWHp-10-easy	5	34429	129464	—	77057	—	—	95616	159236	—	—	—	—	3003642	231873	—	—
QWHp-10-hard	10	67692	257907	—	172974	—	—	141161	312099	—	—	—	—	44935654	428836	—	—
QWHp-15-easy	5	165077	444511	—	318898	—	—	372470	613345	—	—	—	—	10967527	7273544	—	—
QWHp-15-hard	1	35599	87362	—	54769	—	—	53790	123806	—	—	—	—	1741660	327317	—	—
bqwh15-106	19	1959744	2117748	—	1064282	—	—	1809485	1816770	—	—	—	—	47795721	43790593	—	—
bqwh18-141	19	30918138	12776689	—	11790827	—	—	44992926	29305753	—	—	—	—	327594057	373100660	—	—
composed-25-1-25	10	157896	746041	—	851578	—	—	950280	286852	—	—	—	—	994515	9850523	—	—
composed-25-1-2	10	195203	683768	—	854957	—	—	782599	265881	—	—	—	—	921611	10189723	—	—
composed-25-1-40	10	171866	785943	—	869645	—	—	1078391	307508	—	—	—	—	1042664	9762787	—	—
composed-25-1-80	10	186841	907869	—	898576	—	—	1075590	356197	—	—	—	—	1170736	8885873	—	—

Table 23. Total number of consistency checks required for solved instances per problem class. Class range: QCPp-20-hard–composed-25-1-80. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-l-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-10-20	10	565783	2727832	—	1226452	—	—	1905456	4601735	—	—	—	—	23042938	31203166	—	—
composed-75-1-25	10	469940	2131658	—	2111690	—	—	2365953	741410	—	—	—	—	2697800	63415102	—	—
composed-75-1-2	10	491400	2073824	—	2269893	—	—	1948894	840295	—	—	—	—	2624006	64288834	—	—
composed-75-1-40	10	348759	2169745	—	2098647	—	—	2572656	759189	—	—	—	—	2745528	60803842	—	—
composed-75-1-80	10	283799	2272779	—	1851302	—	—	2386180	802179	—	—	—	—	2874105	42688288	—	—
cril	5	382347540	297209948	—	614227519	—	—	663160937	604141335	—	—	—	—	1248043	—	—	—
domino1	10	125557220	125557220	—	5589296345	—	—	5400837765	5400845165	—	—	—	—	1093569105	1093359995	—	—
ehi-85	100	19933133	9662989	—	371740163	—	—	538965988	33085860	—	—	—	—	76255988	2095647845	—	—
ehi-90	100	20801594	10253793	—	359308095	—	—	526974024	34739133	—	—	—	—	83238679	2037889813	—	—
fapp01	11	52191492	266083775	—	110713361	—	—	94294528	453105202	—	—	—	—	—	—	—	—
fapp02	11	—	—	—	5093510488	—	—	736464427	1232138471	—	—	—	—	—	—	—	—
frb30-15	5	3960531	5627909	—	5466713	—	—	15050853	16406269	—	—	—	—	176341020	40306595	—	—
frb35-17	5	62956521	65635554	—	52343443	—	—	68670766	70658895	—	—	—	—	471936604	338247493	—	—
frb40-19	5	188670653	192743061	—	588715752	—	—	1778238133	1780920843	—	—	—	—	—	—	—	—
frb45-21	5	26008697	27217384	—	4729370780	—	—	4370655877	1709437892	—	—	—	—	—	—	—	—
frb50-23	5	—	—	—	212900740	—	—	781340423	782242275	—	—	—	—	—	—	—	—
frb53-24	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb56-25	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
frb59-26	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
geom	100	533952467	613358724	—	2546661664	—	—	4988950919	5026143471	—	—	—	—	2242231611	753569110	—	—

Table 24. Total number of consistency checks required for solved instances per problem class. Class range: composed-25-10-20–geom. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
hanoi1	5	71520608	71520608	—	213444790	—	—	59075956	59076422	—	—	—	—	11256360	11251496	—	—
js-e0ddr1	10	21927208	64420628	—	42658155940	—	—	3779831769	3824924469	—	—	—	—	449976004	10677389	—	—
js-e0ddr2	10	16331006	67021392	—	42575023	—	—	4363101562	4421951882	—	—	—	—	707905969	15291907	—	—
js-enddr1	10	11189933	55370605	—	7321528920	—	—	63933797	127839143	—	—	—	—	737153892	294099610	—	—
js-enddr2	6	7899867	40549583	—	1415823430	—	—	3956376116	3993175172	—	—	—	—	564597754	12545687	—	—
js-ewddr2	10	8117879	65578123	—	57282026	—	—	450285186	549264778	—	—	—	—	1205419003	47967509	—	—
lsq-dg1	5	431716	723004	—	221033	—	—	218105	313817	—	—	—	—	7971421	5312019	—	—
marc	10	—	—	—	158683819	—	—	155307952	155346392	—	—	—	—	—	—	—	—
pigeons	20	96882755	96920129	—	597433110	—	—	597431586	597475782	—	—	—	—	36462565	148489545	—	—
qa1	8	25597456	28763445	—	404503842	—	—	755696323	1067909926	—	—	—	—	147654712	105179727	—	—
qk1	18	161879280	101325160	—	4983288569	—	—	14015920331	98128445	—	—	—	—	1740930470	524736957	—	—
random-23-23-253	10	2840455	3539270	—	2418802158	—	—	3342707281	3345530012	—	—	—	—	165838623	64122451	—	—
random-24-24-276	10	25848957	27531668	—	5808388074	—	—	8739555424	8742821193	—	—	—	—	—	—	—	—
random-25-25-300	10	178159898	180146543	—	11561113328	—	—	20122026881	20125828106	—	—	—	—	—	—	—	—
random-26-26-325	10	129554722	130723893	—	6414973391	—	—	1561685382	1562566813	—	—	—	—	—	—	—	—
random-27-27-351	10	—	—	—	6065890767	—	—	696928728	697443482	—	—	—	—	—	—	—	—
rlfapGraphs	14	7569394	104660396	—	51932014	—	—	50331509	917223043	—	—	—	—	—	—	—	—
rlfapModGraphs	12	25997565	66985374	—	66523673	—	—	56344920	167357617	—	—	—	—	—	—	—	—
rlfapModScens	14	9405936	45847458	—	129108944	—	—	97281632	210024209	—	—	—	—	—	—	—	—
rlfapScens11	9	49642595	61683842	—	3198534557	—	—	1411073507	1525114363	—	—	—	—	—	—	—	—

Table 25. Total number of consistency checks required for solved instances per problem class. Class range: `hanoi1`–`rlfapScens11`. The maximum solution time was set to 600 seconds.

	#instances	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`rlfapScens`	11	7220661	17638430	—	39588126	—	—	29123950	437902689	—	—	—	—	—	—	—	—
Grand total:		2485493005	3043322061	—	115607357453	—	—	87859689114	72953387491	—	—	—	—	10949156481	8975026057	—	—

Table 26. Total number of consistency checks required for solved instances per problem class. Class range: `BH-4-4`–`rlfapScens`. The maximum solution time was set to 600 seconds.

2.2 SOTACS

This section provides information about "State-Of-The-Art-Contributors" (*SOTACs*), a notion borrowed from the SAT competition, which, in its turn, borrowed it from the CASC competition.[1]

Let's say that the ideal CSP solver is the one that solves all the benchmarks which are solved by at least one solver from the competition. This ideal solver, called *SOTA*, is useful for instance for a comparison between each competition: there is progress in the field if the number of problems solved by the SOTA increases.

SOTA Contributors are the solvers needed to build the SOTA solver. If one solver can solve all the benchmarks, then the SOTAC is also the SOTA. This is unlikely. More often, taking the subset of the best solver is sufficient.

Information about SOTACs and the problem instances for which they were the only solver may be found in Table 27 and Table 28.

[1] Thanks to Daniel Le Berre for pointing us to the notion of a SOTAC.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb_lemma-100-9-mod`									+				

Table 27. Problems which were only solved by one solver. Problem range: `nb_Golomb-3-sat`–`nb_lemma-100-9-mod`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order20-holes187-balanced-6-QWH-20					+											
qcp-order20-holes187-balanced-597-QWH-20					+											
qcp-order25-holes264-balanced-31-QWH-25					+											
qcp-order25-holes264-balanced-3-QWH-25					+											
qcp-order25-holes264-balanced-68-QWH-25					+											
qwh-order25-holes235-balanced-5-QWH-25					+											
qwh-order25-holes235-balanced-394-QWH-25					+											
qwh-order25-holes235-balanced-918-QWH-25					+											
frb45-21-1-bis				+												
random-26-26-325-155-53021				+												
random-26-26-325-155-54021				+												
random-27-27-351-163-56021				+												
random-27-27-351-163-60021				+												
random-27-27-351-163-63021				+												
scen11_f4									+							
scen11_f5									+							

Table 28. Problems which were only solved by one solver. Problem range: bh-4-4-easy-sat-0001-BlackHole-4-4–scen10. The maximum solution time was set to 600 seconds.

2.3 Barcharts with Coarse-grained Results

This section provides barcharts with coarse-grained statistics for all problems.

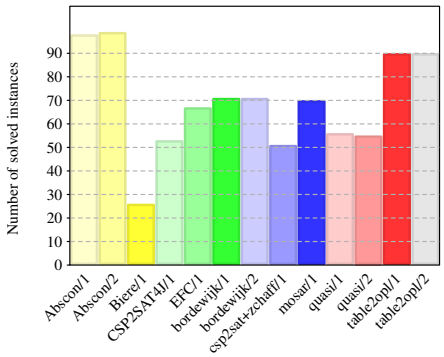

Fig. 1. Number of solved instances for class `non-bin`. The maximum solution time was set to 600 seconds.

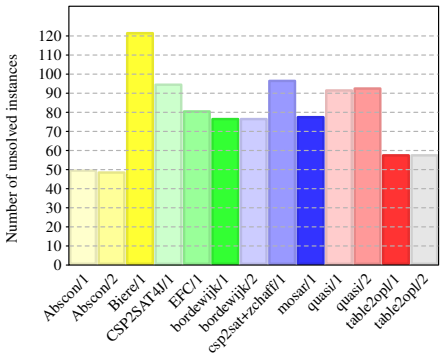

Fig. 2. Number of unsolved instances for class `non-bin`. The maximum solution time was set to 600 seconds.

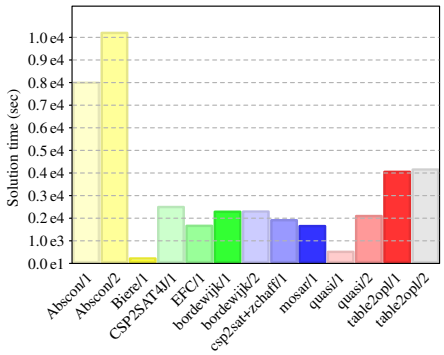

Fig. 3. Solution time in seconds for solved instances from class `non-bin`. The maximum solution time was set to 600 seconds.

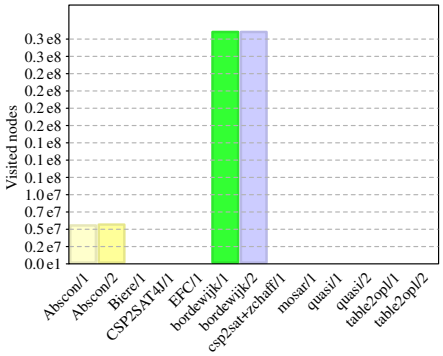

Fig. 4. Visited nodes required for solved instances from class `non-bin`. The maximum solution time was set to 600 seconds.

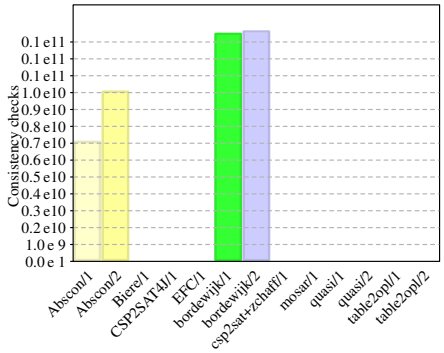

Fig. 5. Consistency checks required for solved instances from class `non-bin`. The maximum solution time was set to 600 seconds.

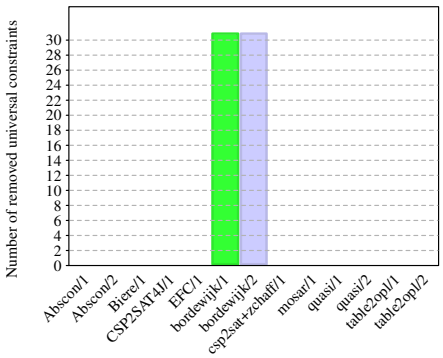

Fig. 6. Number of removed universal constraints for solved instances from class `non-bin`. The maximum solution time was set to 600 seconds.

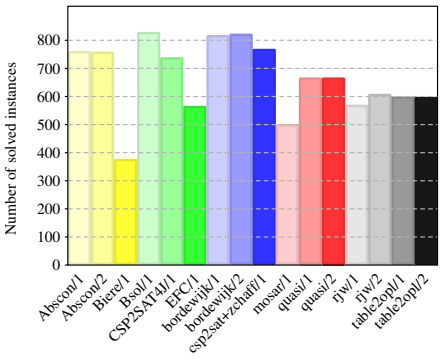

Fig. 7. Number of solved instances for class `bin`. The maximum solution time was set to 600 seconds.

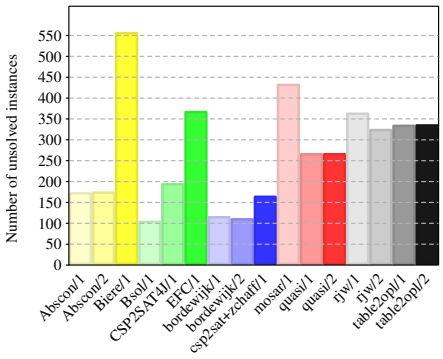

Fig. 8. Number of unsolved instances for class `bin`. The maximum solution time was set to 600 seconds.

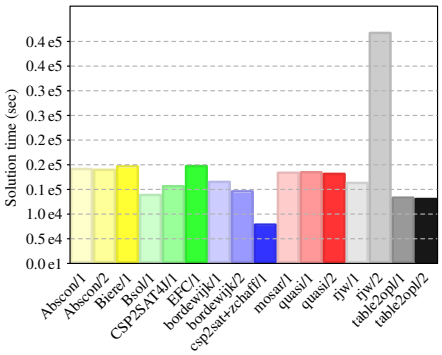

Fig. 9. Solution time in seconds for solved instances from class `bin`. The maximum solution time was set to 600 seconds.

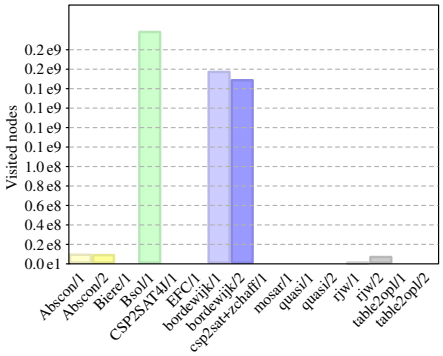

Fig. 10. Visited nodes required for solved instances from class `bin`. The maximum solution time was set to 600 seconds.

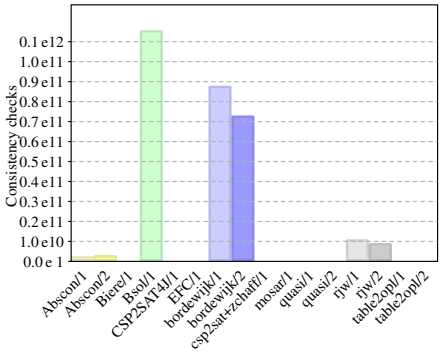

Fig. 11. Consistency checks required for solved instances from class `bin`. The maximum solution time was set to 600 seconds.

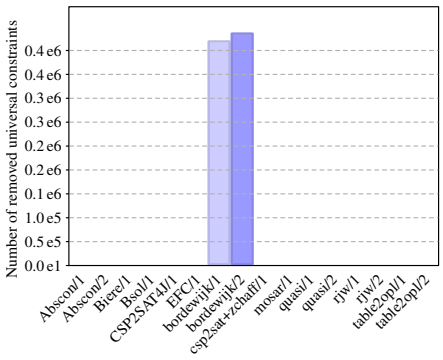

Fig. 12. Number of removed universal constraints for solved instances from class `bin`. The maximum solution time was set to 600 seconds.

2.4 Graphs with Coarse-grained Results

This section provides figures detailing the results for all problems.

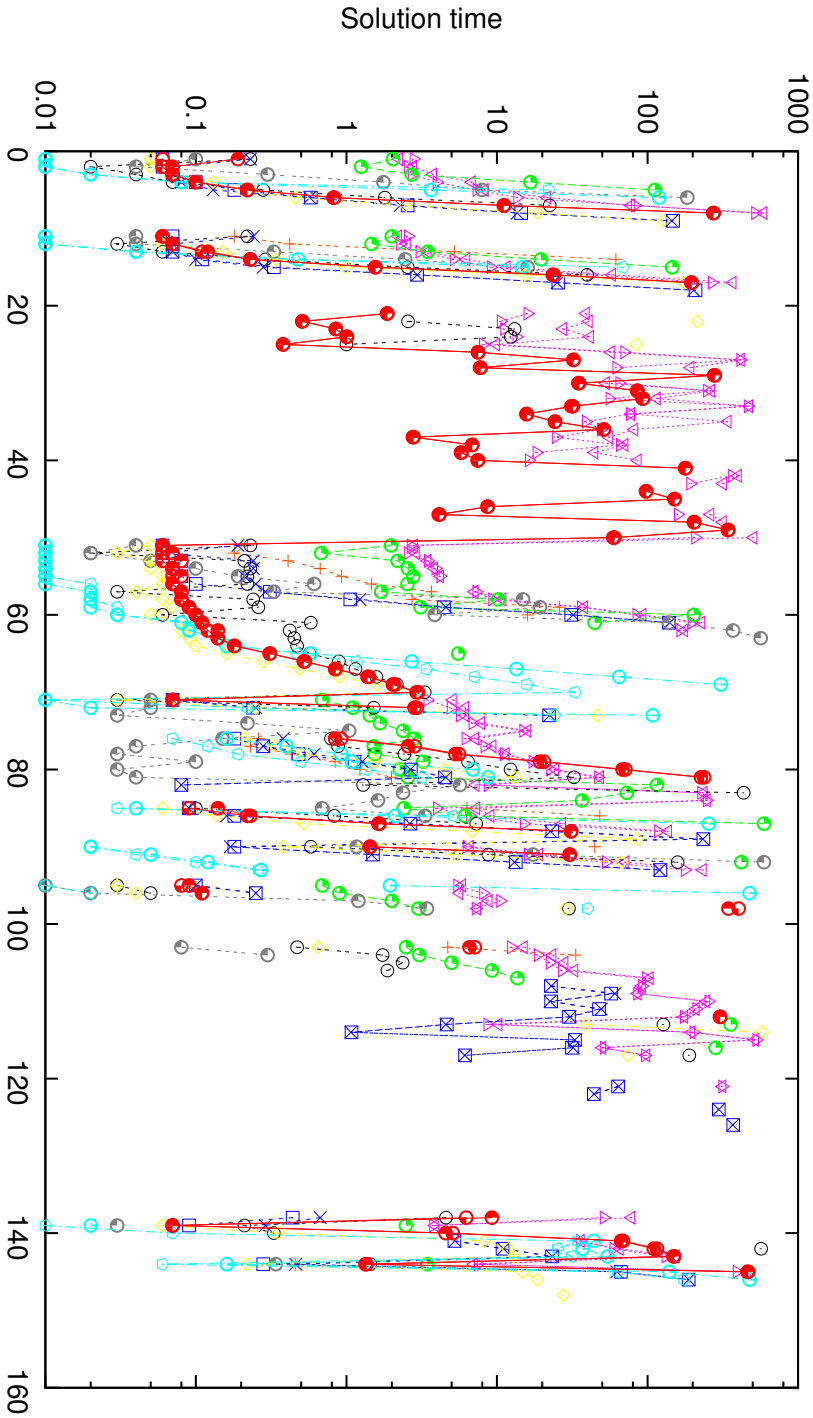

Fig. 13. Solution time in seconds for solving instances from class `non-bin`. The maximum solution time was set to 600 seconds.

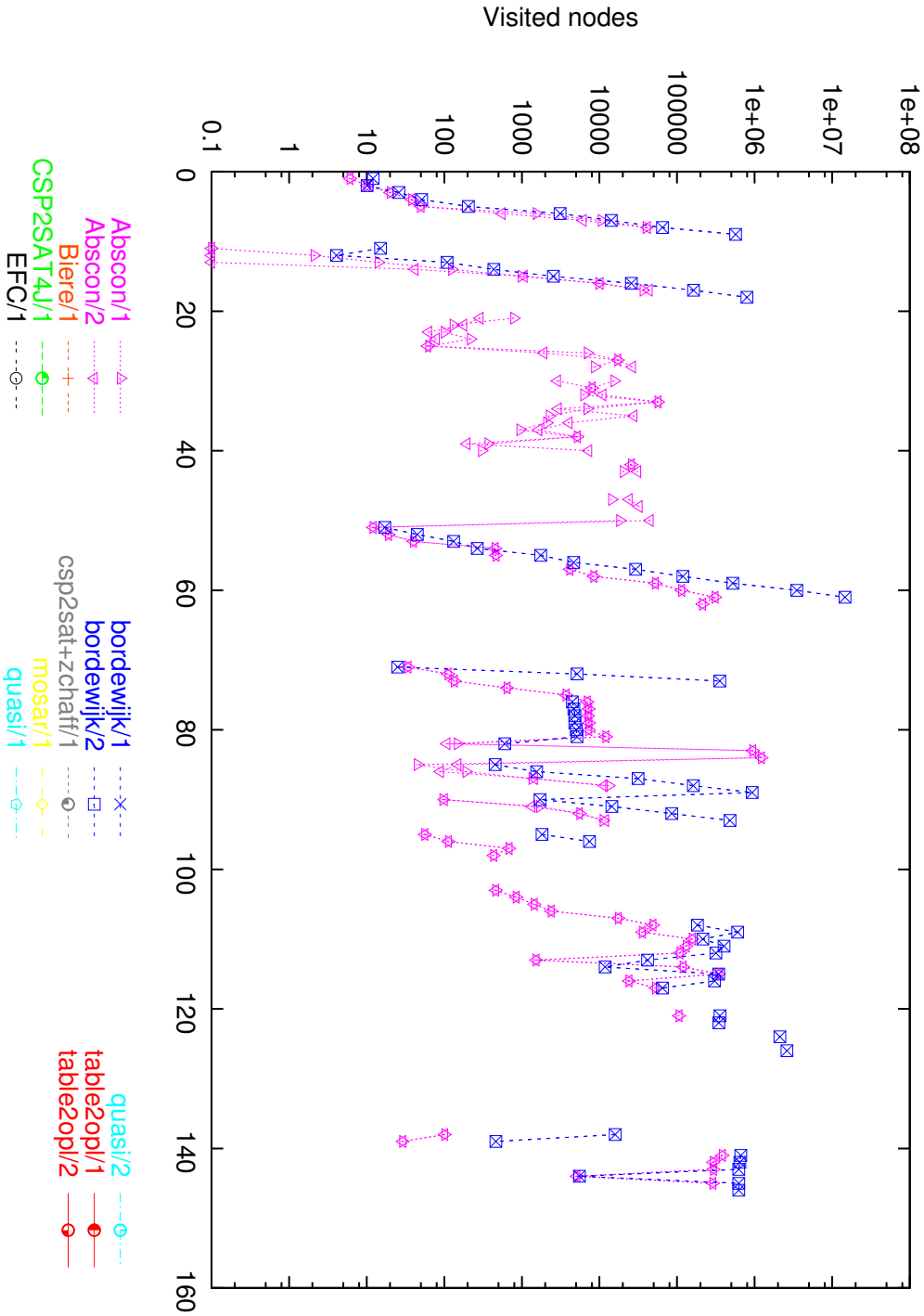

Fig. 14. Visited nodes required for solving instances from class `non-bin`. The maximum solution time was set to 600 seconds.

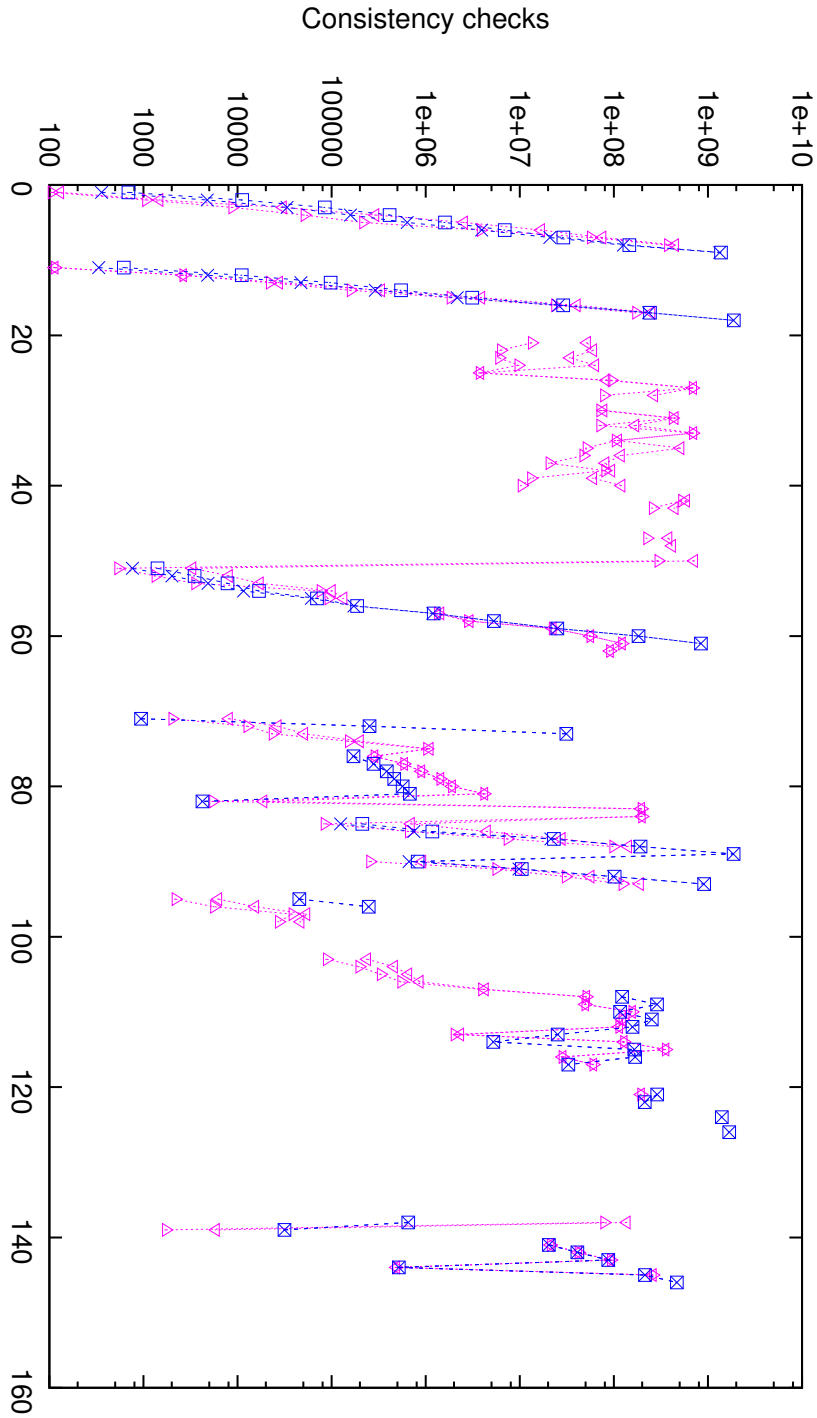

Fig. 15. Consistency checks required for solving instances from class `non-bin`. The maximum solution time was set to 600 seconds.

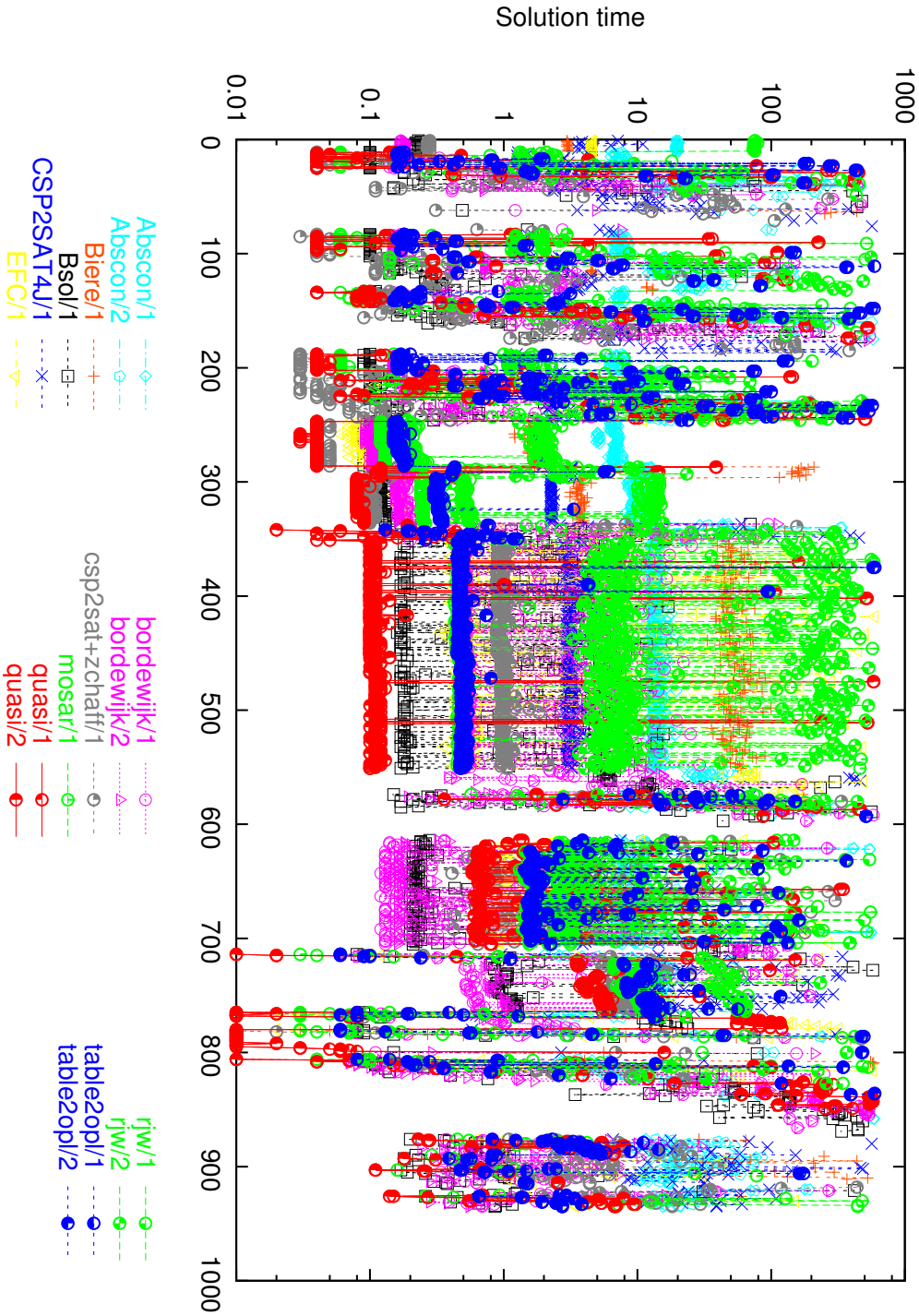

Fig. 16. Solution time in seconds for solving instances from class bin. The maximum solution time was set to 600 seconds.

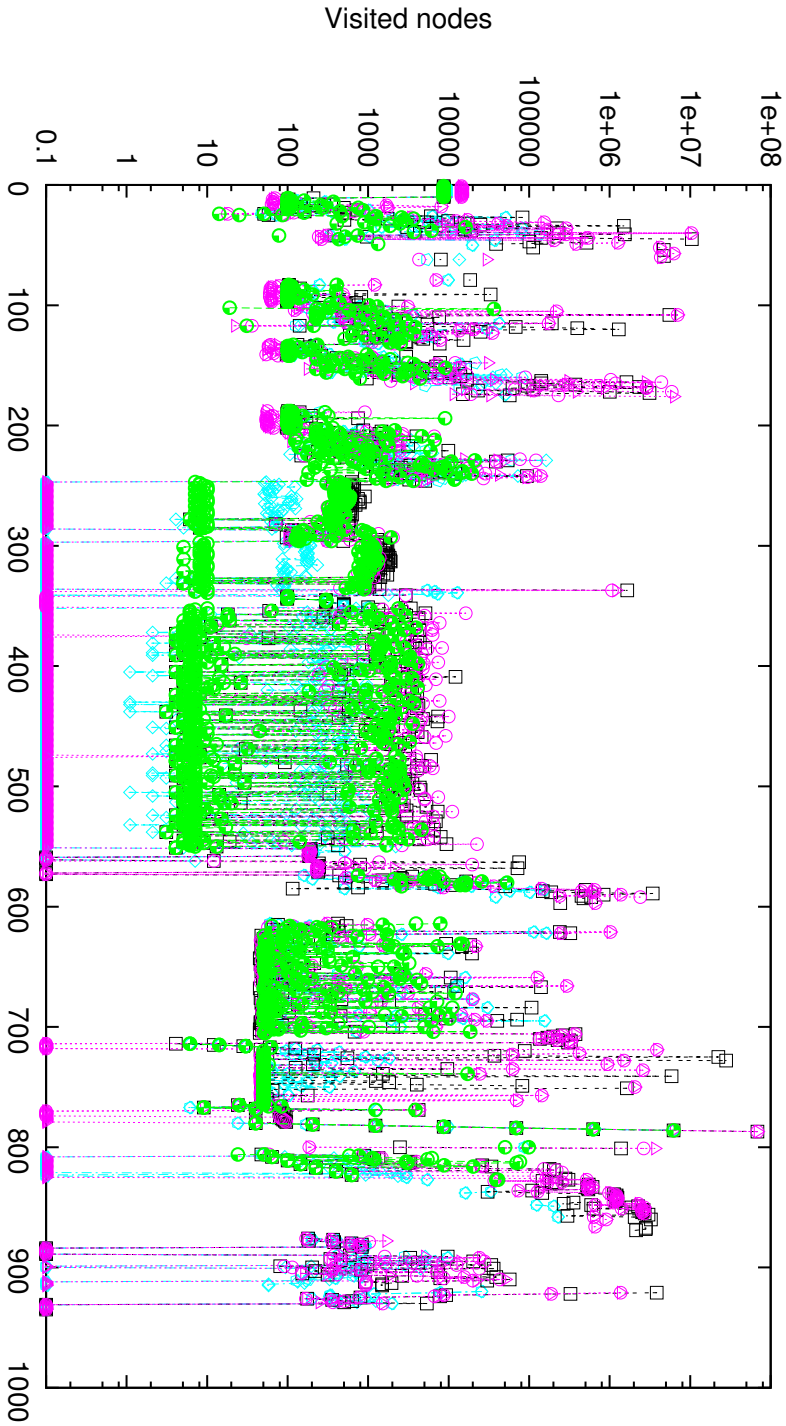

Fig. 17. Visited nodes required for solving instances from class bin. The maximum solution time was set to 600 seconds.

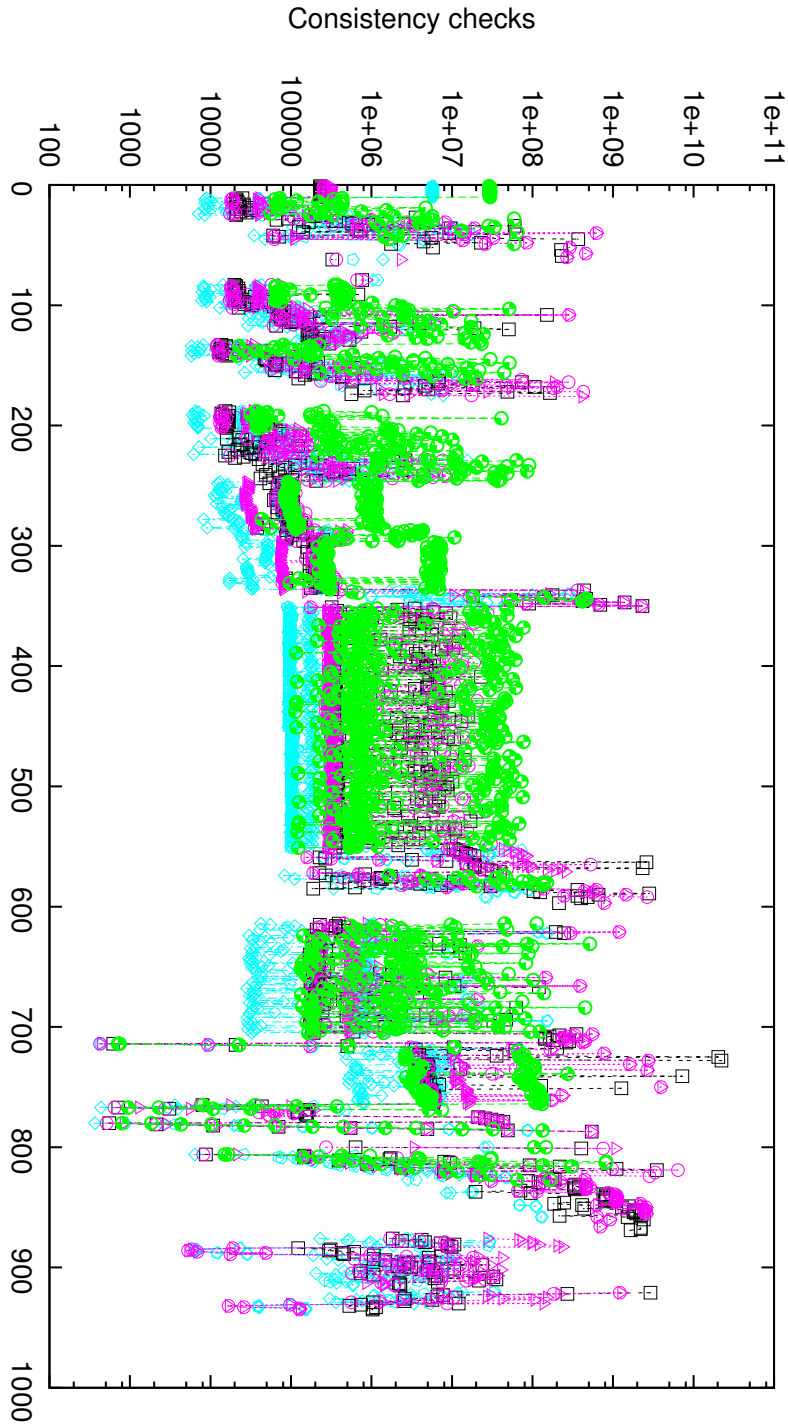

Fig. 18. Consistency checks required for solving instances from class `bin`. The maximum solution time was set to 600 seconds.

3 Tables by Problem Class

3.1 Non-binary Problems

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_Golomb-3-sat	+	+		+	+	+	+	+	+	+	+	+	+
nb_Golomb-4-sat	+	+		+	+	+	+	+	+	+	+	+	+
nb_Golomb-5-sat	+	+		+	+	+	+	+	+	+	+	+	+
nb_Golomb-6-sat	+	+		+	+	+	+	+	+	+	+	+	+
nb_Golomb-7-sat	+	+		+	+	+	+	+	+	+	+	+	+
nb_Golomb-8-sat	+	+			+	+	+	+	+		+	+	+
nb_Golomb-9-sat	+	+			+	+	+		+			+	+
nb_Golomb-10-sat	+	+				+	+		+			+	+
nb_Golomb-11-sat						+	+		+				
nb_Golomb-12-sat													
nb_Golomb-3-unsat	+	+	+	+	+	+	+	+		+	+	+	+
nb_Golomb-4-unsat	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_Golomb-5-unsat	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_Golomb-6-unsat	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_Golomb-7-unsat	+	+		+	+	+	+	+	+	+	+	+	+
nb_Golomb-8-unsat	+	+			+	+	+		+			+	+
nb_Golomb-9-unsat	+	+				+	+		+			+	+
nb_Golomb-10-unsat						+	+						
nb_Golomb-11-unsat													
nb_Golomb-12-unsat													
Grand total:	15	15	4	10	13	17	17	11	15	10	11	15	15

Table 29. Number of solved instances belonging to class `nb-Golomb`. Problem range: `nb_Golomb-3-sat`–`nb_Golomb-12-unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_1-TSP-20	+	+										+	+
nb_8-TSP-20	+	+			+				+			+	+
nb_29-TSP-20	+	+			+							+	+
nb_30-TSP-20	+	+			+							+	+
nb_68-TSP-20	+	+			+				+			+	+
Grand total:	5	5	0	0	4	0	0	0	2	0	0	5	5

Table 30. Number of solved instances belonging to class nb-TSP-20-easy. Problem range: nb_1-TSP-20–nb_68-TSP-20. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_2-TSP-20	+	+										+	+
nb_75-TSP-20	+	+										+	+
nb_76-TSP-20	+	+										+	+
nb_142-TSP-20												+	+
nb_190-TSP-20	+	+										+	+
nb_193-TSP-20	+	+										+	+
nb_366-TSP-20	+	+										+	+
nb_453-TSP-20	+	+										+	+
nb_727-TSP-20	+	+										+	+
nb_901-TSP-20	+	+										+	+
Grand total:	9	9	0	0	0	0	0	0	0	0	0	10	10

Table 31. Number of solved instances belonging to class `nb-TSP-20-hard`. Problem range: `nb_2-TSP-20`–`nb_901-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_3-TSP-25	+	+										+	+
nb_13-TSP-25	+	+										+	+
nb_38-TSP-25	+	+										+	+
nb_54-TSP-25	+	+										+	+
nb_66-TSP-25	+	+										+	+
Grand total:	5	5	0	0	0	0	0	0	0	0	0	5	5

Table 32. Number of solved instances belonging to class nb-TSP-25-easy. Problem range: nb_3-TSP-25–nb_66-TSP-25. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_48-TSP-25												+	+
nb_163-TSP-25	+	+											
nb_190-TSP-25	+	+											
nb_312-TSP-25												+	+
nb_456-TSP-25												+	+
nb_523-TSP-25												+	+
nb_561-TSP-25	+	+										+	+
nb_681-TSP-25		+										+	+
nb_715-TSP-25												+	+
nb_843-TSP-25	+	+										+	+
Grand total:	4	5	0	0	0	0	0	0	0	0	0	8	8

Table 33. Number of solved instances belonging to class nb-TSP-25-hard. Problem range: nb_48-TSP-25–nb_843-TSP-25. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_series5	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series6	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series7	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series8	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series9	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series10			+	+	+	+	+	+	+	+	+	+	+
nb_series11	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series12	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series13	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series14	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_series15	+	+		+	+	+	+	+	+	+	+	+	+
nb_series16	+	+			+			+	+	+	+	+	+
nb_series18					+			+	+	+	+	+	+
nb_series20					+				+	+	+	+	+
nb_series25				+	+				+	+	+	+	+
nb_series30					+				+	+	+	+	+
nb_series35					+				+	+	+	+	+
nb_series40					+				+	+	+	+	+
nb_series45					+				+	+	+	+	+
nb_series50					+				+	+		+	+
Grand total:	11	11	10	12	20	11	11	13	20	20	19	20	20

Table 34. Number of solved instances belonging to class `nb-allSeries1`. Problem range: `nb_series5`–`nb_series50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cc_5_5_3	+	+		+	+	+	+	+	+	+	+	+	+
nb_cc_6_6_3	+	+		+	+	+	+	+	+	+	+	+	+
nb_cc_7_7_3	+	+		+		+	+	+	+	+	+		
nb_cc_8_8_3	+	+		+				+					
nb_cc_9_9_3	+	+		+				+					
nb_cc_5_5_2	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_cc_6_6_2	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_cc_7_7_2	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_cc_8_8_2	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_cc_9_9_2	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_cc_10_10_2	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	11	11	6	11	8	9	9	11	9	9	9	8	8

Table 35. Number of solved instances belonging to class nb-cc1. Problem range: nb_cc_5_5_3–nb_cc_10_10_2. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cril_sat_nb_0	+	+		+	+	+	+	+					
nb_cril_unsat_nb_6	+	+		+	+			+					
nb_cril_unsat_nb_7	+	+		+				+					
Grand total:	3	3	0	3	2	1	1	3	0	0	0	0	0

Table 36. Number of solved instances belonging to class `nb-cril`. Problem range: `nb_cril_sat_nb_0`–`nb_cril_unsat_nb_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_gr_17_6_a3	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_gr_25_7_a3	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_gr_34_8_a3	+	+		+	+	+	+		+		+	+	+
nb_gr_44_9_a3	+	+				+	+		+			+	+
nb_gr_55_10_a3						+	+		+				
nb_gr_17_7_a3	+	+	+		+	+	+	+	+	+	+	+	+
nb_gr_25_8_a3	+	+			+	+	+	+	+	+	+	+	+
nb_gr_34_9_a3	+	+		+	+	+	+	+	+	+	+		
nb_gr_44_10_a3	+	+				+	+			+	+		
nb_gr_55_11_a3													
Grand total:	8	8	3	4	6	9	9	5	8	6	7	6	6

Table 37. Number of solved instances belonging to class nb-gr1. Problem range: nb_gr_17_6_a3–nb_gr_55_11_a3. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_10_3	+	+		+	+	+	+	+	+	+	+	+	+
nb_ramsey_13_3	+	+		+	+	+	+	+	+	+	+	+	+
nb_ramsey_15_3	+	+		+				+					
nb_ramsey_16_3	+	+		+	+			+	+	+		+	+
nb_ramsey_17_3													
nb_ramsey_18_3													
nb_ramsey_20_3													
nb_ramsey_25_3													
Grand total:	4	4	0	4	3	2	2	4	3	3	2	3	3

Table 38. Number of solved instances belonging to class `nb-ramsey3`. Problem range: `nb_ramsey_10_3`–`nb_ramsey_25_3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_25_4	+	+	+	+	+			+	+			+	+
nb_ramsey_30_4	+	+	+	+	+			+					
nb_ramsey_32_4	+	+		+	+								
nb_ramsey_33_4	+	+		+	+								
nb_ramsey_34_4	+	+		+									
Grand total:	5	5	2	5	4	0	0	2	1	0	0	1	1

Table 39. Number of solved instances belonging to class nb-ramsey4. Problem range: nb_ramsey_25_4–nb_ramsey_34_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-20-20-60-632-forced-1	+	+				+	+						
nb_random-3-20-20-60-632-forced-2	+	+				+	+						
nb_random-3-20-20-60-632-forced-3	+	+				+	+						
nb_random-3-20-20-60-632-forced-4	+	+				+	+						
nb_random-3-20-20-60-632-forced-5	+	+				+	+					+	+
nb_random-3-20-20-60-632-forced-6	+	+		+	+	+	+		+				
nb_random-3-20-20-60-632-forced-7	+	+				+	+		+				
nb_random-3-20-20-60-632-forced-8	+	+				+	+						
nb_random-3-20-20-60-632-forced-9	+	+		+		+	+						
nb_random-3-20-20-60-632-forced-10	+	+			+	+	+		+				
Grand total:	10	10	0	2	2	10	10	0	3	0	0	1	1

Table 40. Number of solved instances belonging to class `nb-random-3-20-20-60-632-forced`. Problem range: `nb_random-3-20-20-60-632-forced-1`–`nb_random-3-20-20-60-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-24-24-76-632-forced-1													
nb_random-3-24-24-76-632-forced-2													
nb_random-3-24-24-76-632-forced-3													
nb_random-3-24-24-76-632-forced-4	+	+				+	+						
nb_random-3-24-24-76-632-forced-5						+	+						
nb_random-3-24-24-76-632-forced-6													
nb_random-3-24-24-76-632-forced-7						+	+						
nb_random-3-24-24-76-632-forced-8													
nb_random-3-24-24-76-632-forced-9						+	+						
nb_random-3-24-24-76-632-forced-10													
Grand total:	1	1	0	0	0	4	4	0	0	0	0	0	0

Table 41. Number of solved instances belonging to class `nb-random-3-24-24-76-632-forced`. Problem range: `nb_random-3-24-24-76-632-forced-1`–`nb_random-3-24-24-76-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-28-28-93-632-forced-1													
nb_random-3-28-28-93-632-forced-2													
nb_random-3-28-28-93-632-forced-3													
nb_random-3-28-28-93-632-forced-4													
nb_random-3-28-28-93-632-forced-5													
nb_random-3-28-28-93-632-forced-6													
nb_random-3-28-28-93-632-forced-7													
nb_random-3-28-28-93-632-forced-8													
nb_random-3-28-28-93-632-forced-9													
nb_random-3-28-28-93-632-forced-10													
Grand total:	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 42. Number of solved instances belonging to class `nb-random-3-28-28-93-632-forced`. Problem range: `nb_random-3-28-28-93-632-forced-1`–`nb_random-3-28-28-93-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb_renault-merged`	+	+			+	+	+					+	+
Grand total:	1	1	0	0	1	1	1	0	0	0	0	1	1

Table 43. Number of solved instances belonging to class `nb-renault`. Problem: `nb_renault-merged`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_lemma-23-3	+	+		+	+	+	+	+	+	+	+	+	+
nb_lemma-66-4					+				+	+		+	+
nb_lemma-12-9-mod	+	+				+	+		+	+	+	+	+
nb_lemma-15-9-mod	+	+			+	+	+		+	+	+	+	+
nb_lemma-20-9-mod	+	+				+	+		+	+	+	+	+
nb_lemma-24-3	+	+	+	+	+	+	+	+	+	+	+	+	+
nb_lemma-30-9-mod	+	+				+	+		+	+	+	+	+
nb_lemma-50-9-mod						+	+		+	+	+		
nb_lemma-67-4													
nb_lemma-100-9-mod									+				
Grand total:	6	6	1	2	4	7	7	2	9	8	7	7	7

Table 44. Number of solved instances belonging to class `nb-schurr`. Problem range: `nb_lemma-23-3`–`nb_lemma-100-9-mod`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_Golomb-3-sat	2.78	2.25	—	2.04	0.23	0.23	0.06	0.10	0.05	0.01	0.01	0.19	0.06
nb_Golomb-4-sat	2.54	2.78	—	1.25	0.02	0.07	0.06	0.04	0.05	0.01	0.01	0.07	0.06
nb_Golomb-5-sat	2.72	3.78	—	2.72	0.04	0.07	0.07	0.30	0.07	0.02	0.02	0.07	0.07
nb_Golomb-6-sat	3.96	6.83	—	16.68	0.07	0.08	0.10	1.76	0.13	0.08	0.08	0.10	0.10
nb_Golomb-7-sat	7.28	8.33	—	111.65	0.28	0.13	0.18	7.97	0.20	22.03	3.64	0.22	0.22
nb_Golomb-8-sat	13.58	21.63	—	—	1.80	0.57	0.58	183.93	0.46	—	119.78	0.82	0.83
nb_Golomb-9-sat	82.23	77.80	—	—	22.40	2.28	2.55	—	2.48	—	—	11.18	11.08
nb_Golomb-10-sat	517.11	589.76	—	—	—	13.63	14.50	—	18.64	—	—	275.71	272.98
nb_Golomb-11-sat	—	—	—	—	—	145.13	147.95	—	127.02	—	—	—	—
nb_Golomb-12-sat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-3-unsat	2.55	2.21	0.18	2.00	0.22	0.24	0.07	0.04	—	0.01	0.01	0.06	0.06
nb_Golomb-4-unsat	2.26	2.53	0.42	1.47	0.03	0.07	0.07	0.04	0.06	0.01	0.01	0.07	0.07
nb_Golomb-5-unsat	3.05	3.48	5.22	3.48	0.06	0.07	0.07	0.33	0.15	0.04	0.04	0.12	0.11
nb_Golomb-6-unsat	5.13	6.29	61.67	19.57	0.29	0.10	0.11	2.46	0.34	0.45	0.48	0.23	0.23
nb_Golomb-7-unsat	9.06	11.66	—	145.81	2.55	0.28	0.33	15.97	0.99	68.66	14.69	1.55	1.56
nb_Golomb-8-unsat	41.61	58.39	—	—	39.71	2.96	2.95	—	15.42	—	—	23.42	23.89
nb_Golomb-9-unsat	266.67	368.79	—	—	—	25.08	25.53	—	174.44	—	—	195.51	196.54
nb_Golomb-10-unsat	—	—	—	—	—	202.54	208.37	—	—	—	—	—	—
nb_Golomb-11-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-12-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	962.53	1166.51	67.48	306.66	67.70	393.54	403.55	212.94	340.48	91.30	138.77	509.32	507.87

Table 45. Solution time of solved instances belonging to class nb-Golomb. Problem range: nb_Golomb-3-sat–nb_Golomb-12-unsat. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_1-TSP-20	15.90	39.07	—	—	—	—	—	—	—	—	—	1.86	1.87
nb_8-TSP-20	10.55	40.83	—	—	2.57	—	—	—	213.99	—	—	0.51	0.51
nb_29-TSP-20	11.11	27.50	—	—	13.10	—	—	—	—	—	—	0.85	0.85
nb_30-TSP-20	13.40	41.65	—	—	12.35	—	—	—	—	—	—	1.00	1.01
nb_68-TSP-20	8.03	9.89	—	—	1.00	—	—	—	84.56	—	—	0.38	0.38
Grand total:	58.99	158.93	—	—	29.02	—	—	—	298.55	—	—	4.59	4.62

Table 46. Solution time of solved instances belonging to class nb-TSP-20-easy. Problem range: nb_1-TSP-20–nb_68-TSP-20. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_2-TSP-20	69.88	57.31	—	—	—	—	—	—	—	—	—	7.50	7.48
nb_75-TSP-20	412.09	418.74	—	—	—	—	—	—	—	—	—	32.15	32.28
nb_76-TSP-20	61.77	193.57	—	—	—	—	—	—	—	—	—	7.72	7.80
nb_142-TSP-20	—	—	—	—	—	—	—	—	—	—	—	277.40	279.66
nb_190-TSP-20	64.74	53.09	—	—	—	—	—	—	—	—	—	34.69	35.21
nb_193-TSP-20	247.50	264.89	—	—	—	—	—	—	—	—	—	85.27	85.98
nb_366-TSP-20	55.73	115.56	—	—	—	—	—	—	—	—	—	92.65	93.56
nb_453-TSP-20	461.92	474.47	—	—	—	—	—	—	—	—	—	31.20	31.97
nb_727-TSP-20	76.09	78.14	—	—	—	—	—	—	—	—	—	15.68	15.81
nb_901-TSP-20	38.85	342.09	—	—	—	—	—	—	—	—	—	24.24	24.35
Grand total:	1488.58	1997.86	—	—	—	—	—	—	—	—	—	608.52	614.11

Table 47. Solution time of solved instances belonging to class nb-TSP-20-hard. Problem range: nb_2-TSP-20–nb_901-TSP-20. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_3-TSP-25	49.03	82.05	—	—	—	—	—	—	—	—	—	51.50	51.17
nb_13-TSP-25	24.49	55.61	—	—	—	—	—	—	—	—	—	2.76	2.80
nb_38-TSP-25	65.31	70.64	—	—	—	—	—	—	—	—	—	6.83	6.86
nb_54-TSP-25	18.24	44.57	—	—	—	—	—	—	—	—	—	5.77	5.80
nb_66-TSP-25	16.22	86.42	—	—	—	—	—	—	—	—	—	7.45	7.50
Grand total:	173.29	339.30	—	—	—	—	—	—	—	—	—	74.32	74.13

Table 48. Solution time of solved instances belonging to class nb-TSP-25-easy. Problem range: nb_3-TSP-25–nb_66-TSP-25. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_48-TSP-25	—	—	—	—	—	—	—	—	—	—	—	177.66	179.30
nb_163-TSP-25	363.35	399.97	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-25	191.26	318.00	—	—	—	—	—	—	—	—	—	—	—
nb_312-TSP-25	—	—	—	—	—	—	—	—	—	—	—	97.67	97.98
nb_456-TSP-25	—	—	—	—	—	—	—	—	—	—	—	150.89	151.61
nb_523-TSP-25	—	—	—	—	—	—	—	—	—	—	—	8.65	8.69
nb_561-TSP-25	158.82	262.29	—	—	—	—	—	—	—	—	—	4.10	4.15
nb_681-TSP-25	—	317.21	—	—	—	—	—	—	—	—	—	203.62	204.56
nb_715-TSP-25	—	—	—	—	—	—	—	—	—	—	—	341.41	344.85
nb_843-TSP-25	206.37	508.29	—	—	—	—	—	—	—	—	—	59.18	60.43
Grand total:	919.80	1805.75	—	—	—	—	—	—	—	—	—	1043.17	1051.56

Table 49. Solution time of solved instances belonging to class nb-TSP-25-hard. Problem range: nb_48-TSP-25–nb_843-TSP-25. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_series5	2.66	2.82	0.22	1.98	0.23	0.19	0.06	0.04	0.05	0.01	0.01	0.06	0.06
nb_series6	2.56	2.90	0.18	0.68	0.02	0.06	0.06	0.02	0.03	0.01	0.01	0.07	0.06
nb_series7	3.47	3.47	0.41	2.19	0.21	0.24	0.08	0.05	0.05	0.01	0.01	0.08	0.06
nb_series8	3.88	3.84	0.67	2.56	0.23	0.24	0.07	0.10	0.05	0.01	0.01	0.07	0.07
nb_series9	4.19	4.21	0.93	2.78	0.22	0.21	0.08	0.19	0.06	0.01	0.01	0.08	0.07
nb_series10	—	—	1.47	2.54	0.22	0.25	0.10	0.61	0.06	0.02	0.01	0.07	0.07
nb_series11	7.26	7.14	3.67	1.70	0.03	0.29	0.31	0.33	0.04	0.02	0.02	0.08	0.08
nb_series12	9.27	10.94	2.73	10.21	0.24	1.23	1.06	14.87	0.06	0.02	0.02	0.08	0.08
nb_series13	35.91	38.01	25.97	3.10	0.26	4.58	4.44	19.32	0.07	0.03	0.02	0.09	0.09
nb_series14	84.13	93.13	15.97	203.02	0.06	32.09	31.15	3.86	0.05	0.03	0.03	0.10	0.10
nb_series15	195.26	228.73	—	44.59	0.58	140.54	138.77	138.68	0.09	0.10	0.08	0.11	0.11
nb_series16	164.39	175.88	—	—	0.42	—	—	369.99	0.08	0.09	0.09	0.14	0.12
nb_series18	—	—	—	—	0.45	—	—	564.29	0.09	0.14	0.14	0.14	0.14
nb_series20	—	—	—	—	0.47	—	—	—	0.10	0.19	0.16	0.18	0.18
nb_series25	—	—	—	5.52	0.57	—	—	—	0.16	0.47	0.58	0.31	0.31
nb_series30	—	—	—	—	0.89	—	—	—	0.28	1.17	2.71	0.53	0.52
nb_series35	—	—	—	—	1.15	—	—	—	0.49	3.39	13.45	0.84	0.85
nb_series40	—	—	—	—	1.58	—	—	—	0.90	7.13	64.93	1.41	1.38
nb_series45	—	—	—	—	2.16	—	—	—	1.58	15.78	307.30	2.07	2.03
nb_series50	—	—	—	—	3.31	—	—	—	2.93	33.11	—	2.99	2.92
Grand total:	513.00	571.07	52.23	280.87	13.29	179.92	176.20	1112.33	7.25	61.73	389.60	9.50	9.28

Table 50. Solution time of solved instances belonging to class `nb-allSeries1`. Problem range: `nb_series5`–`nb_series50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cc_5_5_3	3.44	5.10	—	0.69	0.03	0.07	0.07	0.05	0.03	0.01	0.01	0.07	0.07
nb_cc_6_6_3	4.91	6.17	—	1.10	1.52	0.25	0.24	0.05	0.25	0.22	0.02	2.83	2.94
nb_cc_7_7_3	5.64	6.15	—	1.43	—	22.37	22.16	0.03	46.59	24.09	108.46	—	—
nb_cc_8_8_3	6.86	7.87	—	1.67	—	—	—	0.22	—	—	—	—	—
nb_cc_9_9_3	14.89	15.98	—	2.38	—	—	—	1.04	—	—	—	—	—
nb_cc_5_5_2	6.16	7.20	0.26	2.83	0.79	0.38	0.18	0.15	0.21	0.07	0.16	0.84	0.92
nb_cc_6_6_2	8.23	9.36	0.23	1.52	0.88	0.28	0.28	0.04	0.34	0.12	0.40	2.57	2.84
nb_cc_7_7_2	11.05	11.48	0.43	1.54	2.43	0.61	0.48	0.03	0.51	0.19	0.92	5.30	5.60
nb_cc_8_8_2	17.13	17.63	0.84	3.23	6.42	1.27	1.13	0.10	1.54	0.50	1.09	19.34	20.56
nb_cc_9_9_2	22.45	24.42	1.23	2.26	12.30	2.66	2.68	0.03	4.56	1.35	6.89	68.20	71.49
nb_cc_10_10_2	46.84	48.59	1.99	2.56	32.45	4.57	4.51	0.04	13.24	3.19	8.73	226.21	237.67
Grand total:	147.60	159.96	4.99	21.21	56.82	32.46	31.73	1.79	67.27	29.73	126.68	325.37	342.10

Table 51. Solution time of solved instances belonging to class nb-cc1. Problem range: nb_cc_5_5_3–nb_cc_10_10_2. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cril_sat_nb_0	8.66	7.25	—	115.54	1.29	0.08	0.08	5.69	—	—	—	—	—
nb_cril_unsat_nb_6	226.44	237.06	—	72.71	435.31	—	—	2.38	—	—	—	—	—
nb_cril_unsat_nb_7	246.84	247.95	—	36.66	—	—	—	1.62	—	—	—	—	—
Grand total:	481.94	492.26	—	224.91	436.60	0.08	0.08	9.69	—	—	—	—	—

Table 52. Solution time of solved instances belonging to class `nb-cril`. Problem range: `nb_cril_sat_nb_0`–`nb_cril_unsat_nb_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_gr_17_6_a3	3.98	7.31	6.33	2.41	0.10	0.09	0.09	0.69	0.06	0.03	0.04	0.14	0.09
nb_gr_25_7_a3	6.59	9.10	48.21	6.12	0.83	0.16	0.18	3.33	0.14	5.14	2.11	0.23	0.22
nb_gr_34_8_a3	15.04	27.17	—	593.59	7.28	2.63	2.66	—	0.52	—	255.42	1.66	1.63
nb_gr_44_9_a3	117.02	137.30	—	—	—	22.58	23.34	—	6.85	—	—	31.02	31.09
nb_gr_55_10_a3	—	—	—	—	—	233.87	234.61	—	85.34	—	—	—	—
nb_gr_17_7_a3	6.25	6.62	44.62	—	0.58	0.17	0.18	1.17	0.38	0.02	0.02	1.43	1.44
nb_gr_25_8_a3	16.00	19.13	—	—	8.78	1.47	1.50	17.37	5.36	0.04	0.05	30.33	30.55
nb_gr_34_9_a3	52.71	71.76	—	419.57	158.43	13.05	13.34	592.87	67.18	0.10	0.12	—	—
nb_gr_44_10_a3	176.22	233.72	—	—	—	120.16	121.90	—	—	0.26	0.27	—	—
nb_gr_55_11_a3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	393.80	512.12	99.16	1021.69	175.99	394.17	397.80	615.43	165.83	5.59	258.02	64.80	65.03

Table 53. Solution time of solved instances belonging to class nb-gr1. Problem range: nb_gr_17_6_a3–nb_gr_55_11_a3. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_10_3	5.42	5.88	—	0.69	0.03	0.10	0.10	0.01	0.03	0.01	1.95	0.09	0.08
nb_ramsey_13_3	8.06	5.64	—	0.90	0.05	0.25	0.25	0.02	0.04	0.02	475.25	0.11	0.11
nb_ramsey_15_3	10.48	8.84	—	2.00	—	—	—	1.20	—	—	—	—	—
nb_ramsey_16_3	7.20	7.40	—	3.01	30.11	—	—	3.42	28.81	39.99	—	344.44	402.67
nb_ramsey_17_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_18_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_20_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_25_3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	31.16	27.75	—	6.60	30.19	0.34	0.35	4.65	28.88	40.02	477.21	344.64	402.86

Table 54. Solution time of solved instances belonging to class nb-ramsey3. Problem range: nb_ramsey_10_3–nb_ramsey_25_3. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_25_4	12.35	15.11	4.71	2.49	0.47	—	—	0.08	0.65	—	—	6.56	7.12
nb_ramsey_30_4	18.56	23.46	33.37	3.05	1.74	—	—	0.30	—	—	—	—	—
nb_ramsey_32_4	22.31	28.20	—	4.99	2.36	—	—	—	—	—	—	—	—
nb_ramsey_33_4	26.92	32.78	—	9.27	1.87	—	—	—	—	—	—	—	—
nb_ramsey_34_4	97.40	103.81	—	13.67	—	—	—	—	—	—	—	—	—
Grand total:	177.53	203.36	38.08	33.47	6.44	—	—	0.38	0.65	—	—	6.56	7.12

Table 55. Solution time of solved instances belonging to class nb-ramsey4. Problem range: nb_ramsey_25_4–nb_ramsey_34_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-20-20-60-632-forced-1	91.64	92.27	—	—	—	22.96	22.81	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-2	85.11	86.26	—	—	—	60.71	57.33	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-3	253.00	246.49	—	—	—	22.56	22.85	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-4	210.62	209.83	—	—	—	49.35	47.66	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-5	174.07	176.17	—	—	—	30.59	30.04	—	—	—	—	302.88	303.71
nb_random-3-20-20-60-632-forced-6	8.60	10.28	—	356.22	127.68	4.58	4.64	—	38.89	—	—	—	—
nb_random-3-20-20-60-632-forced-7	201.62	196.06	—	—	—	1.07	1.08	—	580.02	—	—	—	—
nb_random-3-20-20-60-632-forced-8	526.98	520.02	—	—	—	32.90	33.01	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-9	50.96	50.16	—	282.95	—	32.05	31.48	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-10	95.97	98.58	—	—	189.55	6.12	6.13	—	73.86	—	—	—	—
Grand total:	1698.56	1686.13	—	639.17	317.22	262.89	257.02	—	692.77	—	—	302.88	303.71

Table 56. Solution time of solved instances belonging to class `nb-random-3-20-20-60-632-forced`. Problem range: `nb_random-3-20-20-60-632-forced-1`–`nb_random-3-20-20-60-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-24-24-76-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-4	313.01	315.49	—	—	—	64.38	63.76	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-5	—	—	—	—	—	44.16	44.03	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-7	—	—	—	—	—	297.94	297.17	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-9	—	—	—	—	—	369.40	370.80	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	313.01	315.49	—	—	—	775.87	775.75	—	—	—	—	—	—

Table 57. Solution time of solved instances belonging to class `nb-random-3-24-24-76-632-forced`. Problem range: `nb_random-3-24-24-76-632-forced-1`–`nb_random-3-24-24-76-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-28-28-93-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-5	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-7	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-9	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 58. Solution time of solved instances belonging to class `nb-random-3-28-28-93-632-forced`. Problem range: `nb_random-3-28-28-93-632-forced-1`–`nb_random-3-28-28-93-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb_renault-merged`	50.90	78.24	—	—	4.58	0.67	0.44	—	—	—	—	9.26	6.25
Grand total:	50.90	78.24	—	—	4.58	0.67	0.44	—	—	—	—	9.26	6.25

Table 59. Solution time of solved instances belonging to class `nb-renault`. Problem: `nb_renault-merged`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_lemma-23-3	3.75	3.88	—	2.48	0.21	0.29	0.09	0.03	0.06	0.01	0.02	0.07	0.07
nb_lemma-66-4	—	—	—	—	0.33	—	—	—	0.35	0.07	—	4.56	5.09
nb_lemma-12-9-mod	35.56	36.19	—	—	—	5.27	5.22	—	8.23	34.25	43.99	66.79	68.83
nb_lemma-15-9-mod	59.05	65.56	—	—	568.01	11.03	10.88	—	11.90	25.29	37.05	110.06	115.50
nb_lemma-20-9-mod	131.09	154.69	—	—	—	23.34	23.25	—	13.05	31.36	54.39	148.55	150.54
nb_lemma-24-3	7.45	7.05	0.46	3.45	1.44	0.46	0.28	0.34	0.22	0.06	0.16	1.34	1.36
nb_lemma-30-9-mod	390.28	461.24	—	—	—	62.69	66.56	—	14.82	63.32	140.09	461.60	467.03
nb_lemma-50-9-mod	—	—	—	—	—	187.56	188.08	—	18.56	174.26	475.43	—	—
nb_lemma-67-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-100-9-mod	—	—	—	—	—	—	—	—	27.63	—	—	—	—
Grand total:	627.19	728.60	0.46	5.93	570.00	290.64	294.35	0.37	94.83	328.63	751.14	792.98	808.42

Table 60. Solution time of solved instances belonging to class `nb-schurr`. Problem range: `nb_lemma-23-3`–`nb_lemma-100-9-mod`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_Golomb-3-sat	6	6	—	—	—	12	12	—	—	—	—	—	—
nb_Golomb-4-sat	10	10	—	—	—	10	10	—	—	—	—	—	—
nb_Golomb-5-sat	20	20	—	—	—	26	26	—	—	—	—	—	—
nb_Golomb-6-sat	38	38	—	—	—	51	51	—	—	—	—	—	—
nb_Golomb-7-sat	49	50	—	—	—	204	204	—	—	—	—	—	—
nb_Golomb-8-sat	1534	554	—	—	—	3117	3117	—	—	—	—	—	—
nb_Golomb-9-sat	10561	6158	—	—	—	14190	14190	—	—	—	—	—	—
nb_Golomb-10-sat	39802	41566	—	—	—	64917	64917	—	—	—	—	—	—
nb_Golomb-11-sat	—	—	—	—	—	567068	567068	—	—	—	—	—	—
nb_Golomb-12-sat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-3-unsat	0	0	—	—	—	15	15	—	—	—	—	—	—
nb_Golomb-4-unsat	2	0	—	—	—	4	4	—	—	—	—	—	—
nb_Golomb-5-unsat	14	0	—	—	—	109	109	—	—	—	—	—	—
nb_Golomb-6-unsat	124	42	—	—	—	436	436	—	—	—	—	—	—
nb_Golomb-7-unsat	978	1072	—	—	—	2548	2548	—	—	—	—	—	—
nb_Golomb-8-unsat	9819	10172	—	—	—	25794	25794	—	—	—	—	—	—
nb_Golomb-9-unsat	36446	43923	—	—	—	163420	163420	—	—	—	—	—	—
nb_Golomb-10-unsat	—	—	—	—	—	795612	795612	—	—	—	—	—	—
nb_Golomb-11-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-12-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	99403	103611	—	—	—	1637533	1637533	—	—	—	—	—	—

Table 61. Number of visited nodes required for solved instances belonging to class `nb-Golomb`. Problem range: `nb_Golomb-3-sat`–`nb_Golomb-12-unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_1-TSP-20	785	289	—	—	—	—	—	—	—	—	—	—	—
nb_8-TSP-20	130	178	—	—	—	—	—	—	—	—	—	—	—
nb_29-TSP-20	100	63	—	—	—	—	—	—	—	—	—	—	—
nb_30-TSP-20	217	79	—	—	—	—	—	—	—	—	—	—	—
nb_68-TSP-20	63	61	—	—	—	—	—	—	—	—	—	—	—
Grand total:	1295	670	—	—	—	—	—	—	—	—	—	—	—

Table 62. Number of visited nodes required for solved instances belonging to class `nb-TSP-20-easy`. Problem range: `nb_1-TSP-20`–`nb_68-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_2-TSP-20	6974	1926	—	—	—	—	—	—	—	—	—	—	—
nb_75-TSP-20	17251	17251	—	—	—	—	—	—	—	—	—	—	—
nb_76-TSP-20	8634	26595	—	—	—	—	—	—	—	—	—	—	—
nb_142-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-20	15413	2886	—	—	—	—	—	—	—	—	—	—	—
nb_193-TSP-20	8057	8057	—	—	—	—	—	—	—	—	—	—	—
nb_366-TSP-20	6264	11058	—	—	—	—	—	—	—	—	—	—	—
nb_453-TSP-20	56785	56785	—	—	—	—	—	—	—	—	—	—	—
nb_727-TSP-20	6919	2945	—	—	—	—	—	—	—	—	—	—	—
nb_901-TSP-20	2258	27795	—	—	—	—	—	—	—	—	—	—	—
Grand total:	128555	155298	—	—	—	—	—	—	—	—	—	—	—

Table 63. Number of visited nodes required for solved instances belonging to class `nb-TSP-20-hard`. Problem range: `nb_2-TSP-20`–`nb_901-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_3-TSP-25	2089	4060	—	—	—	—	—	—	—	—	—	—	—
nb_13-TSP-25	942	1659	—	—	—	—	—	—	—	—	—	—	—
nb_38-TSP-25	5165	5165	—	—	—	—	—	—	—	—	—	—	—
nb_54-TSP-25	366	196	—	—	—	—	—	—	—	—	—	—	—
nb_66-TSP-25	303	7286	—	—	—	—	—	—	—	—	—	—	—
Grand total:	8865	18366	—	—	—	—	—	—	—	—	—	—	—

Table 64. Number of visited nodes required for solved instances belonging to class `nb-TSP-25-easy`. Problem range: `nb_3-TSP-25`–`nb_66-TSP-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_48-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_163-TSP-25	25794	25794	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-25	20390	31067	—	—	—	—	—	—	—	—	—	—	—
nb_312-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_456-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_523-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_561-TSP-25	14364	24170	—	—	—	—	—	—	—	—	—	—	—
nb_681-TSP-25	—	32593	—	—	—	—	—	—	—	—	—	—	—
nb_715-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_843-TSP-25	18168	45046	—	—	—	—	—	—	—	—	—	—	—
Grand total:	78716	158670	—	—	—	—	—	—	—	—	—	—	—

Table 65. Number of visited nodes required for solved instances belonging to class `nb-TSP-25-hard`. Problem range: `nb_48-TSP-25`–`nb_843-TSP-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_series5	12	12	—	—	—	17	17	—	—	—	—	—	—
nb_series6	19	19	—	—	—	45	45	—	—	—	—	—	—
nb_series7	40	40	—	—	—	132	132	—	—	—	—	—	—
nb_series8	453	453	—	—	—	266	266	—	—	—	—	—	—
nb_series9	465	465	—	—	—	1748	1748	—	—	—	—	—	—
nb_series10	—	—	—	—	—	4642	4642	—	—	—	—	—	—
nb_series11	4156	4156	—	—	—	29218	29218	—	—	—	—	—	—
nb_series12	8439	8439	—	—	—	118911	118911	—	—	—	—	—	—
nb_series13	52614	52614	—	—	—	524323	524323	—	—	—	—	—	—
nb_series14	114489	114489	—	—	—	3490936	3490936	—	—	—	—	—	—
nb_series15	310158	310158	—	—	—	14645145	14645145	—	—	—	—	—	—
nb_series16	212348	212348	—	—	—	—	—	—	—	—	—	—	—
nb_series18	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series30	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series35	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series40	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series45	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series50	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	703193	703193	—	—	—	18815383	18815383	—	—	—	—	—	—

Table 66. Number of visited nodes required for solved instances belonging to class `nb-allSeries1`. Problem range: `nb_series5`–`nb_series50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cc_5_5_3	34	34	—	—	—	25	25	—	—	—	—	—	—
nb_cc_6_6_3	112	112	—	—	—	5139	5139	—	—	—	—	—	—
nb_cc_7_7_3	135	135	—	—	—	354668	354668	—	—	—	—	—	—
nb_cc_8_8_3	644	644	—	—	—	—	—	—	—	—	—	—	—
nb_cc_9_9_3	3707	3707	—	—	—	—	—	—	—	—	—	—	—
nb_cc_5_5_2	6980	6980	—	—	—	4486	4486	—	—	—	—	—	—
nb_cc_6_6_2	7272	7272	—	—	—	4673	4673	—	—	—	—	—	—
nb_cc_7_7_2	7128	7128	—	—	—	4835	4835	—	—	—	—	—	—
nb_cc_8_8_2	7334	7334	—	—	—	4815	4815	—	—	—	—	—	—
nb_cc_9_9_2	7264	7264	—	—	—	5038	5038	—	—	—	—	—	—
nb_cc_10_10_2	12090	12090	—	—	—	5134	5134	—	—	—	—	—	—
Grand total:	52700	52700	—	—	—	388813	388813	—	—	—	—	—	—

Table 67. Number of visited nodes required for solved instances belonging to class nb-cc1. Problem range: nb_cc_5_5_3–nb_cc_10_10_2. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cril_sat_nb_0	147	108	—	—	—	602	602	—	—	—	—	—	—
nb_cril_unsat_nb_6	946602	946602	—	—	—	—	—	—	—	—	—	—	—
nb_cril_unsat_nb_7	1226798	1226798	—	—	—	—	—	—	—	—	—	—	—
Grand total:	2173547	2173508	—	—	—	602	602	—	—	—	—	—	—

Table 68. Number of visited nodes required for solved instances belonging to class nb-cril. Problem range: nb_cril_sat_nb_0–nb_cril_unsat_nb_7. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_gr_17_6_a3	45	150	—	—	—	453	453	—	—	—	—	—	—
nb_gr_25_7_a3	190	89	—	—	—	1549	1549	—	—	—	—	—	—
nb_gr_34_8_a3	1347	1448	—	—	—	31539	31539	—	—	—	—	—	—
nb_gr_44_9_a3	13183	11605	—	—	—	161985	161985	—	—	—	—	—	—
nb_gr_55_10_a3	—	—	—	—	—	929517	929517	—	—	—	—	—	—
nb_gr_17_7_a3	96	100	—	—	—	1713	1713	—	—	—	—	—	—
nb_gr_25_8_a3	1698	1353	—	—	—	14410	14410	—	—	—	—	—	—
nb_gr_34_9_a3	5577	5511	—	—	—	85539	85539	—	—	—	—	—	—
nb_gr_44_10_a3	11122	11963	—	—	—	482048	482048	—	—	—	—	—	—
nb_gr_55_11_a3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	33258	32219	—	—	—	1708753	1708753	—	—	—	—	—	—

Table 69. Number of visited nodes required for solved instances belonging to class nb-gr1. Problem range: nb_gr_17_6_a3–nb_gr_55_11_a3. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_10_3	56	56	—	—	—	1821	1821	—	—	—	—	—	—
nb_ramsey_13_3	113	113	—	—	—	7424	7424	—	—	—	—	—	—
nb_ramsey_15_3	685	685	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_16_3	433	433	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_17_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_18_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_20_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_25_3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	1287	1287	—	—	—	9245	9245	—	—	—	—	—	—

Table 70. Number of visited nodes required for solved instances belonging to class `nb-ramsey3`. Problem range: `nb_ramsey_10_3`–`nb_ramsey_25_3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_25_4	461	461	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_30_4	846	846	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_32_4	1442	1442	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_33_4	2390	2390	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_34_4	17505	17505	—	—	—	—	—	—	—	—	—	—	—
Grand total:	22644	22644	—	—	—	—	—	—	—	—	—	—	—

Table 71. Number of visited nodes required for solved instances belonging to class nb-ramsey4. Problem range: nb_ramsey_25_4–nb_ramsey_34_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-20-20-60-632-forced-1	48926	48926	—	—	—	183636	183636	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-2	35722	35722	—	—	—	605102	605102	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-3	156615	156615	—	—	—	215309	215309	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-4	131486	131486	—	—	—	402677	402677	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-5	109041	109041	—	—	—	316557	316557	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-6	1527	1527	—	—	—	41701	41701	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-7	119463	119463	—	—	—	11852	11852	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-8	346217	346217	—	—	—	343678	343678	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-9	23964	23964	—	—	—	305128	305128	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-10	52847	52847	—	—	—	64960	64960	—	—	—	—	—	—
Grand total:	1025808	1025808	—	—	—	2490600	2490600	—	—	—	—	—	—

Table 72. Number of visited nodes required for solved instances belonging to class `nb-random-3-20-20-60-632-forced`. Problem range: `nb_random-3-20-20-60-632-forced-1`–`nb_random-3-20-20-60-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-24-24-76-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-4	106226	106226	—	—	—	357868	357868	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-5	—	—	—	—	—	345742	345742	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-7	—	—	—	—	—	2119564	2119564	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-9	—	—	—	—	—	2604537	2604537	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	106226	106226	—	—	—	5427711	5427711	—	—	—	—	—	—

Table 73. Number of visited nodes required for solved instances belonging to class `nb-random-3-24-24-76-632-forced`. Problem range: `nb_random-3-24-24-76-632-forced-1`–`nb_random-3-24-24-76-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-28-28-93-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-5	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-7	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-9	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 74. Number of visited nodes required for solved instances belonging to class `nb-random-3-28-28-93-632-forced`. Problem range: `nb_random-3-28-28-93-632-forced-1`–`nb_random-3-28-28-93-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb_renault-merged`	101	101	—	—	—	15909	15909	—	—	—	—	—	—
Grand total:	101	101	—	—	—	15909	15909	—	—	—	—	—	—

Table 75. Number of visited nodes required for solved instances belonging to class `nb-renault`. Problem: `nb_renault-merged`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_lemma-23-3	29	29	—	—	—	462	462	—	—	—	—	—	—
nb_lemma-66-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-12-9-mod	383717	383717	—	—	—	663835	663835	—	—	—	—	—	—
nb_lemma-15-9-mod	293107	293107	—	—	—	644565	644565	—	—	—	—	—	—
nb_lemma-20-9-mod	295263	295263	—	—	—	623529	623529	—	—	—	—	—	—
nb_lemma-24-3	5118	5118	—	—	—	5513	5513	—	—	—	—	—	—
nb_lemma-30-9-mod	290374	290374	—	—	—	623529	623529	—	—	—	—	—	—
nb_lemma-50-9-mod	—	—	—	—	—	623529	623529	—	—	—	—	—	—
nb_lemma-67-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-100-9-mod	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	1267608	1267608	—	—	—	3184962	3184962	—	—	—	—	—	—

Table 76. Number of visited nodes required for solved instances belonging to class `nb-schurr`. Problem range: `nb_lemma-23-3`–`nb_lemma-100-9-mod`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_Golomb-3-sat	105	131	—	—	—	359	691	—	—	—	—	—	—
nb_Golomb-4-sat	1063	1487	—	—	—	4759	11207	—	—	—	—	—	—
nb_Golomb-5-sat	8749	30520	—	—	—	33621	84534	—	—	—	—	—	—
nb_Golomb-6-sat	51363	293735	—	—	—	158443	413525	—	—	—	—	—	—
nb_Golomb-7-sat	214593	2564348	—	—	—	636551	1600231	—	—	—	—	—	—
nb_Golomb-8-sat	3827613	16917415	—	—	—	3936284	6930220	—	—	—	—	—	—
nb_Golomb-9-sat	56609234	75891861	—	—	—	20923074	28976875	—	—	—	—	—	—
nb_Golomb-10-sat	374119251	450048672	—	—	—	126735090	146126204	—	—	—	—	—	—
nb_Golomb-11-sat	—	—	—	—	—	1336253978	1379010890	—	—	—	—	—	—
nb_Golomb-12-sat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-3-unsat	114	114	—	—	—	335	619	—	—	—	—	—	—
nb_Golomb-4-unsat	2644	2640	—	—	—	4802	11080	—	—	—	—	—	—
nb_Golomb-5-unsat	21963	27774	—	—	—	47186	97666	—	—	—	—	—	—
nb_Golomb-6-unsat	158700	337168	—	—	—	291562	545745	—	—	—	—	—	—
nb_Golomb-7-unsat	1825274	3911808	—	—	—	2166143	3128237	—	—	—	—	—	—
nb_Golomb-8-unsat	23578348	40437547	—	—	—	25843055	28834847	—	—	—	—	—	—
nb_Golomb-9-unsat	171872671	251883497	—	—	—	234361655	242412189	—	—	—	—	—	—
nb_Golomb-10-unsat	—	—	—	—	—	1864946824	1884333133	—	—	—	—	—	—
nb_Golomb-11-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-12-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	632291685	842348717	—	—	—	3616343721	3722517893	—	—	—	—	—	—

Table 77. Number of consistency checks required for solved instances belonging to class `nb-Golomb`. Problem range: `nb_Golomb-3-sat`–`nb_Golomb-12-unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_1-TSP-20	13392496	52132740	—	—	—	—	—	—	—	—	—	—	—
nb_8-TSP-20	6269330	60682600	—	—	—	—	—	—	—	—	—	—	—
nb_29-TSP-20	6001454	34417936	—	—	—	—	—	—	—	—	—	—	—
nb_30-TSP-20	9622528	63764348	—	—	—	—	—	—	—	—	—	—	—
nb_68-TSP-20	3728591	3817252	—	—	—	—	—	—	—	—	—	—	—
Grand total:	39014399	214814876	—	—	—	—	—	—	—	—	—	—	—

Table 78. Number of consistency checks required for solved instances belonging to class `nb-TSP-20-easy`. Problem range: `nb_1-TSP-20`–`nb_68-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_2-TSP-20	94180475	83610357	—	—	—	—	—	—	—	—	—	—	—
nb_75-TSP-20	683877774	700017733	—	—	—	—	—	—	—	—	—	—	—
nb_76-TSP-20	78389904	269046506	—	—	—	—	—	—	—	—	—	—	—
nb_142-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-20	71406351	77848116	—	—	—	—	—	—	—	—	—	—	—
nb_193-TSP-20	419969985	445384632	—	—	—	—	—	—	—	—	—	—	—
nb_366-TSP-20	71228749	170338618	—	—	—	—	—	—	—	—	—	—	—
nb_453-TSP-20	688912317	701725814	—	—	—	—	—	—	—	—	—	—	—
nb_727-TSP-20	104195075	111293455	—	—	—	—	—	—	—	—	—	—	—
nb_901-TSP-20	50998433	512225020	—	—	—	—	—	—	—	—	—	—	—
Grand total:	2263159063	3071490251	—	—	—	—	—	—	—	—	—	—	—

Table 79. Number of consistency checks required for solved instances belonging to class `nb-TSP-20-hard`. Problem range: `nb_2-TSP-20`–`nb_901-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_3-TSP-25	47076264	119229197	—	—	—	—	—	—	—	—	—	—	—
nb_13-TSP-25	20569755	81680491	—	—	—	—	—	—	—	—	—	—	—
nb_38-TSP-25	80472281	94083792	—	—	—	—	—	—	—	—	—	—	—
nb_54-TSP-25	13131431	60541637	—	—	—	—	—	—	—	—	—	—	—
nb_66-TSP-25	10389752	121294783	—	—	—	—	—	—	—	—	—	—	—
Grand total:	171639483	476829900	—	—	—	—	—	—	—	—	—	—	—

Table 80. Number of consistency checks required for solved instances belonging to class `nb-TSP-25-easy`. Problem range: `nb_3-TSP-25`–`nb_66-TSP-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_48-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_163-TSP-25	527503889	587107535	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-25	258447891	444365019	—	—	—	—	—	—	—	—	—	—	—
nb_312-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_456-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_523-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_561-TSP-25	224585689	382635571	—	—	—	—	—	—	—	—	—	—	—
nb_681-TSP-25	—	417089419	—	—	—	—	—	—	—	—	—	—	—
nb_715-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_843-TSP-25	296591980	716254264	—	—	—	—	—	—	—	—	—	—	—
Grand total:	1307129449	2547451808	—	—	—	—	—	—	—	—	—	—	—

Table 81. Number of consistency checks required for solved instances belonging to class `nb-TSP-25-hard`. Problem range: `nb_48-TSP-25`–`nb_843-TSP-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_series5	537	3336	—	—	—	765	1409	—	—	—	—	—	—
nb_series6	1333	8155	—	—	—	2011	3491	—	—	—	—	—	—
nb_series7	3540	17357	—	—	—	4854	7812	—	—	—	—	—	—
nb_series8	75881	100830	—	—	—	11601	16949	—	—	—	—	—	—
nb_series9	92134	134166	—	—	—	60952	69920	—	—	—	—	—	—
nb_series10	—	—	—	—	—	172447	186631	—	—	—	—	—	—
nb_series11	1340419	1440696	—	—	—	1193552	1214962	—	—	—	—	—	—
nb_series12	2807109	2952017	—	—	—	5287224	5318332	—	—	—	—	—	—
nb_series13	22226095	22430173	—	—	—	25053441	25097229	—	—	—	—	—	—
nb_series14	56009352	56287793	—	—	—	183015171	183075179	—	—	—	—	—	—
nb_series15	121764649	122138247	—	—	—	840207823	840288197	—	—	—	—	—	—
nb_series16	90506314	90994440	—	—	—	—	—	—	—	—	—	—	—
nb_series18	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series30	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series35	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series40	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series45	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series50	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	294827363	296507210	—	—	—	1055009841	1055280111	—	—	—	—	—	—

Table 82. Number of consistency checks required for solved instances belonging to class `nb-allSeries1`. Problem range: `nb_series5`–`nb_series50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cc_5_5_3	2021	8140	—	—	—	943	943	—	—	—	—	—	—
nb_cc_6_6_3	12659	26787	—	—	—	252495	252495	—	—	—	—	—	—
nb_cc_7_7_3	23512	51245	—	—	—	31214513	31214513	—	—	—	—	—	—
nb_cc_8_8_3	152055	201171	—	—	—	—	—	—	—	—	—	—	—
nb_cc_9_9_3	1030110	1111010	—	—	—	—	—	—	—	—	—	—	—
nb_cc_5_5_2	284145	286205	—	—	—	171037	171037	—	—	—	—	—	—
nb_cc_6_6_2	587088	591630	—	—	—	278476	278476	—	—	—	—	—	—
nb_cc_7_7_2	892577	901261	—	—	—	385865	385865	—	—	—	—	—	—
nb_cc_8_8_2	1423015	1438241	—	—	—	462434	462434	—	—	—	—	—	—
nb_cc_9_9_2	1889494	1914431	—	—	—	568072	568072	—	—	—	—	—	—
nb_cc_10_10_2	4174220	4212884	—	—	—	678541	678541	—	—	—	—	—	—
Grand total:	10470896	10743005	—	—	—	34012376	34012376	—	—	—	—	—	—

Table 83. Number of consistency checks required for solved instances belonging to class nb-cc1. Problem range: nb_cc_5_5_3–nb_cc_10_10_2. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cril_sat_nb_0	5455	18918	—	—	—	4237	4243	—	—	—	—	—	—
nb_cril_unsat_nb_6	196124563	196200541	—	—	—	—	—	—	—	—	—	—	—
nb_cril_unsat_nb_7	198930412	198993254	—	—	—	—	—	—	—	—	—	—	—
Grand total:	395060430	395212713	—	—	—	4237	4243	—	—	—	—	—	—

Table 84. Number of consistency checks required for solved instances belonging to class `nb-cril`. Problem range: `nb_cril_sat_nb_0`–`nb_cril_unsat_nb_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_gr_17_6_a3	83781	699561	—	—	—	124594	212019	—	—	—	—	—	—
nb_gr_25_7_a3	658931	4493363	—	—	—	749741	1174886	—	—	—	—	—	—
nb_gr_34_8_a3	7377780	27997513	—	—	—	21444069	23032186	—	—	—	—	—	—
nb_gr_44_9_a3	97912584	142730520	—	—	—	187602890	192576215	—	—	—	—	—	—
nb_gr_55_10_a3	—	—	—	—	—	1859844451	1873538100	—	—	—	—	—	—
nb_gr_17_7_a3	255988	925871	—	—	—	664030	822291	—	—	—	—	—	—
nb_gr_25_8_a3	5602527	9697204	—	—	—	9802829	10504250	—	—	—	—	—	—
nb_gr_34_9_a3	30569978	56784788	—	—	—	99469765	101919640	—	—	—	—	—	—
nb_gr_44_10_a3	122807988	189985483	—	—	—	901453721	908747212	—	—	—	—	—	—
nb_gr_55_11_a3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	265269557	433314303	—	—	—	3081156090	3112526799	—	—	—	—	—	—

Table 85. Number of consistency checks required for solved instances belonging to class nb-gr1. Problem range: nb_gr_17_6_a3–nb_gr_55_11_a3. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_10_3	2188	6267	—	—	—	45409	45409	—	—	—	—	—	—
nb_ramsey_13_3	5615	15504	—	—	—	247909	247909	—	—	—	—	—	—
nb_ramsey_15_3	38247	54043	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_16_3	27426	46860	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_17_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_18_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_20_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_25_3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	73476	122674	—	—	—	293318	293318	—	—	—	—	—	—

Table 86. Number of consistency checks required for solved instances belonging to class `nb-ramsey3`. Problem range: `nb_ramsey_10_3`–`nb_ramsey_25_3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_25_4	88510	239869	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_30_4	195862	461590	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_32_4	331833	654449	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_33_4	547260	865287	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_34_4	3953872	4269476	—	—	—	—	—	—	—	—	—	—	—
Grand total:	5117337	6490671	—	—	—	—	—	—	—	—	—	—	—

Table 87. Number of consistency checks required for solved instances belonging to class nb-ramsey4. Problem range: nb_ramsey_25_4–nb_ramsey_34_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-20-20-60-632-forced-1	50691657	51011725	—	—	—	122350010	122350010	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-2	49490015	49813476	—	—	—	287512020	287512020	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-3	156270915	156599257	—	—	—	116293712	116293712	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-4	123087043	123407774	—	—	—	253124435	253124435	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-5	113702781	114046724	—	—	—	157484269	157484269	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-6	2017937	2342031	—	—	—	25353701	25353701	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-7	127799329	128131918	—	—	—	5221467	5221467	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-8	354128478	354455413	—	—	—	165019003	165019003	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-9	28284013	28610757	—	—	—	168630544	168630544	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-10	60295402	60618374	—	—	—	32786351	32786351	—	—	—	—	—	—
Grand total:	1065767570	1069037449	—	—	—	1333775512	1333775512	—	—	—	—	—	—

Table 88. Number of consistency checks required for solved instances belonging to class `nb-random-3-20-20-60-632-forced`. Problem range: `nb_random-3-20-20-60-632-forced-1`–`nb_random-3-20-20-60-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-24-24-76-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-4	194301612	194901439	—	—	—	289342962	289342962	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-5	—	—	—	—	—	212964133	212964133	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-7	—	—	—	—	—	1404482699	1404482699	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-9	—	—	—	—	—	1684117045	1684117045	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	194301612	194901439	—	—	—	3590906839	3590906839	—	—	—	—	—	—

Table 89. Number of consistency checks required for solved instances belonging to class `nb-random-3-24-24-76-632-forced`. Problem range: `nb_random-3-24-24-76-632-forced-1`–`nb_random-3-24-24-76-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-28-28-93-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-5	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-7	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-9	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 90. Number of consistency checks required for solved instances belonging to class `nb-random-3-28-28-93-632-forced`. Problem range: `nb_random-3-28-28-93-632-forced-1`–`nb_random-3-28-28-93-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb_renault-merged`	78646203	137429911	—	—	—	652285	653882	—	—	—	—	—	—
Grand total:	78646203	137429911	—	—	—	652285	653882	—	—	—	—	—	—

Table 91. Number of consistency checks required for solved instances belonging to class `nb-renault`. Problem: `nb_renault-merged`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_lemma-23-3	1721	5908	—	—	—	31482	31482	—	—	—	—	—	—
nb_lemma-66-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-12-9-mod	21209248	21257069	—	—	—	20348343	20348343	—	—	—	—	—	—
nb_lemma-15-9-mod	41877034	41970377	—	—	—	40899150	40899150	—	—	—	—	—	—
nb_lemma-20-9-mod	92273664	92491199	—	—	—	87056330	87056330	—	—	—	—	—	—
nb_lemma-24-3	484482	489233	—	—	—	517226	517226	—	—	—	—	—	—
nb_lemma-30-9-mod	259573542	260302158	—	—	—	214425980	214425980	—	—	—	—	—	—
nb_lemma-50-9-mod	—	—	—	—	—	466404242	466404242	—	—	—	—	—	—
nb_lemma-67-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-100-9-mod	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	415419691	416515944	—	—	—	829682753	829682753	—	—	—	—	—	—

Table 92. Number of consistency checks required for solved instances belonging to class `nb-schurr`. Problem range: `nb_lemma-23-3`–`nb_lemma-100-9-mod`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_Golomb-3-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-4-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-5-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-6-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-7-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-8-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-9-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-10-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-11-sat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-12-sat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-3-unsat	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_Golomb-4-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-5-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-6-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-7-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-8-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-9-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-10-unsat	—	—	—	—	—	1	1	—	—	—	—	—	—
nb_Golomb-11-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_Golomb-12-unsat	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	27	27	—	—	—	—	—	—

Table 93. Number of removed universal constraints required for solved instances belonging to class `nb-Golomb`. Problem range: `nb_Golomb-3-sat`–`nb_Golomb-12-unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_1-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_8-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_29-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_30-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_68-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 94. Number of removed universal constraints required for solved instances belonging to class `nb-TSP-20-easy`. Problem range: `nb_1-TSP-20`–`nb_68-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_2-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_75-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_76-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_142-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_193-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_366-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_453-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_727-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_901-TSP-20	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 95. Number of removed universal constraints required for solved instances belonging to class `nb-TSP-20-hard`. Problem range: `nb_2-TSP-20`–`nb_901-TSP-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_3-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_13-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_38-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_54-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_66-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 96. Number of removed universal constraints required for solved instances belonging to class `nb-TSP-25-easy`. Problem range: `nb_3-TSP-25`–`nb_66-TSP-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_48-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_163-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_190-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_312-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_456-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_523-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_561-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_681-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_715-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_843-TSP-25	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 97. Number of removed universal constraints required for solved instances belonging to class `nb-TSP-25-hard`. Problem range: `nb_48-TSP-25`–`nb_843-TSP-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_series5	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series6	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series7	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series8	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series9	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series10	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series11	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series12	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series13	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series14	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series15	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_series16	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series18	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series20	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series25	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series30	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series35	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series40	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series45	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_series50	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 98. Number of removed universal constraints required for solved instances belonging to class `nb-allSeries1`. Problem range: `nb_series5`–`nb_series50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cc_5_5_3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_6_6_3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_7_7_3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_8_8_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_cc_9_9_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_cc_5_5_2	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_6_6_2	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_7_7_2	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_8_8_2	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_9_9_2	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_cc_10_10_2	—	—	—	—	—	0	0	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 99. Number of removed universal constraints required for solved instances belonging to class `nb-cc1`. Problem range: `nb_cc_5_5_3`–`nb_cc_10_10_2`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_cril_sat_nb_0	—	—	—	—	—	2	2	—	—	—	—	—	—
nb_cril_unsat_nb_6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_cril_unsat_nb_7	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	2	2	—	—	—	—	—	—

Table 100. Number of removed universal constraints required for solved instances belonging to class `nb-cril`. Problem range: `nb_cril_sat_nb_0`–`nb_cril_unsat_nb_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_gr_17_6_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_25_7_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_34_8_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_44_9_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_55_10_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_17_7_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_25_8_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_34_9_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_44_10_a3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_gr_55_11_a3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 101. Number of removed universal constraints required for solved instances belonging to class `nb-gr1`. Problem range: `nb_gr_17_6_a3`–`nb_gr_55_11_a3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_10_3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_ramsey_13_3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_ramsey_15_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_16_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_17_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_18_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_20_3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_25_3	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 102. Number of removed universal constraints required for solved instances belonging to class `nb-ramsey3`. Problem range: `nb_ramsey_10_3`–`nb_ramsey_25_3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_ramsey_25_4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_30_4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_32_4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_33_4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_ramsey_34_4	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 103. Number of removed universal constraints required for solved instances belonging to class nb-ramsey4. Problem range: nb_ramsey_25_4–nb_ramsey_34_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-20-20-60-632-forced-1	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-2	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-4	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-5	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-6	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-7	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-8	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-9	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-20-20-60-632-forced-10	—	—	—	—	—	0	0	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 104. Number of removed universal constraints required for solved instances belonging to class nb-random-3-20-20-60-632-forced. Problem range: nb_random-3-20-20-60-632-forced-1–nb_random-3-20-20-60-632-forced-10. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-24-24-76-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-4	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-5	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-7	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-9	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_random-3-24-24-76-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 105. Number of removed universal constraints required for solved instances belonging to class `nb-random-3-24-24-76-632-forced`. Problem range: `nb_random-3-24-24-76-632-forced-1`–`nb_random-3-24-24-76-632-forced-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_random-3-28-28-93-632-forced-1	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-2	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-3	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-5	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-6	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-7	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-8	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-9	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_random-3-28-28-93-632-forced-10	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 106. Number of removed universal constraints required for solved instances belonging to class nb-random-3-28-28-93-632-forced. Problem range: nb_random-3-28-28-93-632-forced-1–nb_random-3-28-28-93-632-forced-10. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
`nb_renault-merged`	—	—	—	—	—	2	2	—	—	—	—	—	—
Grand total:	—	—	—	—	—	2	2	—	—	—	—	—	—

Table 107. Number of removed universal constraints required for solved instances belonging to class `nb-renault`. Problem: `nb_renault-merged`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	table2opl/1	table2opl/2
nb_lemma-23-3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-66-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-12-9-mod	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-15-9-mod	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-20-9-mod	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-24-3	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-30-9-mod	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-50-9-mod	—	—	—	—	—	0	0	—	—	—	—	—	—
nb_lemma-67-4	—	—	—	—	—	—	—	—	—	—	—	—	—
nb_lemma-100-9-mod	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	0	0	—	—	—	—	—	—

Table 108. Number of removed universal constraints required for solved instances belonging to class `nb-schurr`. Problem range: `nb_lemma-23-3`–`nb_lemma-100-9-mod`. The maximum solution time was set to 600 seconds.

3.2 Binary Problems

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bh-4-4-easy-sat-0001-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0002-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0003-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0004-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0005-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0006-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0007-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0008-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0009-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
bh-4-4-easy-sat-0010-BlackHole-4-4	+	+	+	+	+	+	+	+	+					+		
Grand total:	10	10	10	10	10	10	10	10	10	0	0	0	0	10	0	0

Table 109. Number of solved instances belonging to class `BH-4-4`. Problem range: `bh-4-4-easy-sat-0001-BlackHole-4-4`–`bh-4-4-easy-sat-0010-BlackHole-4-4`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-rzchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-1-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-2-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-3-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-4-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-5-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	5	5	5	5

Table 110. Number of solved instances belonging to class `QCP-10-easy`. Problem range: `qcp-order10-holes67-balanced-1-QWH-10`–`qcp-order10-holes67-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-7-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-17-QWH-10`	+	+		+	+		+	+	+	+	+	+		+	+	+
`qcp-order10-holes67-balanced-186-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-267-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-315-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	4	5	5	5

Table 111. Number of solved instances belonging to class `QCP-10-hard`. Problem range: `qcp-order10-holes67-balanced-7-QWH-10`–`qcp-order10-holes67-balanced-315-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-33-QWH-10`	+	+	+	+	+		+	+	+					+	+	+
`qcp-order10-holes67-balanced-140-QWH-10`	+	+	+	+	+		+	+	+	+				+	+	+
`qcp-order10-holes67-balanced-150-QWH-10`	+	+	+	+	+		+	+	+		+	+		+	+	+
`qcp-order10-holes67-balanced-160-QWH-10`	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes67-balanced-946-QWH-10`	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	5	5	5	0	5	5	5	3	3	3	2	5	5	5

Table 112. Number of solved instances belonging to class `QCP-10`. Problem range: `qcp-order10-holes67-balanced-33-QWH-10`–`qcp-order10-holes67-balanced-946-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-20-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+		
`qcp-order15-holes120-balanced-21-QWH-15`	+	+		+	+		+	+	+	+	+	+		+	+	+
`qcp-order15-holes120-balanced-22-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order15-holes120-balanced-23-QWH-15`	+	+		+	+		+	+	+	+	+	+		+	+	+
`qcp-order15-holes120-balanced-24-QWH-15`	+	+		+	+		+	+	+						+	+
Grand total:	5	5	0	5	5	0	5	5	5	4	4	4	2	4	4	4

Table 113. Number of solved instances belonging to class `QCP-15-easy`. Problem range: `qcp-order15-holes120-balanced-20-QWH-15`–`qcp-order15-holes120-balanced-24-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-225-QWH-15`	+	+		+	+		+	+	+	+	+	+		+	+	+
`qcp-order15-holes120-balanced-245-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order15-holes120-balanced-259-QWH-15`	+	+		+	+		+	+	+		+	+				
`qcp-order15-holes120-balanced-278-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order15-holes120-balanced-363-QWH-15`	+	+		+	+		+	+	+	+				+		
`qcp-order15-holes120-balanced-488-QWH-15`	+	+		+	+		+	+	+		+	+				
`qcp-order15-holes120-balanced-711-QWH-15`	+	+		+	+		+	+	+							
`qcp-order15-holes120-balanced-736-QWH-15`	+	+		+	+		+	+	+	+				+	+	+
`qcp-order15-holes120-balanced-819-QWH-15`	+	+		+	+		+	+	+	+	+	+	+			
`qcp-order15-holes120-balanced-941-QWH-15`	+	+		+	+		+	+	+							
Grand total:	10	10	0	10	10	0	10	10	10	6	6	6	3	5	4	4

Table 114. Number of solved instances belonging to class `QCP-15-hard`. Problem range: `qcp-order15-holes120-balanced-225-QWH-15`–`qcp-order15-holes120-balanced-941-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-90-QWH-15`	+	+	+	+	+		+	+	+							
`qcp-order15-holes120-balanced-100-QWH-15`	+	+	+	+	+		+	+	+				+	+		
`qcp-order15-holes120-balanced-103-QWH-15`	+	+	+	+	+		+	+	+					+		
`qcp-order15-holes120-balanced-268-QWH-15`			+	+	+		+	+	+							
`qcp-order15-holes120-balanced-999-QWH-15`	+	+	+	+	+		+	+	+					+		
Grand total:	4	4	5	5	5	0	5	5	5	0	0	0	1	3	0	0

Table 115. Number of solved instances belonging to class `QCP-15`. Problem range: `qcp-order15-holes120-balanced-90-QWH-15`–`qcp-order15-holes120-balanced-999-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-11-QWH-20`	+	+			+		+	+	+							
`qcp-order20-holes187-balanced-19-QWH-20`				+	+				+							
`qcp-order20-holes187-balanced-24-QWH-20`				+	+		+	+	+							
`qcp-order20-holes187-balanced-29-QWH-20`				+	+		+	+	+				+			
`qcp-order20-holes187-balanced-30-QWH-20`	+	+			+				+							
Grand total:	2	2	0	3	5	0	3	3	5	0	0	0	1	0	0	0

Table 116. Number of solved instances belonging to class `QCP-20-easy`. Problem range: `qcp-order20-holes187-balanced-11-QWH-20`–`qcp-order20-holes187-balanced-30-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order20-holes187-balanced-6-QWH-20					+											
qcp-order20-holes187-balanced-10-QWH-20				+	+		+	+	+							
qcp-order20-holes187-balanced-32-QWH-20					+				+							
qcp-order20-holes187-balanced-214-QWH-20				+	+				+							
qcp-order20-holes187-balanced-217-QWH-20					+				+							
qcp-order20-holes187-balanced-332-QWH-20					+				+							
qcp-order20-holes187-balanced-380-QWH-20					+		+	+	+							
qcp-order20-holes187-balanced-597-QWH-20					+											
qcp-order20-holes187-balanced-702-QWH-20				+	+				+							
qcp-order20-holes187-balanced-981-QWH-20					+		+	+	+							
Grand total:	0	0	0	3	10	0	3	3	8	0	0	0	0	0	0	0

Table 117. Number of solved instances belonging to class `QCP-20-hard`. Problem range: `qcp-order20-holes187-balanced-6-QWH-20`–`qcp-order20-holes187-balanced-981-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-375-QWH-20`					+				+							
`qcp-order20-holes187-balanced-378-QWH-20`	+	+	+	+	+		+	+	+							
`qcp-order20-holes187-balanced-580-QWH-20`			+		+				+							
`qcp-order20-holes187-balanced-602-QWH-20`			+		+				+							
`qcp-order20-holes187-balanced-722-QWH-20`			+		+				+							
Grand total:	1	1	4	1	5	0	1	1	5	0	0	0	0	0	0	0

Table 118. Number of solved instances belonging to class `QCP-20`. Problem range: `qcp-order20-holes187-balanced-375-QWH-20`–`qcp-order20-holes187-balanced-722-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-23-QWH-25`																
`qcp-order25-holes264-balanced-31-QWH-25`					+											
`qcp-order25-holes264-balanced-64-QWH-25`																
Grand total:	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

Table 119. Number of solved instances belonging to class `QCP-25-easy`. Problem range: `qcp-order25-holes264-balanced-23-QWH-25`–`qcp-order25-holes264-balanced-64-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-3-QWH-25`					+											
`qcp-order25-holes264-balanced-6-QWH-25`																
`qcp-order25-holes264-balanced-9-QWH-25`					+				+							
`qcp-order25-holes264-balanced-11-QWH-25`																
`qcp-order25-holes264-balanced-14-QWH-25`																
`qcp-order25-holes264-balanced-22-QWH-25`																
`qcp-order25-holes264-balanced-29-QWH-25`																
`qcp-order25-holes264-balanced-68-QWH-25`					+											
`qcp-order25-holes264-balanced-79-QWH-25`																
Grand total:	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0

Table 120. Number of solved instances belonging to class `QCP-25-hard`. Problem range: `qcp-order25-holes264-balanced-3-QWH-25`–`qcp-order25-holes264-balanced-79-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-15-QWH-25`																
`qcp-order25-holes264-balanced-32-QWH-25`	+	+		+	+		+	+	+							
`qcp-order25-holes264-balanced-33-QWH-25`					+				+							
`qcp-order25-holes264-balanced-34-QWH-25`					+				+							
`qcp-order25-holes264-balanced-75-QWH-25`																
Grand total:	1	1	0	1	3	0	1	1	3	0	0	0	0	0	0	0

Table 121. Number of solved instances belonging to class `QCP-25`. Problem range: `qcp-order25-holes264-balanced-15-QWH-25`–`qcp-order25-holes264-balanced-75-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-1-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes64-balanced-15-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes64-balanced-22-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes64-balanced-52-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order10-holes64-balanced-70-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	5	5	5	5

Table 122. Number of solved instances belonging to class `QCPp-10-easy`. Problem range: `qcp-order10-holes64-balanced-1-QWH-10`–`qcp-order10-holes64-balanced-70-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order10-holes64-balanced-221-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
qcp-order10-holes64-balanced-280-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
qcp-order10-holes64-balanced-351-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+		
qcp-order10-holes64-balanced-511-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+		
qcp-order10-holes64-balanced-558-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
qcp-order10-holes64-balanced-698-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
qcp-order10-holes64-balanced-701-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
qcp-order10-holes64-balanced-731-QWH-10	+	+		+	+		+	+	+		+	+	+	+		
qcp-order10-holes64-balanced-764-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
qcp-order10-holes64-balanced-885-QWH-10	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	0	10	10	0	10	10	10	9	10	10	10	10	7	7

Table 123. Number of solved instances belonging to class `QCPp-10-hard`. Problem range: `qcp-order10-holes64-balanced-221-QWH-10`–`qcp-order10-holes64-balanced-885-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-16-QWH-10`	+	+	+	+	+		+	+	+					+		
`qcp-order10-holes64-balanced-32-QWH-10`	+	+	+	+	+		+	+	+	+	+	+		+	+	+
`qcp-order10-holes64-balanced-45-QWH-10`	+	+	+	+	+		+	+	+					+		
`qcp-order10-holes64-balanced-109-QWH-10`	+	+	+	+	+		+	+	+					+		
`qcp-order10-holes64-balanced-140-QWH-10`	+	+	+	+	+		+	+	+		+	+	+	+		
Grand total:	5	5	5	5	5	0	5	5	5	1	2	2	1	5	1	1

Table 124. Number of solved instances belonging to class `QCPp-10`. Problem range: `qcp-order10-holes64-balanced-16-QWH-10`–`qcp-order10-holes64-balanced-140-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-73-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order15-holes120-balanced-74-QWH-15`	+	+		+	+		+	+	+	+			+	+	+	+
`qcp-order15-holes120-balanced-75-QWH-15`	+	+		+	+		+	+	+	+			+			
`qcp-order15-holes120-balanced-76-QWH-15`	+	+		+	+		+	+	+		+	+	+	+	+	+
`qcp-order15-holes120-balanced-77-QWH-15`	+	+		+	+		+	+	+	+			+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	4	2	2	5	4	4	4

Table 125. Number of solved instances belonging to class `QCPp-15-easy`. Problem range: `qcp-order15-holes120-balanced-73-QWH-15`–`qcp-order15-holes120-balanced-77-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-3-QWH-15`	+	+		+	+		+	+	+		+	+				
`qcp-order15-holes120-balanced-25-QWH-15`	+	+		+	+		+	+	+	+			+	+	+	+
`qcp-order15-holes120-balanced-48-QWH-15`	+	+		+	+		+	+	+	+				+	+	+
`qcp-order15-holes120-balanced-127-QWH-15`	+	+		+	+		+	+	+	+	+	+		+	+	
`qcp-order15-holes120-balanced-135-QWH-15`	+	+		+	+		+	+	+	+				+	+	+
`qcp-order15-holes120-balanced-171-QWH-15`	+	+		+	+		+	+	+				+	+	+	+
Grand total:	6	6	0	6	6	0	6	6	6	4	2	2	2	5	5	4

Table 126. Number of solved instances belonging to class `QCPp-15-hard`. Problem range: `qcp-order15-holes120-balanced-3-QWH-15`–`qcp-order15-holes120-balanced-171-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-1-QWH-15`	+	+	+	+	+		+	+	+					+		
`qcp-order15-holes120-balanced-2-QWH-15`	+	+	+	+	+		+	+	+							
`qcp-order15-holes120-balanced-17-QWH-15`	+	+	+	+	+		+	+	+					+		
`qcp-order15-holes120-balanced-21-QWH-15`	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
`qcp-order15-holes120-balanced-54-QWH-15`	+	+	+	+	+		+	+	+					+		
Grand total:	5	5	5	5	5	0	5	5	5	1	1	1	1	4	1	1

Table 127. Number of solved instances belonging to class `QCPp-15`. Problem range: `qcp-order15-holes120-balanced-1-QWH-15`–`qcp-order15-holes120-balanced-54-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-13-QWH-20`				+	+				+							
`qcp-order20-holes187-balanced-14-QWH-20`	+	+		+	+		+	+	+							
`qcp-order20-holes187-balanced-15-QWH-20`	+	+		+	+		+	+	+					+		
`qcp-order20-holes187-balanced-16-QWH-20`	+	+		+	+		+	+	+		+	+		+		
`qcp-order20-holes187-balanced-17-QWH-20`	+	+		+	+		+	+	+		+	+	+		+	+
Grand total:	4	4	0	5	5	0	4	4	5	0	2	2	1	2	1	1

Table 128. Number of solved instances belonging to class `QCPp-20-easy`. Problem range: `qcp-order20-holes187-balanced-13-QWH-20`–`qcp-order20-holes187-balanced-17-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-3-QWH-20`	+	+		+	+		+	+	+					+	+	+
`qcp-order20-holes187-balanced-12-QWH-20`	+	+		+	+		+	+	+				+	+		
`qcp-order20-holes187-balanced-18-QWH-20`	+	+		+	+		+	+	+					+		
`qcp-order20-holes187-balanced-22-QWH-20`	+	+		+	+		+	+	+					+		
`qcp-order20-holes187-balanced-23-QWH-20`	+	+		+	+				+				+	+	+	+
Grand total:	5	5	0	5	5	0	4	4	5	0	0	0	2	5	2	2

Table 129. Number of solved instances belonging to class `QCPp-20-hard`. Problem range: `qcp-order20-holes187-balanced-3-QWH-20`–`qcp-order20-holes187-balanced-23-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-8-QWH-20`	+	+	+	+	+		+	+	+							
`qcp-order20-holes187-balanced-25-QWH-20`	+	+	+	+	+		+	+	+					+		
`qcp-order20-holes187-balanced-27-QWH-20`	+	+	+	+	+		+	+	+					+		
`qcp-order20-holes187-balanced-29-QWH-20`	+	+	+	+	+		+	+	+					+		
Grand total:	4	4	4	4	4	0	4	4	4	0	0	0	0	3	0	0

Table 130. Number of solved instances belonging to class `QCPp-20`. Problem range: `qcp-order20-holes187-balanced-8-QWH-20`–`qcp-order20-holes187-balanced-29-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-2-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-3-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-4-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-5-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	5	5	5	5

Table 131. Number of solved instances belonging to class `QWH-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-35-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-54-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-187-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-219-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-647-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	5	5	5	5

Table 132. Number of solved instances belonging to class `QWH-10-hard`. Problem range: `qwh-order10-holes57-balanced-35-QWH-10`–`qwh-order10-holes57-balanced-647-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-14-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-15-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-16-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-17-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-18-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	5	5	5	5

Table 133. Number of solved instances belonging to class `QWH-15-easy`. Problem range: `qwh-order15-holes106-balanced-14-QWH-15`–`qwh-order15-holes106-balanced-18-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-26-QWH-15`	+	+		+	+		+	+	+	+	+	+	+		+	+
`qwh-order15-holes106-balanced-155-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-369-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-392-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-413-QWH-15`	+	+		+	+		+	+	+	+	+	+		+	+	+
`qwh-order15-holes106-balanced-461-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-463-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-586-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-974-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	9	9	0	9	9	0	9	9	9	9	9	9	8	8	9	9

Table 134. Number of solved instances belonging to class `QWH-15-hard`. Problem range: `qwh-order15-holes106-balanced-26-QWH-15`–`qwh-order15-holes106-balanced-974-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-17-QWH-20`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order20-holes166-balanced-18-QWH-20`	+	+		+	+		+	+	+	+						
`qwh-order20-holes166-balanced-19-QWH-20`	+	+		+	+		+	+	+	+	+	+		+	+	+
`qwh-order20-holes166-balanced-20-QWH-20`	+	+		+	+		+	+	+	+						
`qwh-order20-holes166-balanced-26-QWH-20`	+	+		+	+		+	+	+		+	+	+	+		
Grand total:	5	5	0	5	5	0	5	5	5	4	3	3	2	3	2	2

Table 135. Number of solved instances belonging to class `QWH-20-easy`. Problem range: `qwh-order20-holes166-balanced-17-QWH-20`–`qwh-order20-holes166-balanced-26-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-156-QWH-20`	+			+	+		+	+	+							
`qwh-order20-holes166-balanced-285-QWH-20`		+		+	+		+	+	+		+	+				
`qwh-order20-holes166-balanced-457-QWH-20`				+	+		+	+	+							
`qwh-order20-holes166-balanced-522-QWH-20`	+			+	+		+	+	+		+	+				
`qwh-order20-holes166-balanced-578-QWH-20`	+	+		+	+		+	+	+							
`qwh-order20-holes166-balanced-624-QWH-20`		+		+	+		+	+	+							
`qwh-order20-holes166-balanced-707-QWH-20`				+	+		+	+	+							
`qwh-order20-holes166-balanced-862-QWH-20`		+		+	+		+	+	+	+						
`qwh-order20-holes166-balanced-900-QWH-20`	+			+	+		+	+	+							
`qwh-order20-holes166-balanced-988-QWH-20`				+	+		+	+	+	+						
Grand total:	4	4	0	10	10	0	10	10	10	2	2	2	0	0	0	0

Table 136. Number of solved instances belonging to class `QWH-20-hard`. Problem range: `qwh-order20-holes166-balanced-156-QWH-20`–`qwh-order20-holes166-balanced-988-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-2-QWH-25`				+	+		+	+	+							
`qwh-order25-holes235-balanced-4-QWH-25`				+	+				+							
`qwh-order25-holes235-balanced-13-QWH-25`	+			+	+		+	+	+		+	+				
`qwh-order25-holes235-balanced-26-QWH-25`	+			+	+		+	+	+							
`qwh-order25-holes235-balanced-27-QWH-25`					+			+	+							
Grand total:	2	0	0	4	5	0	3	4	5	0	1	1	0	0	0	0

Table 137. Number of solved instances belonging to class `QWH-25-easy`. Problem range: `qwh-order25-holes235-balanced-2-QWH-25`–`qwh-order25-holes235-balanced-27-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qwh-order25-holes235-balanced-5-QWH-25					+											
qwh-order25-holes235-balanced-99-QWH-25					+				+							
qwh-order25-holes235-balanced-111-QWH-25					+				+							
qwh-order25-holes235-balanced-114-QWH-25					+				+							
qwh-order25-holes235-balanced-164-QWH-25					+				+							
qwh-order25-holes235-balanced-228-QWH-25					+				+							
qwh-order25-holes235-balanced-288-QWH-25					+				+							
qwh-order25-holes235-balanced-394-QWH-25					+											
qwh-order25-holes235-balanced-795-QWH-25					+				+							
qwh-order25-holes235-balanced-918-QWH-25					+											
qwh-order25-holes235-balanced-993-QWH-25					+				+							
Grand total:	0	0	0	0	11	0	0	0	8	0	0	0	0	0	0	0

Table 138. Number of solved instances belonging to class `QWH-25-hard`. Problem range: `qwh-order25-holes235-balanced-5-QWH-25`–`qwh-order25-holes235-balanced-993-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-33-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-43-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-46-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-111-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	0	5	5	0	5	5	5	5	5	5	5	5	5	5

Table 139. Number of solved instances belonging to class `QWHp-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-111-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-8-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-10-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-48-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-154-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-210-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-295-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-535-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-623-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-634-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order10-holes57-balanced-987-QWH-10`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	0	10	10	0	10	10	10	10	10	10	10	10	10	10

Table 140. Number of solved instances belonging to class `QWHp-10-hard`. Problem range: `qwh-order10-holes57-balanced-8-QWH-10`–`qwh-order10-holes57-balanced-987-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-4-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-5-QWH-15`	+	+		+	+		+	+	+				+	+	+	+
`qwh-order15-holes106-balanced-6-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+	+	+
`qwh-order15-holes106-balanced-7-QWH-15`	+	+		+	+		+	+	+		+	+	+	+	+	+
`qwh-order15-holes106-balanced-8-QWH-15`	+	+		+	+		+	+	+					+		
Grand total:	5	5	0	5	5	0	5	5	5	2	3	3	4	5	4	4

Table 141. Number of solved instances belonging to class `QWHp-15-easy`. Problem range: `qwh-order15-holes106-balanced-4-QWH-15`–`qwh-order15-holes106-balanced-8-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-3-QWH-15`	+	+		+	+		+	+	+	+	+	+	+	+		
Grand total:	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	0

Table 142. Number of solved instances belonging to class `QWHp-15-hard`. Problem: `qwh-order15-holes106-balanced-3-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-15-106-0	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-17	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-22	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-29	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-34	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-39	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-53	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-64	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-67	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-76	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-77	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-78	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-83	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-87	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-89	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-90	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-93	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-96	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-15-106-97	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	19	19	0	19	19	19	19	19	19	19	19	19	19	19	19	19

Table 143. Number of solved instances belonging to class `bqwh15-106`. Problem range: `bqwh-15-106-0`–`bqwh-15-106-97`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-18-141-10	+	+		+	+		+	+	+	+	+	+	+		+	+
bqwh-18-141-23	+	+		+	+	+	+	+	+	+	+	+	+	+		
bqwh-18-141-28	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-29	+	+		+	+	+	+	+	+	+	+	+	+	+		
bqwh-18-141-33	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-36	+	+		+	+		+	+	+	+	+	+	+	+	+	+
bqwh-18-141-37	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-39	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-40	+	+		+	+	+	+	+	+	+			+	+		
bqwh-18-141-44	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-59	+	+		+	+		+	+	+	+	+	+	+	+	+	+
bqwh-18-141-62	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-65	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-68	+	+		+	+	+	+	+	+	+					+	+
bqwh-18-141-73	+	+		+	+		+	+	+	+	+	+				
bqwh-18-141-89	+	+		+	+	+	+	+	+	+	+	+		+	+	+
bqwh-18-141-90	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
bqwh-18-141-92	+	+		+	+	+	+	+	+	+	+	+	+	+		
bqwh-18-141-96	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	19	19	0	19	19	15	19	19	19	19	17	17	16	16	14	14

Table 144. Number of solved instances belonging to class `bqwh18-141`. Problem range: `bqwh-18-141-10`–`bqwh-18-141-96`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-1-25-0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-25-9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Table 145. Number of solved instances belonging to class `composed-25-1-25`. Problem range: `composed-25-1-25-0`–`composed-25-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-2-0`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-3`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-4`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-25-1-2-5`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-25-1-2-6`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-2-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	8	10	10	10	10	10	10

Table 146. Number of solved instances belonging to class `composed-25-1-2`. Problem range: `composed-25-1-2-0`–`composed-25-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-40-0`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-3`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-4`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-5`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-6`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-1-40-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Table 147. Number of solved instances belonging to class `composed-25-1-40`. Problem range: `composed-25-1-40-0`–`composed-25-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-1-80-0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
composed-25-1-80-9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Table 148. Number of solved instances belonging to class `composed-25-1-80`. Problem range: `composed-25-1-80-0`–`composed-25-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-10-20-0`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-25-10-20-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
`composed-25-10-20-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-10-20-3`	+	+	+	+	+	+	+	+	+		+	+	+	+		
`composed-25-10-20-4`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-25-10-20-5`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-10-20-6`	+	+	+	+	+		+	+	+					+		
`composed-25-10-20-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-25-10-20-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
`composed-25-10-20-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Grand total:	10	10	10	10	10	9	10	10	10	6	9	9	9	10	5	5

Table 149. Number of solved instances belonging to class `composed-25-10-20`. Problem range: `composed-25-10-20-0`–`composed-25-10-20-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-25-0`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-25-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-25-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-25-3`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-25-4`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-25-5`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-25-6`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-25-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-25-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-25-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	7	10	10	10	10	10	10

Table 150. Number of solved instances belonging to class `composed-75-1-25`. Problem range: `composed-75-1-25-0`–`composed-75-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-2-0`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-2-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-2-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-2-3`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-2-4`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-2-5`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-2-6`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-2-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-2-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-2-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	7	10	10	10	10	10	10

Table 151. Number of solved instances belonging to class `composed-75-1-2`. Problem range: `composed-75-1-2-0`–`composed-75-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-40-0`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-3`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-4`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-5`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-6`	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
`composed-75-1-40-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-40-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	9	10	10	10	10	10	10

Table 152. Number of solved instances belonging to class `composed-75-1-40`. Problem range: `composed-75-1-40-0`–`composed-75-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-80-0`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-1`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-2`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-3`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-4`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-5`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-6`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-7`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-8`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`composed-75-1-80-9`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Table 153. Number of solved instances belonging to class `composed-75-1-80`. Problem range: `composed-75-1-80-0`–`composed-75-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`cril_unsat_b_1`	+	+		+	+		+	+	+							
`cril_unsat_b_2`	+	+	+		+	+		+	+		+	+	+		+	+
`cril_unsat_b_3`	+	+	+		+			+	+				+			
`cril_unsat_b_4`	+	+						+								
`cril_unsat_b_5`	+	+		+			+	+	+							
Grand total:	5	5	2	2	3	1	2	5	4	0	1	1	2	0	1	1

Table 154. Number of solved instances belonging to class `cril`. Problem range: `cril_unsat_b_1`–`cril_unsat_b_5`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`domino-100-100`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`domino-100-200`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`domino-100-300`	+	+		+	+	+	+	+		+	+	+	+	+	+	+
`domino-300-100`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`domino-300-200`	+	+		+	+	+	+	+		+	+	+	+	+	+	+
`domino-300-300`	+	+		+	+	+	+	+		+	+	+			+	+
`domino-500-100`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
`domino-500-200`	+	+		+	+	+	+	+		+	+	+			+	+
`domino-500-300`	+	+		+		+	+	+		+	+	+			+	+
`domino-1000-10`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
Grand total:	10	10	5	10	9	10	10	10	5	10	10	10	5	5	10	10

Table 155. Number of solved instances belonging to class `domino1`. Problem range: `domino-100-100`–`domino-1000-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-0	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-10	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-11	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-12	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-13	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+
dual_ehi-85-297-14	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-15	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-16	+	+	+	+	+	+	+	+	+	+			+	+		
dual_ehi-85-297-17	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-18	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-19	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-1	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-20	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-21	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-22	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-23	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-24	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-25	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-26	+	+	+	+	+	+	+	+	+	+	+	+		+		
dual_ehi-85-297-27	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 156. Number of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-28	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-29	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-31	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-32	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-85-297-33	+	+	+	+	+	+	+	+	+					+		
dual_ehi-85-297-34	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-35	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-36	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-37	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-38	+	+	+	+	+	+	+	+	+		+	+		+	+	+
dual_ehi-85-297-39	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-3	+	+	+	+	+	+	+	+	+				+	+		
dual_ehi-85-297-40	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-41	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-42	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-43	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-44	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-45	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+

Table 157. Number of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-28`–`dual_ehi-85-297-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-46	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-47	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-48	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-49	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-4	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-50	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-51	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-52	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-53	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-54	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-55	+	+	+	+	+		+	+	+		+	+		+		
dual_ehi-85-297-56	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-57	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-58	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-59	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-61	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-85-297-62	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-63	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+

Table 158. Number of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-46`–`dual_ehi-85-297-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-64	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-65	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-66	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-67	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-68	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-69	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-6	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-71	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-72	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-73	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-74	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-75	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-76	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-77	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-78	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-79	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-7	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-81	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 159. Number of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-64`–`dual_ehi-85-297-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-82	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-83	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-84	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-85	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-86	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-87	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-88	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-89	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-91	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-92	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-93	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-94	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-95	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-96	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-97	+	+	+	+	+	+	+	+	+				+	+		
dual_ehi-85-297-98	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-85-297-99	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-85-297-9	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
Grand total:	100	100	100	100	100	95	100	100	100	55	96	96	96	99	94	94

Table 160. Number of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-0	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-10	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-11	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-12	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-13	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-14	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-15	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-16	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+
dual_ehi-90-315-17	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-90-315-18	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-19	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-1	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-20	+	+	+	+	+		+	+	+				+	+		
dual_ehi-90-315-21	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-22	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-23	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-24	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-25	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-26	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-27	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 161. Number of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-28	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-29	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-30	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
dual_ehi-90-315-31	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-32	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-33	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-34	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-35	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-36	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-37	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-38	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-39	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-3	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-90-315-40	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-41	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-42	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-43	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-44	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-45	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 162. Number of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-28`–`dual_ehi-90-315-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-46	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-47	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-48	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-49	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-4	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-51	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-52	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-53	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-54	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-55	+	+	+	+	+		+	+	+		+	+	+		+	+
dual_ehi-90-315-56	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-57	+	+	+	+	+	+	+	+	+	+			+	+		
dual_ehi-90-315-58	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-59	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-61	+	+	+	+	+	+	+	+	+		+	+	+	+		
dual_ehi-90-315-62	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-90-315-63	+	+	+	+	+	+	+	+	+		+	+	+	+		

Table 163. Number of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-46`–`dual_ehi-90-315-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-64	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-65	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-66	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-67	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-68	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-69	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-90-315-6	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-71	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-72	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-73	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-74	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-75	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-76	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+
dual_ehi-90-315-77	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-78	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-79	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-7	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-81	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 164. Number of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-64`–`dual_ehi-90-315-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-82	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-83	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-84	+	+	+	+	+		+	+	+		+	+	+	+	+	+
dual_ehi-90-315-85	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-86	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-87	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-88	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-89	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-91	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-92	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-93	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-94	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-95	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-96	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-97	+	+	+	+	+		+	+	+		+	+	+		+	+
dual_ehi-90-315-98	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dual_ehi-90-315-99	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
dual_ehi-90-315-9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	100	100	100	100	100	91	100	100	100	49	98	98	99	97	95	95

Table 165. Number of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
fapp01_0200_4-bis	+	+		+		+	+	+								
fapp01_0200_5-bis	+	+		+		+	+	+								
fapp01_0200_6-bis	+	+		+		+	+	+								
fapp01_0200_7-bis	+	+		+		+	+	+								
fapp01_0200_8-bis	+	+		+		+	+	+								
fapp01_0200_9-bis	+	+		+		+	+	+								
fapp01_0200_10-bis	+	+		+		+	+	+								
fapp01_0200_0-bis	+	+		+	+	+	+	+								
fapp01_0200_1-bis	+	+		+	+	+	+	+								
fapp01_0200_2-bis	+	+		+	+	+	+	+								
fapp01_0200_3-bis	+	+		+	+	+	+	+								
Grand total:	11	11	0	11	4	11	11	11	0	0	0	0	0	0	0	0

Table 166. Number of solved instances belonging to class `fapp01`. Problem range: `fapp01_0200_4-bis`–`fapp01_0200_3-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
fapp02_0250_2-bis				+		+	+	+								
fapp02_0250_3-bis				+		+	+	+								
fapp02_0250_4-bis				+		+	+	+								
fapp02_0250_5-bis				+			+	+								
fapp02_0250_6-bis				+		+	+	+								
fapp02_0250_7-bis				+			+	+								
fapp02_0250_8-bis				+		+	+	+								
fapp02_0250_9-bis				+		+	+	+								
fapp02_0250_10-bis				+		+	+	+								
fapp02_0250_0-bis				+		+	+	+								
fapp02_0250_1-bis				+		+	+	+								
Grand total:	0	0	0	11	0	9	11	11	0	0	0	0	0	0	0	0

Table 167. Number of solved instances belonging to class `fapp02`. Problem range: `fapp02_0250_2-bis`–`fapp02_0250_1-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb30-15-1-bis`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`frb30-15-2-bis`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`frb30-15-3-bis`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`frb30-15-4-bis`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`frb30-15-5-bis`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 168. Number of solved instances belonging to class `frb30-15`. Problem range: `frb30-15-1-bis`–`frb30-15-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb35-17-1-bis`	+	+		+			+	+	+	+	+	+	+	+	+	+
`frb35-17-2-bis`	+	+		+			+	+	+	+	+	+	+	+	+	+
`frb35-17-3-bis`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`frb35-17-4-bis`	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
`frb35-17-5-bis`	+	+		+			+	+	+	+	+	+	+		+	+
Grand total:	5	5	1	5	2	2	5	5	5	5	5	5	5	4	5	5

Table 169. Number of solved instances belonging to class `frb35-17`. Problem range: `frb35-17-1-bis`–`frb35-17-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb40-19-1-bis`	+	+		+			+	+	+	+	+	+				
`frb40-19-2-bis`	+	+		+			+	+		+	+	+				
`frb40-19-3-bis`	+	+		+			+	+		+						
`frb40-19-4-bis`	+	+		+			+	+		+	+	+				
`frb40-19-5-bis`	+	+		+			+	+		+	+	+				
Grand total:	5	5	0	5	0	0	5	5	1	5	4	4	0	0	0	0

Table 170. Number of solved instances belonging to class `frb40-19`. Problem range: `frb40-19-1-bis`–`frb40-19-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb45-21-1-bis`				+												
`frb45-21-2-bis`				+			+	+								
`frb45-21-3-bis`				+			+	+								
`frb45-21-4-bis`	+	+		+			+									
`frb45-21-5-bis`				+							+	+			+	+
Grand total:	1	1	0	5	0	0	3	2	0	0	1	1	0	0	1	1

Table 171. Number of solved instances belonging to class `frb45-21`. Problem range: `frb45-21-1-bis`–`frb45-21-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb50-23-1-bis`																
`frb50-23-2-bis`																
`frb50-23-3-bis`																
`frb50-23-4-bis`				+			+	+								
`frb50-23-5-bis`																
Grand total:	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0

Table 172. Number of solved instances belonging to class `frb50-23`. Problem range: `frb50-23-1-bis`–`frb50-23-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb53-24-1-bis`																
`frb53-24-2-bis`																
`frb53-24-3-bis`																
`frb53-24-4-bis`																
`frb53-24-5-bis`																
Grand total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 173. Number of solved instances belonging to class `frb53-24`. Problem range: `frb53-24-1-bis`–`frb53-24-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb56-25-1-bis`																
`frb56-25-2-bis`																
`frb56-25-3-bis`																
`frb56-25-4-bis`																
`frb56-25-5-bis`																
Grand total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 174. Number of solved instances belonging to class `frb56-25`. Problem range: `frb56-25-1-bis`–`frb56-25-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb59-26-1-bis`																
`frb59-26-2-bis`																
`frb59-26-3-bis`																
`frb59-26-4-bis`																
`frb59-26-5-bis`																
Grand total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 175. Number of solved instances belonging to class `frb59-26`. Problem range: `frb59-26-1-bis`–`frb59-26-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.10	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.11	+	+		+	+	+	+	+	+	+				+		
geo50.20.d4.75.13	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.15	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.16	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.17	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.18	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.19	+	+		+			+	+								
geo50.20.d4.75.1	+	+		+			+	+								
geo50.20.d4.75.20	+	+		+	+	+	+	+	+	+	+	+		+	+	+
geo50.20.d4.75.21	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.22	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.23	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.24	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.25	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.26	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.27	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.28	+	+		+	+		+	+	+				+	+		
geo50.20.d4.75.29	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.2	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+

Table 176. Number of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.2`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.30	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.31	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.32	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.33	+	+		+	+	+	+	+	+	+	+	+	+	+		
geo50.20.d4.75.34	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.35	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.36	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.37	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.38	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.39	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.3	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.40	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.42	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.43	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.44	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.45	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.46	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.47	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.48	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.49	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+

Table 177. Number of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.30`–`geo50.20.d4.75.49`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.4	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.50	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.51	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.53	+	+		+	+	+	+	+	+	+	+	+		+		
geo50.20.d4.75.54	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.55	+	+		+			+	+	+							
geo50.20.d4.75.56	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.58	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.59	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.5	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.60	+	+		+	+	+	+	+	+	+	+	+		+	+	+
geo50.20.d4.75.61	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.62	+	+		+			+	+			+	+				
geo50.20.d4.75.63	+	+		+		+	+	+	+	+				+		
geo50.20.d4.75.64	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.65	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.66	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.67	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.68	+	+		+	+	+	+	+	+		+	+	+	+	+	+
geo50.20.d4.75.69	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+

Table 178. Number of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.4`–`geo50.20.d4.75.69`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.6	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.71	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.72	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.73	+	+		+			+	+	+	+	+	+				
geo50.20.d4.75.74	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.75	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.76	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.77	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.78	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.79	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.7	+	+		+		+	+	+		+	+	+	+	+	+	+
geo50.20.d4.75.80	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.81	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.82	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.83	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.84	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.85	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.87	+	+		+	+	+	+	+	+	+				+		
geo50.20.d4.75.88	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.89	+	+		+	+	+	+	+	+	+				+		

Table 179. Number of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.6`–`geo50.20.d4.75.89`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.8	+	+		+	+		+	+	+	+	+	+			+	+
geo50.20.d4.75.90	+	+		+		+	+	+	+	+				+		
geo50.20.d4.75.91	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.92	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.93	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.95	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.96	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.97	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.98	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.99	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.9	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.100	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
geo50.20.d4.75.12				+			+	+								
geo50.20.d4.75.14				+			+	+								
geo50.20.d4.75.41				+			+	+								
geo50.20.d4.75.52				+			+	+								
geo50.20.d4.75.57				+			+	+								
geo50.20.d4.75.70				+			+	+								
geo50.20.d4.75.86				+			+	+								
geo50.20.d4.75.94				+			+	+								
Grand total:	92	92	0	100	84	85	100	100	88	86	83	83	78	86	79	79

Table 180. Number of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.94`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi_3`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`hanoi_4`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`hanoi_5`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`hanoi_6`	+	+		+		+	+	+		+	+	+	+	+	+	+
`hanoi_7`	+	+		+		+	+	+							+	+
Grand total:	5	5	0	5	3	5	5	5	3	4	4	4	4	4	5	5

Table 181. Number of solved instances belonging to class `hanoi1`. Problem range: `hanoi_3`–`hanoi_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr1-10-by-5-1`	+	+		+	+		+	+	+		+	+				
`e0ddr1-10-by-5-2`	+	+		+	+	+			+		+	+	+			
`e0ddr1-10-by-5-3`	+	+							+							
`e0ddr1-10-by-5-4`	+	+		+	+	+	+	+	+	+	+	+			+	+
`e0ddr1-10-by-5-5`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`e0ddr1-10-by-5-6`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`e0ddr1-10-by-5-7`	+	+		+	+		+	+	+				+	+		
`e0ddr1-10-by-5-8`	+	+		+	+				+							
`e0ddr1-10-by-5-9`	+	+		+	+	+	+	+	+	+			+	+		
`e0ddr1-10-by-5-10`	+	+		+	+		+	+	+		+	+	+			
Grand total:	10	10	0	9	9	5	7	7	10	4	6	6	6	4	3	3

Table 182. Number of solved instances belonging to class `js-e0ddr1`. Problem range: `e0ddr1-10-by-5-1`–`e0ddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr2-10-by-5-1`	+	+							+							
`e0ddr2-10-by-5-2`	+	+							+							
`e0ddr2-10-by-5-3`	+	+		+			+	+	+				+			
`e0ddr2-10-by-5-4`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`e0ddr2-10-by-5-5`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`e0ddr2-10-by-5-6`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`e0ddr2-10-by-5-7`	+	+		+			+	+	+		+	+	+		+	+
`e0ddr2-10-by-5-8`	+	+		+	+	+	+	+	+				+			
`e0ddr2-10-by-5-9`	+	+							+							
`e0ddr2-10-by-5-10`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	10	10	0	7	5	5	7	7	10	4	5	5	7	4	5	5

Table 183. Number of solved instances belonging to class `js-e0ddr2`. Problem range: `e0ddr2-10-by-5-1`–`e0ddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr1-10-by-5-1`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-2`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-3`	+	+		+	+	+	+	+	+	+	+	+			+	+
`enddr1-10-by-5-4`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-5`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-6`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-7`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-8`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-9`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr1-10-by-5-10`	+	+		+	+				+				+			
Grand total:	10	10	0	10	10	9	9	9	10	9	9	9	9	8	9	9

Table 184. Number of solved instances belonging to class `js-enddr1`. Problem range: `enddr1-10-by-5-1`–`enddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr2-10-by-5-1`	+	+		+	+				+				+			
`enddr2-10-by-5-2`	+	+			+	+	+	+	+	+	+	+				
`enddr2-10-by-5-3`	+	+		+	+	+			+		+	+	+		+	+
`enddr2-10-by-5-4`	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
`enddr2-10-by-5-5`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`enddr2-10-by-5-10`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
Grand total:	6	6	0	5	6	5	4	4	6	2	5	5	5	3	4	4

Table 185. Number of solved instances belonging to class `js-enddr2`. Problem range: `enddr2-10-by-5-1`–`enddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`ewddr2-10-by-5-1`	+	+		+	+	+	+	+	+		+	+	+	+		
`ewddr2-10-by-5-2`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-3`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-4`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-5`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-6`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-7`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-8`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-9`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
`ewddr2-10-by-5-10`	+	+		+	+	+	+	+	+		+	+	+	+	+	+
Grand total:	10	10	0	10	10	10	10	10	10	0	10	10	10	10	9	9

Table 186. Number of solved instances belonging to class `js-ewddr2`. Problem range: `ewddr2-10-by-5-1`–`ewddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
lsq_dg_5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
lsq_dg_7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
lsq_dg_3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
lsq_dg_4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
lsq_dg_6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Table 187. Number of solved instances belonging to class `lsq-dg1`. Problem range: `lsq_dg_5`–`lsq_dg_6`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
large_80_sat				+		+	+	+			+	+				
large_84_sat				+		+	+	+			+	+				
large_88_sat				+		+	+	+			+	+				
large_92_sat				+		+	+	+			+	+				
large_96_sat				+		+	+	+			+	+				
large_80_unsat				+		+	+	+			+	+				
large_84_unsat				+		+	+	+			+	+				
large_88_unsat				+		+	+	+			+	+				
large_92_unsat				+		+	+	+			+	+				
large_96_unsat				+		+	+	+			+	+				
Grand total:	0	0	0	10	0	10	10	10	0	0	10	10	0	0	0	0

Table 188. Number of solved instances belonging to class `marc`. Problem range: `large_80_sat`–`large_96_unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
pigeons5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
pigeons6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
pigeons7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
pigeons8	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
pigeons9	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
pigeons10	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
pigeons11	+	+	+	+		+	+	+	+	+	+	+		+	+	+
pigeons12			+	+		+	+	+	+	+	+	+				
pigeons13			+			+			+		+	+				
pigeons14											+	+				
pigeons15											+	+				
pigeons16											+	+				
pigeons18											+	+				
pigeons20											+	+				
pigeons25											+	+				
pigeons30											+	+				
pigeons35											+	+				
pigeons40											+	+				
pigeons45											+	+				
pigeons50											+	+				
Grand total:	7	7	9	8	5	9	8	8	9	8	20	20	6	7	7	7

Table 189. Number of solved instances belonging to class `pigeons`. Problem range: `pigeons5`–`pigeons50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qa_5	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
qa_6				+			+	+	+							
qa_7																
qa_8																
qa_9																
qa_10																
qa_3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
qa_4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grand total:	3	3	3	4	3	2	4	4	4	3	3	3	3	3	3	3

Table 190. Number of solved instances belonging to class qa1. Problem range: qa_5–qa_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qk_8_0_5	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
qk_8_8_5_add	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
qk_8_8_5_mul	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
qk_10_0_5	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_10_10_5_add	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_10_10_5_mul	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_12_0_5	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_12_12_5_add	+	+		+		+	+	+	+					+		
qk_12_12_5_mul	+	+		+		+	+	+	+					+		
qk_15_0_5	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_15_15_5_add	+	+		+		+	+	+	+							
qk_15_15_5_mul	+	+		+			+	+	+							
qk_20_0_5	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_20_20_5_add	+	+				+	+	+	+							
qk_20_20_5_mul	+	+						+	+							
qk_25_0_5	+	+		+		+	+	+	+	+	+	+	+	+	+	+
qk_25_25_5_add	+	+				+	+	+	+							
qk_25_25_5_mul	+	+						+	+							
Grand total:	18	18	3	14	0	15	16	18	18	10	10	10	10	12	10	10

Table 191. Number of solved instances belonging to class `qk1`. Problem range: `qk_8_0_5`–`qk_25_25_5_mul`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-23-23-253-131-48021`				+			+	+			+	+				
`random-23-23-253-131-49021`	+	+		+			+	+		+	+	+	+	+	+	+
`random-23-23-253-131-50021`				+			+	+			+	+				
`random-23-23-253-131-53021`				+			+	+			+	+				
`random-23-23-253-131-54021`				+			+	+	+		+	+				
`random-23-23-253-131-46021`				+			+	+			+	+				
`random-23-23-253-131-47021`				+			+	+			+	+				
`random-23-23-253-131-51021`				+			+	+			+	+				
`random-23-23-253-131-52021`				+			+	+			+	+				
`random-23-23-253-131-55021`				+			+	+			+	+				
Grand total:	1	1	0	10	0	0	10	10	1	1	10	10	1	1	1	1

Table 192. Number of solved instances belonging to class `random-23-23-253`. Problem range: `random-23-23-253-131-48021`–`random-23-23-253-131-55021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-24-24-276-139-48021`				+			+	+			+	+			+	+
`random-24-24-276-139-50021`	+	+		+			+	+			+	+			+	+
`random-24-24-276-139-55021`	+	+		+			+	+			+	+				
`random-24-24-276-139-49021`				+			+	+			+	+				
`random-24-24-276-139-51021`				+			+	+			+	+				
`random-24-24-276-139-52021`				+			+	+			+	+				
`random-24-24-276-139-53021`				+			+	+			+	+				
`random-24-24-276-139-54021`				+			+	+			+	+				
`random-24-24-276-139-56021`				+			+	+			+	+				
`random-24-24-276-139-57021`				+			+	+			+	+				
Grand total:	2	2	0	10	0	0	10	10	0	0	10	10	0	0	2	2

Table 193. Number of solved instances belonging to class `random-24-24-276`. Problem range: `random-24-24-276-139-48021`–`random-24-24-276-139-57021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-25-25-300-147-51021`				+			+	+			+	+				
`random-25-25-300-147-52021`				+			+	+			+	+				
`random-25-25-300-147-53021`	+	+		+			+	+								
`random-25-25-300-147-54021`	+	+		+			+	+			+	+				
`random-25-25-300-147-56021`				+			+	+								
`random-25-25-300-147-59021`				+			+	+								
`random-25-25-300-147-50021`				+			+	+								
`random-25-25-300-147-55021`				+			+	+								
`random-25-25-300-147-57021`				+			+	+								
`random-25-25-300-147-58021`				+			+	+								
Grand total:	2	2	0	10	0	0	10	10	0	0	3	3	0	0	0	0

Table 194. Number of solved instances belonging to class `random-25-25-300`. Problem range: `random-25-25-300-147-51021`–`random-25-25-300-147-58021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-26-26-325-155-53021`				+												
`random-26-26-325-155-54021`				+												
`random-26-26-325-155-55021`	+	+		+			+	+								
`random-26-26-325-155-59021`																
`random-26-26-325-155-61021`				+			+	+								
`random-26-26-325-155-52021`																
`random-26-26-325-155-56021`																
`random-26-26-325-155-57021`																
`random-26-26-325-155-58021`																
`random-26-26-325-155-60021`																
Grand total:	1	1	0	4	0	0	2	2	0	0	0	0	0	0	0	0

Table 195. Number of solved instances belonging to class `random-26-26-325`. Problem range: `random-26-26-325-155-53021`–`random-26-26-325-155-60021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-27-27-351-163-54021							+	+								
random-27-27-351-163-56021				+												
random-27-27-351-163-60021				+												
random-27-27-351-163-63021				+												
random-27-27-351-163-55021																
random-27-27-351-163-57021																
random-27-27-351-163-58021																
random-27-27-351-163-59021																
random-27-27-351-163-61021																
random-27-27-351-163-62021																
Grand total:	0	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0

Table 196. Number of solved instances belonging to class random-27-27-351. Problem range: random-27-27-351-163-54021–random-27-27-351-163-62021. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph1`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
`graph2`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
`graph3`	+	+		+	+	+	+	+	+	+	+	+			+	+
`graph4`	+	+		+		+	+	+	+	+	+	+			+	+
`graph8`	+	+		+	+	+	+	+	+	+	+	+			+	+
`graph9`	+	+		+		+	+	+	+	+	+	+			+	+
`graph10`	+	+		+		+	+	+	+		+	+			+	+
`graph14`	+	+		+	+	+	+	+	+	+	+	+			+	+
`graph5`	+	+		+	+	+	+	+	+		+	+			+	+
`graph6`	+	+		+	+	+	+	+	+		+	+			+	+
`graph7`	+	+		+	+	+	+	+	+		+	+			+	+
`graph11`	+	+		+	+	+	+	+	+		+	+			+	+
`graph12`	+	+		+	+	+	+	+	+		+	+			+	+
`graph13`	+	+		+	+	+	+	+	+		+	+			+	+
Grand total:	14	14	2	14	11	14	14	14	14	7	14	14	0	0	14	14

Table 197. Number of solved instances belonging to class `rlfapGraphs`. Problem range: `graph1`–`graph13`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph2_f24`	+	+		+	+	+	+	+	+	+					+	+
`graph8_f10`	+	+	+	+			+	+	+							
`graph9_f9`	+	+		+			+	+								
`graph12_w0`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
`graph13_w0`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
`graph14_f27`	+	+	+	+		+	+	+	+							
`graph2_f25`	+	+	+	+	+		+	+	+							
`graph8_f11`	+	+	+	+	+		+	+	+							
`graph9_f10`	+	+		+	+		+	+	+							
`graph12_w1`	+	+		+	+	+	+	+	+							
`graph13_w1`	+	+		+	+	+	+	+	+							
`graph14_f28`	+	+	+	+	+		+	+	+							
Grand total:	12	12	7	12	9	6	12	12	11	3	2	2	0	0	3	3

Table 198. Number of solved instances belonging to class `rlfapModGraphs`. Problem range: `graph2_f24`–`graph14_f28`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen1_f8	+	+		+	+	+	+	+	+	+	+	+			+	+
scen2_f24	+	+	+	+	+	+	+	+	+	+	+	+			+	+
scen3_f10	+	+	+	+	+	+	+	+	+		+	+			+	+
scen6_w1	+	+	+	+	+	+	+	+	+	+	+	+			+	+
scen7_w1_f4	+	+		+	+	+	+	+	+	+					+	+
scen1_f9	+	+		+	+	+	+	+	+							
scen2_f25	+	+	+	+	+	+	+	+	+	+						
scen3_f11	+	+	+	+	+	+	+	+	+							
scen6_w1_f2	+	+	+	+	+	+	+	+	+							
scen6_w1_f3	+	+	+	+	+	+	+	+	+							
scen6_w2	+	+		+	+		+	+	+							
scen7_w1_f5	+	+		+	+	+	+	+	+							
scen9_w1_f3	+	+		+	+	+	+	+	+		+	+			+	+
scen10_w1_f3	+	+		+	+	+	+	+	+		+	+			+	+
Grand total:	14	14	7	14	14	13	14	14	14	5	6	6	0	0	7	7

Table 199. Number of solved instances belonging to class `rlfapModScens`. Problem range: `scen1_f8`–`scen10_w1_f3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen11_f2																
scen11_f3																
scen11_f4									+							
scen11_f5									+							
scen11_f6	+	+			+				+							
scen11_f7	+	+		+	+		+	+	+							
scen11_f8	+	+		+	+		+	+	+							
scen11_f10	+	+		+	+		+	+	+							
scen11_f12	+	+		+	+		+	+	+							
Grand total:	5	5	0	4	5	0	4	4	7	0	0	0	0	0	0	0

Table 200. Number of solved instances belonging to class `rlfapScens11`. Problem range: `scen11_f2`–`scen11_f12`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen1`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen2`	+	+	+	+	+	+	+	+	+	+	+	+			+	+
`scen3`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen4`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen5`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen11`	+	+		+	+	+	+	+	+	+	+	+				
`scen6`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen7`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen8`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen9`	+	+		+	+	+	+	+	+	+	+	+			+	+
`scen10`	+	+		+	+	+	+	+	+	+	+	+			+	+
Grand total:	11	11	1	11	11	11	11	11	11	11	11	11	0	0	10	10

Table 201. Number of solved instances belonging to class `rlfapScens`. Problem range: `scen1`–`scen10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`bh-4-4-easy-sat-0001-BlackHole-4-4`	19.44	19.82	2.97	0.23	7.14	4.60	0.17	0.18	0.28	—	—	—	—	75.70	—	—
`bh-4-4-easy-sat-0002-BlackHole-4-4`	19.81	20.12	2.97	0.24	3.85	4.72	0.17	0.18	0.27	—	—	—	—	74.33	—	—
`bh-4-4-easy-sat-0003-BlackHole-4-4`	20.29	19.88	3.02	0.22	3.67	4.66	0.17	0.18	0.27	—	—	—	—	79.33	—	—
`bh-4-4-easy-sat-0004-BlackHole-4-4`	19.71	19.87	2.98	0.22	10.99	4.62	0.17	0.18	0.28	—	—	—	—	74.00	—	—
`bh-4-4-easy-sat-0005-BlackHole-4-4`	19.44	19.72	3.06	0.22	6.32	4.58	0.17	0.18	0.27	—	—	—	—	76.24	—	—
`bh-4-4-easy-sat-0006-BlackHole-4-4`	19.36	19.94	2.96	0.22	4.55	4.59	0.17	0.18	0.28	—	—	—	—	75.42	—	—
`bh-4-4-easy-sat-0007-BlackHole-4-4`	19.35	19.72	3.08	0.22	3.87	4.59	0.17	0.18	0.27	—	—	—	—	74.66	—	—
`bh-4-4-easy-sat-0008-BlackHole-4-4`	19.48	19.96	3.11	0.22	3.59	4.60	0.17	0.18	0.27	—	—	—	—	73.46	—	—
`bh-4-4-easy-sat-0009-BlackHole-4-4`	19.46	19.74	3.02	0.23	4.58	4.58	0.17	0.18	0.27	—	—	—	—	73.75	—	—
`bh-4-4-easy-sat-0010-BlackHole-4-4`	20.12	19.76	3.03	0.22	4.28	4.70	0.17	0.18	0.28	—	—	—	—	75.70	—	—
Grand total:	196.46	198.52	30.21	2.25	52.83	46.25	1.69	1.79	2.76	—	—	—	—	752.58	—	—

Table 202. Solution time of solved instances belonging to class `BH-4-4`. Problem range: `bh-4-4-easy-sat-0001-BlackHole-4-4`–`bh-4-4-easy-sat-0010-BlackHole-4-4`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-1-QWH-10`	6.42	7.55	—	0.10	1.28	—	0.15	0.17	0.04	0.06	0.15	0.14	2.09	1.32	0.18	0.17
`qcp-order10-holes67-balanced-2-QWH-10`	6.70	7.31	—	0.10	1.53	—	0.15	0.17	0.04	0.06	0.04	0.04	1.90	1.37	0.16	0.16
`qcp-order10-holes67-balanced-3-QWH-10`	6.78	7.76	—	0.10	1.43	—	0.15	0.17	0.04	0.06	0.05	0.05	2.29	1.60	0.16	0.16
`qcp-order10-holes67-balanced-4-QWH-10`	6.82	8.06	—	0.10	1.26	—	0.15	0.17	0.05	0.79	0.48	0.48	2.00	2.47	0.17	0.18
`qcp-order10-holes67-balanced-5-QWH-10`	6.34	7.92	—	0.10	1.28	—	0.15	0.17	0.04	0.06	0.04	0.04	2.21	1.37	0.16	0.17
Grand total:	33.06	38.60	—	0.50	6.78	—	0.75	0.84	0.21	1.02	0.76	0.75	10.49	8.13	0.83	0.83

Table 203. Solution time of solved instances belonging to class `QCP-10-easy`. Problem range: `qcp-order10-holes67-balanced-1-QWH-10`–`qcp-order10-holes67-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-7-QWH-10`	7.32	7.54	—	0.11	2.82	—	0.33	0.18	0.15	0.07	0.09	0.08	2.04	1.28	0.19	0.17
`qcp-order10-holes67-balanced-17-QWH-10`	7.10	8.44	—	0.10	1.27	—	0.16	0.18	0.05	0.06	0.04	0.04	—	2.18	1.87	1.99
`qcp-order10-holes67-balanced-186-QWH-10`	6.89	7.68	—	0.11	2.77	—	0.41	0.25	0.13	0.07	4.33	4.24	1.96	1.38	0.80	0.83
`qcp-order10-holes67-balanced-267-QWH-10`	6.57	8.48	—	0.10	1.31	—	0.16	0.18	0.05	0.07	0.04	0.04	18.06	2.15	0.33	0.46
`qcp-order10-holes67-balanced-315-QWH-10`	7.45	7.38	—	0.14	3.05	—	0.33	0.17	0.13	0.61	0.08	0.08	2.52	1.36	0.17	0.17
Grand total:	35.34	39.53	—	0.57	11.22	—	1.39	0.97	0.50	0.88	4.59	4.49	24.58	8.36	3.34	3.62

Table 204. Solution time of solved instances belonging to class `QCP-10-hard`. Problem range: `qcp-order10-holes67-balanced-7-QWH-10`–`qcp-order10-holes67-balanced-315-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-33-QWH-10`	8.29	8.93	1.59	0.10	1.76	—	0.15	0.17	0.07	—	—	—	—	9.43	176.87	189.20
`qcp-order10-holes67-balanced-140-QWH-10`	7.02	8.69	1.40	0.10	1.44	—	0.15	0.17	0.05	0.06	—	—	—	4.74	0.42	0.23
`qcp-order10-holes67-balanced-150-QWH-10`	6.67	7.87	1.41	0.10	1.38	—	0.15	0.17	0.04	—	78.45	77.41	—	2.38	272.23	289.88
`qcp-order10-holes67-balanced-160-QWH-10`	6.05	8.01	1.47	0.10	1.21	—	0.14	0.17	0.04	0.06	0.04	0.04	1.43	1.20	0.18	0.16
`qcp-order10-holes67-balanced-946-QWH-10`	6.56	7.61	1.47	0.10	1.31	—	0.15	0.17	0.04	7.04	0.04	0.04	1.71	1.74	0.90	0.95
Grand total:	34.59	41.10	7.34	0.50	7.10	—	0.74	0.84	0.23	7.16	78.53	77.49	3.13	19.50	450.60	480.41

Table 205. Solution time of solved instances belonging to class `QCP-10`. Problem range: `qcp-order10-holes67-balanced-33-QWH-10`–`qcp-order10-holes67-balanced-946-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-20-QWH-15`	23.43	26.20	—	0.31	3.67	—	0.45	0.74	1.17	4.57	5.65	5.68	49.09	30.18	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	155.28	156.65	—	4.45	2.71	—	0.59	0.89	0.41	44.35	282.84	261.23	—	54.41	425.98	441.15
`qcp-order15-holes120-balanced-22-QWH-15`	71.17	32.92	—	0.18	2.59	—	0.49	0.74	0.90	0.27	4.18	3.76	437.27	26.58	1.44	1.49
`qcp-order15-holes120-balanced-23-QWH-15`	30.32	33.04	—	0.18	3.48	—	1.22	1.33	0.21	0.40	451.47	444.57	—	61.81	1.58	1.64
`qcp-order15-holes120-balanced-24-QWH-15`	18.47	20.74	—	0.43	2.81	—	0.84	1.13	0.26	—	—	—	—	—	1.59	1.66
Grand total:	298.66	269.55	—	5.54	15.26	—	3.60	4.84	2.95	49.58	744.13	715.24	486.36	172.99	430.59	445.94

Table 206. Solution time of solved instances belonging to class `QCP-15-easy`. Problem range: `qcp-order15-holes120-balanced-20-QWH-15`–`qcp-order15-holes120-balanced-24-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order15-holes120-balanced-225-QWH-15	23.32	25.80	—	0.26	2.94	—	5.81	6.12	0.84	11.25	0.43	0.41	—	22.24	101.04	105.36
qcp-order15-holes120-balanced-245-QWH-15	23.35	26.19	—	0.78	2.77	—	2.39	2.67	1.00	2.34	0.95	0.94	42.30	50.27	11.38	11.86
qcp-order15-holes120-balanced-259-QWH-15	173.34	27.04	—	1.04	2.68	—	0.58	1.06	0.94	—	101.30	97.35	—	—	—	—
qcp-order15-holes120-balanced-278-QWH-15	19.62	22.34	—	73.29	4.20	—	2.59	2.95	2.12	2.28	19.50	18.79	218.15	26.33	22.22	23.19
qcp-order15-holes120-balanced-363-QWH-15	14.08	16.89	—	0.21	2.54	—	0.74	1.03	1.33	47.29	—	—	—	334.59	—	—
qcp-order15-holes120-balanced-488-QWH-15	277.52	273.93	—	13.24	3.93	—	14.68	14.84	3.65	—	421.94	404.23	—	—	—	—
qcp-order15-holes120-balanced-711-QWH-15	42.42	43.77	—	0.87	4.07	—	7.21	7.31	1.31	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-736-QWH-15	54.51	57.05	—	0.93	6.30	—	1.30	1.58	3.11	19.82	—	—	—	141.27	172.65	181.40
qcp-order15-holes120-balanced-819-QWH-15	17.14	19.85	—	0.23	3.67	—	0.89	1.12	1.10	389.58	211.69	198.85	454.96	—	—	—
qcp-order15-holes120-balanced-941-QWH-15	262.51	258.89	—	11.65	7.24	—	437.62	443.40	0.77	—	—	—	—	—	—	—
Grand total:	907.79	771.76	—	102.50	40.33	—	473.83	482.08	16.17	472.56	755.82	720.56	715.42	574.71	307.28	321.81

Table 207. Solution time of solved instances belonging to class `QCP-15-hard`. Problem range: `qcp-order15-holes120-balanced-225-QWH-15`–`qcp-order15-holes120-balanced-941-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-90-QWH-15`	466.89	459.01	6.74	75.96	2.85	—	8.41	8.70	0.56	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-100-QWH-15`	12.39	14.96	4.00	0.15	2.37	—	0.42	0.71	0.11	—	—	—	21.83	30.13	—	—
`qcp-order15-holes120-balanced-103-QWH-15`	13.90	16.59	4.22	0.15	2.38	—	0.41	0.70	0.17	—	—	—	—	23.93	—	—
`qcp-order15-holes120-balanced-268-QWH-15`	—	—	8.88	8.28	5.02	—	23.06	23.70	2.16	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-999-QWH-15`	13.22	16.04	4.13	406.68	2.32	—	0.41	0.70	0.11	—	—	—	—	23.15	—	—
Grand total:	506.40	506.60	27.98	491.22	14.94	—	32.71	34.51	3.10	—	—	—	21.83	77.20	—	—

Table 208. Solution time of solved instances belonging to class `QCP-15`. Problem range: `qcp-order15-holes120-balanced-90-QWH-15`–`qcp-order15-holes120-balanced-999-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-11-QWH-20`	208.19	215.38	—	—	7.09	—	14.02	14.83	27.72	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-19-QWH-20`	—	—	—	7.73	12.12	—	—	—	20.51	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-24-QWH-20`	—	—	—	45.54	5.48	—	77.65	80.71	36.86	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	—	—	—	2.93	5.46	—	25.87	26.92	19.45	—	—	—	434.06	—	—	—
`qcp-order20-holes187-balanced-30-QWH-20`	111.40	122.06	—	—	6.18	—	—	—	3.94	—	—	—	—	—	—	—
Grand total:	319.59	337.44	—	56.20	36.34	—	117.54	122.46	108.48	—	—	—	434.06	—	—	—

Table 209. Solution time of solved instances belonging to class `QCP-20-easy`. Problem range: `qcp-order20-holes187-balanced-11-QWH-20`–`qcp-order20-holes187-balanced-30-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order20-holes187-balanced-6-QWH-20	—	—	—	—	28.95	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-10-QWH-20	—	—	—	10.73	26.43	—	288.81	289.76	265.58	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-32-QWH-20	—	—	—	—	11.62	—	—	—	43.25	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-214-QWH-20	—	—	—	475.13	11.94	—	—	—	49.30	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-217-QWH-20	—	—	—	—	14.68	—	—	—	37.36	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-332-QWH-20	—	—	—	—	5.51	—	—	—	42.62	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-380-QWH-20	—	—	—	—	12.18	—	468.86	464.76	42.21	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-597-QWH-20	—	—	—	—	29.92	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-702-QWH-20	—	—	—	437.62	9.41	—	—	—	53.69	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-981-QWH-20	—	—	—	—	14.56	—	234.55	232.45	11.15	—	—	—	—	—	—	—
Grand total:	—	—	—	923.48	165.19	—	992.22	986.97	545.15	—	—	—	—	—	—	—

Table 210. Solution time of solved instances belonging to class `QCP-20-hard`. Problem range: `qcp-order20-holes187-balanced-6-QWH-20`–`qcp-order20-holes187-balanced-981-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-375-QWH-20`	—	—	—	—	379.32	—	—	—	128.03	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-378-QWH-20`	73.60	41.66	13.27	0.49	3.55	—	1.22	4.87	0.31	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-580-QWH-20`	—	—	435.61	—	32.05	—	—	—	12.79	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-602-QWH-20`	—	—	280.74	—	37.47	—	—	—	37.76	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-722-QWH-20`	—	—	251.49	—	27.40	—	—	—	30.89	—	—	—	—	—	—	—
Grand total:	73.60	41.66	981.11	0.49	479.79	—	1.22	4.87	209.78	—	—	—	—	—	—	—

Table 211. Solution time of solved instances belonging to class `QCP-20`. Problem range: `qcp-order20-holes187-balanced-375-QWH-20`–`qcp-order20-holes187-balanced-722-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-23-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-31-QWH-25`	—	—	—	—	129.36	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-64-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	129.36	—	—	—	—	—	—	—	—	—	—	—

Table 212. Solution time of solved instances belonging to class `QCP-25-easy`. Problem range: `qcp-order25-holes264-balanced-23-QWH-25`–`qcp-order25-holes264-balanced-64-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order25-holes264-balanced-3-QWH-25	—	—	—	—	200.14	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-6-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-9-QWH-25	—	—	—	—	148.20	—	—	—	105.62	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-11-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-14-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-22-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-29-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-68-QWH-25	—	—	—	—	566.68	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-79-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	915.02	—	—	—	105.62	—	—	—	—	—	—	—

Table 213. Solution time of solved instances belonging to class `QCP-25-hard`. Problem range: `qcp-order25-holes264-balanced-3-QWH-25`–`qcp-order25-holes264-balanced-79-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-15-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-32-QWH-25`	92.37	101.10	—	1.50	5.21	—	2.75	7.55	0.63	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-33-QWH-25`	—	—	—	—	6.09	—	—	—	1.98	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-34-QWH-25`	—	—	—	—	6.63	—	—	—	1.63	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-75-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	92.37	101.10	—	1.50	17.93	—	2.75	7.55	4.24	—	—	—	—	—	—	—

Table 214. Solution time of solved instances belonging to class `QCP-25`. Problem range: `qcp-order25-holes264-balanced-15-QWH-25`–`qcp-order25-holes264-balanced-75-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-1-QWH-10`	7.41	7.71	—	0.10	1.64	—	0.17	0.19	0.04	0.06	1.23	1.12	1.91	2.97	0.18	0.18
`qcp-order10-holes64-balanced-15-QWH-10`	6.41	7.26	—	0.10	1.52	—	0.15	0.17	0.04	0.29	0.14	0.13	1.87	1.23	0.20	0.21
`qcp-order10-holes64-balanced-22-QWH-10`	7.32	7.55	—	0.10	1.21	—	0.15	0.17	0.03	0.06	0.04	0.04	2.09	1.24	0.17	0.20
`qcp-order10-holes64-balanced-52-QWH-10`	7.07	8.27	—	0.10	1.21	—	0.15	0.17	0.04	0.08	0.04	0.04	1.98	1.26	0.30	0.31
`qcp-order10-holes64-balanced-70-QWH-10`	7.19	7.70	—	0.10	1.25	—	0.15	0.17	0.05	0.06	36.09	33.99	1.95	1.57	0.16	0.16
Grand total:	35.40	38.49	—	0.50	6.83	—	0.76	0.86	0.20	0.55	37.54	35.32	9.79	8.27	1.02	1.05

Table 215. Solution time of solved instances belonging to class `QCPp-10-easy`. Problem range: `qcp-order10-holes64-balanced-1-QWH-10`–`qcp-order10-holes64-balanced-70-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order10-holes64-balanced-221-QWH-10	7.45	8.25	—	0.10	1.22	—	0.15	0.17	0.04	0.06	0.04	0.04	1.97	2.82	0.18	0.18
qcp-order10-holes64-balanced-280-QWH-10	6.47	8.02	—	0.10	1.27	—	0.15	0.17	0.04	0.06	0.04	0.04	2.64	1.25	0.43	0.45
qcp-order10-holes64-balanced-351-QWH-10	6.91	7.64	—	0.10	1.27	—	0.15	0.17	0.04	0.06	227.30	223.44	1.96	1.16	—	—
qcp-order10-holes64-balanced-511-QWH-10	7.87	8.61	—	0.34	1.28	—	0.15	0.17	0.04	516.80	0.11	0.11	1.96	1.92	—	—
qcp-order10-holes64-balanced-558-QWH-10	6.87	7.51	—	0.10	1.26	—	0.15	0.17	0.04	0.06	0.18	0.18	1.96	1.25	0.20	0.20
qcp-order10-holes64-balanced-698-QWH-10	7.07	7.63	—	0.10	1.42	—	0.15	0.17	0.04	0.06	4.43	4.25	1.91	1.29	1.42	1.51
qcp-order10-holes64-balanced-701-QWH-10	7.12	7.92	—	0.10	1.26	—	0.15	0.17	0.04	0.61	0.04	0.04	1.97	1.35	0.21	0.21
qcp-order10-holes64-balanced-731-QWH-10	6.78	7.40	—	0.10	1.25	—	0.15	0.17	0.04	—	0.04	0.04	1.96	1.20	—	—
qcp-order10-holes64-balanced-764-QWH-10	6.37	7.87	—	0.10	1.38	—	0.15	0.17	0.04	0.06	0.06	0.06	2.00	1.35	0.35	0.35
qcp-order10-holes64-balanced-885-QWH-10	6.86	7.63	—	0.10	1.42	—	0.15	0.17	0.04	0.06	0.04	0.04	2.04	1.14	0.17	0.17
Grand total:	69.77	78.48	—	1.22	13.05	—	1.50	1.67	0.37	517.83	232.29	228.23	20.37	14.72	2.95	3.07

Table 216. Solution time of solved instances belonging to class `QCPp-10-hard`. Problem range: `qcp-order10-holes64-balanced-221-QWH-10`–`qcp-order10-holes64-balanced-885-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-16-QWH-10`	6.87	8.49	1.39	0.10	1.37	—	0.15	0.17	0.04	—	—	—	—	5.29	—	—
`qcp-order10-holes64-balanced-32-QWH-10`	7.66	8.46	1.33	0.10	1.36	—	0.15	0.17	0.04	45.08	112.19	110.13	—	3.75	141.17	150.97
`qcp-order10-holes64-balanced-45-QWH-10`	6.88	8.57	1.42	0.10	1.32	—	0.15	0.17	0.05	—	—	—	—	8.69	—	—
`qcp-order10-holes64-balanced-109-QWH-10`	8.08	9.25	1.49	0.11	1.68	—	0.17	0.19	0.05	—	—	—	—	12.74	—	—
`qcp-order10-holes64-balanced-140-QWH-10`	6.69	7.74	1.34	0.10	1.28	—	0.15	0.17	0.04	—	40.53	38.29	1.61	4.16	—	—
Grand total:	36.18	42.51	6.97	0.51	7.01	—	0.77	0.86	0.21	45.08	152.72	148.42	1.61	34.64	141.17	150.97

Table 217. Solution time of solved instances belonging to class `QCPp-10`. Problem range: `qcp-order10-holes64-balanced-16-QWH-10`–`qcp-order10-holes64-balanced-140-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-73-QWH-15`	13.03	15.87	—	0.15	2.58	—	0.43	0.72	0.24	0.14	0.64	0.61	19.94	557.63	0.42	0.44
`qcp-order15-holes120-balanced-74-QWH-15`	12.80	15.91	—	0.14	2.72	—	0.42	0.72	0.12	0.14	—	—	23.79	18.42	2.96	3.12
`qcp-order15-holes120-balanced-75-QWH-15`	14.72	17.47	—	0.16	2.71	—	5.81	6.27	0.14	504.49	—	—	71.23	—	—	—
`qcp-order15-holes120-balanced-76-QWH-15`	12.49	15.49	—	0.15	2.49	—	0.42	0.72	0.11	—	0.29	0.30	20.05	14.21	4.99	5.19
`qcp-order15-holes120-balanced-77-QWH-15`	13.07	16.07	—	0.14	2.58	—	0.42	0.75	0.20	0.14	—	—	20.19	19.27	0.54	0.56
Grand total:	66.11	80.81	—	0.74	13.09	—	7.50	9.17	0.81	504.91	0.93	0.91	155.21	609.53	8.92	9.31

Table 218. Solution time of solved instances belonging to class `QCPp-15-easy`. Problem range: `qcp-order15-holes120-balanced-73-QWH-15`–`qcp-order15-holes120-balanced-77-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-3-QWH-15`	17.78	20.97	—	105.20	2.78	—	148.65	148.12	0.38	—	97.82	89.31	—	—	—	—
`qcp-order15-holes120-balanced-25-QWH-15`	12.93	15.92	—	0.15	2.67	—	0.42	0.71	0.13	0.21	—	—	19.88	33.26	2.32	2.41
`qcp-order15-holes120-balanced-48-QWH-15`	13.61	16.63	—	0.25	2.79	—	0.42	0.71	0.47	53.50	—	—	—	26.78	7.48	7.85
`qcp-order15-holes120-balanced-127-QWH-15`	12.09	15.55	—	0.15	2.54	—	0.42	0.71	0.12	2.04	0.87	0.88	—	13.85	592.40	—
`qcp-order15-holes120-balanced-135-QWH-15`	12.99	15.90	—	0.15	2.75	—	0.44	0.73	0.24	2.46	—	—	—	50.83	361.88	373.77
`qcp-order15-holes120-balanced-171-QWH-15`	15.18	18.10	—	0.17	2.76	—	0.43	0.72	0.13	—	—	—	132.36	59.58	6.49	6.75
Grand total:	84.57	103.08	—	106.06	16.30	—	150.78	151.71	1.46	58.20	98.70	90.19	152.24	184.30	970.58	390.77

Table 219. Solution time of solved instances belonging to class `QCPp-15-hard`. Problem range: `qcp-order15-holes120-balanced-3-QWH-15`–`qcp-order15-holes120-balanced-171-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-1-QWH-15`	13.02	15.54	4.59	0.16	2.41	—	0.41	0.71	0.11	—	—	—	—	36.17	—	—
`qcp-order15-holes120-balanced-2-QWH-15`	144.81	141.84	4.47	2.72	3.18	—	3.21	3.42	0.14	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-17-QWH-15`	13.18	16.96	4.62	0.22	2.40	—	0.43	0.72	0.11	—	—	—	—	53.81	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	12.01	15.08	4.49	0.14	2.59	—	0.40	0.76	0.11	0.14	0.29	0.31	14.84	16.10	0.45	0.45
`qcp-order15-holes120-balanced-54-QWH-15`	14.04	16.79	4.87	1.34	2.43	—	0.45	0.75	0.11	—	—	—	—	127.05	—	—
Grand total:	197.07	206.20	23.04	4.59	13.01	—	4.90	6.35	0.58	0.14	0.29	0.31	14.84	233.13	0.45	0.45

Table 220. Solution time of solved instances belonging to class `QCPp-15`. Problem range: `qcp-order15-holes120-balanced-1-QWH-15`–`qcp-order15-holes120-balanced-54-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-13-QWH-20`	—	—	—	27.68	5.57	—	—	—	107.56	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-14-QWH-20`	140.10	147.31	—	60.12	4.51	—	1.90	3.38	21.25	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-15-QWH-20`	26.85	33.10	—	0.26	3.62	—	1.48	2.91	2.37	—	—	—	—	187.10	—	—
`qcp-order20-holes187-balanced-16-QWH-20`	21.12	27.65	—	0.73	3.71	—	1.15	2.59	0.37	—	88.97	85.03	—	212.10	—	—
`qcp-order20-holes187-balanced-17-QWH-20`	25.48	31.40	—	0.29	3.60	—	2.39	3.79	16.82	—	131.28	123.94	196.39	—	36.74	37.79
Grand total:	213.55	239.46	—	89.08	21.01	—	6.92	12.67	148.37	—	220.25	208.98	196.39	399.20	36.74	37.79

Table 221. Solution time of solved instances belonging to class `QCPp-20-easy`. Problem range: `qcp-order20-holes187-balanced-13-QWH-20`–`qcp-order20-holes187-balanced-17-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-3-QWH-20`	24.42	30.60	—	0.28	3.76	—	1.19	2.64	2.36	—	—	—	—	488.65	25.99	26.88
`qcp-order20-holes187-balanced-12-QWH-20`	31.24	37.64	—	0.26	3.86	—	1.09	2.55	1.55	—	—	—	267.37	95.42	—	—
`qcp-order20-holes187-balanced-18-QWH-20`	33.86	40.35	—	0.29	4.50	—	1.20	2.75	3.49	—	—	—	—	173.19	—	—
`qcp-order20-holes187-balanced-22-QWH-20`	43.27	50.15	—	0.34	4.57	—	1.28	3.06	2.12	—	—	—	—	227.73	—	—
`qcp-order20-holes187-balanced-23-QWH-20`	22.20	28.41	—	0.35	3.71	—	—	—	2.04	—	—	—	144.88	231.69	82.22	84.21
Grand total:	155.00	187.15	—	1.51	20.40	—	4.77	10.99	11.57	—	—	—	412.25	1216.67	108.21	111.09

Table 222. Solution time of solved instances belonging to class `QCPp-20-hard`. Problem range: `qcp-order20-holes187-balanced-3-QWH-20`–`qcp-order20-holes187-balanced-23-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-8-QWH-20`	24.48	30.37	11.77	0.60	3.53	—	1.22	2.69	0.28	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-25-QWH-20`	21.28	27.24	11.67	0.33	3.48	—	1.10	2.55	0.26	—	—	—	—	337.27	—	—
`qcp-order20-holes187-balanced-27-QWH-20`	20.40	26.78	13.10	0.31	3.68	—	1.06	2.50	0.26	—	—	—	—	292.21	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	21.87	28.93	12.93	0.43	3.56	—	1.08	2.53	0.31	—	—	—	—	364.64	—	—
Grand total:	88.03	113.33	49.47	1.67	14.24	—	4.47	10.27	1.11	—	—	—	—	994.12	—	—

Table 223. Solution time of solved instances belonging to class `QCPp-20`. Problem range: `qcp-order20-holes187-balanced-8-QWH-20`–`qcp-order20-holes187-balanced-29-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	7.76	8.03	—	0.11	2.92	—	0.37	0.18	0.14	0.09	0.09	0.10	1.99	1.51	0.91	0.24
`qwh-order10-holes57-balanced-2-QWH-10`	6.66	7.32	—	0.10	1.24	—	0.15	0.17	0.04	0.06	0.04	0.04	1.73	1.12	0.17	0.17
`qwh-order10-holes57-balanced-3-QWH-10`	7.51	7.75	—	0.11	2.79	—	0.37	0.18	0.11	0.08	0.09	0.09	1.60	1.30	0.17	3.16
`qwh-order10-holes57-balanced-4-QWH-10`	7.44	7.81	—	0.11	2.73	—	0.32	0.18	0.13	0.08	0.10	0.10	1.60	1.36	0.23	0.22
`qwh-order10-holes57-balanced-5-QWH-10`	7.35	7.46	—	0.13	2.62	—	0.36	0.19	0.12	0.10	0.09	0.08	1.57	1.62	0.16	0.18
Grand total:	36.72	38.37	—	0.56	12.30	—	1.56	0.89	0.52	0.40	0.41	0.41	8.49	6.92	1.63	3.97

Table 224. Solution time of solved instances belonging to class `QWH-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-35-QWH-10`	7.01	7.24	—	0.13	2.97	—	0.33	0.17	0.12	0.07	0.08	0.09	1.57	1.16	0.18	0.16
`qwh-order10-holes57-balanced-54-QWH-10`	7.01	7.46	—	0.11	2.84	—	0.35	0.18	0.12	0.07	0.10	0.12	2.00	1.35	0.23	0.24
`qwh-order10-holes57-balanced-187-QWH-10`	6.70	7.22	—	0.11	2.76	—	0.33	0.17	0.12	0.09	0.08	0.10	1.67	1.06	0.19	0.19
`qwh-order10-holes57-balanced-219-QWH-10`	8.10	7.96	—	0.11	2.62	—	0.34	0.17	0.12	0.08	0.08	0.11	1.62	5.10	0.15	0.16
`qwh-order10-holes57-balanced-647-QWH-10`	7.15	7.81	—	0.11	2.60	—	0.35	0.17	0.14	0.08	0.09	0.10	1.72	1.09	0.19	0.19
Grand total:	35.98	37.70	—	0.58	13.79	—	1.70	0.85	0.61	0.39	0.43	0.52	8.57	9.76	0.94	0.93

Table 225. Solution time of solved instances belonging to class `QWH-10-hard`. Problem range: `qwh-order10-holes57-balanced-35-QWH-10`–`qwh-order10-holes57-balanced-647-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-14-QWH-15`	14.04	16.33	—	0.22	2.74	—	0.45	0.77	0.16	0.66	0.34	0.34	23.44	16.25	2.45	2.59
`qwh-order15-holes106-balanced-15-QWH-15`	15.54	16.09	—	0.14	2.59	—	0.44	0.77	0.14	0.39	0.52	0.50	45.16	22.55	2.33	2.43
`qwh-order15-holes106-balanced-16-QWH-15`	11.78	15.19	—	0.14	2.87	—	0.42	0.75	0.18	0.41	0.51	0.52	239.54	11.78	0.72	0.75
`qwh-order15-holes106-balanced-17-QWH-15`	14.04	16.58	—	0.15	2.65	—	0.46	0.83	0.14	0.18	0.54	0.52	34.34	20.34	0.74	0.78
`qwh-order15-holes106-balanced-18-QWH-15`	14.61	17.92	—	0.16	2.64	—	0.42	0.81	0.14	0.50	0.86	0.79	31.82	29.30	1.13	1.19
Grand total:	70.02	82.11	—	0.82	13.50	—	2.20	3.92	0.76	2.15	2.77	2.68	374.30	100.21	7.37	7.73

Table 226. Solution time of solved instances belonging to class `QWH-15-easy`. Problem range: `qwh-order15-holes106-balanced-14-QWH-15`–`qwh-order15-holes106-balanced-18-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-26-QWH-15`	14.20	73.05	—	0.33	3.00	—	0.90	1.68	0.15	63.76	3.90	3.69	391.34	—	562.08	588.53
`qwh-order15-holes106-balanced-155-QWH-15`	46.64	47.90	—	0.17	2.79	—	0.67	0.97	0.22	3.29	1.82	1.73	75.20	69.92	21.31	22.07
`qwh-order15-holes106-balanced-369-QWH-15`	13.65	15.39	—	0.17	4.05	—	0.58	0.70	0.39	0.21	1.31	1.26	25.01	14.18	10.17	10.65
`qwh-order15-holes106-balanced-392-QWH-15`	13.11	16.60	—	0.35	2.21	—	0.43	0.90	0.36	1.24	3.25	3.17	26.89	30.32	6.23	6.44
`qwh-order15-holes106-balanced-413-QWH-15`	18.73	20.39	—	0.83	4.74	—	1.09	1.22	0.35	32.59	4.83	4.68	—	171.79	451.48	470.40
`qwh-order15-holes106-balanced-461-QWH-15`	13.45	17.40	—	0.22	2.39	—	0.41	0.80	0.12	13.11	12.80	12.38	16.17	15.48	70.61	74.71
`qwh-order15-holes106-balanced-463-QWH-15`	19.52	15.44	—	0.16	2.38	—	0.75	0.80	0.71	1.62	8.78	8.46	174.45	85.76	54.18	56.45
`qwh-order15-holes106-balanced-586-QWH-15`	13.75	18.63	—	0.24	2.71	—	0.55	0.79	0.52	2.85	0.72	0.70	83.87	56.87	25.74	26.64
`qwh-order15-holes106-balanced-974-QWH-15`	12.07	14.59	—	0.31	2.66	—	0.46	0.74	0.09	5.20	7.79	7.45	342.10	12.55	117.76	121.72
Grand total:	165.12	239.38	—	2.78	26.92	—	5.84	8.59	2.91	123.88	45.21	43.52	1135.03	456.88	1319.56	1377.62

Table 227. Solution time of solved instances belonging to class `QWH-15-hard`. Problem range: `qwh-order15-holes106-balanced-26-QWH-15`–`qwh-order15-holes106-balanced-974-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-17-QWH-20`	70.52	28.84	—	0.44	3.91	—	1.50	3.75	0.46	1.76	34.49	31.47	221.31	124.34	376.76	388.69
`qwh-order20-holes166-balanced-18-QWH-20`	359.61	309.18	—	0.32	3.72	—	2.04	3.62	0.49	181.80	—	—	—	—	—	—
`qwh-order20-holes166-balanced-19-QWH-20`	34.85	32.29	—	0.95	3.58	—	1.23	3.70	0.35	5.25	52.02	52.42	—	220.20	11.07	11.50
`qwh-order20-holes166-balanced-20-QWH-20`	228.79	563.97	—	0.89	4.38	—	7.12	3.05	0.88	135.53	—	—	—	—	—	—
`qwh-order20-holes166-balanced-26-QWH-20`	73.62	56.59	—	0.27	3.68	—	1.55	3.74	0.40	—	60.04	57.85	254.86	379.68	—	—
Grand total:	767.38	990.87	—	2.88	19.27	—	13.43	17.87	2.57	324.34	146.55	141.73	476.17	724.22	387.83	400.19

Table 228. Solution time of solved instances belonging to class `QWH-20-easy`. Problem range: `qwh-order20-holes166-balanced-17-QWH-20`–`qwh-order20-holes166-balanced-26-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qwh-order20-holes166-balanced-156-QWH-20	28.28	—	—	1.11	11.01	—	75.73	5.21	2.12	—	—	—	—	—	—	—
qwh-order20-holes166-balanced-285-QWH-20	—	201.19	—	14.38	7.09	—	1.15	24.52	4.19	—	188.53	179.00	—	—	—	—
qwh-order20-holes166-balanced-457-QWH-20	—	—	—	133.55	7.80	—	269.46	174.82	1.99	—	—	—	—	—	—	—
qwh-order20-holes166-balanced-522-QWH-20	238.88	—	—	13.29	7.60	—	80.63	2.77	2.30	—	533.92	518.56	—	—	—	—
qwh-order20-holes166-balanced-578-QWH-20	152.53	158.71	—	34.89	4.65	—	19.05	20.60	2.09	—	—	—	—	—	—	—
qwh-order20-holes166-balanced-624-QWH-20	—	37.50	—	9.21	7.23	—	48.04	12.62	8.79	—	—	—	—	—	—	—
qwh-order20-holes166-balanced-707-QWH-20	—	—	—	226.89	4.08	—	216.81	215.82	5.99	—	—	—	—	—	—	—
qwh-order20-holes166-balanced-862-QWH-20	—	72.14	—	5.03	6.56	—	184.39	55.85	3.74	434.71	—	—	—	—	—	—
qwh-order20-holes166-balanced-900-QWH-20	135.28	—	—	9.48	8.29	—	5.09	3.61	5.91	—	—	—	—	—	—	—
qwh-order20-holes166-balanced-988-QWH-20	—	—	—	1.78	6.16	—	8.13	9.59	6.11	128.26	—	—	—	—	—	—
Grand total:	554.97	469.56	—	449.60	70.46	—	908.48	525.42	43.22	562.97	722.45	697.56	—	—	—	—

Table 229. Solution time of solved instances belonging to class `QWH-20-hard`. Problem range: `qwh-order20-holes166-balanced-156-QWH-20`–`qwh-order20-holes166-balanced-988-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-2-QWH-25`	—	—	—	126.67	6.92	—	544.54	41.16	3.65	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-4-QWH-25`	—	—	—	468.83	5.91	—	—	—	1.66	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-13-QWH-25`	506.02	—	—	1.44	5.70	—	4.12	12.94	1.11	—	389.47	371.65	—	—	—	—
`qwh-order25-holes235-balanced-26-QWH-25`	577.53	—	—	6.70	6.16	—	24.94	11.30	1.46	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-27-QWH-25`	—	—	—	—	8.65	—	—	523.16	5.52	—	—	—	—	—	—	—
Grand total:	1083.55	—	—	603.63	33.34	—	573.60	588.55	13.39	—	389.47	371.65	—	—	—	—

Table 230. Solution time of solved instances belonging to class `QWH-25-easy`. Problem range: `qwh-order25-holes235-balanced-2-QWH-25`–`qwh-order25-holes235-balanced-27-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qwh-order25-holes235-balanced-5-QWH-25	—	—	—	—	431.34	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-99-QWH-25	—	—	—	—	84.54	—	—	—	149.81	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-111-QWH-25	—	—	—	—	49.14	—	—	—	115.90	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-114-QWH-25	—	—	—	—	28.23	—	—	—	108.69	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-164-QWH-25	—	—	—	—	40.45	—	—	—	149.67	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-228-QWH-25	—	—	—	—	14.96	—	—	—	132.93	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-288-QWH-25	—	—	—	—	11.27	—	—	—	42.08	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-394-QWH-25	—	—	—	—	282.47	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-795-QWH-25	—	—	—	—	41.83	—	—	—	382.79	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-918-QWH-25	—	—	—	—	306.96	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-993-QWH-25	—	—	—	—	15.21	—	—	—	156.66	—	—	—	—	—	—	—
Grand total:	—	—	—	—	1306.40	—	—	—	1238.53	—	—	—	—	—	—	—

Table 231. Solution time of solved instances belonging to class `QWH-25-hard`. Problem range: `qwh-order25-holes235-balanced-5-QWH-25`–`qwh-order25-holes235-balanced-993-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	6.22	7.48	—	0.10	1.25	—	0.15	0.17	0.03	0.15	0.04	0.04	1.63	1.00	0.20	0.17
`qwh-order10-holes57-balanced-33-QWH-10`	6.93	7.76	—	0.09	1.37	—	0.16	0.17	0.03	0.06	0.13	0.12	5.82	1.12	2.01	2.10
`qwh-order10-holes57-balanced-43-QWH-10`	6.89	7.84	—	0.10	1.44	—	0.15	0.17	0.03	0.06	0.04	0.04	1.71	1.23	0.16	0.16
`qwh-order10-holes57-balanced-46-QWH-10`	6.97	8.06	—	0.10	1.37	—	0.15	0.18	0.03	0.06	0.04	0.04	1.60	1.08	0.16	0.16
`qwh-order10-holes57-balanced-111-QWH-10`	7.42	7.86	—	0.10	1.16	—	0.15	0.17	0.04	0.06	0.04	0.04	7.92	1.42	0.78	3.80
Grand total:	34.43	39.00	—	0.48	6.59	—	0.76	0.86	0.17	0.39	0.31	0.29	18.68	5.85	3.31	6.40

Table 232. Solution time of solved instances belonging to class `QWHp-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-111-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-8-QWH-10`	6.12	7.36	—	0.10	1.20	—	0.15	0.17	0.03	0.06	0.04	0.04	1.53	1.17	0.21	0.18
`qwh-order10-holes57-balanced-10-QWH-10`	6.20	7.66	—	0.10	1.26	—	0.15	0.17	0.03	0.06	0.04	0.04	202.62	1.07	123.23	133.36
`qwh-order10-holes57-balanced-48-QWH-10`	6.31	8.05	—	0.10	1.16	—	0.15	0.17	0.04	0.06	0.05	0.04	1.65	1.12	0.17	0.16
`qwh-order10-holes57-balanced-154-QWH-10`	6.72	7.73	—	0.09	1.20	—	0.15	0.17	0.03	0.06	0.04	0.04	1.75	1.14	0.25	0.25
`qwh-order10-holes57-balanced-210-QWH-10`	6.22	7.60	—	0.09	1.28	—	0.15	0.17	0.03	0.06	0.04	0.04	2.24	1.07	0.16	0.16
`qwh-order10-holes57-balanced-295-QWH-10`	6.65	7.47	—	0.10	1.22	—	0.15	0.17	0.04	0.06	0.04	0.04	2.28	1.13	0.19	0.16
`qwh-order10-holes57-balanced-535-QWH-10`	6.17	7.18	—	0.10	1.44	—	0.15	0.17	0.03	0.07	0.04	0.04	1.66	1.08	0.17	0.18
`qwh-order10-holes57-balanced-623-QWH-10`	6.22	7.24	—	0.10	1.21	—	0.15	0.17	0.04	0.06	0.04	0.04	1.66	1.10	0.17	0.17
`qwh-order10-holes57-balanced-634-QWH-10`	6.63	7.86	—	0.09	1.33	—	0.15	0.17	0.03	0.06	0.04	0.05	2.28	1.10	0.17	0.16
`qwh-order10-holes57-balanced-987-QWH-10`	7.21	7.52	—	0.10	1.16	—	0.15	0.17	0.03	0.81	0.04	0.04	8.44	1.16	0.22	0.23
Grand total:	64.46	75.66	—	0.96	12.46	—	1.50	1.70	0.34	1.35	0.42	0.42	226.11	11.14	124.94	135.01

Table 233. Solution time of solved instances belonging to class `QWHp-10-hard`. Problem range: `qwh-order10-holes57-balanced-8-QWH-10`–`qwh-order10-holes57-balanced-987-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-4-QWH-15`	12.49	14.98	—	0.14	2.66	—	0.43	0.76	0.11	0.27	0.30	0.29	17.09	12.23	72.88	76.07
`qwh-order15-holes106-balanced-5-QWH-15`	13.31	16.10	—	0.15	2.61	—	0.41	0.71	0.12	—	—	—	21.82	29.26	8.72	9.08
`qwh-order15-holes106-balanced-6-QWH-15`	12.80	15.11	—	0.16	2.46	—	0.44	0.72	0.17	5.73	1.39	1.73	16.15	28.55	17.92	18.82
`qwh-order15-holes106-balanced-7-QWH-15`	12.24	14.86	—	0.14	2.48	—	0.41	0.70	0.09	—	0.27	0.29	38.68	11.17	0.43	0.44
`qwh-order15-holes106-balanced-8-QWH-15`	13.06	15.58	—	0.15	2.48	—	0.45	0.74	0.11	—	—	—	—	39.67	—	—
Grand total:	63.90	76.63	—	0.74	12.69	—	2.15	3.63	0.61	5.99	1.97	2.31	93.75	120.88	99.95	104.41

Table 234. Solution time of solved instances belonging to class `QWHp-15-easy`. Problem range: `qwh-order15-holes106-balanced-4-QWH-15`–`qwh-order15-holes106-balanced-8-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-3-QWH-15`	12.99	15.00	—	0.14	2.37	—	0.41	0.75	0.11	3.22	144.05	138.21	18.01	12.98	—	—
Grand total:	12.99	15.00	—	0.14	2.37	—	0.41	0.75	0.11	3.22	144.05	138.21	18.01	12.98	—	—

Table 235. Solution time of solved instances belonging to class `QWHp-15-hard`. Problem: `qwh-order15-holes106-balanced-3-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-15-106-0	9.58	12.08	—	0.17	2.26	17.18	0.37	0.24	0.03	0.56	0.24	0.24	3.95	48.71	1.50	1.63
bqwh-15-106-17	10.39	9.21	—	0.10	2.05	1.19	0.16	0.17	0.05	0.15	4.57	4.50	1.62	2.96	1.80	1.92
bqwh-15-106-22	8.32	9.45	—	0.10	2.04	0.29	0.17	0.19	0.03	0.14	0.07	0.06	9.08	2.55	0.86	0.95
bqwh-15-106-29	11.65	9.50	—	0.10	2.10	2.61	0.27	0.23	0.10	0.30	0.70	0.69	6.43	69.44	9.29	10.27
bqwh-15-106-34	9.07	9.38	—	0.12	2.00	1.44	0.23	0.17	0.06	0.35	0.98	0.99	1.33	15.03	3.57	3.99
bqwh-15-106-39	9.40	9.30	—	0.11	2.05	0.29	0.17	0.18	0.06	0.57	0.21	0.20	13.93	2.89	20.51	22.54
bqwh-15-106-53	10.01	11.31	—	0.12	2.10	0.11	0.20	0.19	0.04	0.12	0.30	0.29	19.74	1.97	0.73	0.81
bqwh-15-106-64	9.23	11.26	—	0.10	2.06	0.20	0.20	0.21	0.06	0.71	8.83	8.39	3.28	4.93	0.42	0.45
bqwh-15-106-67	11.86	7.93	—	0.17	2.07	1.18	0.25	0.26	0.04	1.72	1.15	1.14	26.88	19.30	7.14	8.01
bqwh-15-106-76	8.23	7.85	—	0.11	1.74	0.28	0.17	0.18	0.03	0.74	0.24	0.23	1.83	4.63	2.38	2.81
bqwh-15-106-77	8.06	7.56	—	0.10	1.78	0.22	0.20	0.18	0.03	0.17	0.19	0.19	3.23	2.57	1.49	1.65
bqwh-15-106-78	10.65	9.25	—	0.10	2.05	4.36	0.25	0.20	0.04	0.20	1.09	1.01	6.89	11.58	2.45	2.75
bqwh-15-106-83	11.70	11.95	—	0.35	2.46	10.44	0.23	0.25	0.05	7.94	8.81	8.63	10.49	68.92	91.35	100.10
bqwh-15-106-87	8.27	11.08	—	0.10	1.78	3.03	0.17	0.19	0.03	0.26	1.51	1.40	4.99	10.59	0.76	0.82
bqwh-15-106-89	13.94	11.22	—	0.11	1.99	0.94	0.20	0.19	0.05	0.44	0.08	0.08	6.03	3.71	1.55	1.71
bqwh-15-106-90	7.30	9.10	—	0.11	1.65	0.25	0.18	0.20	0.04	0.10	0.09	0.09	2.90	3.47	1.91	2.15
bqwh-15-106-93	11.19	10.89	—	0.09	1.58	0.17	0.15	0.23	0.05	0.41	0.06	0.06	49.04	1.80	0.93	1.00
bqwh-15-106-96	9.44	8.92	—	0.10	2.26	12.02	0.18	0.19	0.04	0.84	0.56	0.54	21.58	10.64	11.90	13.29
bqwh-15-106-97	9.62	9.75	—	0.10	2.20	0.52	0.18	0.19	0.05	0.11	0.77	0.72	8.63	7.64	0.65	0.71
Grand total:	187.90	187.00	—	2.36	38.23	56.71	3.94	3.85	0.89	15.83	30.45	29.43	201.84	293.33	161.20	177.59

Table 236. Solution time of solved instances belonging to class `bqwh15-106`. Problem range: `bqwh-15-106-0`–`bqwh-15-106-97`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-18-141-10	13.46	12.60	—	0.12	2.77	—	3.66	0.84	0.05	30.67	58.40	54.66	50.28	—	70.19	77.05
bqwh-18-141-23	197.85	74.73	—	2.70	3.04	4.50	5.86	2.21	0.07	33.65	13.16	12.88	23.32	471.16	—	—
bqwh-18-141-28	10.39	13.86	—	2.01	2.28	44.89	2.19	2.57	0.08	28.93	11.32	10.66	25.12	171.88	2.47	2.78
bqwh-18-141-29	9.96	10.46	—	0.28	2.51	9.25	0.45	0.44	0.12	22.67	193.62	185.33	5.55	80.81	—	—
bqwh-18-141-33	12.07	12.50	—	0.13	2.07	2.83	0.36	0.38	0.05	0.53	16.79	16.66	7.35	9.59	8.97	4.64
bqwh-18-141-36	21.60	13.20	—	0.18	2.26	—	0.55	1.16	0.07	29.69	9.11	8.79	433.47	87.53	526.37	570.65
bqwh-18-141-37	20.04	10.89	—	0.13	2.33	22.36	0.39	0.42	0.19	26.48	4.36	4.17	212.44	161.74	30.77	34.46
bqwh-18-141-39	37.11	14.13	—	0.16	2.20	15.28	0.44	0.55	0.11	27.25	31.61	29.79	5.06	154.06	239.88	265.19
bqwh-18-141-40	14.20	15.13	—	0.62	2.11	2.84	0.26	0.29	0.07	308.07	—	—	65.06	18.07	—	—
bqwh-18-141-44	11.99	14.30	—	0.16	3.11	41.33	0.42	0.58	0.13	2.80	27.49	25.99	11.91	107.30	51.07	55.07
bqwh-18-141-59	18.03	12.66	—	0.41	3.28	—	1.08	0.41	0.12	22.94	184.89	181.24	387.59	294.59	488.63	538.54
bqwh-18-141-62	17.42	14.06	—	0.44	3.35	102.35	0.46	1.05	0.07	85.52	134.87	120.87	3.65	266.95	73.96	81.10
bqwh-18-141-65	11.50	15.73	—	0.65	2.70	34.89	1.72	0.37	0.12	1.19	14.34	13.65	63.49	361.55	5.46	6.09
bqwh-18-141-68	27.73	23.41	—	0.13	2.34	321.97	6.55	2.37	0.32	1.31	—	—	—	—	4.43	5.34
bqwh-18-141-73	89.24	24.66	—	4.46	3.27	—	6.15	6.23	0.24	101.13	17.52	17.30	—	—	—	—
bqwh-18-141-89	12.11	12.21	—	0.14	2.46	3.88	4.49	4.11	0.08	0.82	46.42	45.27	—	32.51	91.56	102.75
bqwh-18-141-90	14.87	21.54	—	0.12	2.69	161.07	1.67	0.56	0.09	71.42	10.15	9.53	57.51	237.06	340.36	379.83
bqwh-18-141-92	15.78	14.18	—	0.17	2.20	34.57	0.31	0.34	0.15	47.99	509.54	500.90	3.32	263.62	—	—
bqwh-18-141-96	16.05	17.57	—	0.30	2.36	11.05	0.39	0.47	0.40	0.19	44.73	42.63	164.15	31.22	21.18	23.86
Grand total:	571.39	347.81	—	13.31	49.33	813.05	37.36	25.35	2.53	843.24	1328.33	1280.33	1519.26	2749.63	1955.31	2147.36

Table 237. Solution time of solved instances belonging to class `bqwh18-141`. Problem range: `bqwh-18-141-10`–`bqwh-18-141-96`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-25-0`	6.51	6.81	1.53	0.10	1.94	0.08	0.10	0.09	0.04	0.12	0.04	0.04	0.19	1.82	0.16	0.16
`composed-25-1-25-1`	6.26	6.86	1.73	0.10	1.92	0.07	0.10	0.10	0.04	0.12	0.04	0.04	0.20	1.29	0.16	0.15
`composed-25-1-25-2`	6.33	6.71	1.71	0.10	1.90	0.09	0.11	0.10	0.04	0.12	0.04	0.04	0.20	2.02	0.16	0.16
`composed-25-1-25-3`	6.31	6.88	1.90	0.10	1.91	0.08	0.11	0.10	0.05	0.13	0.04	0.04	0.22	1.98	0.15	0.15
`composed-25-1-25-4`	6.40	7.14	1.54	0.10	1.89	0.08	0.11	0.10	0.04	0.12	0.04	0.04	0.23	2.71	0.16	0.17
`composed-25-1-25-5`	6.41	6.94	1.59	0.10	1.92	0.07	0.10	0.10	0.05	0.12	0.04	0.04	0.19	1.85	0.16	0.16
`composed-25-1-25-6`	6.17	6.58	1.59	0.10	1.95	0.08	0.11	0.10	0.04	0.12	0.04	0.04	0.22	1.68	0.16	0.16
`composed-25-1-25-7`	6.31	6.89	1.54	0.10	1.91	0.08	0.10	0.09	0.04	0.13	0.04	0.04	0.22	2.27	0.16	0.16
`composed-25-1-25-8`	6.33	6.70	1.53	0.10	1.92	0.08	0.11	0.10	0.04	0.13	0.04	0.04	0.20	1.98	0.17	0.16
`composed-25-1-25-9`	6.32	6.90	1.70	0.10	1.91	0.08	0.11	0.10	0.05	0.12	0.04	0.04	0.20	2.07	0.16	0.16
Grand total:	63.34	68.42	16.37	0.98	19.17	0.80	1.06	0.96	0.44	1.25	0.37	0.37	2.07	19.67	1.61	1.60

Table 238. Solution time of solved instances belonging to class `composed-25-1-25`. Problem range: `composed-25-1-25-0`–`composed-25-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-2-0`	5.03	7.09	1.74	0.10	1.90	0.07	0.10	0.09	0.04	0.12	0.04	0.04	0.17	1.67	0.16	0.15
`composed-25-1-2-1`	5.01	7.04	1.20	0.09	1.90	0.06	0.10	0.09	0.04	0.12	0.04	0.03	0.18	1.41	0.20	0.15
`composed-25-1-2-2`	5.14	7.08	1.51	0.10	1.91	0.08	0.10	0.09	0.04	0.12	0.03	0.04	0.18	2.08	0.16	0.16
`composed-25-1-2-3`	4.95	7.32	1.67	0.09	1.86	0.07	0.10	0.09	0.04	0.12	0.03	0.03	0.21	2.04	0.15	0.15
`composed-25-1-2-4`	5.20	7.09	1.21	0.10	1.79	0.08	0.10	0.09	0.04	—	0.04	0.04	0.19	2.19	0.16	0.16
`composed-25-1-2-5`	5.25	7.20	1.54	0.09	1.91	0.07	0.10	0.09	0.04	—	0.04	0.04	0.18	1.99	0.16	0.16
`composed-25-1-2-6`	5.13	7.12	1.44	0.10	1.79	0.08	0.11	0.09	0.04	0.12	0.04	0.03	0.19	1.87	0.15	0.15
`composed-25-1-2-7`	5.11	7.11	1.70	0.10	1.86	0.08	0.10	0.09	0.04	0.12	0.04	0.04	0.19	2.06	0.16	0.15
`composed-25-1-2-8`	4.96	7.07	1.50	0.10	1.86	0.08	0.11	0.09	0.04	0.12	0.03	0.04	0.19	2.30	0.15	0.15
`composed-25-1-2-9`	5.20	7.07	1.67	0.10	1.93	0.08	0.10	0.09	0.04	0.12	0.04	0.04	0.18	1.78	0.18	0.15
Grand total:	51.00	71.18	15.18	0.96	18.71	0.74	1.01	0.92	0.42	0.96	0.35	0.36	1.88	19.40	1.63	1.52

Table 239. Solution time of solved instances belonging to class `composed-25-1-2`. Problem range: `composed-25-1-2-0`–`composed-25-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-40-0`	6.66	7.04	1.67	0.10	1.97	0.08	0.11	0.10	0.04	0.13	0.04	0.04	0.20	1.59	0.17	0.17
`composed-25-1-40-1`	6.70	7.08	1.64	0.10	1.96	0.07	0.11	0.10	0.05	0.13	0.04	0.04	0.21	1.57	0.17	0.17
`composed-25-1-40-2`	6.86	6.88	1.76	0.10	1.96	0.09	0.11	0.10	0.04	0.13	0.04	0.04	0.20	2.09	0.16	0.16
`composed-25-1-40-3`	6.87	7.23	1.98	0.10	1.91	0.08	0.11	0.10	0.04	0.13	0.04	0.04	0.22	1.64	0.17	0.17
`composed-25-1-40-4`	6.76	6.67	1.74	0.10	1.90	0.09	0.11	0.10	0.05	0.13	0.04	0.04	0.22	2.27	0.17	0.17
`composed-25-1-40-5`	6.81	7.10	1.80	0.10	1.91	0.07	0.11	0.10	0.04	0.13	0.04	0.04	0.20	1.90	0.16	0.16
`composed-25-1-40-6`	6.68	6.70	1.55	0.10	1.91	0.09	0.12	0.10	0.04	0.13	0.04	0.04	0.22	1.81	0.17	0.16
`composed-25-1-40-7`	6.65	6.82	1.51	0.10	1.91	0.09	0.11	0.10	0.05	0.13	0.04	0.04	0.22	2.17	0.16	0.16
`composed-25-1-40-8`	6.80	7.02	1.55	0.10	1.90	0.08	0.11	0.10	0.04	0.13	0.04	0.04	0.20	1.73	0.17	0.17
`composed-25-1-40-9`	6.70	6.67	1.71	0.10	1.93	0.09	0.11	0.10	0.04	0.13	0.04	0.04	0.20	2.16	0.20	0.18
Grand total:	67.50	69.22	16.92	0.99	19.26	0.82	1.10	0.98	0.45	1.27	0.38	0.38	2.09	18.93	1.70	1.67

Table 240. Solution time of solved instances belonging to class `composed-25-1-40`. Problem range: `composed-25-1-40-0`–`composed-25-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-80-0`	6.46	7.70	1.90	0.10	1.99	0.09	0.12	0.10	0.05	0.13	0.04	0.04	0.22	2.20	0.18	0.18
`composed-25-1-80-1`	6.09	7.72	1.63	0.09	2.03	0.07	0.10	0.10	0.04	0.13	0.04	0.04	0.23	0.19	0.17	0.17
`composed-25-1-80-2`	6.64	7.58	1.80	0.11	2.10	0.10	0.13	0.11	0.05	0.13	0.04	0.04	0.23	2.41	0.18	0.18
`composed-25-1-80-3`	6.69	6.42	1.74	0.10	1.96	0.09	0.11	0.10	0.04	0.13	0.04	0.04	0.24	1.67	0.18	0.18
`composed-25-1-80-4`	6.60	7.71	1.85	0.11	1.97	0.10	0.12	0.10	0.05	0.13	0.04	0.04	0.25	2.47	0.18	0.18
`composed-25-1-80-5`	6.61	7.58	1.69	0.10	1.91	0.08	0.11	0.10	0.05	0.13	0.04	0.04	0.22	1.98	0.18	0.18
`composed-25-1-80-6`	6.69	7.86	1.67	0.10	2.00	0.10	0.12	0.10	0.04	0.13	0.04	0.04	0.27	2.18	0.19	0.19
`composed-25-1-80-7`	6.64	7.41	1.61	0.11	1.95	0.10	0.12	0.10	0.04	0.13	0.04	0.04	0.26	2.30	0.18	0.18
`composed-25-1-80-8`	6.04	7.63	1.70	0.09	2.00	0.10	0.10	0.10	0.04	0.13	0.04	0.04	0.23	0.21	0.18	0.18
`composed-25-1-80-9`	6.59	7.38	1.59	0.10	1.94	0.09	0.12	0.10	0.05	0.13	0.04	0.04	0.25	2.90	0.18	0.18
Grand total:	65.06	74.98	17.18	1.01	19.85	0.92	1.16	1.04	0.46	1.32	0.42	0.41	2.41	18.52	1.81	1.80

Table 241. Solution time of solved instances belonging to class `composed-25-1-80`. Problem range: `composed-25-1-80-0`–`composed-25-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-10-20-0`	10.84	12.48	209.27	0.11	3.23	0.27	0.17	0.21	0.16	—	38.52	38.99	3.52	10.10	0.43	0.43
`composed-25-10-20-1`	11.55	12.36	167.04	0.12	3.24	0.26	0.16	0.20	0.16	0.47	0.12	0.12	2.97	8.74	—	—
`composed-25-10-20-2`	11.13	12.48	189.70	0.12	3.23	0.23	0.17	0.21	0.12	0.62	0.12	0.12	2.56	9.22	0.42	0.43
`composed-25-10-20-3`	10.61	12.56	160.25	0.11	3.13	0.55	0.19	0.21	0.12	—	0.12	0.12	4.37	9.44	—	—
`composed-25-10-20-4`	11.28	12.46	143.68	0.11	3.18	0.21	0.17	0.21	0.14	—	13.94	14.45	4.19	1.26	5.65	6.13
`composed-25-10-20-5`	10.92	12.42	158.46	0.11	3.19	0.21	0.16	0.20	0.14	0.44	0.12	0.11	2.49	4.88	0.41	0.41
`composed-25-10-20-6`	10.83	12.28	142.13	0.11	3.13	—	0.21	0.21	0.15	—	—	—	—	23.44	—	—
`composed-25-10-20-7`	10.51	12.92	182.54	0.11	3.11	0.20	0.15	0.21	0.12	0.44	0.12	0.12	2.38	1.53	0.41	0.41
`composed-25-10-20-8`	9.32	12.93	163.42	0.13	3.37	0.23	0.18	0.23	0.12	0.43	0.11	0.12	2.75	1.23	—	—
`composed-25-10-20-9`	11.10	12.44	115.15	0.12	3.08	0.52	0.16	0.20	0.14	4.04	0.44	0.43	2.61	3.04	—	—
Grand total:	108.08	125.34	1631.63	1.15	31.87	2.68	1.71	2.09	1.36	6.44	53.61	54.56	27.83	72.88	7.32	7.82

Table 242. Solution time of solved instances belonging to class `composed-25-10-20`. Problem range: `composed-25-10-20-0`–`composed-25-10-20-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-25-0`	9.62	10.37	3.76	0.13	2.41	0.17	0.19	0.16	0.10	0.25	0.08	0.08	0.48	12.45	0.31	0.31
`composed-75-1-25-1`	8.84	10.17	3.87	0.12	2.22	0.18	0.19	0.15	0.11	0.25	0.08	0.09	0.56	14.53	0.36	0.33
`composed-75-1-25-2`	8.68	9.90	3.73	0.13	2.28	0.17	0.19	0.15	0.10	0.24	0.08	0.08	0.51	13.36	0.32	0.32
`composed-75-1-25-3`	8.68	9.94	3.32	0.12	2.26	0.17	0.18	0.15	0.11	—	0.08	0.08	0.51	14.55	0.31	0.31
`composed-75-1-25-4`	8.42	9.88	4.52	0.12	2.25	0.16	0.18	0.15	0.11	0.25	0.08	0.08	0.41	10.52	0.32	0.32
`composed-75-1-25-5`	8.63	9.81	3.66	0.13	2.26	0.18	0.18	0.15	0.10	—	0.08	0.08	0.51	12.96	0.32	0.32
`composed-75-1-25-6`	8.71	9.94	3.91	0.13	2.27	0.17	0.18	0.15	0.11	—	0.08	0.08	0.52	14.68	0.33	0.33
`composed-75-1-25-7`	8.64	9.83	3.55	0.13	2.25	0.17	0.18	0.15	0.10	0.24	0.10	0.08	0.49	13.92	0.32	0.33
`composed-75-1-25-8`	8.74	9.89	3.70	0.12	2.24	0.18	0.18	0.15	0.10	0.24	0.08	0.08	0.52	10.01	0.32	0.32
`composed-75-1-25-9`	8.59	9.83	3.51	0.13	2.27	0.17	0.19	0.15	0.10	0.24	0.08	0.08	0.54	12.88	0.32	0.31
Grand total:	87.56	99.57	37.54	1.25	22.71	1.70	1.85	1.54	1.04	1.72	0.83	0.82	5.05	129.86	3.23	3.20

Table 243. Solution time of solved instances belonging to class `composed-75-1-25`. Problem range: `composed-75-1-25-0`–`composed-75-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-2-0`	9.54	10.39	3.74	0.12	2.25	0.16	0.17	0.15	0.10	0.24	0.08	0.08	0.48	13.19	0.30	0.30
`composed-75-1-2-1`	9.54	10.49	3.53	0.12	2.25	0.17	0.17	0.15	0.10	0.24	0.08	0.08	0.53	14.29	0.32	0.32
`composed-75-1-2-2`	9.46	10.51	3.14	0.12	2.26	0.16	0.17	0.15	0.10	0.24	0.08	0.08	0.51	13.38	0.31	0.31
`composed-75-1-2-3`	9.52	10.36	3.49	0.12	2.26	0.16	0.17	0.15	0.10	—	0.08	0.08	0.50	12.74	0.30	0.30
`composed-75-1-2-4`	9.18	10.34	3.59	0.12	2.37	0.15	0.17	0.15	0.10	0.24	0.08	0.08	0.40	10.20	0.32	0.32
`composed-75-1-2-5`	9.54	10.33	3.84	0.12	2.26	0.17	0.17	0.15	0.10	—	0.08	0.08	0.50	13.89	0.32	0.32
`composed-75-1-2-6`	9.50	10.36	3.13	0.12	2.24	0.17	0.17	0.17	0.10	—	0.08	0.08	0.51	14.38	0.32	0.32
`composed-75-1-2-7`	9.61	10.33	4.21	0.12	2.26	0.16	0.17	0.15	0.10	0.24	0.08	0.08	0.49	14.18	0.35	0.30
`composed-75-1-2-8`	9.57	10.50	3.57	0.12	2.25	0.17	0.17	0.15	0.11	0.25	0.08	0.08	0.50	10.62	0.34	0.32
`composed-75-1-2-9`	9.61	10.41	3.74	0.13	2.38	0.17	0.18	0.15	0.10	0.25	0.08	0.08	0.52	14.61	0.32	0.32
Grand total:	95.07	104.02	35.99	1.21	22.78	1.65	1.71	1.52	1.01	1.71	0.80	0.80	4.95	131.48	3.21	3.12

Table 244. Solution time of solved instances belonging to class `composed-75-1-2`. Problem range: `composed-75-1-2-0`–`composed-75-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-40-0`	9.21	10.66	4.02	0.12	2.26	0.17	0.19	0.16	0.10	0.25	0.08	0.08	0.48	10.97	0.33	0.33
`composed-75-1-40-1`	9.36	10.53	3.95	0.13	2.35	0.19	0.20	0.16	0.10	0.25	0.08	0.09	0.53	14.22	0.33	0.33
`composed-75-1-40-2`	9.25	10.78	3.78	0.13	2.30	0.17	0.19	0.16	0.10	0.27	0.08	0.08	0.54	13.71	0.32	0.32
`composed-75-1-40-3`	8.98	10.63	3.77	0.13	2.27	0.17	0.20	0.16	0.11	0.25	0.08	0.08	0.52	15.02	0.36	0.33
`composed-75-1-40-4`	9.05	10.72	4.02	0.12	2.24	0.16	0.19	0.16	0.10	0.25	0.08	0.08	0.42	10.10	0.32	0.32
`composed-75-1-40-5`	9.12	10.46	3.40	0.13	2.26	0.18	0.19	0.16	0.10	0.25	0.08	0.08	0.51	11.73	0.32	0.32
`composed-75-1-40-6`	8.97	10.55	3.81	0.12	2.29	0.17	0.19	0.16	0.10	—	0.08	0.08	0.53	12.40	0.33	0.33
`composed-75-1-40-7`	9.00	10.43	3.71	0.14	2.31	0.17	0.19	0.16	0.10	0.25	0.08	0.08	0.49	13.26	3.33	0.33
`composed-75-1-40-8`	9.21	10.45	3.73	0.12	2.26	0.18	0.19	0.16	0.11	0.24	0.08	0.08	0.53	10.18	0.32	0.32
`composed-75-1-40-9`	9.35	11.53	3.52	0.14	2.26	0.18	0.21	0.16	0.11	0.25	0.08	0.08	0.57	13.53	0.33	0.33
Grand total:	91.51	106.74	37.71	1.28	22.80	1.75	1.93	1.57	1.04	2.24	0.82	0.84	5.12	125.11	6.29	3.26

Table 245. Solution time of solved instances belonging to class `composed-75-1-40`. Problem range: `composed-75-1-40-0`–`composed-75-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-80-0`	8.19	12.81	3.47	0.11	2.25	0.18	0.16	0.16	0.10	0.25	0.09	0.08	0.54	0.46	0.33	0.33
`composed-75-1-80-1`	8.95	12.71	3.99	0.13	2.25	0.19	0.22	0.16	0.11	0.25	0.09	0.09	0.58	14.34	0.33	0.33
`composed-75-1-80-2`	8.74	12.68	3.53	0.11	2.35	0.18	0.16	0.16	0.10	0.25	0.09	0.09	0.57	0.53	0.33	0.33
`composed-75-1-80-3`	8.87	12.62	3.29	0.13	2.24	0.18	0.22	0.16	0.11	0.25	0.09	0.09	0.57	13.29	0.34	0.34
`composed-75-1-80-4`	8.68	12.34	3.89	0.11	2.24	0.17	0.16	0.16	0.11	0.25	0.09	0.08	0.47	0.40	0.34	0.34
`composed-75-1-80-5`	8.99	12.66	3.91	0.15	2.30	0.19	0.20	0.16	0.10	0.25	0.09	0.09	0.55	12.52	0.35	0.35
`composed-75-1-80-6`	8.73	12.54	3.66	0.13	2.26	0.18	0.21	0.16	0.10	0.25	0.09	0.09	0.58	13.63	0.34	0.33
`composed-75-1-80-7`	8.99	10.93	3.96	0.14	2.30	0.18	0.21	0.16	0.10	0.25	0.09	0.09	0.54	12.17	0.35	0.35
`composed-75-1-80-8`	8.81	12.51	3.80	0.13	2.25	0.19	0.19	0.16	0.10	0.25	0.09	0.09	0.57	10.34	0.35	0.35
`composed-75-1-80-9`	8.92	12.60	3.96	0.17	2.29	0.19	0.24	0.41	0.10	0.26	0.09	0.09	0.60	15.61	0.35	0.35
Grand total:	87.86	124.41	37.45	1.30	22.72	1.83	1.98	1.86	1.05	2.54	0.86	0.87	5.58	93.29	3.41	3.41

Table 246. Solution time of solved instances belonging to class `composed-75-1-80`. Problem range: `composed-75-1-80-0`–`composed-75-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`cril_unsat_b_1`	43.43	47.15	—	69.81	59.92	—	94.73	110.92	8.15	—	—	—	—	—	—	—
`cril_unsat_b_2`	29.29	33.77	8.61	—	2.62	0.40	—	0.36	5.70	—	0.19	0.19	1.47	—	0.78	0.75
`cril_unsat_b_3`	43.57	46.99	8.56	—	4.30	—	—	0.55	155.67	—	—	—	1.93	—	—	—
`cril_unsat_b_4`	329.41	336.22	—	—	—	—	—	11.44	—	—	—	—	—	—	—	—
`cril_unsat_b_5`	93.21	14.87	—	3.76	—	—	13.13	0.70	5.78	—	—	—	—	—	—	—
Grand total:	538.91	479.00	17.17	73.57	66.84	0.40	107.86	123.96	175.31	—	0.19	0.19	3.41	—	0.78	0.75

Table 247. Solution time of solved instances belonging to class `cril`. Problem range: `cril_unsat_b_1`–`cril_unsat_b_5`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`domino-100-100`	9.00	11.14	32.81	0.24	8.78	0.94	0.66	0.66	4.94	2.68	0.02	0.02	11.25	11.61	0.13	0.13
`domino-100-200`	10.12	12.85	126.83	1.14	27.37	3.38	4.85	4.80	14.81	10.68	0.06	0.06	89.35	92.57	0.19	0.20
`domino-100-300`	14.10	14.77	—	3.33	56.54	8.08	15.29	15.18	—	24.98	0.44	0.21	294.94	300.13	0.26	0.25
`domino-300-100`	13.70	12.88	100.63	0.58	39.98	2.81	1.93	1.95	25.78	8.88	0.04	0.04	45.97	42.54	0.31	0.34
`domino-300-200`	20.44	17.87	—	3.25	249.95	10.51	13.81	13.64	—	35.97	0.35	0.14	287.88	284.48	0.54	0.58
`domino-300-300`	25.74	23.41	—	9.77	391.19	22.70	45.49	45.47	—	80.00	0.46	0.25	—	—	0.71	0.74
`domino-500-100`	17.76	17.50	174.31	0.90	103.67	4.72	3.05	3.09	69.46	16.67	0.30	0.09	—	—	0.48	0.57
`domino-500-200`	25.58	24.11	—	5.35	454.84	16.92	23.07	22.91	—	62.67	0.41	0.16	—	—	0.87	0.96
`domino-500-300`	36.88	32.40	—	16.24	—	36.77	76.83	77.41	—	141.90	0.53	0.26	—	—	1.18	1.27
`domino-1000-10`	21.38	22.79	16.67	0.32	7.75	0.38	0.20	0.45	0.55	1.19	0.04	0.05	—	—	0.26	0.62
Grand total:	194.70	189.71	451.26	41.12	1340.09	107.21	185.17	185.54	115.53	385.60	2.65	1.29	729.40	731.33	4.93	5.66

Table 248. Solution time of solved instances belonging to class `domino1`. Problem range: `domino-100-100`–`domino-1000-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-0	14.87	13.45	67.28	1.98	3.50	0.53	4.32	0.54	0.91	—	0.11	0.11	8.20	324.37	0.48	0.48
dual_ehi-85-297-10	15.77	13.51	79.91	1.45	3.97	0.41	5.09	0.51	1.33	—	0.10	0.10	8.52	182.72	0.46	0.45
dual_ehi-85-297-11	13.92	12.96	48.24	0.18	2.78	0.49	0.49	0.49	0.90	399.34	0.12	0.12	7.02	14.04	0.51	0.50
dual_ehi-85-297-12	13.85	13.67	48.36	4.07	2.79	4.75	1.75	0.48	0.90	0.43	0.10	0.10	5.90	131.38	0.49	0.48
dual_ehi-85-297-13	14.95	12.67	39.44	5.73	3.89	0.41	25.39	0.51	0.95	0.45	0.10	0.11	7.76	—	0.47	0.47
dual_ehi-85-297-14	12.47	13.57	45.85	0.19	2.94	0.59	0.51	0.49	0.91	—	0.10	0.11	6.31	8.69	0.48	0.53
dual_ehi-85-297-15	14.36	13.46	52.13	2.51	3.26	309.99	8.52	0.53	0.90	—	0.11	0.11	7.50	343.79	0.48	0.48
dual_ehi-85-297-16	13.65	13.22	50.85	0.52	4.47	134.75	1.26	0.52	0.99	255.81	—	—	11.15	194.79	—	—
dual_ehi-85-297-17	14.34	13.70	50.64	7.14	4.51	0.86	3.55	0.53	1.00	—	0.10	0.11	6.78	143.88	0.52	0.64
dual_ehi-85-297-18	14.09	13.73	59.52	2.12	3.15	155.14	4.54	0.51	1.09	—	0.10	0.10	4.89	151.82	0.46	0.48
dual_ehi-85-297-19	12.11	12.72	49.50	0.19	3.07	0.55	0.51	0.49	0.92	—	0.10	0.10	5.32	7.25	0.46	0.46
dual_ehi-85-297-1	14.48	13.33	67.38	2.23	3.16	133.55	5.20	0.49	0.93	—	0.11	0.11	7.52	208.09	0.50	0.50
dual_ehi-85-297-20	13.64	12.80	62.71	2.87	2.99	277.81	17.38	0.53	1.03	—	0.11	0.11	7.02	273.02	0.48	0.48
dual_ehi-85-297-21	13.39	13.24	43.67	0.46	3.48	0.60	0.49	0.51	0.90	0.45	0.11	0.11	10.01	35.63	0.48	0.48
dual_ehi-85-297-22	14.06	13.56	47.62	0.17	2.79	0.40	0.48	0.49	0.90	—	0.10	0.10	6.13	4.68	0.45	0.45
dual_ehi-85-297-23	13.21	13.06	60.23	0.18	3.31	0.47	0.49	0.47	0.91	—	0.11	0.10	5.53	5.72	0.45	0.45
dual_ehi-85-297-24	13.52	13.29	63.09	5.21	3.09	219.02	12.22	0.49	0.91	312.04	0.11	0.11	7.09	559.59	0.50	0.50
dual_ehi-85-297-25	14.13	12.64	50.27	1.71	3.00	0.47	7.18	0.50	0.91	210.58	0.10	0.10	6.19	238.46	0.46	0.47
dual_ehi-85-297-26	14.17	13.94	70.78	3.92	2.89	93.89	10.57	0.51	0.91	584.99	160.33	159.73	—	321.99	—	—
dual_ehi-85-297-27	12.17	12.94	91.39	0.17	3.04	0.54	0.49	0.49	1.03	0.45	0.11	0.11	5.36	5.03	0.46	0.46

Table 249. Solution time of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-28	11.85	13.13	75.60	0.17	2.99	0.47	0.48	0.50	0.91	0.45	0.10	0.10	5.60	5.13	0.48	0.49
dual_ehi-85-297-29	12.45	12.89	38.55	0.17	3.05	0.47	0.48	0.48	0.89	0.43	0.10	0.10	5.74	4.26	0.46	0.46
dual_ehi-85-297-2	16.58	12.99	39.80	3.95	4.46	0.73	14.81	0.50	1.09	0.46	0.10	0.10	6.12	253.64	0.49	0.48
dual_ehi-85-297-30	14.41	14.19	48.61	8.87	3.07	48.78	6.95	1.70	1.01	202.48	293.60	293.64	9.77	394.47	577.36	596.42
dual_ehi-85-297-31	12.32	13.43	83.56	0.17	3.25	0.49	0.49	0.52	0.89	0.45	0.11	0.11	9.25	4.84	0.47	0.47
dual_ehi-85-297-32	12.49	13.09	43.83	0.23	3.13	—	0.53	0.49	0.93	—	0.11	0.11	7.29	113.38	0.49	0.49
dual_ehi-85-297-33	14.51	13.15	51.80	0.57	3.13	335.21	3.80	0.51	0.92	—	—	—	—	195.26	—	—
dual_ehi-85-297-34	11.86	12.65	59.49	0.18	3.80	0.40	0.49	0.50	0.89	0.47	0.13	0.12	5.93	4.19	0.46	0.46
dual_ehi-85-297-35	14.56	12.64	45.01	9.01	2.85	—	7.76	0.51	0.94	0.46	0.10	0.11	9.17	252.31	0.49	0.49
dual_ehi-85-297-36	11.84	13.02	54.51	0.18	2.95	0.54	0.50	0.50	0.89	—	0.10	0.10	5.26	5.99	0.46	0.46
dual_ehi-85-297-37	14.49	13.33	44.48	1.20	3.15	0.55	1.83	0.51	0.93	0.45	0.10	0.10	7.14	125.66	0.48	0.47
dual_ehi-85-297-38	14.02	13.76	33.51	6.20	3.07	232.50	9.11	0.51	0.92	—	0.11	0.11	—	332.56	0.50	0.50
dual_ehi-85-297-39	14.68	13.28	67.88	2.84	3.13	0.62	6.35	0.51	0.99	0.46	0.11	0.11	8.85	278.44	0.52	0.52
dual_ehi-85-297-3	13.91	12.97	50.58	7.25	3.47	46.31	16.51	0.50	0.94	—	—	—	7.23	353.35	—	—
dual_ehi-85-297-40	13.37	13.21	32.36	4.68	2.81	0.47	11.31	0.54	0.94	—	0.10	0.11	4.84	221.01	0.46	0.47
dual_ehi-85-297-41	13.96	13.11	49.01	1.71	3.99	123.10	1.88	0.50	0.88	—	0.11	0.10	8.06	140.21	0.47	0.48
dual_ehi-85-297-42	13.42	13.88	42.36	0.19	3.30	0.48	0.50	0.50	0.89	0.44	0.10	0.10	5.59	6.62	0.47	0.47
dual_ehi-85-297-43	12.20	13.14	49.42	0.18	2.98	0.41	0.50	0.53	0.88	0.44	0.11	0.10	9.62	4.47	0.47	0.47
dual_ehi-85-297-44	13.86	13.03	51.93	2.18	3.62	335.17	9.57	0.51	0.91	0.45	0.99	1.03	9.75	195.71	4.21	4.34
dual_ehi-85-297-45	12.05	12.91	45.42	0.17	3.52	0.47	0.48	0.53	0.89	—	0.10	0.10	8.18	4.45	0.47	0.46

Table 250. Solution time of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-28`–`dual_ehi-85-297-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-46	13.48	12.74	45.61	1.35	3.06	41.59	7.41	0.54	0.94	—	0.11	0.11	7.51	366.93	0.48	0.47
dual_ehi-85-297-47	12.57	13.10	57.60	0.18	2.78	0.54	0.49	0.50	0.88	403.69	0.10	0.10	8.43	4.48	0.48	0.48
dual_ehi-85-297-48	16.05	13.01	44.46	2.28	3.30	0.42	7.55	0.51	0.90	—	0.10	0.11	7.49	382.19	0.46	0.46
dual_ehi-85-297-49	14.07	13.25	77.48	2.26	3.00	0.59	1.89	0.52	1.02	—	0.10	0.11	6.52	441.11	0.47	0.47
dual_ehi-85-297-4	13.54	12.60	65.51	3.98	3.02	84.76	8.23	0.50	0.96	—	105.58	107.90	6.57	217.27	93.43	96.31
dual_ehi-85-297-50	13.78	13.27	46.69	3.12	3.36	65.81	19.52	0.56	1.02	—	0.11	0.11	8.31	291.91	0.48	0.48
dual_ehi-85-297-51	14.37	13.07	47.18	1.68	3.53	0.60	3.21	0.52	1.00	—	0.10	0.11	7.87	220.40	0.47	0.47
dual_ehi-85-297-52	17.13	13.15	88.91	0.20	4.59	0.59	0.64	0.49	1.29	—	0.10	0.10	5.28	7.77	0.48	0.48
dual_ehi-85-297-53	14.66	13.44	45.35	3.55	3.44	0.47	11.51	0.49	1.09	0.45	0.10	0.10	7.19	289.70	0.46	0.48
dual_ehi-85-297-54	14.13	13.10	43.71	2.93	3.30	0.52	1.13	0.50	0.91	465.31	0.10	0.10	5.85	97.15	0.47	0.46
dual_ehi-85-297-55	15.88	14.19	47.35	3.13	3.47	—	11.23	0.52	1.21	—	510.41	522.55	—	282.54	—	—
dual_ehi-85-297-56	16.43	13.04	49.79	0.81	4.21	70.10	1.38	0.53	1.01	403.96	0.10	0.10	5.96	71.47	0.48	0.46
dual_ehi-85-297-57	15.98	12.87	56.73	4.07	2.81	44.53	6.92	0.49	0.88	403.08	0.14	0.14	7.00	183.37	0.59	0.59
dual_ehi-85-297-58	12.21	13.04	55.42	0.17	3.04	0.41	0.49	0.49	0.91	0.43	0.10	0.10	6.23	4.03	0.46	0.46
dual_ehi-85-297-59	14.29	13.22	42.71	4.70	3.11	0.40	6.95	0.53	0.91	—	0.11	0.11	7.62	254.06	0.46	0.47
dual_ehi-85-297-5	14.48	13.88	57.16	0.65	5.96	55.73	0.84	0.55	1.06	0.47	0.11	0.12	8.00	56.28	0.49	0.50
dual_ehi-85-297-60	12.06	13.03	47.52	0.17	3.03	0.46	0.49	0.49	0.90	0.43	0.10	0.10	5.62	3.88	0.47	0.46
dual_ehi-85-297-61	13.43	13.13	43.55	17.03	3.17	—	7.02	0.49	1.45	—	0.11	0.11	7.05	292.76	0.49	0.48
dual_ehi-85-297-62	15.05	13.52	46.79	4.32	3.15	—	6.19	0.51	0.90	1.56	0.11	0.11	8.25	251.44	0.50	0.50
dual_ehi-85-297-63	14.36	13.34	75.38	3.25	3.23	176.50	12.31	0.52	1.02	—	0.11	0.11	6.76	366.05	0.47	0.48

Table 251. Solution time of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-46`–`dual_ehi-85-297-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-64	13.49	13.05	61.18	0.17	3.27	0.55	0.48	0.51	0.90	0.45	0.10	0.11	6.93	4.89	0.48	0.47
dual_ehi-85-297-65	13.44	13.27	60.38	0.18	4.85	0.53	0.50	0.50	0.89	0.45	0.10	0.10	7.64	4.68	0.47	0.46
dual_ehi-85-297-66	12.07	13.63	46.35	0.18	3.20	0.56	0.49	0.55	0.93	—	0.11	0.11	10.70	8.54	0.51	0.50
dual_ehi-85-297-67	17.96	14.06	52.77	0.17	3.86	0.48	0.49	0.50	0.96	0.45	0.10	0.10	5.86	5.15	0.49	0.47
dual_ehi-85-297-68	13.52	13.09	50.80	3.45	3.05	259.99	11.07	0.51	1.00	—	0.10	0.10	8.35	256.12	0.48	0.48
dual_ehi-85-297-69	14.36	13.76	44.11	3.48	2.94	26.17	1.23	0.50	1.02	—	0.18	0.19	9.44	106.62	0.74	0.74
dual_ehi-85-297-6	17.04	13.09	38.62	3.11	3.08	595.83	5.84	0.51	1.01	—	0.10	0.10	4.99	383.25	0.47	0.46
dual_ehi-85-297-70	14.51	13.03	51.05	2.09	3.33	0.52	3.71	0.50	0.90	0.45	0.10	0.10	7.08	130.19	0.47	0.47
dual_ehi-85-297-71	12.91	12.96	38.68	4.40	2.95	0.59	4.79	0.52	0.93	0.45	0.10	0.10	6.91	221.78	0.47	0.47
dual_ehi-85-297-72	13.31	13.16	44.53	1.27	3.14	0.60	1.31	0.48	0.94	0.44	0.11	0.11	6.63	47.49	0.49	0.49
dual_ehi-85-297-73	16.48	13.34	41.23	6.23	3.64	0.53	4.94	0.53	1.10	0.43	0.11	0.10	7.21	98.48	0.48	0.48
dual_ehi-85-297-74	14.70	13.45	65.04	0.18	2.92	0.47	0.49	0.48	1.04	0.45	0.10	0.11	6.14	5.33	0.47	0.47
dual_ehi-85-297-75	13.66	13.05	51.41	0.18	2.96	0.41	0.48	0.50	0.90	—	0.14	0.12	5.97	4.16	0.46	0.45
dual_ehi-85-297-76	13.89	13.42	50.42	0.60	3.19	186.11	1.60	0.52	1.09	0.45	0.11	0.11	7.36	107.34	0.48	0.48
dual_ehi-85-297-77	17.11	14.10	50.89	0.17	3.00	0.55	0.49	0.49	0.94	200.42	0.11	0.11	5.02	4.61	0.48	0.47
dual_ehi-85-297-78	13.87	13.15	51.85	2.53	3.06	0.62	6.86	0.50	0.95	0.45	0.11	0.12	7.58	310.58	0.53	0.53
dual_ehi-85-297-79	13.94	13.03	41.33	0.17	3.30	0.48	0.49	0.48	0.89	—	0.10	0.10	6.19	4.72	0.46	0.46
dual_ehi-85-297-7	13.96	12.57	51.88	6.30	3.00	10.90	16.54	0.50	0.90	—	0.11	0.11	5.47	328.36	0.51	0.52
dual_ehi-85-297-80	12.13	13.29	45.61	0.17	2.99	0.41	0.49	0.49	0.88	0.44	0.10	0.10	5.11	4.54	0.46	0.46
dual_ehi-85-297-81	16.13	12.92	42.37	4.11	3.14	0.60	5.71	0.56	0.90	0.45	0.10	0.10	8.47	348.53	0.47	0.47

Table 252. Solution time of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-64`–`dual_ehi-85-297-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-82	12.04	13.12	42.09	0.16	3.51	0.34	0.48	0.51	0.88	—	0.10	0.10	4.56	3.96	0.49	0.50
dual_ehi-85-297-83	13.75	13.22	68.97	5.67	3.56	13.20	0.97	0.49	0.93	425.93	0.10	0.10	5.45	114.75	0.46	0.46
dual_ehi-85-297-84	19.15	13.57	65.94	4.04	2.86	507.11	5.92	0.52	0.94	—	0.11	0.11	7.66	252.29	0.49	0.48
dual_ehi-85-297-85	16.30	13.59	48.78	4.92	3.18	0.53	2.04	0.52	0.91	—	0.10	0.10	9.16	125.75	0.47	0.47
dual_ehi-85-297-86	14.73	12.83	72.90	0.50	4.18	0.60	1.04	0.50	0.92	0.43	0.10	0.10	7.22	105.12	0.47	0.47
dual_ehi-85-297-87	13.49	12.89	45.81	0.34	3.04	0.56	5.09	0.51	0.92	461.12	0.11	0.11	7.86	247.89	0.50	0.50
dual_ehi-85-297-88	12.03	13.01	70.31	0.17	3.04	0.40	0.48	0.48	0.88	0.44	0.10	0.10	7.72	3.28	0.47	0.45
dual_ehi-85-297-89	15.67	13.23	33.29	3.92	3.16	0.52	6.29	0.49	0.98	0.45	0.10	0.10	6.52	180.31	0.46	0.46
dual_ehi-85-297-8	21.18	13.97	58.29	0.17	3.50	0.48	0.49	0.51	0.91	0.45	0.10	0.11	6.26	4.92	0.46	0.46
dual_ehi-85-297-90	14.92	13.56	49.22	0.18	3.04	0.54	0.50	0.50	0.97	0.44	0.11	0.12	9.26	7.38	0.48	0.48
dual_ehi-85-297-91	14.28	13.31	51.38	11.70	4.45	0.77	18.11	0.51	1.00	—	0.10	0.10	5.95	294.29	0.49	0.49
dual_ehi-85-297-92	14.14	13.16	41.17	0.79	2.95	0.54	6.37	0.51	0.99	273.71	0.10	0.11	6.31	218.00	0.50	0.50
dual_ehi-85-297-93	13.97	13.19	73.27	6.51	3.06	268.58	5.31	0.54	0.94	—	0.12	0.12	8.58	216.16	0.52	0.52
dual_ehi-85-297-94	11.90	12.33	54.77	0.17	2.99	0.47	0.49	0.48	0.90	0.44	0.10	0.10	4.79	4.31	0.45	0.46
dual_ehi-85-297-95	15.86	13.41	54.75	9.98	2.99	0.52	7.67	0.48	1.03	572.18	0.10	0.10	6.25	190.81	0.46	0.46
dual_ehi-85-297-96	12.35	13.38	52.78	0.17	2.93	0.48	0.49	0.52	0.89	0.45	0.10	0.10	6.62	5.19	0.47	0.47
dual_ehi-85-297-97	14.81	13.41	53.15	1.85	2.99	450.05	3.32	0.53	1.05	—	—	—	6.02	214.14	—	—
dual_ehi-85-297-98	14.05	13.03	53.65	3.23	3.37	0.40	11.48	0.48	0.89	0.44	0.10	0.10	4.60	229.04	0.45	0.45
dual_ehi-85-297-99	14.00	13.42	46.92	4.39	3.14	92.46	4.90	0.49	0.92	—	0.10	0.10	5.74	208.33	0.51	0.48
dual_ehi-85-297-9	11.99	12.82	47.67	0.17	3.37	0.46	0.48	0.48	0.91	—	0.10	0.10	4.66	3.75	0.45	0.45
Grand total:	1413.00	1323.00	5307.12	251.07	330.57	5432.31	470.10	51.88	95.86	5593.62	1080.58	1094.63	671.37	15150.71	718.79	740.98

Table 253. Solution time of solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-0	12.87	13.67	47.11	0.19	3.06	0.57	0.51	0.57	0.98	—	0.11	0.12	9.03	5.59	0.51	0.51
dual_ehi-90-315-10	15.68	13.26	70.84	2.20	3.07	340.03	8.76	0.54	0.97	—	0.10	0.11	8.60	339.05	0.48	0.48
dual_ehi-90-315-11	13.67	13.33	41.58	1.15	3.13	0.75	0.53	0.52	1.04	—	0.14	0.14	7.48	11.98	0.53	0.54
dual_ehi-90-315-12	16.45	13.36	62.19	5.22	2.90	0.57	8.24	0.51	1.53	0.46	0.10	0.11	6.73	140.43	0.48	0.48
dual_ehi-90-315-13	14.36	13.13	62.05	1.42	3.05	0.44	3.00	0.55	1.02	0.46	0.11	0.11	8.21	194.98	0.50	0.49
dual_ehi-90-315-14	12.50	13.29	48.23	0.19	3.06	0.58	0.52	0.52	0.95	—	0.11	0.11	6.77	5.31	0.50	0.49
dual_ehi-90-315-15	15.84	14.80	59.84	2.06	3.31	0.57	22.08	0.56	0.96	—	0.11	0.11	7.00	182.16	0.50	0.50
dual_ehi-90-315-16	16.62	13.36	55.75	6.44	3.00	228.13	12.90	0.54	1.11	344.34	0.12	0.12	—	328.46	0.55	0.55
dual_ehi-90-315-17	14.97	13.39	70.04	1.51	3.36	—	3.69	0.57	1.01	—	0.11	0.11	8.00	255.01	0.52	0.53
dual_ehi-90-315-18	15.32	14.68	41.86	6.85	3.01	0.57	5.61	0.52	1.00	—	0.11	0.11	5.32	229.90	0.50	0.48
dual_ehi-90-315-19	15.53	13.20	53.37	0.18	3.81	0.59	0.53	0.53	0.95	—	0.10	0.11	5.95	7.44	0.48	0.48
dual_ehi-90-315-1	15.34	14.15	53.24	3.06	3.08	316.95	3.95	0.52	1.00	—	0.11	0.11	7.46	536.73	0.52	0.52
dual_ehi-90-315-20	14.86	13.16	63.00	2.63	3.26	—	15.91	0.56	1.01	—	—	—	7.33	273.13	—	—
dual_ehi-90-315-21	14.73	13.57	57.85	2.35	3.12	0.57	2.42	0.53	1.00	0.47	0.11	0.11	10.72	175.25	0.52	0.50
dual_ehi-90-315-22	12.68	13.59	61.09	0.17	2.93	0.43	0.51	0.53	1.02	—	0.10	0.11	5.60	4.41	0.47	0.48
dual_ehi-90-315-23	13.93	13.23	81.34	0.18	2.98	0.49	0.51	0.50	0.95	—	0.10	0.10	6.70	4.92	0.48	0.48
dual_ehi-90-315-24	15.58	14.58	37.97	1.21	3.26	240.03	6.16	0.53	1.01	—	0.11	0.12	7.40	158.27	0.52	0.52
dual_ehi-90-315-25	14.65	15.10	70.22	0.26	2.87	0.50	0.61	0.54	1.00	—	0.11	0.11	7.36	20.29	0.49	0.49
dual_ehi-90-315-26	16.81	14.61	66.47	5.69	2.91	106.32	4.23	0.54	1.06	—	0.11	0.12	6.50	128.89	0.53	0.53
dual_ehi-90-315-27	12.65	13.51	62.65	0.18	2.90	0.58	0.52	0.50	1.03	0.47	0.13	0.11	5.85	5.63	0.49	0.49

Table 254. Solution time of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-28	14.12	13.51	90.55	0.17	3.08	0.52	0.51	0.53	0.95	0.46	0.11	0.11	5.83	5.48	0.55	0.80
dual_ehi-90-315-29	12.27	13.21	67.20	0.17	3.21	0.50	0.51	0.51	0.94	0.46	0.11	0.11	6.01	4.50	0.48	0.48
dual_ehi-90-315-2	12.56	13.50	52.79	0.20	2.91	0.54	0.54	0.53	0.99	0.46	0.11	0.11	6.70	7.01	0.50	0.52
dual_ehi-90-315-30	14.40	13.42	52.49	3.46	3.27	282.09	9.69	1.83	1.04	0.61	585.31	582.21	8.97	375.55	—	—
dual_ehi-90-315-31	12.88	13.28	51.91	0.19	3.04	0.53	0.52	0.54	0.97	0.47	0.11	0.11	8.26	5.54	0.53	0.53
dual_ehi-90-315-32	16.53	13.43	78.44	3.14	3.36	48.24	3.54	0.51	1.07	—	0.12	0.12	8.10	229.33	0.51	0.51
dual_ehi-90-315-33	14.17	12.88	54.43	11.67	3.25	126.07	8.86	0.53	1.00	—	0.11	0.11	8.47	454.23	0.53	0.54
dual_ehi-90-315-34	13.26	13.17	51.86	0.18	3.09	0.43	0.52	0.52	0.98	0.47	0.11	0.11	5.94	4.36	0.47	0.48
dual_ehi-90-315-35	16.67	13.52	51.84	0.21	3.83	4.62	0.82	0.54	0.94	140.23	0.11	0.11	7.87	51.91	0.52	0.52
dual_ehi-90-315-36	13.11	12.93	48.98	0.20	3.02	0.52	0.53	0.53	0.96	—	0.13	0.12	5.82	9.69	0.49	0.49
dual_ehi-90-315-37	14.22	13.17	62.36	1.01	3.19	0.57	1.58	0.55	0.99	0.46	0.11	0.11	8.01	109.95	0.49	0.49
dual_ehi-90-315-38	19.49	13.35	63.43	6.51	3.62	165.92	14.26	0.54	0.95	—	0.11	0.12	8.99	240.62	0.51	0.51
dual_ehi-90-315-39	14.23	13.44	85.62	1.77	3.14	—	12.54	0.54	0.98	0.47	0.12	0.12	9.64	237.66	0.55	0.55
dual_ehi-90-315-3	15.08	13.21	58.63	5.79	3.35	—	11.98	0.52	1.00	—	0.11	0.11	7.71	270.20	0.48	0.48
dual_ehi-90-315-40	14.30	13.26	41.16	4.76	3.08	0.51	6.21	0.57	0.95	—	0.11	0.11	5.25	351.25	0.50	0.49
dual_ehi-90-315-41	15.15	13.62	61.13	1.66	3.04	232.07	6.78	0.53	0.97	—	0.11	0.11	8.62	279.93	0.50	0.51
dual_ehi-90-315-42	14.97	13.27	44.15	3.19	3.13	0.49	4.26	0.53	1.22	0.46	0.11	0.11	6.26	231.40	0.49	0.49
dual_ehi-90-315-43	12.52	13.34	59.23	0.18	3.27	0.44	0.51	0.55	0.96	0.46	0.11	0.11	9.93	4.75	0.48	0.49
dual_ehi-90-315-44	16.09	13.39	54.14	4.94	3.16	0.44	8.90	0.53	0.98	0.47	0.11	0.11	11.18	405.33	0.49	0.48
dual_ehi-90-315-45	13.90	14.42	42.57	0.18	2.95	0.51	0.52	0.57	0.96	322.55	0.11	0.11	8.90	5.26	0.49	0.49

Table 255. Solution time of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-28`–`dual_ehi-90-315-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-46	16.73	13.16	48.09	3.68	2.86	44.49	4.98	0.56	0.98	—	0.11	0.11	8.89	381.06	0.52	0.53
dual_ehi-90-315-47	12.51	13.29	44.64	0.18	3.25	0.49	0.51	0.53	0.99	—	0.11	0.12	9.47	4.43	0.49	0.49
dual_ehi-90-315-48	16.30	13.00	44.43	3.12	3.01	0.44	4.89	0.54	1.14	75.53	0.11	0.11	8.12	292.56	0.48	0.50
dual_ehi-90-315-49	14.63	13.13	40.56	4.26	2.89	0.64	2.20	0.56	0.98	—	0.11	0.11	6.98	177.11	0.50	0.50
dual_ehi-90-315-4	14.65	13.43	47.57	6.41	2.94	298.50	6.36	0.51	1.07	—	0.10	0.11	7.74	534.01	0.49	0.49
dual_ehi-90-315-50	12.85	13.85	46.43	0.19	3.05	0.54	0.53	0.56	0.97	0.46	0.11	0.12	8.76	9.50	0.51	0.52
dual_ehi-90-315-51	14.97	13.31	99.81	6.44	3.83	0.64	5.34	0.55	1.22	—	0.11	0.11	7.81	220.91	0.50	0.50
dual_ehi-90-315-52	14.27	13.30	44.30	2.70	3.62	0.44	4.75	0.52	1.55	—	0.11	0.11	6.52	120.68	0.50	0.48
dual_ehi-90-315-53	13.72	13.42	49.58	0.18	3.28	0.51	0.51	0.51	0.95	0.47	0.11	0.11	8.04	5.13	0.49	0.49
dual_ehi-90-315-54	14.37	13.25	59.31	6.07	2.92	0.56	4.04	0.52	0.99	—	0.11	0.11	5.98	355.62	0.49	0.48
dual_ehi-90-315-55	16.10	13.47	87.01	4.25	3.08	—	6.95	0.54	1.84	—	0.11	0.12	9.04	—	0.54	0.54
dual_ehi-90-315-56	14.16	13.11	50.65	6.56	3.03	0.51	2.32	0.55	0.99	—	0.11	0.11	6.72	204.77	0.49	0.49
dual_ehi-90-315-57	14.95	13.15	48.60	3.69	4.35	39.44	4.37	0.53	0.95	156.87	—	—	7.82	298.28	—	—
dual_ehi-90-315-58	12.74	13.42	53.40	0.18	3.49	0.44	0.52	0.53	0.94	0.45	0.11	0.11	6.67	4.60	0.49	0.49
dual_ehi-90-315-59	13.95	13.50	48.34	0.75	3.02	0.44	5.00	0.55	0.96	—	0.10	0.11	8.29	133.02	0.50	0.48
dual_ehi-90-315-5	17.21	13.63	56.74	0.18	2.97	0.59	0.51	0.57	1.04	0.47	0.12	0.12	8.92	7.42	0.51	0.51
dual_ehi-90-315-60	12.44	13.24	45.87	0.19	3.19	0.57	0.53	0.52	0.98	0.45	0.11	0.11	6.67	4.37	0.48	0.48
dual_ehi-90-315-61	14.32	13.60	48.86	5.04	2.94	178.60	19.66	0.53	1.00	—	233.85	238.13	7.71	506.03	—	—
dual_ehi-90-315-62	14.99	13.27	49.72	2.31	3.05	—	12.22	0.54	1.07	—	0.12	0.12	8.73	261.78	0.52	0.51
dual_ehi-90-315-63	14.99	13.34	56.46	2.69	3.25	362.49	13.41	0.56	1.17	—	526.11	525.29	7.31	329.05	—	—

Table 256. Solution time of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-46`–`dual_ehi-90-315-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-64	13.85	12.95	66.58	0.17	3.29	0.55	0.51	0.54	0.94	0.47	0.11	0.11	7.42	5.05	0.51	0.51
dual_ehi-90-315-65	12.63	13.39	57.77	0.18	3.00	0.56	0.52	0.53	0.95	0.48	0.12	0.11	7.42	5.13	0.50	0.49
dual_ehi-90-315-66	13.17	13.71	66.41	0.18	3.47	0.61	0.52	0.58	0.97	—	0.12	0.12	11.15	9.51	0.52	0.53
dual_ehi-90-315-67	20.01	13.22	66.79	0.18	3.09	0.51	0.52	0.53	0.97	0.46	0.10	0.11	6.45	5.82	0.50	0.49
dual_ehi-90-315-68	17.02	14.70	35.75	4.35	3.07	185.62	7.22	0.53	0.99	—	0.11	0.12	9.39	325.24	0.51	0.51
dual_ehi-90-315-69	15.05	13.21	57.89	4.80	2.90	—	3.49	0.51	0.99	—	0.11	0.11	10.74	169.07	0.51	0.50
dual_ehi-90-315-6	14.68	13.32	43.82	0.84	2.86	0.63	2.76	0.54	1.01	—	0.12	0.11	5.39	220.06	0.48	0.49
dual_ehi-90-315-70	13.53	13.31	51.95	0.18	3.79	0.57	0.52	0.54	0.96	0.47	0.11	0.11	7.01	5.60	0.50	0.51
dual_ehi-90-315-71	14.62	12.90	68.73	3.70	3.95	0.66	5.08	0.59	1.00	0.47	0.11	0.11	7.87	196.94	0.49	0.49
dual_ehi-90-315-72	19.27	13.08	36.76	15.62	3.08	0.65	24.95	0.52	0.96	0.47	0.11	0.11	6.80	281.76	0.51	0.51
dual_ehi-90-315-73	14.30	13.47	65.25	0.18	3.34	0.58	0.51	0.54	0.98	0.46	0.11	0.11	9.07	7.20	0.50	0.50
dual_ehi-90-315-74	13.20	13.38	50.17	0.18	3.07	0.51	0.51	0.52	0.97	0.46	0.11	0.11	6.58	6.15	0.49	0.49
dual_ehi-90-315-75	12.15	13.17	65.41	0.17	3.41	0.43	0.51	0.53	0.99	—	0.10	0.11	6.25	4.52	0.48	0.47
dual_ehi-90-315-76	14.64	13.17	42.42	1.56	3.55	0.63	11.06	0.53	1.25	0.48	0.11	0.11	7.33	—	0.51	0.50
dual_ehi-90-315-77	13.68	14.54	42.96	0.19	4.02	0.59	0.53	0.52	0.97	7.16	0.11	0.12	6.77	5.00	0.50	0.50
dual_ehi-90-315-78	12.86	13.45	49.64	0.19	3.06	0.68	0.53	0.55	0.95	0.46	0.12	0.12	8.22	7.83	0.54	0.54
dual_ehi-90-315-79	14.50	13.40	44.05	0.20	2.92	0.52	0.52	0.51	0.96	0.47	0.10	0.11	6.18	5.72	0.49	0.49
dual_ehi-90-315-7	17.92	13.97	63.96	13.96	3.25	282.33	9.78	0.53	0.96	—	0.12	0.12	5.88	296.19	0.54	0.54
dual_ehi-90-315-80	14.66	13.21	43.81	0.18	3.23	0.44	0.52	0.53	0.94	0.45	0.11	0.11	4.93	4.79	0.48	0.48
dual_ehi-90-315-81	15.16	13.15	45.12	3.17	2.97	0.63	12.69	0.60	1.03	0.47	0.11	0.11	7.84	422.50	0.49	0.49

Table 257. Solution time of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-64`–`dual_ehi-90-315-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-82	12.38	13.24	46.66	0.17	3.47	0.36	0.50	0.51	1.02	—	0.11	0.11	4.80	4.18	0.50	0.51
dual_ehi-90-315-83	13.80	13.53	58.47	1.87	3.31	482.26	6.07	0.53	1.01	—	0.11	0.11	6.07	315.07	0.48	0.48
dual_ehi-90-315-84	14.69	13.81	49.40	5.25	3.01	—	7.97	0.55	0.99	—	0.11	0.11	11.04	261.68	0.51	0.51
dual_ehi-90-315-85	15.18	13.31	63.73	8.27	3.12	0.57	7.63	0.54	1.14	—	0.12	0.11	9.78	332.91	0.49	0.49
dual_ehi-90-315-86	15.38	13.34	51.24	8.45	3.09	0.57	6.35	0.53	1.18	0.46	0.11	0.11	7.81	392.93	0.52	0.52
dual_ehi-90-315-87	15.22	13.54	68.79	0.92	3.29	0.58	14.67	0.52	1.06	—	0.12	0.12	8.47	214.60	0.53	0.53
dual_ehi-90-315-88	12.97	13.38	60.83	0.18	2.98	0.42	0.52	0.52	0.96	0.46	0.10	0.10	8.15	3.63	0.48	0.47
dual_ehi-90-315-89	14.28	13.98	54.96	2.54	2.92	0.57	3.27	0.52	0.99	0.50	0.11	0.11	7.11	293.72	0.49	0.49
dual_ehi-90-315-8	15.57	13.27	89.83	0.18	3.10	0.52	0.54	0.56	0.98	0.48	0.11	0.11	7.23	5.46	0.49	0.49
dual_ehi-90-315-90	14.18	13.30	72.65	0.18	3.00	0.57	0.51	0.52	1.06	0.48	0.12	0.12	10.50	5.47	0.53	0.52
dual_ehi-90-315-91	14.31	13.10	77.65	5.93	3.08	0.62	9.30	0.54	0.99	—	0.11	0.11	6.57	219.17	0.49	0.48
dual_ehi-90-315-92	14.94	13.44	43.05	0.49	2.99	0.58	1.33	0.54	1.01	470.56	0.11	0.11	8.06	119.17	0.50	0.50
dual_ehi-90-315-93	15.82	13.38	43.87	1.94	3.16	209.74	11.07	0.56	1.04	—	0.12	0.13	8.92	380.93	0.53	0.54
dual_ehi-90-315-94	13.76	13.20	44.75	0.18	3.56	0.49	0.53	0.52	0.96	0.45	0.11	0.11	4.94	4.75	0.48	0.47
dual_ehi-90-315-95	13.58	13.39	49.55	0.19	2.97	0.62	0.65	0.52	0.98	—	0.12	0.12	6.34	41.83	0.51	0.51
dual_ehi-90-315-96	13.42	13.83	54.25	0.19	3.07	0.59	0.52	0.55	0.97	0.47	0.10	0.11	7.28	6.69	0.50	0.49
dual_ehi-90-315-97	16.00	13.75	58.14	10.45	7.46	—	29.12	0.56	2.15	—	0.11	0.12	6.60	—	0.52	0.52
dual_ehi-90-315-98	13.95	13.32	61.45	1.09	2.97	0.42	7.87	0.51	0.95	0.45	0.11	0.10	4.85	178.86	0.47	0.47
dual_ehi-90-315-99	22.37	13.94	56.37	0.21	3.21	0.49	0.56	0.52	1.09	—	0.11	0.11	6.22	7.33	0.50	0.50
dual_ehi-90-315-9	12.70	13.12	59.52	0.17	3.23	0.50	0.51	0.51	1.06	461.21	0.10	0.10	5.06	4.06	0.48	0.47
Grand total:	1467.20	1347.00	5640.38	250.79	322.39	4212.17	487.09	54.85	103.57	1997.68	1355.74	1356.31	745.10	14918.64	47.65	47.90

Table 258. Solution time of solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp01_0200_4-bis`	30.96	38.04	—	6.14	—	62.40	2.19	9.08	—	—	—	—	—	—	—	—
`fapp01_0200_5-bis`	31.55	65.47	—	6.73	—	78.48	2.23	10.60	—	—	—	—	—	—	—	—
`fapp01_0200_6-bis`	34.89	47.74	—	5.93	—	74.38	2.60	12.04	—	—	—	—	—	—	—	—
`fapp01_0200_7-bis`	28.77	42.92	—	5.91	—	74.03	2.63	11.99	—	—	—	—	—	—	—	—
`fapp01_0200_8-bis`	25.83	34.98	—	5.57	—	70.04	2.78	14.50	—	—	—	—	—	—	—	—
`fapp01_0200_9-bis`	25.83	35.86	—	5.19	—	65.22	3.03	15.38	—	—	—	—	—	—	—	—
`fapp01_0200_10-bis`	23.70	31.29	—	4.75	—	58.62	3.36	15.30	—	—	—	—	—	—	—	—
`fapp01_0200_0-bis`	27.32	27.99	—	5.90	382.64	41.62	0.40	0.38	—	—	—	—	—	—	—	—
`fapp01_0200_1-bis`	43.21	42.77	—	5.99	420.66	77.82	1.02	0.43	—	—	—	—	—	—	—	—
`fapp01_0200_2-bis`	29.54	29.19	—	6.13	418.07	58.57	1.13	0.63	—	—	—	—	—	—	—	—
`fapp01_0200_3-bis`	29.97	38.95	—	6.31	464.57	78.19	1.67	1.63	—	—	—	—	—	—	—	—
Grand total:	331.57	435.20	—	64.55	1685.94	739.38	23.04	91.97	—	—	—	—	—	—	—	—

Table 259. Solution time of solved instances belonging to class `fapp01`. Problem range: `fapp01_0200_4-bis`–`fapp01_0200_3-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp02_0250_2-bis`	—	—	—	299.78	—	495.65	9.61	15.82	—	—	—	—	—	—	—	—
`fapp02_0250_3-bis`	—	—	—	11.91	—	169.03	5.01	16.66	—	—	—	—	—	—	—	—
`fapp02_0250_4-bis`	—	—	—	12.36	—	171.55	169.53	18.80	—	—	—	—	—	—	—	—
`fapp02_0250_5-bis`	—	—	—	11.92	—	—	4.81	20.77	—	—	—	—	—	—	—	—
`fapp02_0250_6-bis`	—	—	—	11.59	—	233.92	4.61	21.24	—	—	—	—	—	—	—	—
`fapp02_0250_7-bis`	—	—	—	234.12	—	—	12.00	51.80	—	—	—	—	—	—	—	—
`fapp02_0250_8-bis`	—	—	—	10.75	—	147.62	5.67	30.59	—	—	—	—	—	—	—	—
`fapp02_0250_9-bis`	—	—	—	13.04	—	162.63	6.61	37.72	—	—	—	—	—	—	—	—
`fapp02_0250_10-bis`	—	—	—	9.32	—	122.74	7.86	47.53	—	—	—	—	—	—	—	—
`fapp02_0250_0-bis`	—	—	—	12.07	—	106.69	1.25	0.60	—	—	—	—	—	—	—	—
`fapp02_0250_1-bis`	—	—	—	12.05	—	115.51	1.40	0.75	—	—	—	—	—	—	—	—
Grand total:	—	—	—	638.91	—	1725.35	228.37	262.28	—	—	—	—	—	—	—	—

Table 260. Solution time of solved instances belonging to class `fapp02`. Problem range: `fapp02_0250_2-bis`–`fapp02_0250_1-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb30-15-1-bis`	6.05	8.01	171.69	0.15	34.40	2.68	0.98	0.82	1.73	0.57	1.74	1.79	73.90	5.00	20.14	8.65
`frb30-15-2-bis`	14.80	14.92	—	0.34	51.62	51.77	1.01	0.88	20.41	1.26	11.37	9.80	77.83	49.92	57.24	50.86
`frb30-15-3-bis`	8.43	9.25	29.97	0.27	69.40	38.33	0.33	0.19	3.84	2.81	4.68	4.83	67.01	36.80	35.42	27.52
`frb30-15-4-bis`	7.64	8.46	174.87	0.29	14.09	34.84	1.20	1.09	18.44	1.31	3.94	4.07	64.18	15.33	27.34	26.53
`frb30-15-5-bis`	10.24	10.86	7.25	0.21	9.81	10.56	0.41	0.28	4.85	1.31	0.36	0.36	29.55	19.07	14.20	2.77
Grand total:	47.16	51.50	383.79	1.26	179.33	138.18	3.94	3.26	49.27	7.27	22.09	20.85	312.47	126.11	154.33	116.32

Table 261. Solution time of solved instances belonging to class `frb30-15`. Problem range: `frb30-15-1-bis`–`frb30-15-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb35-17-1-bis`	35.48	36.39	—	1.61	—	—	0.66	0.70	60.92	6.44	12.90	12.93	117.67	251.10	95.48	95.61
`frb35-17-2-bis`	93.70	92.75	—	0.17	—	—	3.61	3.70	335.16	4.40	23.04	23.12	215.93	441.29	151.82	150.06
`frb35-17-3-bis`	32.75	33.71	—	0.66	70.65	162.05	2.80	2.77	84.42	9.96	4.86	4.83	179.11	127.52	28.55	28.67
`frb35-17-4-bis`	23.59	24.55	46.36	1.12	115.84	166.30	0.52	0.57	110.97	1.85	15.59	15.96	203.84	152.30	88.84	88.70
`frb35-17-5-bis`	42.07	43.30	—	4.39	—	—	6.33	6.40	28.37	54.55	2.46	2.48	34.19	—	14.86	15.89
Grand total:	227.59	230.70	46.36	7.95	186.49	328.35	13.92	14.13	619.85	77.21	58.86	59.33	750.74	972.21	379.55	378.93

Table 262. Solution time of solved instances belonging to class `frb35-17`. Problem range: `frb35-17-1-bis`–`frb35-17-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb40-19-1-bis`	24.07	25.34	—	0.23	—	—	2.00	1.89	7.29	68.22	189.30	188.40	—	—	—	—
`frb40-19-2-bis`	8.89	11.27	—	0.17	—	—	29.97	29.12	—	228.46	215.47	218.02	—	—	—	—
`frb40-19-3-bis`	292.58	295.05	—	58.11	—	—	135.10	123.56	—	250.79	—	—	—	—	—	—
`frb40-19-4-bis`	124.05	124.16	—	16.39	—	—	90.18	90.63	—	75.68	450.42	465.02	—	—	—	—
`frb40-19-5-bis`	202.24	202.35	—	21.00	—	—	121.51	118.44	—	394.89	119.61	122.18	—	—	—	—
Grand total:	651.82	658.17	—	95.89	—	—	378.75	363.63	7.29	1018.04	974.80	993.63	—	—	—	—

Table 263. Solution time of solved instances belonging to class `frb40-19`. Problem range: `frb40-19-1-bis`–`frb40-19-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb45-21-1-bis`	—	—	—	561.65	—	—	—	—	—	—	—	—	—	—	—	—
`frb45-21-2-bis`	—	—	—	132.48	—	—	325.48	334.37	—	—	—	—	—	—	—	—
`frb45-21-3-bis`	—	—	—	68.02	—	—	56.05	56.30	—	—	—	—	—	—	—	—
`frb45-21-4-bis`	100.58	100.43	—	94.47	—	—	580.83	—	—	—	—	—	—	—	—	—
`frb45-21-5-bis`	—	—	—	75.73	—	—	—	—	—	—	87.35	86.68	—	—	516.03	510.85
Grand total:	100.58	100.43	—	932.35	—	—	962.35	390.67	—	—	87.35	86.68	—	—	516.03	510.85

Table 264. Solution time of solved instances belonging to class `frb45-21`. Problem range: `frb45-21-1-bis`–`frb45-21-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb50-23-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-4-bis`	—	—	—	43.78	—	—	182.92	187.05	—	—	—	—	—	—	—	—
`frb50-23-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	43.78	—	—	182.92	187.05	—	—	—	—	—	—	—	—

Table 265. Solution time of solved instances belonging to class `frb50-23`. Problem range: `frb50-23-1-bis`–`frb50-23-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb53-24-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 266. Solution time of solved instances belonging to class `frb53-24`. Problem range: `frb53-24-1-bis`–`frb53-24-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb56-25-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 267. Solution time of solved instances belonging to class `frb56-25`. Problem range: `frb56-25-1-bis`–`frb56-25-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb59-26-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 268. Solution time of solved instances belonging to class `frb59-26`. Problem range: `frb59-26-1-bis`–`frb59-26-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.10	7.29	10.68	—	0.28	7.49	62.35	0.36	0.32	16.13	110.47	1.31	1.39	128.10	147.90	3.88	3.88
geo50.20.d4.75.11	7.97	11.30	—	0.24	17.95	10.77	0.36	0.39	49.32	16.60	—	—	—	36.24	—	—
geo50.20.d4.75.13	7.87	11.66	—	0.24	4.80	2.31	0.14	0.18	21.45	5.90	103.34	105.99	2.77	2.59	18.34	18.43
geo50.20.d4.75.15	7.01	11.74	—	0.26	5.44	2.13	0.14	0.18	3.85	4.74	1.08	1.06	14.73	5.44	3.51	3.51
geo50.20.d4.75.16	7.70	11.40	—	0.25	4.44	2.66	0.16	0.20	1.98	5.77	1.97	2.07	3.48	4.87	6.90	6.96
geo50.20.d4.75.17	7.55	10.02	—	0.22	4.11	0.96	0.15	0.18	4.14	3.33	0.78	0.73	52.59	3.06	2.51	2.51
geo50.20.d4.75.18	6.96	11.52	—	0.26	4.14	1.68	0.15	0.19	22.06	4.22	2.62	2.70	4.01	3.16	6.68	6.70
geo50.20.d4.75.19	414.98	407.38	—	39.38	—	—	262.71	273.63	—	—	—	—	—	—	—	—
geo50.20.d4.75.1	544.85	542.09	—	50.22	—	—	64.59	64.75	—	—	—	—	—	—	—	—
geo50.20.d4.75.20	14.96	19.39	—	0.27	4.16	2.71	0.37	0.41	12.87	5.74	13.43	13.81	—	33.50	86.14	86.60
geo50.20.d4.75.21	7.03	9.16	—	0.21	3.94	0.96	0.13	0.16	0.67	3.14	0.64	0.68	3.52	1.45	1.59	1.57
geo50.20.d4.75.22	7.48	11.71	—	0.25	5.92	1.81	0.44	0.32	4.04	4.06	1.39	1.43	11.32	15.37	7.19	4.31
geo50.20.d4.75.23	8.07	11.33	—	0.24	4.17	1.06	0.19	0.23	11.18	3.55	0.78	0.73	4.22	3.59	28.24	28.28
geo50.20.d4.75.24	7.65	10.35	—	0.32	3.76	0.96	0.13	0.16	0.78	3.23	0.63	0.65	2.80	1.59	1.63	1.63
geo50.20.d4.75.25	7.54	9.95	—	0.21	3.76	1.20	0.13	0.16	0.60	3.48	0.65	0.65	4.47	2.34	1.67	1.67
geo50.20.d4.75.26	7.92	10.79	—	0.21	3.83	0.98	0.13	0.16	0.54	3.16	0.75	0.67	2.66	1.88	1.67	1.69
geo50.20.d4.75.27	6.55	9.97	—	0.22	5.09	1.06	0.14	0.17	1.82	3.52	0.86	0.86	2.31	1.69	2.59	2.60
geo50.20.d4.75.28	7.60	11.89	—	1.58	9.05	—	0.59	0.62	117.10	—	—	—	544.55	357.38	—	—
geo50.20.d4.75.29	9.07	12.25	—	2.75	18.67	29.05	0.53	0.49	22.87	42.04	79.64	79.97	5.94	40.81	366.24	368.04
geo50.20.d4.75.2	10.39	14.61	—	1.99	5.06	127.33	4.64	4.73	51.18	126.27	0.78	0.77	99.49	154.09	2.05	2.05

Table 269. Solution time of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.2`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.30	7.20	9.51	—	0.21	4.32	2.23	0.13	0.16	3.65	4.67	0.67	0.67	3.67	4.71	1.77	1.78
geo50.20.d4.75.31	7.78	8.92	—	0.21	3.82	0.89	0.13	0.15	0.63	3.00	0.63	0.64	2.49	1.50	1.57	1.58
geo50.20.d4.75.32	8.19	10.22	—	0.24	5.22	6.22	0.29	0.18	2.28	11.56	1.84	1.88	2.94	4.41	2.19	2.21
geo50.20.d4.75.33	8.71	11.15	—	0.23	5.69	1.69	0.16	0.17	9.75	4.38	1.21	1.22	2.54	3.11	—	—
geo50.20.d4.75.34	7.56	10.96	—	0.22	3.75	1.07	0.13	0.16	0.84	3.24	0.65	0.70	3.26	2.53	1.65	1.67
geo50.20.d4.75.35	37.80	40.47	—	3.11	35.57	31.50	0.14	0.18	72.02	35.60	19.22	19.96	126.16	63.23	79.51	79.92
geo50.20.d4.75.36	9.59	10.19	—	0.21	5.22	1.23	0.29	0.15	1.09	2.74	0.58	0.61	2.71	1.31	1.45	1.43
geo50.20.d4.75.37	7.49	10.42	—	0.21	3.89	0.98	0.13	0.16	0.85	2.97	0.61	0.68	2.55	1.48	1.56	1.56
geo50.20.d4.75.38	7.34	11.37	—	0.23	4.25	6.65	0.14	0.18	5.44	9.84	4.71	4.78	14.93	12.96	24.82	24.90
geo50.20.d4.75.39	7.12	8.65	—	0.20	3.48	0.83	0.12	0.15	0.41	2.85	0.59	0.58	2.75	1.44	1.49	1.50
geo50.20.d4.75.3	7.20	9.48	—	0.21	4.16	0.92	0.17	0.16	3.13	3.10	0.64	0.64	2.51	2.35	1.65	1.64
geo50.20.d4.75.40	7.83	9.20	—	0.21	3.77	0.87	0.13	0.16	0.83	3.00	0.62	0.62	2.24	1.42	1.56	1.57
geo50.20.d4.75.42	7.62	9.36	—	0.22	4.11	1.38	0.14	0.17	1.31	3.88	0.67	0.67	5.84	1.78	1.87	1.87
geo50.20.d4.75.43	7.96	10.50	—	0.23	4.71	9.05	0.14	0.18	7.40	27.81	30.63	31.64	88.10	3.41	10.80	10.88
geo50.20.d4.75.44	7.72	9.10	—	0.21	3.98	0.89	0.13	0.16	0.89	2.99	0.67	0.65	2.45	1.43	1.57	1.57
geo50.20.d4.75.45	6.64	10.17	—	0.22	8.60	1.53	0.15	0.19	28.44	4.06	0.77	0.78	4.12	10.42	1.97	1.99
geo50.20.d4.75.46	6.96	10.45	—	0.24	5.14	5.32	0.28	0.31	5.05	10.57	1.98	1.95	33.33	49.23	26.86	26.72
geo50.20.d4.75.47	7.33	10.35	—	0.20	3.77	0.95	0.13	0.16	1.74	3.04	0.64	0.65	3.16	1.54	1.85	1.86
geo50.20.d4.75.48	7.78	9.57	—	0.21	3.96	1.06	0.13	0.17	1.93	3.42	0.68	0.69	2.54	1.60	1.84	1.86
geo50.20.d4.75.49	7.89	11.69	—	0.23	4.31	1.89	0.14	0.17	16.35	5.17	0.71	0.73	3.99	2.63	1.88	1.88

Table 270. Solution time of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.30`–`geo50.20.d4.75.49`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`geo50.20.d4.75.4`	6.43	11.03	—	0.22	4.13	1.03	0.13	0.17	0.72	3.39	0.69	0.70	2.57	1.63	1.75	1.74
`geo50.20.d4.75.50`	6.54	9.78	—	0.22	4.38	1.21	0.13	0.17	0.73	3.82	0.70	0.70	4.68	2.93	1.83	1.80
`geo50.20.d4.75.51`	8.77	11.50	—	0.43	15.90	7.55	1.26	1.27	26.18	6.75	3.04	3.07	75.77	14.18	25.38	25.48
`geo50.20.d4.75.53`	16.01	19.57	—	0.54	38.00	5.70	0.70	0.74	82.78	11.82	327.43	346.22	—	66.88	—	—
`geo50.20.d4.75.54`	7.69	10.87	—	0.22	4.04	0.99	0.14	0.17	0.75	3.32	0.72	0.69	2.59	1.64	1.76	1.75
`geo50.20.d4.75.55`	61.47	63.66	—	1.88	—	—	32.14	32.37	266.04	—	—	—	—	—	—	—
`geo50.20.d4.75.56`	7.74	10.17	—	0.24	5.51	42.13	0.16	0.20	2.98	185.15	46.40	48.02	51.16	3.75	113.40	114.39
`geo50.20.d4.75.58`	7.42	12.23	—	0.25	5.87	9.37	0.21	0.24	3.72	20.82	0.87	0.87	130.21	13.46	9.95	10.03
`geo50.20.d4.75.59`	8.40	10.66	—	0.30	5.10	1.50	0.26	0.17	1.71	3.45	0.67	0.67	3.18	2.44	1.61	1.61
`geo50.20.d4.75.5`	7.38	9.11	—	0.20	4.00	0.88	0.12	0.16	1.20	3.02	0.60	0.63	4.67	2.67	1.80	1.80
`geo50.20.d4.75.60`	7.12	10.86	—	0.25	14.92	1.14	0.55	0.58	7.09	3.80	2.21	2.27	—	98.47	8.59	8.64
`geo50.20.d4.75.61`	7.60	11.29	—	0.20	3.89	1.06	0.13	0.15	0.88	3.20	0.66	0.65	2.27	1.98	1.75	1.75
`geo50.20.d4.75.62`	51.06	53.49	—	2.48	—	—	86.41	87.24	—	—	142.59	146.38	—	—	—	—
`geo50.20.d4.75.63`	50.28	52.64	—	25.73	—	15.70	0.27	0.32	300.26	23.96	—	—	—	46.97	—	—
`geo50.20.d4.75.64`	6.69	9.31	—	0.21	5.07	1.25	0.24	0.16	1.99	2.88	0.63	0.64	3.01	1.61	1.53	1.50
`geo50.20.d4.75.65`	8.56	11.63	—	0.27	9.10	14.03	0.42	0.28	14.59	20.39	1.26	1.27	11.13	16.70	3.40	3.42
`geo50.20.d4.75.66`	7.31	10.16	—	0.22	3.75	1.27	0.15	0.18	1.51	3.79	0.67	0.67	2.87	2.21	1.70	1.71
`geo50.20.d4.75.67`	13.25	17.23	—	1.29	12.06	3.50	0.47	0.52	54.40	14.04	5.81	5.90	45.74	7.87	26.17	26.33
`geo50.20.d4.75.68`	6.38	10.31	—	0.22	4.72	48.03	0.65	0.69	5.22	—	23.66	24.12	222.67	30.23	77.86	78.44
`geo50.20.d4.75.69`	7.14	10.68	—	0.22	5.36	1.25	0.24	0.17	0.62	2.98	0.66	0.66	2.68	1.46	1.55	1.55

Table 271. Solution time of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.4`–`geo50.20.d4.75.69`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`geo50.20.d4.75.6`	7.48	9.40	—	0.21	3.60	1.13	0.13	0.16	1.04	3.10	0.67	0.66	2.43	1.61	1.67	1.68
`geo50.20.d4.75.71`	6.46	9.62	—	0.21	4.00	2.25	0.13	0.16	1.41	4.07	10.11	10.46	2.46	5.00	44.28	44.81
`geo50.20.d4.75.72`	7.30	9.81	—	0.21	3.78	1.08	0.13	0.17	0.97	3.34	0.67	0.67	3.23	1.81	1.77	1.78
`geo50.20.d4.75.73`	64.17	65.33	—	0.29	—	—	4.86	4.85	197.80	552.53	151.32	150.59	—	—	—	—
`geo50.20.d4.75.74`	8.26	11.12	—	0.27	5.22	1.53	0.30	0.18	2.30	3.59	5.45	5.31	2.33	1.69	4.94	2.14
`geo50.20.d4.75.75`	6.78	11.65	—	0.40	5.34	2.95	0.37	0.40	23.39	8.46	11.99	12.34	139.89	16.60	8.18	8.69
`geo50.20.d4.75.76`	7.28	9.78	—	0.20	3.63	0.85	0.13	0.15	0.43	2.90	0.60	0.60	2.79	1.39	1.52	1.52
`geo50.20.d4.75.77`	7.94	10.62	—	0.23	7.04	1.49	0.15	0.19	10.39	4.22	0.83	0.80	16.51	3.57	2.13	2.11
`geo50.20.d4.75.78`	6.46	10.82	—	0.21	4.42	1.11	0.13	0.16	1.10	3.41	0.82	0.66	2.46	2.19	1.61	1.62
`geo50.20.d4.75.79`	7.88	10.43	—	0.23	5.62	1.41	0.30	0.20	0.96	3.47	0.67	0.66	2.27	1.45	4.19	1.68
`geo50.20.d4.75.7`	87.84	88.25	—	11.79	—	91.34	1.22	1.28	—	119.44	35.55	33.73	498.72	138.11	160.61	162.58
`geo50.20.d4.75.80`	7.99	10.83	—	0.22	4.03	0.93	0.13	0.16	0.73	3.08	0.64	0.64	2.75	1.52	1.63	1.64
`geo50.20.d4.75.81`	7.37	9.60	—	0.23	3.98	0.99	0.14	0.17	0.99	3.29	0.67	0.66	2.46	1.78	1.66	1.66
`geo50.20.d4.75.82`	7.50	10.81	—	0.21	4.01	0.99	0.13	0.16	0.83	3.30	0.66	0.66	2.88	1.55	1.72	1.73
`geo50.20.d4.75.83`	7.60	11.33	—	0.24	5.25	39.96	0.38	0.41	23.36	58.09	0.84	0.83	10.01	9.33	2.55	2.57
`geo50.20.d4.75.84`	8.14	8.94	—	0.21	5.12	1.24	0.24	0.18	0.72	2.92	0.64	0.67	2.65	1.49	1.52	1.52
`geo50.20.d4.75.85`	9.25	13.18	—	0.79	51.83	220.50	3.19	3.11	11.85	196.96	22.09	22.21	37.75	140.66	108.46	109.70
`geo50.20.d4.75.87`	13.66	17.05	—	0.28	45.62	48.07	1.98	2.02	8.20	53.91	—	—	—	55.71	—	—
`geo50.20.d4.75.88`	7.46	10.17	—	0.20	3.60	0.83	0.12	0.15	0.42	2.96	0.71	0.59	2.49	1.38	1.48	1.48
`geo50.20.d4.75.89`	52.65	54.83	—	1.44	169.24	177.49	1.50	1.54	99.73	244.14	—	—	—	226.31	—	—

Table 272. Solution time of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.6`–`geo50.20.d4.75.89`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.8	12.45	15.81	—	9.76	19.04	—	4.45	5.00	113.04	518.12	128.18	134.68	—	—	118.01	118.97
geo50.20.d4.75.90	552.21	557.97	—	7.12	—	65.80	8.75	8.96	178.67	83.07	—	—	—	140.97	—	—
geo50.20.d4.75.91	7.41	8.84	—	0.20	3.64	0.88	0.13	0.15	0.67	2.97	0.62	0.61	2.40	1.49	1.57	1.56
geo50.20.d4.75.92	8.31	10.71	—	0.23	5.66	1.70	0.32	0.20	1.54	3.79	1.19	1.17	18.14	3.33	1.89	1.91
geo50.20.d4.75.93	6.10	10.60	—	0.21	3.88	0.95	0.13	0.16	1.05	3.15	0.64	0.66	2.41	1.55	1.68	1.67
geo50.20.d4.75.95	7.72	9.56	—	0.21	4.08	1.18	0.14	0.18	4.65	3.32	0.65	0.64	2.96	2.95	1.92	1.92
geo50.20.d4.75.96	15.95	18.90	—	0.47	43.18	65.74	1.72	1.73	35.22	78.98	4.09	4.23	45.36	105.62	93.30	93.72
geo50.20.d4.75.97	7.95	10.63	—	0.24	5.48	1.50	0.30	0.21	2.97	3.45	0.69	0.68	2.93	5.46	1.61	1.63
geo50.20.d4.75.98	7.71	9.00	—	0.21	4.03	0.88	0.13	0.15	0.62	2.99	0.61	0.61	2.49	1.55	1.60	1.58
geo50.20.d4.75.99	7.24	9.72	—	0.22	4.10	0.94	0.13	0.16	1.20	3.17	36.41	37.87	6.81	1.64	31.17	31.74
geo50.20.d4.75.9	9.50	12.58	—	0.32	14.42	270.26	0.47	0.38	23.33	389.02	24.48	24.95	154.75	386.71	132.65	133.89
geo50.20.d4.75.100	7.69	10.40	—	0.21	3.89	0.95	0.13	0.16	0.64	3.16	0.79	0.81	2.16	1.55	2.24	2.25
geo50.20.d4.75.12	—	—	—	79.21	—	—	133.59	128.73	—	—	—	—	—	—	—	—
geo50.20.d4.75.14	—	—	—	43.36	—	—	73.06	73.09	—	—	—	—	—	—	—	—
geo50.20.d4.75.41	—	—	—	33.90	—	—	61.09	60.62	—	—	—	—	—	—	—	—
geo50.20.d4.75.52	—	—	—	30.57	—	—	52.96	54.04	—	—	—	—	—	—	—	—
geo50.20.d4.75.57	—	—	—	35.75	—	—	58.96	58.89	—	—	—	—	—	—	—	—
geo50.20.d4.75.70	—	—	—	37.35	—	—	59.93	59.84	—	—	—	—	—	—	—	—
geo50.20.d4.75.86	—	—	—	59.74	—	—	100.89	103.17	—	—	—	—	—	—	—	—
geo50.20.d4.75.94	—	—	—	57.63	—	—	93.72	92.67	—	—	—	—	—	—	—	—
Grand total:	2583.13	2835.44	—	557.42	830.06	1491.61	1130.83	1141.38	2030.24	3186.04	1281.93	1318.66	2738.91	2572.52	1726.28	1730.55

Table 273. Solution time of solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.94`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi_3`	2.03	2.41	—	0.08	0.96	0.10	0.06	0.06	0.06	0.03	0.01	0.01	0.06	0.06	0.06	0.06
`hanoi_4`	2.61	2.92	—	0.09	14.38	0.12	0.06	0.06	0.25	0.04	0.02	0.02	0.10	0.10	0.10	0.06
`hanoi_5`	3.85	5.01	—	0.14	341.27	0.46	0.08	0.08	6.30	0.15	0.44	0.45	0.91	0.90	0.10	0.09
`hanoi_6`	9.07	8.96	—	1.11	—	3.49	0.32	0.32	—	0.54	23.31	23.66	31.62	30.22	0.24	0.24
`hanoi_7`	54.36	53.09	—	164.89	—	230.76	4.66	4.47	—	—	—	—	—	—	1.13	1.12
Grand total:	71.91	72.40	—	166.30	356.60	234.93	5.17	4.99	6.61	0.77	23.78	24.14	32.70	31.28	1.63	1.58

Table 274. Solution time of solved instances belonging to class `hanoi1`. Problem range: `hanoi_3`–`hanoi_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr1-10-by-5-1`	10.81	14.81	—	0.90	51.53	—	221.46	222.85	12.61	—	151.30	150.83	—	—	—	—
`e0ddr1-10-by-5-2`	9.91	14.20	—	1.83	42.91	29.67	—	—	5.23	—	3.79	3.51	34.05	—	—	—
`e0ddr1-10-by-5-3`	11.44	15.47	—	—	—	—	—	—	6.79	—	—	—	—	—	—	—
`e0ddr1-10-by-5-4`	9.36	14.90	—	0.82	25.00	7.61	39.08	39.19	5.78	8.92	3.59	3.49	—	—	11.99	7.80
`e0ddr1-10-by-5-5`	10.03	14.29	—	0.80	12.20	7.79	3.74	3.90	6.94	9.18	3.60	3.51	38.47	6.63	11.62	7.91
`e0ddr1-10-by-5-6`	8.99	14.65	—	1.50	15.20	8.38	0.52	0.75	5.57	9.34	3.53	3.68	40.85	6.80	13.27	8.04
`e0ddr1-10-by-5-7`	11.75	16.80	—	410.05	108.05	—	0.55	0.71	5.48	—	—	—	35.27	6.63	—	—
`e0ddr1-10-by-5-8`	14.22	18.50	—	0.85	31.49	—	—	—	7.02	—	—	—	—	—	—	—
`e0ddr1-10-by-5-9`	7.94	14.41	—	0.85	13.43	8.03	0.51	0.73	5.80	9.15	—	—	41.85	6.68	—	—
`e0ddr1-10-by-5-10`	12.56	17.97	—	575.77	20.79	—	135.72	137.92	15.46	—	97.68	97.99	40.26	—	—	—
Grand total:	107.00	156.01	—	993.37	320.61	61.49	401.58	406.05	76.67	36.59	263.49	263.00	230.76	26.74	36.87	23.75

Table 275. Solution time of solved instances belonging to class `js-e0ddr1`. Problem range: `e0ddr1-10-by-5-1`–`e0ddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
e0ddr2-10-by-5-1	10.59	16.05	—	—	—	—	—	—	16.61	—	—	—	—	—	—	—
e0ddr2-10-by-5-2	12.43	16.52	—	—	—	—	—	—	56.09	—	—	—	—	—	—	—
e0ddr2-10-by-5-3	10.41	17.01	—	1.07	—	—	73.77	73.77	24.77	—	—	—	49.02	—	—	—
e0ddr2-10-by-5-4	8.81	15.03	—	1.06	308.93	155.43	0.59	0.91	6.60	13.16	7.42	7.71	60.26	9.16	24.75	22.14
e0ddr2-10-by-5-5	8.79	14.67	—	1.04	328.27	12.52	0.57	0.92	8.31	13.02	4.98	5.05	52.84	9.42	12.20	10.79
e0ddr2-10-by-5-6	9.44	15.21	—	1.05	45.16	11.78	0.62	0.96	6.60	16.08	4.88	4.83	51.63	8.93	12.75	10.66
e0ddr2-10-by-5-7	11.24	14.13	—	1.25	—	—	3.79	3.71	8.76	—	5.21	4.73	52.15	—	11.63	10.37
e0ddr2-10-by-5-8	9.15	14.92	—	1.06	67.03	112.69	135.64	135.90	7.17	—	—	—	47.24	—	—	—
e0ddr2-10-by-5-9	12.14	18.10	—	—	—	—	—	—	41.59	—	—	—	—	—	—	—
e0ddr2-10-by-5-10	10.10	14.20	—	1.02	187.31	11.82	0.60	0.92	9.03	12.40	4.69	4.71	52.76	9.11	11.27	10.40
Grand total:	103.09	155.85	—	7.55	936.70	304.24	215.59	217.08	185.53	54.67	27.19	27.04	365.89	36.62	72.61	64.35

Table 276. Solution time of solved instances belonging to class `js-e0ddr2`. Problem range: `e0ddr2-10-by-5-1`–`e0ddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr1-10-by-5-1`	9.84	14.24	—	0.90	17.00	48.51	1.93	2.10	5.80	9.79	3.95	4.05	36.08	233.36	8.30	8.28
`enddr1-10-by-5-2`	8.56	14.35	—	0.88	13.12	9.19	0.52	0.76	8.29	10.03	3.82	4.04	39.70	7.62	8.87	8.78
`enddr1-10-by-5-3`	11.74	15.98	—	172.05	14.60	8.84	0.52	0.74	7.48	9.79	3.99	3.91	—	—	8.49	8.53
`enddr1-10-by-5-4`	10.03	15.41	—	0.86	12.88	8.37	0.53	0.76	5.04	9.68	3.91	3.71	34.70	6.98	8.20	8.18
`enddr1-10-by-5-5`	8.39	13.80	—	0.86	13.58	9.42	0.62	0.78	5.84	10.58	4.20	4.03	43.51	7.45	8.38	8.40
`enddr1-10-by-5-6`	8.51	13.90	—	0.91	13.66	10.16	0.56	0.86	6.65	10.86	4.10	4.27	48.40	7.63	8.93	8.87
`enddr1-10-by-5-7`	11.03	14.52	—	0.91	22.24	9.08	0.53	0.77	5.36	10.87	4.27	4.21	40.12	7.50	8.98	8.97
`enddr1-10-by-5-8`	10.34	15.23	—	0.90	39.43	9.02	0.57	0.80	7.08	10.67	5.32	5.36	40.16	7.65	28.79	28.85
`enddr1-10-by-5-9`	9.43	14.43	—	0.92	14.19	9.64	0.56	0.82	5.79	10.82	4.31	4.14	46.95	7.77	8.50	8.50
`enddr1-10-by-5-10`	8.71	14.95	—	0.97	13.41	—	—	—	6.24	—	—	—	42.01	—	—	—
Grand total:	96.57	146.83	—	180.17	174.11	122.22	6.34	8.38	63.59	93.10	37.88	37.72	371.63	285.95	97.45	97.36

Table 277. Solution time of solved instances belonging to class `js-enddr1`. Problem range: `enddr1-10-by-5-1`–`enddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr2-10-by-5-1`	10.37	16.56	—	5.41	291.22	—	—	—	10.88	—	—	—	50.88	—	—	—
`enddr2-10-by-5-2`	11.18	17.44	—	—	172.15	13.22	194.93	195.16	8.42	66.93	5.38	5.65	—	—	—	—
`enddr2-10-by-5-3`	10.49	15.37	—	35.29	236.79	18.19	—	—	9.08	—	28.83	29.39	55.90	—	117.49	117.80
`enddr2-10-by-5-4`	8.82	15.32	—	1.66	153.61	13.49	0.64	0.99	7.09	14.10	5.34	5.25	55.07	9.65	12.45	11.56
`enddr2-10-by-5-5`	8.92	14.51	—	1.14	33.24	14.89	0.64	1.01	8.95	—	6.54	5.35	60.12	10.34	13.14	12.25
`enddr2-10-by-5-10`	10.17	15.30	—	1.13	73.72	13.99	0.63	0.99	7.94	—	5.22	5.19	58.98	10.24	11.00	10.73
Grand total:	59.95	94.51	—	44.63	960.74	73.78	196.83	198.15	52.35	81.03	51.32	50.82	280.94	30.23	154.09	152.34

Table 278. Solution time of solved instances belonging to class `js-enddr2`. Problem range: `enddr2-10-by-5-1`–`enddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`ewddr2-10-by-5-1`	9.51	16.24	—	1.25	48.22	15.37	0.61	1.01	10.45	—	6.01	5.85	56.29	10.49	—	—
`ewddr2-10-by-5-2`	10.31	14.98	—	1.10	227.36	14.27	0.59	0.95	7.66	—	5.26	5.81	48.74	10.05	12.69	11.10
`ewddr2-10-by-5-3`	11.11	16.65	—	1.22	113.05	15.52	11.70	11.98	9.52	—	6.02	5.85	61.86	11.12	14.50	14.56
`ewddr2-10-by-5-4`	10.04	15.94	—	1.18	39.13	15.81	0.65	1.03	7.37	—	5.46	5.54	58.44	11.10	11.69	11.71
`ewddr2-10-by-5-5`	10.37	15.18	—	1.21	20.26	17.15	0.65	1.08	6.79	—	5.92	6.04	65.45	11.41	13.64	12.99
`ewddr2-10-by-5-6`	10.38	14.79	—	1.24	17.13	15.00	0.71	1.11	7.23	—	5.84	5.90	64.39	11.50	13.49	13.87
`ewddr2-10-by-5-7`	9.46	16.34	—	1.19	18.47	14.60	8.99	9.37	7.93	—	5.57	5.66	59.44	10.39	17.33	13.97
`ewddr2-10-by-5-8`	9.12	15.94	—	1.27	85.51	15.66	0.63	1.07	8.92	—	6.23	6.27	63.56	11.72	56.45	33.83
`ewddr2-10-by-5-9`	10.28	15.21	—	1.18	56.95	15.07	0.66	1.02	9.09	—	5.94	6.27	55.46	11.58	13.05	12.59
`ewddr2-10-by-5-10`	10.20	15.02	—	1.19	26.51	15.87	0.65	1.02	7.30	—	5.48	5.84	64.28	11.18	14.72	11.79
Grand total:	100.76	156.30	—	12.04	652.60	154.30	25.83	29.64	82.26	—	57.75	59.02	597.92	110.54	167.58	136.40

Table 279. Solution time of solved instances belonging to class `js-ewddr2`. Problem range: `ewddr2-10-by-5-1`–`ewddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
lsq_dg_5	3.45	5.61	0.43	0.09	0.73	0.03	0.08	0.08	0.01	0.03	0.01	0.01	0.14	0.10	0.39	0.08
lsq_dg_7	8.67	7.53	1.70	0.09	1.09	0.07	0.12	0.13	0.03	0.05	0.02	0.02	0.72	0.71	0.20	0.19
lsq_dg_3	2.17	2.80	0.15	0.08	0.62	0.02	0.06	0.06	0.01	0.03	0.01	0.01	0.07	0.06	0.50	0.06
lsq_dg_4	2.64	3.54	0.19	0.08	0.67	0.03	0.07	0.07	0.01	0.03	0.01	0.01	0.13	0.11	1.29	0.08
lsq_dg_6	6.65	7.64	0.79	0.12	2.15	4.47	0.14	0.14	0.09	1.22	0.08	0.07	14.92	22.91	13.27	13.70
Grand total:	23.58	27.13	3.26	0.46	5.27	4.63	0.47	0.49	0.15	1.38	0.13	0.12	15.97	23.89	15.66	14.12

Table 280. Solution time of solved instances belonging to class `lsq-dg1`. Problem range: `lsq_dg_5`–`lsq_dg_6`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2pl/1	table2pl/2
large_80_sat	—	—	—	11.02	—	65.70	0.79	0.69	—	—	57.42	55.33	—	—	—	—
large_84_sat	—	—	—	14.06	—	80.30	0.84	0.73	—	—	70.53	70.10	—	—	—	—
large_88_sat	—	—	—	16.13	—	96.57	1.04	0.97	—	—	83.26	80.96	—	—	—	—
large_92_sat	—	—	—	19.25	—	115.39	0.95	0.88	—	—	100.32	99.12	—	—	—	—
large_96_sat	—	—	—	23.24	—	137.89	1.02	0.97	—	—	116.07	116.66	—	—	—	—
large_80_unsat	—	—	—	11.52	—	145.67	1.86	1.72	—	—	56.01	54.92	—	—	—	—
large_84_unsat	—	—	—	13.71	—	180.79	2.16	2.06	—	—	68.15	67.55	—	—	—	—
large_88_unsat	—	—	—	16.53	—	220.23	2.46	2.38	—	—	84.04	81.28	—	—	—	—
large_92_unsat	—	—	—	21.51	—	267.39	2.92	2.79	—	—	98.95	98.14	—	—	—	—
large_96_unsat	—	—	—	23.77	—	321.73	3.37	3.27	—	—	119.52	119.84	—	—	—	—
Grand total:	—	—	—	170.74	—	1631.65	17.42	16.45	—	—	854.27	843.89	—	—	—	—

Table 281. Solution time of solved instances belonging to class marc. Problem range: large_80_sat–large_96_unsat. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
pigeons5	2.22	2.18	0.03	0.08	0.58	0.02	0.06	0.06	0.01	0.03	0.01	0.01	0.06	0.06	0.06	0.06
pigeons6	2.27	2.51	0.05	0.09	1.04	0.03	0.06	0.06	0.01	0.03	0.01	0.01	0.08	0.07	0.06	0.06
pigeons7	3.10	3.07	0.16	0.08	1.94	0.06	0.06	0.07	0.02	0.04	0.01	0.01	0.17	0.14	1.78	0.13
pigeons8	3.79	4.26	0.13	0.09	11.20	0.20	0.08	0.08	0.11	0.07	0.01	0.01	0.86	0.61	0.55	0.57
pigeons9	6.36	6.77	0.27	0.15	301.92	0.83	0.19	0.19	0.73	0.35	0.01	0.01	6.67	5.06	4.53	4.63
pigeons10	26.66	26.85	0.50	0.73	—	3.90	1.28	1.45	3.05	2.92	0.01	0.01	63.98	40.61	43.02	45.17
pigeons11	243.27	233.38	8.18	6.65	—	19.17	11.34	11.47	15.72	31.25	0.01	0.01	—	420.60	474.07	494.29
pigeons12	—	—	54.91	74.68	—	96.91	126.17	126.98	72.85	339.01	0.01	0.01	—	—	—	—
pigeons13	—	—	393.28	—	—	497.69	—	—	471.08	—	0.01	0.01	—	—	—	—
pigeons14	—	—	—	—	—	—	—	—	—	—	0.01	0.01	—	—	—	—
pigeons15	—	—	—	—	—	—	—	—	—	—	0.01	0.01	—	—	—	—
pigeons16	—	—	—	—	—	—	—	—	—	—	0.01	0.01	—	—	—	—
pigeons18	—	—	—	—	—	—	—	—	—	—	0.02	0.02	—	—	—	—
pigeons20	—	—	—	—	—	—	—	—	—	—	0.01	0.01	—	—	—	—
pigeons25	—	—	—	—	—	—	—	—	—	—	0.01	0.01	—	—	—	—
pigeons30	—	—	—	—	—	—	—	—	—	—	0.01	0.01	—	—	—	—
pigeons35	—	—	—	—	—	—	—	—	—	—	0.03	0.03	—	—	—	—
pigeons40	—	—	—	—	—	—	—	—	—	—	0.05	0.06	—	—	—	—
pigeons45	—	—	—	—	—	—	—	—	—	—	0.07	0.06	—	—	—	—
pigeons50	—	—	—	—	—	—	—	—	—	—	0.08	0.06	—	—	—	—
Grand total:	287.67	279.03	457.50	82.56	316.67	618.82	139.26	140.36	563.59	373.69	0.38	0.36	71.83	467.14	524.07	544.92

Table 282. Solution time of solved instances belonging to class `pigeons`. Problem range: `pigeons5`–`pigeons50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qa_5	88.42	103.91	5.59	0.15	2.69	—	0.11	0.29	6.85	30.41	15.90	15.81	364.66	369.72	474.18	483.06
qa_6	—	—	—	78.57	—	—	154.50	209.79	22.82	—	—	—	—	—	—	—
qa_7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_3	2.61	3.58	0.23	0.08	1.00	0.04	0.07	0.07	0.01	0.04	0.01	0.01	0.09	0.10	0.14	0.08
qa_4	4.58	6.12	4.03	0.09	31.41	0.68	0.09	0.12	0.14	0.14	0.07	0.07	1.65	1.08	0.89	0.91
Grand total:	95.60	113.61	9.84	78.90	35.09	0.72	154.77	210.26	29.83	30.59	15.98	15.89	366.40	370.91	475.21	484.05

Table 283. Solution time of solved instances belonging to class qa1. Problem range: qa_5–qa_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qk_8_0_5	2.69	3.07	555.38	0.09	—	0.31	0.07	0.07	0.24	0.10	0.04	0.04	0.22	0.19	0.28	0.19
qk_8_8_5_add	3.71	3.36	582.78	0.11	—	0.29	0.16	0.07	0.24	5.29	3.45	3.06	19.14	3.00	6.37	6.33
qk_8_8_5_mul	4.23	4.04	571.61	0.11	—	19.00	0.21	0.08	0.25	4.33	3.63	3.68	20.85	3.51	13.72	13.62
qk_10_0_5	3.57	3.10	—	0.11	—	1.41	0.20	0.08	0.91	0.21	0.15	0.17	0.55	0.43	0.21	0.22
qk_10_10_5_add	5.13	4.35	—	0.22	—	1.42	0.66	0.12	0.91	100.07	73.49	74.29	481.34	16.72	135.19	134.81
qk_10_10_5_mul	6.68	4.99	—	0.25	—	134.95	1.07	0.10	0.84	86.47	97.17	100.57	532.28	18.21	345.75	344.71
qk_12_0_5	4.28	3.31	—	0.13	—	3.42	0.27	0.11	1.74	0.37	0.31	0.32	1.15	0.94	0.36	0.35
qk_12_12_5_add	5.70	4.48	—	1.43	—	3.22	4.07	0.11	1.77	—	—	—	—	87.35	—	—
qk_12_12_5_mul	7.16	5.58	—	2.36	—	578.22	12.02	0.13	1.75	—	—	—	—	223.56	—	—
qk_15_0_5	4.32	4.07	—	0.14	—	10.76	0.16	0.16	2.29	0.84	0.83	0.87	2.96	2.57	0.81	0.79
qk_15_15_5_add	7.60	5.59	—	26.54	—	10.25	40.13	0.18	2.38	—	—	—	—	—	—	—
qk_15_15_5_mul	10.74	7.68	—	45.17	—	—	247.97	0.22	2.44	—	—	—	—	—	—	—
qk_20_0_5	8.06	5.85	—	0.40	—	59.36	0.63	0.38	9.16	3.25	3.85	3.90	12.02	10.58	2.58	2.57
qk_20_20_5_add	22.09	10.04	—	—	—	55.35	133.38	0.41	8.81	—	—	—	—	—	—	—
qk_20_20_5_mul	30.58	31.84	—	—	—	—	—	0.53	8.86	—	—	—	—	—	—	—
qk_25_0_5	12.52	10.04	—	0.76	—	217.31	1.27	1.26	22.06	9.40	11.89	12.02	35.70	32.31	6.30	6.33
qk_25_25_5_add	32.42	16.15	—	—	—	206.12	181.59	1.31	22.46	—	—	—	—	—	—	—
qk_25_25_5_mul	45.97	50.60	—	—	—	—	—	1.68	22.72	—	—	—	—	—	—	—
Grand total:	217.45	178.12	1709.77	77.82	—	1301.38	623.86	7.02	109.85	210.33	194.81	198.91	1106.21	399.37	511.57	509.92

Table 284. Solution time of solved instances belonging to class qk1. Problem range: qk_8_0_5–qk_25_25_5_mul. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-23-23-253-131-48021	—	—	—	30.51	—	—	26.34	25.87	—	—	174.28	172.37	—	—	—	—
random-23-23-253-131-49021	17.80	20.02	—	30.91	—	—	84.31	82.93	—	229.08	18.72	19.10	343.24	257.71	119.44	119.84
random-23-23-253-131-50021	—	—	—	14.30	—	—	5.84	5.91	—	—	290.32	242.86	—	—	—	—
random-23-23-253-131-53021	—	—	—	18.44	—	—	43.08	40.11	—	—	136.20	131.85	—	—	—	—
random-23-23-253-131-54021	—	—	—	20.79	—	—	26.75	27.26	153.45	—	155.87	155.36	—	—	—	—
random-23-23-253-131-46021	—	—	—	53.39	—	—	87.57	88.84	—	—	241.28	240.09	—	—	—	—
random-23-23-253-131-47021	—	—	—	50.47	—	—	83.86	85.44	—	—	235.86	230.78	—	—	—	—
random-23-23-253-131-51021	—	—	—	62.39	—	—	104.22	97.45	—	—	256.70	259.85	—	—	—	—
random-23-23-253-131-52021	—	—	—	53.46	—	—	86.47	85.89	—	—	232.65	234.59	—	—	—	—
random-23-23-253-131-55021	—	—	—	52.82	—	—	84.07	87.02	—	—	241.76	240.95	—	—	—	—
Grand total:	17.80	20.02	—	387.50	—	—	632.51	626.71	153.45	229.08	1983.65	1927.82	343.24	257.71	119.44	119.84

Table 285. Solution time of solved instances belonging to class `random-23-23-253`. Problem range: `random-23-23-253-131-48021`–`random-23-23-253-131-55021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-24-24-276-139-48021`	—	—	—	12.27	—	—	12.52	13.05	—	—	91.16	88.72	—	—	592.52	594.07
`random-24-24-276-139-50021`	79.39	80.99	—	3.43	—	—	21.89	21.63	—	—	59.09	60.25	—	—	391.50	395.99
`random-24-24-276-139-55021`	44.42	46.41	—	16.11	—	—	169.71	177.43	—	—	156.17	153.03	—	—	—	—
`random-24-24-276-139-49021`	—	—	—	128.34	—	—	205.54	197.02	—	—	535.53	549.32	—	—	—	—
`random-24-24-276-139-51021`	—	—	—	134.06	—	—	213.86	214.14	—	—	566.74	576.59	—	—	—	—
`random-24-24-276-139-52021`	—	—	—	136.06	—	—	219.18	221.62	—	—	547.10	546.47	—	—	—	—
`random-24-24-276-139-53021`	—	—	—	139.27	—	—	212.33	220.07	—	—	564.92	560.35	—	—	—	—
`random-24-24-276-139-54021`	—	—	—	136.33	—	—	217.23	210.68	—	—	577.84	575.09	—	—	—	—
`random-24-24-276-139-56021`	—	—	—	138.30	—	—	215.53	215.23	—	—	563.09	555.74	—	—	—	—
`random-24-24-276-139-57021`	—	—	—	134.27	—	—	208.03	210.75	—	—	541.17	541.56	—	—	—	—
Grand total:	123.81	127.39	—	978.45	—	—	1695.80	1701.62	—	—	4202.80	4207.13	—	—	984.02	990.06

Table 286. Solution time of solved instances belonging to class `random-24-24-276`. Problem range: `random-24-24-276-139-48021`–`random-24-24-276-139-57021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-25-25-300-147-51021	—	—	—	43.98	—	—	229.06	222.02	—	—	114.43	111.46	—	—	—	—
random-25-25-300-147-52021	—	—	—	32.89	—	—	455.18	476.70	—	—	293.52	307.88	—	—	—	—
random-25-25-300-147-53021	296.82	293.72	—	74.32	—	—	136.92	136.75	—	—	—	—	—	—	—	—
random-25-25-300-147-54021	478.12	466.97	—	276.13	—	—	480.12	491.92	—	—	406.55	251.96	—	—	—	—
random-25-25-300-147-56021	—	—	—	244.89	—	—	530.81	537.33	—	—	—	—	—	—	—	—
random-25-25-300-147-59021	—	—	—	80.07	—	—	289.65	297.92	—	—	—	—	—	—	—	—
random-25-25-300-147-50021	—	—	—	337.55	—	—	521.00	532.13	—	—	—	—	—	—	—	—
random-25-25-300-147-55021	—	—	—	323.89	—	—	514.83	528.98	—	—	—	—	—	—	—	—
random-25-25-300-147-57021	—	—	—	317.93	—	—	505.46	507.66	—	—	—	—	—	—	—	—
random-25-25-300-147-58021	—	—	—	354.35	—	—	537.23	540.46	—	—	—	—	—	—	—	—
Grand total:	774.94	760.69	—	2085.99	—	—	4200.26	4271.87	—	—	814.51	671.31	—	—	—	—

Table 287. Solution time of solved instances belonging to class random-25-25-300. Problem range: random-25-25-300-147-51021–random-25-25-300-147-58021. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-26-26-325-155-53021`	—	—	—	437.61	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-54021`	—	—	—	41.17	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-55021`	588.46	573.86	—	289.64	—	—	137.89	138.48	—	—	—	—	—	—	—	—
`random-26-26-325-155-59021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-61021`	—	—	—	484.05	—	—	202.41	200.74	—	—	—	—	—	—	—	—
`random-26-26-325-155-52021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-56021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-57021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-58021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-60021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	588.46	573.86	—	1252.46	—	—	340.30	339.22	—	—	—	—	—	—	—	—

Table 288. Solution time of solved instances belonging to class `random-26-26-325`. Problem range: `random-26-26-325-155-53021`–`random-26-26-325-155-60021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-27-27-351-163-54021	—	—	—	—	—	—	157.26	158.86	—	—	—	—	—	—	—	—
random-27-27-351-163-56021	—	—	—	445.23	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-60021	—	—	—	447.65	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-63021	—	—	—	336.55	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-55021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-57021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-58021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-59021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-61021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-62021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	1229.44	—	—	157.26	158.86	—	—	—	—	—	—	—	—

Table 289. Solution time of solved instances belonging to class `random-27-27-351`. Problem range: `random-27-27-351-163-54021`–`random-27-27-351-163-62021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph1`	11.59	13.81	28.84	0.20	6.58	0.63	0.37	2.59	1.09	0.45	0.23	0.23	—	—	2.31	0.82
`graph2`	16.52	17.94	64.59	0.36	17.70	0.97	0.70	6.10	2.52	0.55	0.27	0.28	—	—	2.11	1.23
`graph3`	11.35	39.93	—	0.39	68.39	2.37	0.69	11.56	3.68	2.59	2.95	3.05	—	—	3.30	1.94
`graph4`	14.53	45.30	—	0.63	—	3.97	1.86	15.06	7.25	4.19	5.37	5.46	—	—	11.06	3.73
`graph8`	18.40	23.87	—	0.61	565.14	2.56	1.40	9.95	5.25	1.46	0.82	0.85	—	—	2.48	2.64
`graph9`	24.10	31.89	—	0.86	—	3.19	1.92	12.82	7.70	1.26	0.84	0.88	—	—	3.04	3.32
`graph10`	19.52	53.33	—	1.01	—	6.08	2.07	29.96	21.10	—	7.74	8.01	—	—	4.10	4.27
`graph14`	24.38	31.62	—	0.74	94.01	2.34	1.72	21.92	6.78	0.88	0.58	0.57	—	—	3.75	2.64
`graph5`	12.55	9.86	—	0.42	10.76	2.79	0.40	0.24	3.93	—	3.11	3.21	—	—	4.25	2.90
`graph6`	12.21	13.70	—	0.62	18.39	2.55	0.52	0.35	8.04	—	4.30	4.29	—	—	14.38	4.98
`graph7`	13.57	13.54	—	0.61	18.29	3.14	0.53	0.35	7.69	—	4.83	5.11	—	—	5.11	4.06
`graph11`	15.74	19.88	—	0.94	35.62	4.26	0.69	0.53	13.86	—	5.69	5.95	—	—	8.87	4.77
`graph12`	15.59	20.32	—	0.91	35.22	3.34	0.73	0.57	14.47	—	5.55	5.54	—	—	5.78	4.62
`graph13`	18.62	24.03	—	1.19	58.32	4.99	0.83	0.67	20.12	—	6.70	6.59	—	—	5.33	5.31
Grand total:	228.66	359.02	93.43	9.50	928.44	43.16	14.43	112.64	123.48	11.38	48.96	50.02	—	—	75.85	47.22

Table 290. Solution time of solved instances belonging to class `rlfapGraphs`. Problem range: `graph1`–`graph13`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph2_f24`	16.87	29.27	—	0.22	152.69	1.00	0.56	1.68	2.46	0.29	—	—	—	—	0.82	0.88
`graph8_f10`	35.94	56.45	248.73	1.10	—	—	1.06	4.12	25.40	—	—	—	—	—	—	—
`graph9_f9`	76.76	85.41	—	0.90	—	—	5.47	10.40	—	—	—	—	—	—	—	—
`graph12_w0`	12.70	20.19	48.38	0.18	25.31	0.79	0.35	0.30	2.38	0.42	0.18	0.18	—	—	0.39	0.57
`graph13_w0`	16.59	21.30	69.57	0.23	45.38	0.99	0.40	0.45	3.38	0.57	0.31	0.31	—	—	0.53	0.81
`graph14_f27`	37.94	72.00	437.89	0.96	—	44.63	1.98	5.16	21.14	—	—	—	—	—	—	—
`graph2_f25`	31.51	31.00	30.84	0.44	11.81	—	0.83	1.72	1.03	—	—	—	—	—	—	—
`graph8_f11`	19.12	49.81	207.90	0.50	50.10	—	1.06	3.33	3.58	—	—	—	—	—	—	—
`graph9_f10`	28.10	74.07	—	5.44	58.62	—	4.23	7.05	6.65	—	—	—	—	—	—	—
`graph12_w1`	16.73	17.46	—	0.42	30.19	2.66	0.61	0.50	4.83	—	—	—	—	—	—	—
`graph13_w1`	17.53	18.33	—	0.57	50.63	5.05	0.74	0.65	6.57	—	—	—	—	—	—	—
`graph14_f28`	43.17	54.49	213.81	2.44	464.61	—	2.39	4.56	39.93	—	—	—	—	—	—	—
Grand total:	352.96	529.78	1257.13	13.40	889.34	55.12	19.68	39.93	117.35	1.28	0.49	0.49	—	—	1.73	2.26

Table 291. Solution time of solved instances belonging to class `rlfapModGraphs`. Problem range: `graph2_f24`–`graph14_f28`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen1_f8`	24.11	31.07	—	0.69	486.27	2.22	1.47	7.08	6.05	1.18	0.66	0.69	—	—	2.16	2.47
`scen2_f24`	11.83	14.82	26.98	0.17	5.18	0.65	0.40	0.62	0.83	0.16	0.11	0.11	—	—	0.47	0.49
`scen3_f10`	18.78	20.65	106.27	0.92	142.90	1.24	1.67	3.60	2.84	—	0.25	0.26	—	—	1.48	1.08
`scen6_w1`	11.05	17.66	295.53	0.19	11.19	1.08	0.34	0.73	1.37	0.94	1.10	1.07	—	—	0.71	0.73
`scen7_w1_f4`	12.12	19.78	—	0.26	33.10	1.55	0.43	0.64	2.45	26.79	—	—	—	—	162.53	174.90
`scen1_f9`	27.14	58.77	—	0.99	47.81	6.66	2.17	7.18	6.14	—	—	—	—	—	—	—
`scen2_f25`	14.33	17.23	27.86	5.08	6.43	30.85	2.72	3.01	1.96	77.89	—	—	—	—	—	—
`scen3_f11`	18.83	20.48	132.34	1.01	31.57	6.45	1.84	3.16	3.56	—	—	—	—	—	—	—
`scen6_w1_f2`	11.76	17.10	527.42	1.10	8.85	1.30	3.44	4.16	1.54	—	—	—	—	—	—	—
`scen6_w1_f3`	10.75	15.61	368.48	0.66	8.40	1.08	1.99	2.18	1.46	—	—	—	—	—	—	—
`scen6_w2`	10.51	10.00	—	0.47	9.57	—	1.32	0.33	2.87	—	—	—	—	—	—	—
`scen7_w1_f5`	12.05	14.67	—	0.30	18.26	1.30	0.51	0.28	2.40	—	—	—	—	—	—	—
`scen9_w1_f3`	17.02	17.20	—	0.37	31.45	1.66	0.62	0.40	4.40	—	2.58	2.52	—	—	1.42	1.43
`scen10_w1_f3`	17.17	17.27	—	0.38	31.55	1.60	0.64	0.40	4.39	—	2.53	2.55	—	—	1.52	1.48
Grand total:	217.45	292.29	1484.87	12.58	872.52	57.64	19.57	33.75	42.26	106.96	7.24	7.19	—	—	170.28	182.57

Table 292. Solution time of solved instances belonging to class `rlfapModScens`. Problem range: `scen1_f8`–`scen10_w1_f3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen11_f2`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f3`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f4`	—	—	—	—	—	—	—	—	438.37	—	—	—	—	—	—	—
`scen11_f5`	—	—	—	—	—	—	—	—	118.72	—	—	—	—	—	—	—
`scen11_f6`	178.25	190.85	—	—	96.65	—	—	—	35.07	—	—	—	—	—	—	—
`scen11_f7`	70.62	75.89	—	418.88	32.05	—	270.08	273.37	33.42	—	—	—	—	—	—	—
`scen11_f8`	28.12	32.26	—	30.93	24.09	—	37.94	42.00	7.59	—	—	—	—	—	—	—
`scen11_f10`	22.24	25.13	—	1.26	20.37	—	2.23	5.50	5.21	—	—	—	—	—	—	—
`scen11_f12`	21.91	49.41	—	1.22	20.29	—	1.88	4.72	4.66	—	—	—	—	—	—	—
Grand total:	321.14	373.55	—	452.29	193.45	—	312.12	325.59	643.06	—	—	—	—	—	—	—

Table 293. Solution time of solved instances belonging to class `rlfapScens11`. Problem range: `scen11_f2`–`scen11_f12`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen1`	24.67	31.46	—	0.84	59.13	2.60	2.12	16.09	8.00	0.93	0.69	0.70	—	—	2.60	2.94
`scen2`	13.00	15.13	59.78	0.26	8.38	0.88	0.66	4.02	1.95	0.26	0.14	0.15	—	—	0.65	0.66
`scen3`	17.23	19.01	—	0.45	16.71	1.50	1.15	9.96	3.85	0.42	0.27	0.27	—	—	1.35	1.40
`scen4`	18.87	31.17	—	0.96	108.84	4.38	0.97	2.27	19.81	128.63	7.76	7.91	—	—	3.35	3.41
`scen5`	14.71	20.90	—	0.64	33.54	3.07	0.66	1.15	12.68	15.76	5.02	5.20	—	—	2.69	2.70
`scen11`	28.51	33.10	—	1.03	41.84	152.93	1.75	13.74	12.16	479.38	0.57	0.55	—	—	—	—
`scen6`	10.68	10.21	—	0.40	11.72	2.10	0.39	0.28	6.27	12.53	4.19	4.30	—	—	1.93	1.94
`scen7`	13.23	14.80	—	0.65	21.56	2.73	0.53	0.38	13.80	4.17	5.36	5.39	—	—	2.47	2.46
`scen8`	19.26	25.72	—	1.16	60.47	4.21	0.85	0.71	29.56	7.17	9.68	9.32	—	—	3.85	3.81
`scen9`	16.09	20.62	—	0.87	39.10	3.44	0.69	0.57	18.21	443.20	6.75	6.95	—	—	2.74	2.73
`scen10`	15.48	20.62	—	0.86	38.95	3.46	0.69	0.55	18.17	443.98	6.72	6.91	—	—	2.75	2.73
Grand total:	191.72	242.74	59.78	8.12	440.24	181.31	10.44	49.73	144.46	1536.42	47.16	47.64	—	—	24.39	24.78

Table 294. Solution time of solved instances belonging to class `rlfapScens`. Problem range: `scen1`–`scen10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`bh-4-4-easy-sat-0001-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0002-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0003-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0004-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0005-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0006-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0007-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0008-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0009-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
`bh-4-4-easy-sat-0010-BlackHole-4-4`	9253	9253	—	8661	—	—	14468	14468	—	—	—	—	—	8661	—	—
Grand total:	92530	92530	—	86610	—	—	144680	144680	—	—	—	—	—	86610	—	—

Table 295. Number of visited nodes required for solved instances belonging to class `BH-4-4`. Problem range: `bh-4-4-easy-sat-0001-BlackHole-4-4`–`bh-4-4-easy-sat-0010-BlackHole-4-4`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-1-QWH-10`	102	102	—	209	—	—	69	69	—	—	—	—	100	102	—	—
`qcp-order10-holes67-balanced-2-QWH-10`	100	100	—	103	—	—	65	65	—	—	—	—	100	100	—	—
`qcp-order10-holes67-balanced-3-QWH-10`	128	128	—	99	—	—	97	97	—	—	—	—	113	160	—	—
`qcp-order10-holes67-balanced-4-QWH-10`	288	288	—	100	—	—	66	66	—	—	—	—	100	369	—	—
`qcp-order10-holes67-balanced-5-QWH-10`	109	109	—	100	—	—	66	66	—	—	—	—	109	111	—	—
Grand total:	727	727	—	611	—	—	363	363	—	—	—	—	522	842	—	—

Table 296. Number of visited nodes required for solved instances belonging to class `QCP-10-easy`. Problem range: `qcp-order10-holes67-balanced-1-QWH-10`–`qcp-order10-holes67-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-7-QWH-10`	100	100	—	98	—	—	63	63	—	—	—	—	100	100	—	—
`qcp-order10-holes67-balanced-17-QWH-10`	145	145	—	285	—	—	1695	1695	—	—	—	—	—	259	—	—
`qcp-order10-holes67-balanced-186-QWH-10`	109	109	—	145	—	—	8089	8089	—	—	—	—	100	110	—	—
`qcp-order10-holes67-balanced-267-QWH-10`	230	230	—	497	—	—	1751	1751	—	—	—	—	752	269	—	—
`qcp-order10-holes67-balanced-315-QWH-10`	100	100	—	98	—	—	65	65	—	—	—	—	101	100	—	—
Grand total:	684	684	—	1123	—	—	11663	11663	—	—	—	—	1053	838	—	—

Table 297. Number of visited nodes required for solved instances belonging to class `QCP-10-hard`. Problem range: `qcp-order10-holes67-balanced-7-QWH-10`–`qcp-order10-holes67-balanced-315-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-33-QWH-10`	1013	1013	—	719	—	—	784	784	—	—	—	—	—	867	—	—
`qcp-order10-holes67-balanced-140-QWH-10`	350	350	—	163	—	—	648	648	—	—	—	—	—	447	—	—
`qcp-order10-holes67-balanced-150-QWH-10`	159	159	—	523	—	—	119	119	—	—	—	—	—	160	—	—
`qcp-order10-holes67-balanced-160-QWH-10`	47	47	—	51	—	—	18	18	—	—	—	—	14	51	—	—
`qcp-order10-holes67-balanced-946-QWH-10`	72	72	—	58	—	—	91	91	—	—	—	—	25	86	—	—
Grand total:	1641	1641	—	1514	—	—	1660	1660	—	—	—	—	39	1611	—	—

Table 298. Number of visited nodes required for solved instances belonging to class `QCP-10`. Problem range: `qcp-order10-holes67-balanced-33-QWH-10`–`qcp-order10-holes67-balanced-946-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-20-QWH-15`	6288	6288	—	5998	—	—	1136	1136	—	—	—	—	474	1257	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	51139	51139	—	82884	—	—	3409	3409	—	—	—	—	—	2596	—	—
`qcp-order15-holes120-balanced-22-QWH-15`	1999	1999	—	1741	—	—	1153	1153	—	—	—	—	3665	1193	—	—
`qcp-order15-holes120-balanced-23-QWH-15`	9033	9033	—	508	—	—	17190	17190	—	—	—	—	—	2771	—	—
`qcp-order15-holes120-balanced-24-QWH-15`	3409	3409	—	9852	—	—	12453	12453	—	—	—	—	—	—	—	—
Grand total:	71868	71868	—	100983	—	—	35341	35341	—	—	—	—	4139	7817	—	—

Table 299. Number of visited nodes required for solved instances belonging to class `QCP-15-easy`. Problem range: `qcp-order15-holes120-balanced-20-QWH-15`–`qcp-order15-holes120-balanced-24-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order15-holes120-balanced-225-QWH-15	6342	6342	—	4944	—	—	153953	153953	—	—	—	—	—	896	—	—
qcp-order15-holes120-balanced-245-QWH-15	6393	6393	—	15784	—	—	41403	41403	—	—	—	—	408	2489	—	—
qcp-order15-holes120-balanced-259-QWH-15	51770	6853	—	24751	—	—	5705	9154	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-278-QWH-15	4321	4321	—	1500778	—	—	52659	52659	—	—	—	—	1860	1181	—	—
qcp-order15-holes120-balanced-363-QWH-15	1454	1454	—	3051	—	—	8070	8070	—	—	—	—	—	16208	—	—
qcp-order15-holes120-balanced-488-QWH-15	82049	82049	—	220527	—	—	288823	288823	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-711-QWH-15	12115	12115	—	15815	—	—	168985	168985	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-736-QWH-15	16793	16793	—	18888	—	—	20035	20035	—	—	—	—	—	6137	—	—
qcp-order15-holes120-balanced-819-QWH-15	2911	2911	—	3782	—	—	10805	10805	—	—	—	—	3692	—	—	—
qcp-order15-holes120-balanced-941-QWH-15	80189	80189	—	232511	—	—	10389619	10389619	—	—	—	—	—	—	—	—
Grand total:	264337	219420	—	2040831	—	—	11140057	11143506	—	—	—	—	5960	26911	—	—

Table 300. Number of visited nodes required for solved instances belonging to class `QCP-15-hard`. Problem range: `qcp-order15-holes120-balanced-225-QWH-15`–`qcp-order15-holes120-balanced-941-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-90-QWH-15`	135864	135864	—	1540939	—	—	288755	288755	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-100-QWH-15`	342	342	—	380	—	—	305	305	—	—	—	—	78	740	—	—
`qcp-order15-holes120-balanced-103-QWH-15`	1039	1039	—	962	—	—	243	243	—	—	—	—	—	515	—	—
`qcp-order15-holes120-balanced-268-QWH-15`	—	—	—	139941	—	—	541651	541651	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-999-QWH-15`	512	512	—	10508286	—	—	264	264	—	—	—	—	—	432	—	—
Grand total:	137757	137757	—	12190508	—	—	831218	831218	—	—	—	—	78	1687	—	—

Table 301. Number of visited nodes required for solved instances belonging to class `QCP-15`. Problem range: `qcp-order15-holes120-balanced-90-QWH-15`–`qcp-order15-holes120-balanced-999-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-11-QWH-20`	37240	37240	—	—	—	—	204098	204098	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-19-QWH-20`	—	—	—	100383	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-24-QWH-20`	—	—	—	516799	—	—	1271515	1271515	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	—	—	—	38828	—	—	383991	383991	—	—	—	—	1328	—	—	—
`qcp-order20-holes187-balanced-30-QWH-20`	19665	19665	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	56905	56905	—	656010	—	—	1859604	1859604	—	—	—	—	1328	—	—	—

Table 302. Number of visited nodes required for solved instances belonging to class `QCP-20-easy`. Problem range: `qcp-order20-holes187-balanced-11-QWH-20`–`qcp-order20-holes187-balanced-30-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-6-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-10-QWH-20`	—	—	—	111959	—	—	4182112	4182112	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-32-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-214-QWH-20`	—	—	—	4699746	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-217-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-332-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-380-QWH-20`	—	—	—	—	—	—	6254303	6254303	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-597-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-702-QWH-20`	—	—	—	4722023	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-981-QWH-20`	—	—	—	—	—	—	4308239	4308239	—	—	—	—	—	—	—	—
Grand total:	—	—	—	9533728	—	—	14744654	14744654	—	—	—	—	—	—	—	—

Table 303. Number of visited nodes required for solved instances belonging to class `QCP-20-hard`. Problem range: `qcp-order20-holes187-balanced-6-QWH-20`–`qcp-order20-holes187-balanced-981-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-375-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-378-QWH-20`	13585	5369	—	8017	—	—	4291	29421	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-580-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-602-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-722-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	13585	5369	—	8017	—	—	4291	29421	—	—	—	—	—	—	—	—

Table 304. Number of visited nodes required for solved instances belonging to class `QCP-20`. Problem range: `qcp-order20-holes187-balanced-375-QWH-20`–`qcp-order20-holes187-balanced-722-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-23-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-31-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-64-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 305. Number of visited nodes required for solved instances belonging to class `QCP-25-easy`. Problem range: `qcp-order25-holes264-balanced-23-QWH-25`–`qcp-order25-holes264-balanced-64-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-3-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-6-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-9-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-11-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-14-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-22-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-29-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-68-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-79-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 306. Number of visited nodes required for solved instances belonging to class `QCP-25-hard`. Problem range: `qcp-order25-holes264-balanced-3-QWH-25`–`qcp-order25-holes264-balanced-79-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-15-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-32-QWH-25`	9827	9827	—	18518	—	—	7021	7021	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-33-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-34-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-75-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	9827	9827	—	18518	—	—	7021	7021	—	—	—	—	—	—	—	—

Table 307. Number of visited nodes required for solved instances belonging to class `QCP-25`. Problem range: `qcp-order25-holes264-balanced-15-QWH-25`–`qcp-order25-holes264-balanced-75-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-1-QWH-10`	249	249	—	104	—	—	1206	1206	—	—	—	—	103	407	—	—
`qcp-order10-holes64-balanced-15-QWH-10`	110	110	—	103	—	—	78	78	—	—	—	—	100	112	—	—
`qcp-order10-holes64-balanced-22-QWH-10`	101	101	—	112	—	—	63	63	—	—	—	—	113	101	—	—
`qcp-order10-holes64-balanced-52-QWH-10`	108	108	—	143	—	—	61	61	—	—	—	—	100	110	—	—
`qcp-order10-holes64-balanced-70-QWH-10`	154	154	—	98	—	—	120	120	—	—	—	—	104	160	—	—
Grand total:	722	722	—	560	—	—	1528	1528	—	—	—	—	520	890	—	—

Table 308. Number of visited nodes required for solved instances belonging to class `QCPp-10-easy`. Problem range: `qcp-order10-holes64-balanced-1-QWH-10`–`qcp-order10-holes64-balanced-70-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-221-QWH-10`	208	208	—	100	—	—	61	61	—	—	—	—	100	400	—	—
`qcp-order10-holes64-balanced-280-QWH-10`	101	101	—	108	—	—	80	80	—	—	—	—	122	101	—	—
`qcp-order10-holes64-balanced-351-QWH-10`	100	100	—	100	—	—	60	60	—	—	—	—	100	100	—	—
`qcp-order10-holes64-balanced-511-QWH-10`	423	423	—	33208	—	—	486	486	—	—	—	—	101	204	—	—
`qcp-order10-holes64-balanced-558-QWH-10`	100	100	—	99	—	—	116	116	—	—	—	—	100	100	—	—
`qcp-order10-holes64-balanced-698-QWH-10`	140	140	—	819	—	—	60	60	—	—	—	—	100	150	—	—
`qcp-order10-holes64-balanced-701-QWH-10`	134	134	—	99	—	—	73	73	—	—	—	—	103	138	—	—
`qcp-order10-holes64-balanced-731-QWH-10`	100	100	—	98	—	—	62	62	—	—	—	—	100	100	—	—
`qcp-order10-holes64-balanced-764-QWH-10`	100	100	—	99	—	—	62	62	—	—	—	—	101	100	—	—
`qcp-order10-holes64-balanced-885-QWH-10`	100	100	—	98	—	—	63	63	—	—	—	—	100	100	—	—
Grand total:	1506	1506	—	34828	—	—	1123	1123	—	—	—	—	1027	1493	—	—

Table 309. Number of visited nodes required for solved instances belonging to class `QCPp-10-hard`. Problem range: `qcp-order10-holes64-balanced-221-QWH-10`–`qcp-order10-holes64-balanced-885-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-16-QWH-10`	174	174	—	711	—	—	499	499	—	—	—	—	—	443	—	—
`qcp-order10-holes64-balanced-32-QWH-10`	216	216	—	512	—	—	144	144	—	—	—	—	—	335	—	—
`qcp-order10-holes64-balanced-45-QWH-10`	344	344	—	761	—	—	525	525	—	—	—	—	—	1022	—	—
`qcp-order10-holes64-balanced-109-QWH-10`	766	766	—	2375	—	—	3130	3130	—	—	—	—	—	1299	—	—
`qcp-order10-holes64-balanced-140-QWH-10`	172	172	—	255	—	—	134	134	—	—	—	—	19	327	—	—
Grand total:	1672	1672	—	4614	—	—	4432	4432	—	—	—	—	19	3426	—	—

Table 310. Number of visited nodes required for solved instances belonging to class `QCPp-10`. Problem range: `qcp-order10-holes64-balanced-16-QWH-10`–`qcp-order10-holes64-balanced-140-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-73-QWH-15`	599	599	—	728	—	—	1082	1082	—	—	—	—	229	36362	—	—
`qcp-order15-holes120-balanced-74-QWH-15`	492	492	—	499	—	—	122	122	—	—	—	—	255	584	—	—
`qcp-order15-holes120-balanced-75-QWH-15`	1657	1657	—	783	—	—	219076	219076	—	—	—	—	708	—	—	—
`qcp-order15-holes120-balanced-76-QWH-15`	288	288	—	699	—	—	707	707	—	—	—	—	225	301	—	—
`qcp-order15-holes120-balanced-77-QWH-15`	884	884	—	231	—	—	206	206	—	—	—	—	230	917	—	—
Grand total:	3920	3920	—	2940	—	—	221193	221193	—	—	—	—	1647	38164	—	—

Table 311. Number of visited nodes required for solved instances belonging to class `QCPp-15-easy`. Problem range: `qcp-order15-holes120-balanced-73-QWH-15`–`qcp-order15-holes120-balanced-77-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-3-QWH-15`	3602	3602	—	5525857	—	—	6965816	6965816	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-25-QWH-15`	485	485	—	479	—	—	499	499	—	—	—	—	226	1486	—	—
`qcp-order15-holes120-balanced-48-QWH-15`	854	854	—	7601	—	—	475	475	—	—	—	—	—	1595	—	—
`qcp-order15-holes120-balanced-127-QWH-15`	227	227	—	542	—	—	219	219	—	—	—	—	—	227	—	—
`qcp-order15-holes120-balanced-135-QWH-15`	444	444	—	958	—	—	1276	1276	—	—	—	—	—	2155	—	—
`qcp-order15-holes120-balanced-171-QWH-15`	1837	1837	—	2232	—	—	821	821	—	—	—	—	1200	2932	—	—
Grand total:	7449	7449	—	5537669	—	—	6969106	6969106	—	—	—	—	1426	8395	—	—

Table 312. Number of visited nodes required for solved instances belonging to class `QCPp-15-hard`. Problem range: `qcp-order15-holes120-balanced-3-QWH-15`–`qcp-order15-holes120-balanced-171-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-1-QWH-15`	368	368	—	1530	—	—	531	531	—	—	—	—	—	816	—	—
`qcp-order15-holes120-balanced-2-QWH-15`	42483	42483	—	191687	—	—	174608	174608	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-17-QWH-15`	565	565	—	5444	—	—	1248	1248	—	—	—	—	—	1259	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	142	126	—	141	—	—	36	22	—	—	—	—	31	211	—	—
`qcp-order15-holes120-balanced-54-QWH-15`	981	981	—	68113	—	—	2595	2595	—	—	—	—	—	3816	—	—
Grand total:	44539	44523	—	266915	—	—	179018	179004	—	—	—	—	31	6102	—	—

Table 313. Number of visited nodes required for solved instances belonging to class `QCPp-15`. Problem range: `qcp-order15-holes120-balanced-1-QWH-15`–`qcp-order15-holes120-balanced-54-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-13-QWH-20`	—	—	—	396065	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-14-QWH-20`	30185	30185	—	1299345	—	—	20579	20579	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-15-QWH-20`	3139	3139	—	703	—	—	13564	13564	—	—	—	—	—	1734	—	—
`qcp-order20-holes187-balanced-16-QWH-20`	1572	1572	—	24968	—	—	3541	3541	—	—	—	—	—	2445	—	—
`qcp-order20-holes187-balanced-17-QWH-20`	2384	2384	—	1600	—	—	34993	34993	—	—	—	—	650	—	—	—
Grand total:	37280	37280	—	1722681	—	—	72677	72677	—	—	—	—	650	4179	—	—

Table 314. Number of visited nodes required for solved instances belonging to class `QCPp-20-easy`. Problem range: `qcp-order20-holes187-balanced-13-QWH-20`–`qcp-order20-holes187-balanced-17-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-3-QWH-20`	2503	2503	—	1466	—	—	5826	5826	—	—	—	—	—	3741	—	—
`qcp-order20-holes187-balanced-12-QWH-20`	4593	4593	—	592	—	—	1794	1794	—	—	—	—	909	632	—	—
`qcp-order20-holes187-balanced-18-QWH-20`	5467	5467	—	1294	—	—	4518	4518	—	—	—	—	—	1246	—	—
`qcp-order20-holes187-balanced-22-QWH-20`	6622	6622	—	1170	—	—	983	983	—	—	—	—	—	2623	—	—
`qcp-order20-holes187-balanced-23-QWH-20`	1813	1813	—	4832	—	—	—	—	—	—	—	—	509	2258	—	—
Grand total:	20998	20998	—	9354	—	—	13121	13121	—	—	—	—	1418	10500	—	—

Table 315. Number of visited nodes required for solved instances belonging to class `QCPp-20-hard`. Problem range: `qcp-order20-holes187-balanced-3-QWH-20`–`qcp-order20-holes187-balanced-23-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-8-QWH-20`	1928	1928	—	15358	—	—	7910	7910	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-25-QWH-20`	961	961	—	2924	—	—	2467	2467	—	—	—	—	—	2189	—	—
`qcp-order20-holes187-balanced-27-QWH-20`	917	917	—	2980	—	—	1115	1115	—	—	—	—	—	1848	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	1320	1320	—	7749	—	—	2121	2121	—	—	—	—	—	2549	—	—
Grand total:	5126	5126	—	29011	—	—	13613	13613	—	—	—	—	—	6586	—	—

Table 316. Number of visited nodes required for solved instances belonging to class `QCPp-20`. Problem range: `qcp-order20-holes187-balanced-8-QWH-20`–`qcp-order20-holes187-balanced-29-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	194	219	—	132	—	—	61	75	—	—	—	—	117	233	—	—
`qwh-order10-holes57-balanced-2-QWH-10`	100	101	—	219	—	—	58	68	—	—	—	—	106	100	—	—
`qwh-order10-holes57-balanced-3-QWH-10`	128	128	—	186	—	—	58	58	—	—	—	—	103	137	—	—
`qwh-order10-holes57-balanced-4-QWH-10`	159	131	—	100	—	—	145	78	—	—	—	—	103	185	—	—
`qwh-order10-holes57-balanced-5-QWH-10`	268	181	—	99	—	—	84	54	—	—	—	—	100	209	—	—
Grand total:	849	760	—	736	—	—	406	333	—	—	—	—	529	864	—	—

Table 317. Number of visited nodes required for solved instances belonging to class `QWH-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-35-QWH-10`	100	102	—	98	—	—	107	111	—	—	—	—	100	100	—	—
`qwh-order10-holes57-balanced-54-QWH-10`	147	133	—	101	—	—	255	91	—	—	—	—	115	153	—	—
`qwh-order10-holes57-balanced-187-QWH-10`	105	105	—	101	—	—	67	67	—	—	—	—	104	106	—	—
`qwh-order10-holes57-balanced-219-QWH-10`	334	334	—	97	—	—	54	54	—	—	—	—	101	966	—	—
`qwh-order10-holes57-balanced-647-QWH-10`	101	115	—	260	—	—	76	94	—	—	—	—	107	101	—	—
Grand total:	787	789	—	657	—	—	559	417	—	—	—	—	527	1426	—	—

Table 318. Number of visited nodes required for solved instances belonging to class `QWH-10-hard`. Problem range: `qwh-order10-holes57-balanced-35-QWH-10`–`qwh-order10-holes57-balanced-647-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-14-QWH-15`	1572	1499	—	2967	—	—	1115	1229	—	—	—	—	280	567	—	—
`qwh-order15-holes106-balanced-15-QWH-15`	2141	1042	—	405	—	—	684	210	—	—	—	—	443	1049	—	—
`qwh-order15-holes106-balanced-16-QWH-15`	231	231	—	505	—	—	223	539	—	—	—	—	1878	232	—	—
`qwh-order15-holes106-balanced-17-QWH-15`	1379	1418	—	716	—	—	1033	921	—	—	—	—	348	868	—	—
`qwh-order15-holes106-balanced-18-QWH-15`	1813	2195	—	972	—	—	407	1364	—	—	—	—	352	1533	—	—
Grand total:	7136	6385	—	5565	—	—	3462	4263	—	—	—	—	3301	4249	—	—

Table 319. Number of visited nodes required for solved instances belonging to class `QWH-15-easy`. Problem range: `qwh-order15-holes106-balanced-14-QWH-15`–`qwh-order15-holes106-balanced-18-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-26-QWH-15`	1445	21416	—	7826	—	—	12049	30710	—	—	—	—	3117	—	—	—
`qwh-order15-holes106-balanced-155-QWH-15`	13975	13975	—	1086	—	—	7127	7127	—	—	—	—	688	3683	—	—
`qwh-order15-holes106-balanced-369-QWH-15`	544	544	—	969	—	—	255	255	—	—	—	—	298	389	—	—
`qwh-order15-holes106-balanced-392-QWH-15`	796	1345	—	6974	—	—	541	4785	—	—	—	—	311	1395	—	—
`qwh-order15-holes106-balanced-413-QWH-15`	3792	3792	—	16056	—	—	13739	13739	—	—	—	—	—	9061	—	—
`qwh-order15-holes106-balanced-461-QWH-15`	974	1990	—	4709	—	—	324	176	—	—	—	—	226	513	—	—
`qwh-order15-holes106-balanced-463-QWH-15`	4522	936	—	1292	—	—	9073	1086	—	—	—	—	1472	4741	—	—
`qwh-order15-holes106-balanced-586-QWH-15`	877	2324	—	3202	—	—	2971	1228	—	—	—	—	709	3095	—	—
`qwh-order15-holes106-balanced-974-QWH-15`	342	342	—	5856	—	—	1453	1453	—	—	—	—	2834	303	—	—
Grand total:	27267	46664	—	47970	—	—	47532	60559	—	—	—	—	9655	23180	—	—

Table 320. Number of visited nodes required for solved instances belonging to class `QWH-15-hard`. Problem range: `qwh-order15-holes106-balanced-26-QWH-15`–`qwh-order15-holes106-balanced-974-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-17-QWH-20`	11864	2367	—	4321	—	—	7520	11646	—	—	—	—	694	1585	—	—
`qwh-order20-holes166-balanced-18-QWH-20`	51989	44267	—	2414	—	—	16812	11328	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-19-QWH-20`	5599	3545	—	13971	—	—	3445	2126	—	—	—	—	—	2684	—	—
`qwh-order20-holes166-balanced-20-QWH-20`	35450	81419	—	10273	—	—	89792	4497	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-26-QWH-20`	12455	8543	—	962	—	—	7352	12058	—	—	—	—	788	4440	—	—
Grand total:	117357	140141	—	31941	—	—	124921	41655	—	—	—	—	1482	8709	—	—

Table 321. Number of visited nodes required for solved instances belonging to class `QWH-20-easy`. Problem range: `qwh-order20-holes166-balanced-17-QWH-20`–`qwh-order20-holes166-balanced-26-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-156-QWH-20`	3650	—	—	16904	—	—	1030895	36456	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-285-QWH-20`	—	31800	—	141043	—	—	1909	303630	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-457-QWH-20`	—	—	—	1613103	—	—	4384095	2790530	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-522-QWH-20`	38547	—	—	141625	—	—	1182725	3682	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-578-QWH-20`	25645	25645	—	374444	—	—	285217	285217	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-624-QWH-20`	—	5103	—	95745	—	—	735435	146495	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-707-QWH-20`	—	—	—	2329322	—	—	2894231	2894231	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-862-QWH-20`	—	13534	—	62229	—	—	2855555	864012	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-900-QWH-20`	23616	—	—	113119	—	—	66316	15875	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-988-QWH-20`	—	—	—	23168	—	—	114749	114749	—	—	—	—	—	—	—	—
Grand total:	91458	76082	—	4910702	—	—	13551127	7454877	—	—	—	—	—	—	—	—

Table 322. Number of visited nodes required for solved instances belonging to class `QWH-20-hard`. Problem range: `qwh-order20-holes166-balanced-156-QWH-20`–`qwh-order20-holes166-balanced-988-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-2-QWH-25`	—	—	—	1005071	—	—	5913189	386624	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-4-QWH-25`	—	—	—	3129669	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-13-QWH-25`	51375	—	—	15065	—	—	18895	11448	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-26-QWH-25`	50177	—	—	57252	—	—	231554	32684	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-27-QWH-25`	—	—	—	—	—	—	—	6249380	—	—	—	—	—	—	—	—
Grand total:	101552	—	—	4207057	—	—	6163638	6680136	—	—	—	—	—	—	—	—

Table 323. Number of visited nodes required for solved instances belonging to class `QWH-25-easy`. Problem range: `qwh-order25-holes235-balanced-2-QWH-25`–`qwh-order25-holes235-balanced-27-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-5-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-99-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-111-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-114-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-164-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-228-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-288-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-394-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-795-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-918-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-993-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 324. Number of visited nodes required for solved instances belonging to class `QWH-25-hard`. Problem range: `qwh-order25-holes235-balanced-5-QWH-25`–`qwh-order25-holes235-balanced-993-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	103	103	—	101	—	—	56	54	—	—	—	—	100	109	—	—
`qwh-order10-holes57-balanced-33-QWH-10`	113	249	—	141	—	—	909	106	—	—	—	—	291	116	—	—
`qwh-order10-holes57-balanced-43-QWH-10`	112	112	—	99	—	—	148	148	—	—	—	—	105	116	—	—
`qwh-order10-holes57-balanced-46-QWH-10`	100	100	—	100	—	—	101	52	—	—	—	—	101	100	—	—
`qwh-order10-holes57-balanced-111-QWH-10`	170	170	—	195	—	—	65	65	—	—	—	—	321	154	—	—
Grand total:	598	734	—	636	—	—	1279	425	—	—	—	—	918	595	—	—

Table 325. Number of visited nodes required for solved instances belonging to class `QWHp-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-111-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-8-QWH-10`	110	100	—	121	—	—	61	51	—	—	—	—	100	112	—	—
`qwh-order10-holes57-balanced-10-QWH-10`	100	100	—	747	—	—	54	54	—	—	—	—	9039	100	—	—
`qwh-order10-holes57-balanced-48-QWH-10`	101	102	—	121	—	—	56	68	—	—	—	—	101	101	—	—
`qwh-order10-holes57-balanced-154-QWH-10`	100	100	—	99	—	—	54	54	—	—	—	—	100	100	—	—
`qwh-order10-holes57-balanced-210-QWH-10`	103	103	—	125	—	—	55	55	—	—	—	—	100	104	—	—
`qwh-order10-holes57-balanced-295-QWH-10`	100	125	—	171	—	—	56	56	—	—	—	—	126	100	—	—
`qwh-order10-holes57-balanced-535-QWH-10`	100	100	—	101	—	—	55	55	—	—	—	—	100	100	—	—
`qwh-order10-holes57-balanced-623-QWH-10`	104	104	—	108	—	—	55	55	—	—	—	—	100	105	—	—
`qwh-order10-holes57-balanced-634-QWH-10`	116	107	—	97	—	—	58	58	—	—	—	—	125	119	—	—
`qwh-order10-holes57-balanced-987-QWH-10`	102	102	—	99	—	—	67	67	—	—	—	—	363	103	—	—
Grand total:	1036	1043	—	1789	—	—	571	573	—	—	—	—	10254	1044	—	—

Table 326. Number of visited nodes required for solved instances belonging to class `QWHp-10-hard`. Problem range: `qwh-order10-holes57-balanced-8-QWH-10`–`qwh-order10-holes57-balanced-987-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-4-QWH-15`	295	247	—	226	—	—	140	174	—	—	—	—	225	307	—	—
`qwh-order15-holes106-balanced-5-QWH-15`	787	787	—	869	—	—	211	211	—	—	—	—	273	2140	—	—
`qwh-order15-holes106-balanced-6-QWH-15`	490	490	—	1467	—	—	957	957	—	—	—	—	229	1512	—	—
`qwh-order15-holes106-balanced-7-QWH-15`	230	230	—	369	—	—	102	102	—	—	—	—	435	231	—	—
`qwh-order15-holes106-balanced-8-QWH-15`	641	641	—	1374	—	—	2674	2674	—	—	—	—	—	1797	—	—
Grand total:	2443	2395	—	4305	—	—	4084	4118	—	—	—	—	1162	5987	—	—

Table 327. Number of visited nodes required for solved instances belonging to class `QWHp-15-easy`. Problem range: `qwh-order15-holes106-balanced-4-QWH-15`–`qwh-order15-holes106-balanced-8-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-3-QWH-15`	508	238	—	294	—	—	187	120	—	—	—	—	225	454	—	—
Grand total:	508	238	—	294	—	—	187	120	—	—	—	—	225	454	—	—

Table 328. Number of visited nodes required for solved instances belonging to class `QWHp-15-hard`. Problem: `qwh-order15-holes106-balanced-3-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-15-106-0	1165	2174	—	3982	—	—	6610	2403	—	—	—	—	224	4640	—	—
bqwh-15-106-17	339	268	—	264	—	—	313	339	—	—	—	—	128	321	—	—
bqwh-15-106-22	222	180	—	242	—	—	397	464	—	—	—	—	405	296	—	—
bqwh-15-106-29	3403	1048	—	571	—	—	2522	1990	—	—	—	—	305	6688	—	—
bqwh-15-106-34	1124	258	—	1643	—	—	2328	110	—	—	—	—	124	1667	—	—
bqwh-15-106-39	276	273	—	1180	—	—	726	726	—	—	—	—	579	257	—	—
bqwh-15-106-53	1037	1010	—	1674	—	—	871	970	—	—	—	—	784	272	—	—
bqwh-15-106-64	691	1215	—	404	—	—	1688	1127	—	—	—	—	190	622	—	—
bqwh-15-106-67	3656	252	—	3151	—	—	2367	2367	—	—	—	—	983	1787	—	—
bqwh-15-106-76	152	303	—	1108	—	—	775	456	—	—	—	—	137	510	—	—
bqwh-15-106-77	575	433	—	759	—	—	1332	397	—	—	—	—	185	343	—	—
bqwh-15-106-78	1192	1177	—	426	—	—	1488	947	—	—	—	—	304	967	—	—
bqwh-15-106-83	2961	5107	—	9886	—	—	2483	2483	—	—	—	—	461	5954	—	—
bqwh-15-106-87	635	1747	—	236	—	—	754	711	—	—	—	—	257	1160	—	—
bqwh-15-106-89	6311	906	—	770	—	—	1812	744	—	—	—	—	296	465	—	—
bqwh-15-106-90	107	141	—	1027	—	—	779	927	—	—	—	—	175	489	—	—
bqwh-15-106-93	2104	1935	—	148	—	—	159	1534	—	—	—	—	1758	271	—	—
bqwh-15-106-96	941	1646	—	519	—	—	684	684	—	—	—	—	857	1009	—	—
bqwh-15-106-97	1228	2015	—	381	—	—	1219	849	—	—	—	—	384	960	—	—
Grand total:	28119	22088	—	28371	—	—	29307	20228	—	—	—	—	8536	28678	—	—

Table 329. Number of visited nodes required for solved instances belonging to class `bqwh15-106`. Problem range: `bqwh-15-106-0`–`bqwh-15-106-97`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-18-141-10	4080	2307	—	1049	—	—	76873	15526	—	—	—	—	1165	—	—	—
bqwh-18-141-23	162703	59581	—	54163	—	—	121665	40099	—	—	—	—	631	21098	—	—
bqwh-18-141-28	1333	1926	—	38494	—	—	39069	47821	—	—	—	—	675	10788	—	—
bqwh-18-141-29	977	978	—	5184	—	—	5662	5662	—	—	—	—	221	4658	—	—
bqwh-18-141-33	1885	832	—	1238	—	—	3021	2117	—	—	—	—	257	769	—	—
bqwh-18-141-36	9177	2452	—	3344	—	—	8408	20913	—	—	—	—	9823	4391	—	—
bqwh-18-141-37	7751	1326	—	1386	—	—	4229	4229	—	—	—	—	5137	8947	—	—
bqwh-18-141-39	22197	1870	—	2558	—	—	5120	6751	—	—	—	—	217	8025	—	—
bqwh-18-141-40	5192	2952	—	12105	—	—	1679	1498	—	—	—	—	1597	943	—	—
bqwh-18-141-44	2616	2355	—	2054	—	—	4423	6488	—	—	—	—	341	6555	—	—
bqwh-18-141-59	7583	1857	—	8890	—	—	22497	5053	—	—	—	—	9511	14891	—	—
bqwh-18-141-62	7630	4936	—	7697	—	—	5592	17617	—	—	—	—	182	14918	—	—
bqwh-18-141-65	1441	5910	—	12271	—	—	28607	2706	—	—	—	—	1507	19366	—	—
bqwh-18-141-68	16290	12492	—	1251	—	—	120264	41840	—	—	—	—	—	—	—	—
bqwh-18-141-73	72494	14137	—	94006	—	—	139127	139127	—	—	—	—	—	—	—	—
bqwh-18-141-89	2774	3424	—	1981	—	—	95776	91892	—	—	—	—	—	2493	—	—
bqwh-18-141-90	3187	8651	—	909	—	—	26974	5986	—	—	—	—	1262	11953	—	—
bqwh-18-141-92	5620	2224	—	3231	—	—	1945	1945	—	—	—	—	173	11810	—	—
bqwh-18-141-96	5301	7509	—	5131	—	—	3978	5004	—	—	—	—	3639	1673	—	—
Grand total:	340231	137719	—	256942	—	—	714909	462274	—	—	—	—	36338	143278	—	—

Table 330. Number of visited nodes required for solved instances belonging to class `bqwh18-141`. Problem range: `bqwh-18-141-10`–`bqwh-18-141-96`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-25-0`	54	0	—	626	—	—	453	0	—	—	—	—	7	440	—	—
`composed-25-1-25-1`	52	0	—	364	—	—	347	0	—	—	—	—	8	304	—	—
`composed-25-1-25-2`	78	0	—	639	—	—	419	0	—	—	—	—	8	504	—	—
`composed-25-1-25-3`	68	0	—	596	—	—	410	0	—	—	—	—	9	426	—	—
`composed-25-1-25-4`	123	0	—	671	—	—	444	0	—	—	—	—	10	494	—	—
`composed-25-1-25-5`	71	0	—	533	—	—	368	0	—	—	—	—	7	411	—	—
`composed-25-1-25-6`	57	0	—	633	—	—	415	0	—	—	—	—	10	383	—	—
`composed-25-1-25-7`	59	0	—	660	—	—	425	0	—	—	—	—	10	508	—	—
`composed-25-1-25-8`	65	0	—	565	—	—	470	0	—	—	—	—	9	378	—	—
`composed-25-1-25-9`	59	0	—	524	—	—	489	0	—	—	—	—	8	479	—	—
Grand total:	686	0	—	5811	—	—	4240	0	—	—	—	—	86	4327	—	—

Table 331. Number of visited nodes required for solved instances belonging to class `composed-25-1-25`. Problem range: `composed-25-1-25-0`–`composed-25-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-2-0`	51	0	—	620	—	—	505	0	—	—	—	—	7	426	—	—
`composed-25-1-2-1`	53	0	—	582	—	—	431	0	—	—	—	—	8	382	—	—
`composed-25-1-2-2`	111	0	—	909	—	—	573	0	—	—	—	—	8	595	—	—
`composed-25-1-2-3`	63	0	—	619	—	—	518	0	—	—	—	—	9	522	—	—
`composed-25-1-2-4`	129	0	—	750	—	—	589	0	—	—	—	—	10	589	—	—
`composed-25-1-2-5`	112	0	—	609	—	—	575	0	—	—	—	—	7	537	—	—
`composed-25-1-2-6`	107	0	—	785	—	—	559	0	—	—	—	—	10	571	—	—
`composed-25-1-2-7`	103	0	—	787	—	—	552	0	—	—	—	—	10	513	—	—
`composed-25-1-2-8`	52	0	—	634	—	—	511	0	—	—	—	—	9	537	—	—
`composed-25-1-2-9`	119	0	—	698	—	—	503	0	—	—	—	—	8	507	—	—
Grand total:	900	0	—	6993	—	—	5316	0	—	—	—	—	86	5179	—	—

Table 332. Number of visited nodes required for solved instances belonging to class `composed-25-1-2`. Problem range: `composed-25-1-2-0`–`composed-25-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-40-0`	62	0	—	541	—	—	360	0	—	—	—	—	7	352	—	—
`composed-25-1-40-1`	57	0	—	453	—	—	312	0	—	—	—	—	8	320	—	—
`composed-25-1-40-2`	125	0	—	599	—	—	387	0	—	—	—	—	8	466	—	—
`composed-25-1-40-3`	88	0	—	483	—	—	316	0	—	—	—	—	9	362	—	—
`composed-25-1-40-4`	76	0	—	605	—	—	428	0	—	—	—	—	10	475	—	—
`composed-25-1-40-5`	84	0	—	423	—	—	365	0	—	—	—	—	7	329	—	—
`composed-25-1-40-6`	55	0	—	590	—	—	504	0	—	—	—	—	10	389	—	—
`composed-25-1-40-7`	59	0	—	632	—	—	355	0	—	—	—	—	10	519	—	—
`composed-25-1-40-8`	74	0	—	568	—	—	462	0	—	—	—	—	9	371	—	—
`composed-25-1-40-9`	68	0	—	482	—	—	465	0	—	—	—	—	8	518	—	—
Grand total:	748	0	—	5376	—	—	3954	0	—	—	—	—	86	4101	—	—

Table 333. Number of visited nodes required for solved instances belonging to class `composed-25-1-40`. Problem range: `composed-25-1-40-0`–`composed-25-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-80-0`	72	0	—	419	—	—	312	0	—	—	—	—	7	338	—	—
`composed-25-1-80-1`	4	0	—	6	—	—	6	0	—	—	—	—	8	6	—	—
`composed-25-1-80-2`	73	0	—	492	—	—	329	0	—	—	—	—	8	398	—	—
`composed-25-1-80-3`	62	0	—	347	—	—	191	0	—	—	—	—	9	237	—	—
`composed-25-1-80-4`	76	0	—	569	—	—	345	0	—	—	—	—	10	363	—	—
`composed-25-1-80-5`	67	0	—	71	—	—	71	0	—	—	—	—	7	267	—	—
`composed-25-1-80-6`	72	0	—	609	—	—	345	0	—	—	—	—	10	350	—	—
`composed-25-1-80-7`	71	0	—	577	—	—	398	0	—	—	—	—	10	394	—	—
`composed-25-1-80-8`	5	0	—	8	—	—	8	0	—	—	—	—	9	8	—	—
`composed-25-1-80-9`	64	0	—	452	—	—	446	0	—	—	—	—	8	527	—	—
Grand total:	566	0	—	3550	—	—	2451	0	—	—	—	—	86	2888	—	—

Table 334. Number of visited nodes required for solved instances belonging to class `composed-25-1-80`. Problem range: `composed-25-1-80-0`–`composed-25-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-10-20-0`	126	112	—	113	—	—	691	322	—	—	—	—	156	833	—	—
`composed-25-10-20-1`	696	111	—	423	—	—	456	198	—	—	—	—	154	927	—	—
`composed-25-10-20-2`	340	107	—	561	—	—	928	111	—	—	—	—	135	927	—	—
`composed-25-10-20-3`	125	112	—	110	—	—	1344	471	—	—	—	—	179	1049	—	—
`composed-25-10-20-4`	278	108	—	265	—	—	660	120	—	—	—	—	233	134	—	—
`composed-25-10-20-5`	122	110	—	114	—	—	110	124	—	—	—	—	132	398	—	—
`composed-25-10-20-6`	117	115	—	97	—	—	2033	922	—	—	—	—	—	1905	—	—
`composed-25-10-20-7`	108	108	—	111	—	—	109	98	—	—	—	—	126	166	—	—
`composed-25-10-20-8`	119	110	—	1292	—	—	594	301	—	—	—	—	140	129	—	—
`composed-25-10-20-9`	319	109	—	489	—	—	309	114	—	—	—	—	139	350	—	—
Grand total:	2350	1102	—	3575	—	—	7234	2781	—	—	—	—	1394	6818	—	—

Table 335. Number of visited nodes required for solved instances belonging to class `composed-25-10-20`. Problem range: `composed-25-10-20-0`–`composed-25-10-20-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-25-0`	180	0	—	1420	—	—	1139	0	—	—	—	—	8	1013	—	—
`composed-75-1-25-1`	89	0	—	1606	—	—	1178	0	—	—	—	—	10	1047	—	—
`composed-75-1-25-2`	188	0	—	1630	—	—	1186	0	—	—	—	—	9	1031	—	—
`composed-75-1-25-3`	192	0	—	1594	—	—	1229	0	—	—	—	—	9	1143	—	—
`composed-75-1-25-4`	92	0	—	1179	—	—	912	0	—	—	—	—	5	820	—	—
`composed-75-1-25-5`	177	0	—	1692	—	—	967	0	—	—	—	—	9	979	—	—
`composed-75-1-25-6`	169	0	—	1739	—	—	1258	0	—	—	—	—	9	1222	—	—
`composed-75-1-25-7`	170	0	—	1694	—	—	953	0	—	—	—	—	8	1056	—	—
`composed-75-1-25-8`	163	0	—	1186	—	—	1037	0	—	—	—	—	9	757	—	—
`composed-75-1-25-9`	179	0	—	1532	—	—	1164	0	—	—	—	—	10	975	—	—
Grand total:	1599	0	—	15272	—	—	11023	0	—	—	—	—	86	10043	—	—

Table 336. Number of visited nodes required for solved instances belonging to class `composed-75-1-25`. Problem range: `composed-75-1-25-0`–`composed-75-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-2-0`	177	0	—	1653	—	—	1235	0	—	—	—	—	8	1053	—	—
`composed-75-1-2-1`	170	0	—	1781	—	—	1176	0	—	—	—	—	10	1195	—	—
`composed-75-1-2-2`	175	0	—	1785	—	—	1085	0	—	—	—	—	9	1092	—	—
`composed-75-1-2-3`	179	0	—	1852	—	—	1392	0	—	—	—	—	9	1003	—	—
`composed-75-1-2-4`	86	0	—	1634	—	—	1096	0	—	—	—	—	5	810	—	—
`composed-75-1-2-5`	172	0	—	1878	—	—	1227	0	—	—	—	—	9	1318	—	—
`composed-75-1-2-6`	184	0	—	1907	—	—	1324	0	—	—	—	—	9	1196	—	—
`composed-75-1-2-7`	171	0	—	1662	—	—	1112	0	—	—	—	—	8	1128	—	—
`composed-75-1-2-8`	176	0	—	1715	—	—	1247	0	—	—	—	—	9	906	—	—
`composed-75-1-2-9`	234	0	—	1769	—	—	1340	0	—	—	—	—	10	1218	—	—
Grand total:	1724	0	—	17636	—	—	12234	0	—	—	—	—	86	10919	—	—

Table 337. Number of visited nodes required for solved instances belonging to class `composed-75-1-2`. Problem range: `composed-75-1-2-0`–`composed-75-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-40-0`	88	0	—	1197	—	—	926	0	—	—	—	—	8	764	—	—
`composed-75-1-40-1`	85	0	—	1409	—	—	924	0	—	—	—	—	10	1009	—	—
`composed-75-1-40-2`	99	0	—	1245	—	—	976	0	—	—	—	—	9	947	—	—
`composed-75-1-40-3`	98	0	—	1334	—	—	1167	0	—	—	—	—	9	1052	—	—
`composed-75-1-40-4`	90	0	—	1185	—	—	984	0	—	—	—	—	5	793	—	—
`composed-75-1-40-5`	110	0	—	1315	—	—	745	0	—	—	—	—	9	812	—	—
`composed-75-1-40-6`	91	0	—	1556	—	—	1087	0	—	—	—	—	9	875	—	—
`composed-75-1-40-7`	88	0	—	1733	—	—	870	0	—	—	—	—	8	856	—	—
`composed-75-1-40-8`	167	0	—	1089	—	—	849	0	—	—	—	—	9	685	—	—
`composed-75-1-40-9`	169	0	—	1413	—	—	1191	0	—	—	—	—	10	970	—	—
Grand total:	1085	0	—	13476	—	—	9719	0	—	—	—	—	86	8763	—	—

Table 338. Number of visited nodes required for solved instances belonging to class `composed-75-1-40`. Problem range: `composed-75-1-40-0`–`composed-75-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-80-0`	4	0	—	7	—	—	7	0	—	—	—	—	8	7	—	—
`composed-75-1-80-1`	102	0	—	882	—	—	962	0	—	—	—	—	10	891	—	—
`composed-75-1-80-2`	6	0	—	9	—	—	9	0	—	—	—	—	9	9	—	—
`composed-75-1-80-3`	98	0	—	931	—	—	911	0	—	—	—	—	9	752	—	—
`composed-75-1-80-4`	3	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
`composed-75-1-80-5`	93	0	—	1219	—	—	670	0	—	—	—	—	9	690	—	—
`composed-75-1-80-6`	74	0	—	987	—	—	923	0	—	—	—	—	9	906	—	—
`composed-75-1-80-7`	91	0	—	1041	—	—	815	0	—	—	—	—	8	623	—	—
`composed-75-1-80-8`	87	0	—	898	—	—	448	0	—	—	—	—	9	527	—	—
`composed-75-1-80-9`	80	0	—	1381	—	—	962	0	—	—	—	—	10	888	—	—
Grand total:	638	0	—	7360	—	—	5712	0	—	—	—	—	86	5298	—	—

Table 339. Number of visited nodes required for solved instances belonging to class `composed-75-1-80`. Problem range: `composed-75-1-80-0`–`composed-75-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`cril_unsat_b_1`	5404	5404	—	1649151	—	—	1069154	1198138	—	—	—	—	—	—	—	—
`cril_unsat_b_2`	6654	6654	—	—	—	—	—	0	—	—	—	—	7	—	—	—
`cril_unsat_b_3`	12714	12714	—	—	—	—	—	0	—	—	—	—	10	—	—	—
`cril_unsat_b_4`	7253	7253	—	—	—	—	—	0	—	—	—	—	—	—	—	—
`cril_unsat_b_5`	1786	0	—	2937	—	—	2936	0	—	—	—	—	—	—	—	—
Grand total:	33811	32025	—	1652088	—	—	1072090	1198138	—	—	—	—	17	—	—	—

Table 340. Number of visited nodes required for solved instances belonging to class `cril`. Problem range: `cril_unsat_b_1`–`cril_unsat_b_5`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`domino-100-100`	100	100	—	99	—	—	0	0	—	—	—	—	100	100	—	—
`domino-100-200`	100	100	—	99	—	—	0	0	—	—	—	—	100	100	—	—
`domino-100-300`	100	100	—	99	—	—	0	0	—	—	—	—	100	100	—	—
`domino-300-100`	300	300	—	299	—	—	0	0	—	—	—	—	300	300	—	—
`domino-300-200`	300	300	—	299	—	—	0	0	—	—	—	—	300	300	—	—
`domino-300-300`	300	300	—	299	—	—	0	0	—	—	—	—	—	—	—	—
`domino-500-100`	500	500	—	499	—	—	0	0	—	—	—	—	—	—	—	—
`domino-500-200`	500	500	—	499	—	—	0	0	—	—	—	—	—	—	—	—
`domino-500-300`	500	500	—	499	—	—	0	0	—	—	—	—	—	—	—	—
`domino-1000-10`	1000	1000	—	999	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	3700	3700	—	3690	—	—	0	0	—	—	—	—	900	900	—	—

Table 341. Number of visited nodes required for solved instances belonging to class `domino1`. Problem range: `domino-100-100`–`domino-1000-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-0	706	0	—	3391	—	—	2669	0	—	—	—	—	10	2380	—	—
dual_ehi-85-297-10	549	0	—	1334	—	—	1509	0	—	—	—	—	7	1071	—	—
dual_ehi-85-297-11	442	0	—	59	—	—	61	0	—	—	—	—	6	63	—	—
dual_ehi-85-297-12	175	0	—	2588	—	—	483	0	—	—	—	—	6	616	—	—
dual_ehi-85-297-13	911	0	—	5162	—	—	16339	0	—	—	—	—	10	—	—	—
dual_ehi-85-297-14	11	0	—	18	—	—	18	0	—	—	—	—	6	18	—	—
dual_ehi-85-297-15	529	0	—	2963	—	—	5023	0	—	—	—	—	7	2922	—	—
dual_ehi-85-297-16	155	0	—	278	—	—	443	0	—	—	—	—	18	1036	—	—
dual_ehi-85-297-17	270	0	—	4244	—	—	1466	0	—	—	—	—	6	1327	—	—
dual_ehi-85-297-18	387	0	—	1476	—	—	1838	0	—	—	—	—	6	870	—	—
dual_ehi-85-297-19	8	0	—	19	—	—	19	0	—	—	—	—	5	19	—	—
dual_ehi-85-297-1	273	0	—	1360	—	—	1969	0	—	—	—	—	7	1199	—	—
dual_ehi-85-297-20	212	0	—	1458	—	—	7720	0	—	—	—	—	7	1980	—	—
dual_ehi-85-297-21	171	0	—	434	—	—	14	0	—	—	—	—	13	448	—	—
dual_ehi-85-297-22	226	0	—	7	—	—	7	0	—	—	—	—	9	7	—	—
dual_ehi-85-297-23	133	0	—	11	—	—	11	0	—	—	—	—	5	11	—	—
dual_ehi-85-297-24	105	0	—	2887	—	—	6319	0	—	—	—	—	7	3943	—	—
dual_ehi-85-297-25	347	0	—	1286	—	—	3502	0	—	—	—	—	6	2182	—	—
dual_ehi-85-297-26	338	0	—	4346	—	—	6182	0	—	—	—	—	—	2817	—	—
dual_ehi-85-297-27	9	0	—	5	—	—	5	0	—	—	—	—	6	5	—	—

Table 342. Number of visited nodes required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-28	2	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-85-297-29	34	0	—	4	—	—	4	0	—	—	—	—	6	4	—	—
dual_ehi-85-297-2	723	0	—	1941	—	—	6345	0	—	—	—	—	6	1733	—	—
dual_ehi-85-297-30	117	0	—	4096	—	—	3474	6	—	—	—	—	7	2422	—	—
dual_ehi-85-297-31	4	0	—	8	—	—	8	0	—	—	—	—	6	8	—	—
dual_ehi-85-297-32	45	0	—	58	—	—	31	0	—	—	—	—	7	627	—	—
dual_ehi-85-297-33	530	0	—	1195	—	—	1395	0	—	—	—	—	—	1202	—	—
dual_ehi-85-297-34	4	0	—	4	—	—	4	0	—	—	—	—	5	4	—	—
dual_ehi-85-297-35	401	0	—	4380	—	—	2931	0	—	—	—	—	7	1568	—	—
dual_ehi-85-297-36	2	0	—	12	—	—	12	0	—	—	—	—	5	12	—	—
dual_ehi-85-297-37	377	0	—	1113	—	—	864	0	—	—	—	—	6	1607	—	—
dual_ehi-85-297-38	233	0	—	3811	—	—	4036	0	—	—	—	—	—	1446	—	—
dual_ehi-85-297-39	693	0	—	3266	—	—	2679	0	—	—	—	—	16	2164	—	—
dual_ehi-85-297-3	328	0	—	5110	—	—	8283	0	—	—	—	—	7	2829	—	—
dual_ehi-85-297-40	108	0	—	2304	—	—	5464	0	—	—	—	—	6	1442	—	—
dual_ehi-85-297-41	303	0	—	1616	—	—	861	0	—	—	—	—	7	1338	—	—
dual_ehi-85-297-42	7	0	—	9	—	—	9	0	—	—	—	—	6	9	—	—
dual_ehi-85-297-43	2	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-85-297-44	255	0	—	1331	—	—	4669	0	—	—	—	—	22	1293	—	—
dual_ehi-85-297-45	2	0	—	4	—	—	4	0	—	—	—	—	11	4	—	—

Table 343. Number of visited nodes required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-28`–`dual_ehi-85-297-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-46	218	0	—	1233	—	—	3303	0	—	—	—	—	11	3320	—	—
dual_ehi-85-297-47	25	0	—	7	—	—	7	0	—	—	—	—	7	7	—	—
dual_ehi-85-297-48	878	0	—	1364	—	—	4465	0	—	—	—	—	6	2972	—	—
dual_ehi-85-297-49	206	0	—	877	—	—	467	0	—	—	—	—	7	3190	—	—
dual_ehi-85-297-4	322	0	—	2963	—	—	3992	0	—	—	—	—	7	1353	—	—
dual_ehi-85-297-50	181	0	—	1852	—	—	7428	0	—	—	—	—	10	1927	—	—
dual_ehi-85-297-51	465	0	—	3848	—	—	4927	0	—	—	—	—	7	4161	—	—
dual_ehi-85-297-52	962	0	—	15	—	—	15	0	—	—	—	—	6	15	—	—
dual_ehi-85-297-53	316	0	—	2159	—	—	4431	0	—	—	—	—	7	1932	—	—
dual_ehi-85-297-54	274	0	—	1682	—	—	303	0	—	—	—	—	6	368	—	—
dual_ehi-85-297-55	727	0	—	3881	—	—	4770	0	—	—	—	—	—	1742	—	—
dual_ehi-85-297-56	726	0	—	502	—	—	901	0	—	—	—	—	7	790	—	—
dual_ehi-85-297-57	689	0	—	3705	—	—	3581	0	—	—	—	—	7	1008	—	—
dual_ehi-85-297-58	1	0	—	4	—	—	4	0	—	—	—	—	5	4	—	—
dual_ehi-85-297-59	265	0	—	3885	—	—	3469	0	—	—	—	—	7	1884	—	—
dual_ehi-85-297-5	215	0	—	461	—	—	244	0	—	—	—	—	7	432	—	—
dual_ehi-85-297-60	2	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-85-297-61	206	0	—	12155	—	—	3726	0	—	—	—	—	7	2167	—	—
dual_ehi-85-297-62	445	0	—	3118	—	—	4178	0	—	—	—	—	14	3509	—	—
dual_ehi-85-297-63	576	0	—	3922	—	—	6957	0	—	—	—	—	7	2935	—	—

Table 344. Number of visited nodes required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-46`–`dual_ehi-85-297-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-64	263	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-85-297-65	215	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-85-297-66	6	0	—	26	—	—	26	0	—	—	—	—	16	26	—	—
dual_ehi-85-297-67	948	0	—	7	—	—	7	0	—	—	—	—	6	7	—	—
dual_ehi-85-297-68	128	0	—	1923	—	—	5220	0	—	—	—	—	12	2110	—	—
dual_ehi-85-297-69	461	0	—	1999	—	—	321	0	—	—	—	—	11	630	—	—
dual_ehi-85-297-6	983	0	—	3512	—	—	4197	0	—	—	—	—	6	4111	—	—
dual_ehi-85-297-70	442	0	—	2462	—	—	2961	0	—	—	—	—	12	1875	—	—
dual_ehi-85-297-71	56	0	—	2154	—	—	1643	0	—	—	—	—	6	957	—	—
dual_ehi-85-297-72	146	0	—	437	—	—	293	0	—	—	—	—	6	184	—	—
dual_ehi-85-297-73	978	0	—	4077	—	—	3373	0	—	—	—	—	7	1506	—	—
dual_ehi-85-297-74	762	0	—	8	—	—	8	0	—	—	—	—	5	8	—	—
dual_ehi-85-297-75	229	0	—	4	—	—	4	0	—	—	—	—	5	4	—	—
dual_ehi-85-297-76	281	0	—	706	—	—	880	0	—	—	—	—	7	926	—	—
dual_ehi-85-297-77	544	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-85-297-78	237	0	—	2101	—	—	1889	0	—	—	—	—	7	2241	—	—
dual_ehi-85-297-79	251	0	—	7	—	—	7	0	—	—	—	—	5	7	—	—
dual_ehi-85-297-7	260	0	—	3746	—	—	7739	0	—	—	—	—	7	3305	—	—
dual_ehi-85-297-80	1	0	—	4	—	—	4	0	—	—	—	—	6	4	—	—
dual_ehi-85-297-81	1006	0	—	3602	—	—	4804	0	—	—	—	—	7	3709	—	—

Table 345. Number of visited nodes required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-64`–`dual_ehi-85-297-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-82	1	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-85-297-83	236	0	—	4211	—	—	338	0	—	—	—	—	6	620	—	—
dual_ehi-85-297-84	1307	0	—	2563	—	—	4003	0	—	—	—	—	7	2628	—	—
dual_ehi-85-297-85	872	0	—	4010	—	—	901	0	—	—	—	—	7	1031	—	—
dual_ehi-85-297-86	663	0	—	576	—	—	387	0	—	—	—	—	8	653	—	—
dual_ehi-85-297-87	210	0	—	144	—	—	2313	0	—	—	—	—	7	1166	—	—
dual_ehi-85-297-88	1	0	—	3	—	—	3	0	—	—	—	—	6	3	—	—
dual_ehi-85-297-89	575	0	—	2605	—	—	2649	0	—	—	—	—	6	1774	—	—
dual_ehi-85-297-8	1764	0	—	7	—	—	7	0	—	—	—	—	6	7	—	—
dual_ehi-85-297-90	438	0	—	17	—	—	17	0	—	—	—	—	7	17	—	—
dual_ehi-85-297-91	170	0	—	7411	—	—	10001	0	—	—	—	—	6	2202	—	—
dual_ehi-85-297-92	262	0	—	430	—	—	4663	0	—	—	—	—	7	1885	—	—
dual_ehi-85-297-93	158	0	—	4800	—	—	3424	0	—	—	—	—	9	1616	—	—
dual_ehi-85-297-94	4	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-85-297-95	576	0	—	7256	—	—	4476	0	—	—	—	—	7	1850	—	—
dual_ehi-85-297-96	6	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-85-297-97	549	0	—	2028	—	—	4209	0	—	—	—	—	7	3585	—	—
dual_ehi-85-297-98	203	0	—	1084	—	—	3365	0	—	—	—	—	6	1291	—	—
dual_ehi-85-297-99	296	0	—	2047	—	—	1924	0	—	—	—	—	7	1253	—	—
dual_ehi-85-297-9	2	0	—	4	—	—	4	0	—	—	—	—	4	4	—	—
Grand total:	34316	0	—	177237	—	—	229943	6	—	—	—	—	707	119582	—	—

Table 346. Number of visited nodes required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-0	3	0	—	6	—	—	6	0	—	—	—	—	10	6	—	—
dual_ehi-90-315-10	531	0	—	1467	—	—	3902	0	—	—	—	—	7	1818	—	—
dual_ehi-90-315-11	126	0	—	931	—	—	43	0	—	—	—	—	6	45	—	—
dual_ehi-90-315-12	547	0	—	4109	—	—	3696	0	—	—	—	—	6	973	—	—
dual_ehi-90-315-13	229	0	—	1193	—	—	1526	0	—	—	—	—	10	1519	—	—
dual_ehi-90-315-14	5	0	—	7	—	—	7	0	—	—	—	—	6	7	—	—
dual_ehi-90-315-15	267	0	—	1569	—	—	9213	0	—	—	—	—	7	1177	—	—
dual_ehi-90-315-16	599	0	—	4631	—	—	5022	0	—	—	—	—	—	1643	—	—
dual_ehi-90-315-17	601	0	—	1462	—	—	1804	0	—	—	—	—	6	1339	—	—
dual_ehi-90-315-18	278	0	—	3213	—	—	2858	0	—	—	—	—	6	1429	—	—
dual_ehi-90-315-19	408	0	—	9	—	—	9	0	—	—	—	—	5	9	—	—
dual_ehi-90-315-1	516	0	—	1648	—	—	1589	0	—	—	—	—	7	3300	—	—
dual_ehi-90-315-20	424	0	—	2481	—	—	6983	0	—	—	—	—	7	1538	—	—
dual_ehi-90-315-21	456	0	—	1977	—	—	1084	0	—	—	—	—	13	2307	—	—
dual_ehi-90-315-22	3	0	—	4	—	—	4	0	—	—	—	—	4	4	—	—
dual_ehi-90-315-23	226	0	—	7	—	—	7	0	—	—	—	—	5	7	—	—
dual_ehi-90-315-24	253	0	—	634	—	—	3271	0	—	—	—	—	7	813	—	—
dual_ehi-90-315-25	24	0	—	30	—	—	32	0	—	—	—	—	6	32	—	—
dual_ehi-90-315-26	445	0	—	2885	—	—	1530	0	—	—	—	—	7	487	—	—
dual_ehi-90-315-27	3	0	—	5	—	—	5	0	—	—	—	—	6	5	—	—

Table 347. Number of visited nodes required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-28	203	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-90-315-29	2	0	—	4	—	—	4	0	—	—	—	—	6	4	—	—
dual_ehi-90-315-2	4	0	—	8	—	—	8	0	—	—	—	—	6	8	—	—
dual_ehi-90-315-30	223	0	—	2185	—	—	3962	6	—	—	—	—	7	2183	—	—
dual_ehi-90-315-31	7	0	—	8	—	—	8	0	—	—	—	—	11	8	—	—
dual_ehi-90-315-32	864	0	—	3245	—	—	1203	0	—	—	—	—	7	1267	—	—
dual_ehi-90-315-33	286	0	—	6063	—	—	4015	0	—	—	—	—	12	2460	—	—
dual_ehi-90-315-34	53	0	—	4	—	—	4	0	—	—	—	—	4	4	—	—
dual_ehi-90-315-35	689	0	—	92	—	—	294	0	—	—	—	—	7	334	—	—
dual_ehi-90-315-36	16	0	—	22	—	—	22	0	—	—	—	—	5	22	—	—
dual_ehi-90-315-37	285	0	—	546	—	—	605	0	—	—	—	—	6	716	—	—
dual_ehi-90-315-38	1395	0	—	4658	—	—	5830	0	—	—	—	—	7	995	—	—
dual_ehi-90-315-39	228	0	—	1036	—	—	5053	0	—	—	—	—	16	2134	—	—
dual_ehi-90-315-3	313	0	—	4048	—	—	6374	0	—	—	—	—	7	2506	—	—
dual_ehi-90-315-40	206	0	—	1923	—	—	1729	0	—	—	—	—	6	1838	—	—
dual_ehi-90-315-41	145	0	—	681	—	—	4135	0	—	—	—	—	7	1223	—	—
dual_ehi-90-315-42	492	0	—	2159	—	—	2236	0	—	—	—	—	6	1008	—	—
dual_ehi-90-315-43	2	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-90-315-44	545	0	—	2467	—	—	3396	0	—	—	—	—	22	2467	—	—
dual_ehi-90-315-45	2	0	—	4	—	—	4	0	—	—	—	—	11	4	—	—

Table 348. Number of visited nodes required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-28`–`dual_ehi-90-315-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-46	550	0	—	2086	—	—	2204	0	—	—	—	—	12	2453	—	—
dual_ehi-90-315-47	3	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-90-315-48	530	0	—	2896	—	—	1580	0	—	—	—	—	6	2179	—	—
dual_ehi-90-315-49	313	0	—	3192	—	—	1794	0	—	—	—	—	7	1797	—	—
dual_ehi-90-315-4	305	0	—	2767	—	—	2163	0	—	—	—	—	7	2717	—	—
dual_ehi-90-315-50	23	0	—	29	—	—	29	0	—	—	—	—	10	29	—	—
dual_ehi-90-315-51	268	0	—	3545	—	—	1810	0	—	—	—	—	7	1506	—	—
dual_ehi-90-315-52	170	0	—	2084	—	—	2718	0	—	—	—	—	7	1446	—	—
dual_ehi-90-315-53	124	0	—	6	—	—	6	0	—	—	—	—	7	6	—	—
dual_ehi-90-315-54	263	0	—	4396	—	—	3030	0	—	—	—	—	6	2839	—	—
dual_ehi-90-315-55	723	0	—	2820	—	—	4278	0	—	—	—	—	7	—	—	—
dual_ehi-90-315-56	181	0	—	4479	—	—	579	0	—	—	—	—	7	572	—	—
dual_ehi-90-315-57	149	0	—	1527	—	—	1436	0	—	—	—	—	7	1943	—	—
dual_ehi-90-315-58	1	0	—	4	—	—	4	0	—	—	—	—	5	4	—	—
dual_ehi-90-315-59	166	0	—	329	—	—	2392	0	—	—	—	—	7	552	—	—
dual_ehi-90-315-5	867	0	—	14	—	—	14	0	—	—	—	—	7	14	—	—
dual_ehi-90-315-60	2	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-90-315-61	218	0	—	2526	—	—	7455	0	—	—	—	—	7	2549	—	—
dual_ehi-90-315-62	365	0	—	1760	—	—	5027	0	—	—	—	—	14	1747	—	—
dual_ehi-90-315-63	421	0	—	2009	—	—	5041	0	—	—	—	—	7	1368	—	—

Table 349. Number of visited nodes required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-46`–`dual_ehi-90-315-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-64	248	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-90-315-65	4	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-90-315-66	15	0	—	26	—	—	20	0	—	—	—	—	16	20	—	—
dual_ehi-90-315-67	1348	0	—	7	—	—	7	0	—	—	—	—	6	7	—	—
dual_ehi-90-315-68	468	0	—	2767	—	—	2689	0	—	—	—	—	7	1952	—	—
dual_ehi-90-315-69	589	0	—	5302	—	—	1743	0	—	—	—	—	12	585	—	—
dual_ehi-90-315-6	600	0	—	1635	—	—	2352	0	—	—	—	—	6	1952	—	—
dual_ehi-90-315-70	128	0	—	9	—	—	9	0	—	—	—	—	7	9	—	—
dual_ehi-90-315-71	504	0	—	3006	—	—	2112	0	—	—	—	—	6	1183	—	—
dual_ehi-90-315-72	1022	0	—	7296	—	—	11121	0	—	—	—	—	6	1972	—	—
dual_ehi-90-315-73	409	0	—	7	—	—	7	0	—	—	—	—	7	7	—	—
dual_ehi-90-315-74	97	0	—	8	—	—	8	0	—	—	—	—	5	8	—	—
dual_ehi-90-315-75	2	0	—	4	—	—	4	0	—	—	—	—	5	4	—	—
dual_ehi-90-315-76	435	0	—	2994	—	—	6399	0	—	—	—	—	7	—	—	—
dual_ehi-90-315-77	3	0	—	5	—	—	5	0	—	—	—	—	7	5	—	—
dual_ehi-90-315-78	6	0	—	15	—	—	15	0	—	—	—	—	7	15	—	—
dual_ehi-90-315-79	208	0	—	7	—	—	7	0	—	—	—	—	5	7	—	—
dual_ehi-90-315-7	1085	0	—	6938	—	—	5167	0	—	—	—	—	7	1246	—	—
dual_ehi-90-315-80	549	0	—	4	—	—	4	0	—	—	—	—	6	4	—	—
dual_ehi-90-315-81	271	0	—	2129	—	—	6450	0	—	—	—	—	6	2009	—	—

Table 350. Number of visited nodes required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-64`–`dual_ehi-90-315-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-82	1	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-90-315-83	149	0	—	1239	—	—	2104	0	—	—	—	—	6	2113	—	—
dual_ehi-90-315-84	457	0	—	3420	—	—	3664	0	—	—	—	—	17	2014	—	—
dual_ehi-90-315-85	702	0	—	5576	—	—	4219	0	—	—	—	—	7	2366	—	—
dual_ehi-90-315-86	489	0	—	6555	—	—	4461	0	—	—	—	—	6	4595	—	—
dual_ehi-90-315-87	300	0	—	660	—	—	4798	0	—	—	—	—	7	642	—	—
dual_ehi-90-315-88	2	0	—	3	—	—	3	0	—	—	—	—	6	3	—	—
dual_ehi-90-315-89	28	0	—	1286	—	—	802	0	—	—	—	—	6	1078	—	—
dual_ehi-90-315-8	555	0	—	7	—	—	7	0	—	—	—	—	6	7	—	—
dual_ehi-90-315-90	293	0	—	7	—	—	7	0	—	—	—	—	7	7	—	—
dual_ehi-90-315-91	290	0	—	7961	—	—	6597	0	—	—	—	—	6	2432	—	—
dual_ehi-90-315-92	467	0	—	315	—	—	519	0	—	—	—	—	6	650	—	—
dual_ehi-90-315-93	767	0	—	4301	—	—	5480	0	—	—	—	—	9	3131	—	—
dual_ehi-90-315-94	62	0	—	5	—	—	5	0	—	—	—	—	5	5	—	—
dual_ehi-90-315-95	72	0	—	19	—	—	90	0	—	—	—	—	6	141	—	—
dual_ehi-90-315-96	36	0	—	9	—	—	9	0	—	—	—	—	5	9	—	—
dual_ehi-90-315-97	252	0	—	9405	—	—	22506	0	—	—	—	—	7	—	—	—
dual_ehi-90-315-98	113	0	—	422	—	—	2638	0	—	—	—	—	6	1692	—	—
dual_ehi-90-315-99	2203	0	—	13	—	—	13	0	—	—	—	—	7	13	—	—
dual_ehi-90-315-9	5	0	—	4	—	—	4	0	—	—	—	—	4	4	—	—
Grand total:	32780	0	—	167291	—	—	219113	6	—	—	—	—	721	93282	—	—

Table 351. Number of visited nodes required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp01_0200_4-bis`	200	200	—	194	—	—	186	185	—	—	—	—	—	—	—	—
`fapp01_0200_5-bis`	203	203	—	190	—	—	180	186	—	—	—	—	—	—	—	—
`fapp01_0200_6-bis`	509	509	—	191	—	—	192	189	—	—	—	—	—	—	—	—
`fapp01_0200_7-bis`	200	200	—	186	—	—	185	188	—	—	—	—	—	—	—	—
`fapp01_0200_8-bis`	210	210	—	191	—	—	186	184	—	—	—	—	—	—	—	—
`fapp01_0200_9-bis`	204	204	—	187	—	—	180	184	—	—	—	—	—	—	—	—
`fapp01_0200_10-bis`	200	200	—	185	—	—	179	185	—	—	—	—	—	—	—	—
`fapp01_0200_0-bis`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`fapp01_0200_1-bis`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`fapp01_0200_2-bis`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`fapp01_0200_3-bis`	7	0	—	12	—	—	12	0	—	—	—	—	—	—	—	—
Grand total:	1733	1726	—	1336	—	—	1300	1301	—	—	—	—	—	—	—	—

Table 352. Number of visited nodes required for solved instances belonging to class `fapp01`. Problem range: `fapp01_0200_4-bis`–`fapp01_0200_3-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp02_0250_2-bis`	—	—	—	74876	—	—	1371	563	—	—	—	—	—	—	—	—
`fapp02_0250_3-bis`	—	—	—	245	—	—	513	226	—	—	—	—	—	—	—	—
`fapp02_0250_4-bis`	—	—	—	792	—	—	19607	236	—	—	—	—	—	—	—	—
`fapp02_0250_5-bis`	—	—	—	242	—	—	236	234	—	—	—	—	—	—	—	—
`fapp02_0250_6-bis`	—	—	—	246	—	—	230	232	—	—	—	—	—	—	—	—
`fapp02_0250_7-bis`	—	—	—	71736	—	—	903	2087	—	—	—	—	—	—	—	—
`fapp02_0250_8-bis`	—	—	—	239	—	—	230	232	—	—	—	—	—	—	—	—
`fapp02_0250_9-bis`	—	—	—	242	—	—	233	235	—	—	—	—	—	—	—	—
`fapp02_0250_10-bis`	—	—	—	239	—	—	230	235	—	—	—	—	—	—	—	—
`fapp02_0250_0-bis`	—	—	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`fapp02_0250_1-bis`	—	—	—	0	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	148857	—	—	23553	4280	—	—	—	—	—	—	—	—

Table 353. Number of visited nodes required for solved instances belonging to class `fapp02`. Problem range: `fapp02_0250_2-bis`–`fapp02_0250_1-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb30-15-1-bis`	159	159	—	436	—	—	5604	5604	—	—	—	—	6253	747	—	—
`frb30-15-2-bis`	4824	4824	—	3523	—	—	5728	5728	—	—	—	—	7754	6659	—	—
`frb30-15-3-bis`	580	580	—	2529	—	—	530	530	—	—	—	—	5835	4978	—	—
`frb30-15-4-bis`	203	203	—	2637	—	—	7370	7370	—	—	—	—	5567	2097	—	—
`frb30-15-5-bis`	1925	1925	—	1497	—	—	1236	1236	—	—	—	—	2467	2562	—	—
Grand total:	7691	7691	—	10622	—	—	20468	20468	—	—	—	—	27876	17043	—	—

Table 354. Number of visited nodes required for solved instances belonging to class `frb30-15`. Problem range: `frb30-15-1-bis`–`frb30-15-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb35-17-1-bis`	15260	15260	—	16496	—	—	3259	3259	—	—	—	—	8606	25771	—	—
`frb35-17-2-bis`	51395	51395	—	515	—	—	22080	22080	—	—	—	—	16341	53221	—	—
`frb35-17-3-bis`	14463	14463	—	6793	—	—	16471	16471	—	—	—	—	15024	15793	—	—
`frb35-17-4-bis`	8115	8115	—	11184	—	—	2442	2442	—	—	—	—	13893	16112	—	—
`frb35-17-5-bis`	19052	19052	—	50511	—	—	36365	36365	—	—	—	—	2595	—	—	—
Grand total:	108285	108285	—	85499	—	—	80617	80617	—	—	—	—	56459	110897	—	—

Table 355. Number of visited nodes required for solved instances belonging to class `frb35-17`. Problem range: `frb35-17-1-bis`–`frb35-17-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb40-19-1-bis`	7349	7349	—	747	—	—	8624	8624	—	—	—	—	—	—	—	—
`frb40-19-2-bis`	507	507	—	115	—	—	142819	142819	—	—	—	—	—	—	—	—
`frb40-19-3-bis`	155990	155990	—	506122	—	—	647642	647642	—	—	—	—	—	—	—	—
`frb40-19-4-bis`	57457	57457	—	147639	—	—	448500	448500	—	—	—	—	—	—	—	—
`frb40-19-5-bis`	101649	101649	—	188061	—	—	612440	612440	—	—	—	—	—	—	—	—
Grand total:	322952	322952	—	842684	—	—	1860025	1860025	—	—	—	—	—	—	—	—

Table 356. Number of visited nodes required for solved instances belonging to class `frb40-19`. Problem range: `frb40-19-1-bis`–`frb40-19-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb45-21-1-bis`	—	—	—	3419146	—	—	—	—	—	—	—	—	—	—	—	—
`frb45-21-2-bis`	—	—	—	838999	—	—	1374344	1374344	—	—	—	—	—	—	—	—
`frb45-21-3-bis`	—	—	—	446007	—	—	238840	238840	—	—	—	—	—	—	—	—
`frb45-21-4-bis`	38348	38348	—	589969	—	—	2398218	—	—	—	—	—	—	—	—	—
`frb45-21-5-bis`	—	—	—	474644	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	38348	38348	—	5768765	—	—	4011402	1613184	—	—	—	—	—	—	—	—

Table 357. Number of visited nodes required for solved instances belonging to class `frb45-21`. Problem range: `frb45-21-1-bis`–`frb45-21-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb50-23-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-4-bis`	—	—	—	243313	—	—	664381	664381	—	—	—	—	—	—	—	—
`frb50-23-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	243313	—	—	664381	664381	—	—	—	—	—	—	—	—

Table 358. Number of visited nodes required for solved instances belonging to class `frb50-23`. Problem range: `frb50-23-1-bis`–`frb50-23-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb53-24-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 359. Number of visited nodes required for solved instances belonging to class `frb53-24`. Problem range: `frb53-24-1-bis`–`frb53-24-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb56-25-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 360. Number of visited nodes required for solved instances belonging to class `frb56-25`. Problem range: `frb56-25-1-bis`–`frb56-25-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb59-26-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 361. Number of visited nodes required for solved instances belonging to class `frb59-26`. Problem range: `frb59-26-1-bis`–`frb59-26-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`geo50.20.d4.75.10`	60	60	—	421	—	—	312	312	—	—	—	—	3938	7885	—	—
`geo50.20.d4.75.11`	77	77	—	76	—	—	979	979	—	—	—	—	—	1514	—	—
`geo50.20.d4.75.13`	185	185	—	539	—	—	115	115	—	—	—	—	64	106	—	—
`geo50.20.d4.75.15`	127	127	—	368	—	—	57	57	—	—	—	—	350	231	—	—
`geo50.20.d4.75.16`	126	126	—	303	—	—	180	180	—	—	—	—	95	259	—	—
`geo50.20.d4.75.17`	67	67	—	67	—	—	147	147	—	—	—	—	1769	144	—	—
`geo50.20.d4.75.18`	167	167	—	431	—	—	135	135	—	—	—	—	89	133	—	—
`geo50.20.d4.75.19`	113897	113897	—	240780	—	—	1023855	1023855	—	—	—	—	—	—	—	—
`geo50.20.d4.75.1`	162912	162912	—	324012	—	—	247571	247571	—	—	—	—	—	—	—	—
`geo50.20.d4.75.20`	2609	2609	—	363	—	—	1043	1043	—	—	—	—	—	1707	—	—
`geo50.20.d4.75.21`	51	51	—	47	—	—	51	51	—	—	—	—	88	51	—	—
`geo50.20.d4.75.22`	93	93	—	99	—	—	625	625	—	—	—	—	300	736	—	—
`geo50.20.d4.75.23`	120	120	—	179	—	—	460	460	—	—	—	—	86	206	—	—
`geo50.20.d4.75.24`	56	56	—	50	—	—	73	73	—	—	—	—	55	56	—	—
`geo50.20.d4.75.25`	54	54	—	50	—	—	46	46	—	—	—	—	156	96	—	—
`geo50.20.d4.75.26`	79	79	—	50	—	—	47	47	—	—	—	—	70	85	—	—
`geo50.20.d4.75.27`	99	99	—	71	—	—	50	50	—	—	—	—	52	55	—	—
`geo50.20.d4.75.28`	317	317	—	9284	—	—	1700	1700	—	—	—	—	14953	13877	—	—
`geo50.20.d4.75.29`	332	332	—	18486	—	—	1526	1526	—	—	—	—	145	1798	—	—
`geo50.20.d4.75.2`	779	779	—	14655	—	—	21750	21750	—	—	—	—	2088	7280	—	—

Table 362. Number of visited nodes required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.2`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.30	50	50	—	47	—	—	71	71	—	—	—	—	93	254	—	—
geo50.20.d4.75.31	50	50	—	47	—	—	47	47	—	—	—	—	54	52	—	—
geo50.20.d4.75.32	131	131	—	75	—	—	96	96	—	—	—	—	50	314	—	—
geo50.20.d4.75.33	109	109	—	192	—	—	55	55	—	—	—	—	55	140	—	—
geo50.20.d4.75.34	55	55	—	51	—	—	61	61	—	—	—	—	81	108	—	—
geo50.20.d4.75.35	9786	9786	—	19512	—	—	70	70	—	—	—	—	2864	2685	—	—
geo50.20.d4.75.36	98	98	—	79	—	—	48	48	—	—	—	—	50	52	—	—
geo50.20.d4.75.37	51	51	—	49	—	—	58	58	—	—	—	—	58	60	—	—
geo50.20.d4.75.38	59	59	—	75	—	—	76	76	—	—	—	—	322	644	—	—
geo50.20.d4.75.39	50	50	—	45	—	—	51	51	—	—	—	—	54	51	—	—
geo50.20.d4.75.3	51	51	—	50	—	—	77	77	—	—	—	—	65	140	—	—
geo50.20.d4.75.40	54	54	—	49	—	—	48	48	—	—	—	—	53	54	—	—
geo50.20.d4.75.42	50	50	—	51	—	—	76	76	—	—	—	—	333	99	—	—
geo50.20.d4.75.43	150	150	—	213	—	—	96	96	—	—	—	—	3241	158	—	—
geo50.20.d4.75.44	51	51	—	46	—	—	50	50	—	—	—	—	51	52	—	—
geo50.20.d4.75.45	87	87	—	104	—	—	200	200	—	—	—	—	99	462	—	—
geo50.20.d4.75.46	79	79	—	60	—	—	728	728	—	—	—	—	1327	2101	—	—
geo50.20.d4.75.47	51	51	—	49	—	—	48	48	—	—	—	—	74	51	—	—
geo50.20.d4.75.48	58	58	—	112	—	—	46	46	—	—	—	—	52	51	—	—
geo50.20.d4.75.49	125	125	—	179	—	—	85	85	—	—	—	—	123	122	—	—

Table 363. Number of visited nodes required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.30`–`geo50.20.d4.75.49`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.4	61	61	—	47	—	—	48	48	—	—	—	—	59	52	—	—
geo50.20.d4.75.50	72	72	—	71	—	—	52	52	—	—	—	—	101	151	—	—
geo50.20.d4.75.51	416	416	—	2274	—	—	5221	5221	—	—	—	—	2502	686	—	—
geo50.20.d4.75.53	2998	2998	—	2529	—	—	2638	2638	—	—	—	—	—	2784	—	—
geo50.20.d4.75.54	84	84	—	93	—	—	87	87	—	—	—	—	54	59	—	—
geo50.20.d4.75.55	16053	16053	—	10641	—	—	126360	126360	—	—	—	—	—	—	—	—
geo50.20.d4.75.56	57	57	—	49	—	—	198	198	—	—	—	—	2489	199	—	—
geo50.20.d4.75.58	220	220	—	64	—	—	426	426	—	—	—	—	4057	990	—	—
geo50.20.d4.75.59	76	76	—	54	—	—	136	136	—	—	—	—	53	128	—	—
geo50.20.d4.75.5	59	59	—	51	—	—	46	46	—	—	—	—	158	139	—	—
geo50.20.d4.75.60	118	118	—	181	—	—	1732	1732	—	—	—	—	—	4549	—	—
geo50.20.d4.75.61	76	76	—	60	—	—	53	53	—	—	—	—	52	103	—	—
geo50.20.d4.75.62	12554	12554	—	12750	—	—	294256	294256	—	—	—	—	—	—	—	—
geo50.20.d4.75.63	11849	11849	—	140245	—	—	462	462	—	—	—	—	—	1579	—	—
geo50.20.d4.75.64	53	53	—	45	—	—	54	54	—	—	—	—	50	70	—	—
geo50.20.d4.75.65	198	198	—	351	—	—	530	530	—	—	—	—	306	872	—	—
geo50.20.d4.75.66	56	56	—	86	—	—	240	240	—	—	—	—	58	128	—	—
geo50.20.d4.75.67	2640	2640	—	8128	—	—	1609	1609	—	—	—	—	1133	426	—	—
geo50.20.d4.75.68	57	57	—	62	—	—	3144	3144	—	—	—	—	12194	1808	—	—
geo50.20.d4.75.69	60	60	—	59	—	—	52	52	—	—	—	—	57	53	—	—

Table 364. Number of visited nodes required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.4`–`geo50.20.d4.75.69`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.6	51	51	—	51	—	—	54	54	—	—	—	—	62	66	—	—
geo50.20.d4.75.71	53	53	—	52	—	—	62	62	—	—	—	—	60	351	—	—
geo50.20.d4.75.72	50	50	—	46	—	—	55	55	—	—	—	—	71	65	—	—
geo50.20.d4.75.73	20104	20104	—	464	—	—	19828	19828	—	—	—	—	—	—	—	—
geo50.20.d4.75.74	71	71	—	295	—	—	81	81	—	—	—	—	53	55	—	—
geo50.20.d4.75.75	115	115	—	1818	—	—	1452	1452	—	—	—	—	7174	928	—	—
geo50.20.d4.75.76	51	51	—	47	—	—	48	48	—	—	—	—	51	50	—	—
geo50.20.d4.75.77	162	162	—	134	—	—	129	129	—	—	—	—	333	151	—	—
geo50.20.d4.75.78	61	61	—	64	—	—	57	57	—	—	—	—	50	86	—	—
geo50.20.d4.75.79	62	62	—	53	—	—	59	59	—	—	—	—	52	52	—	—
geo50.20.d4.75.7	30311	30311	—	107106	—	—	4217	4217	—	—	—	—	11136	5820	—	—
geo50.20.d4.75.80	65	65	—	58	—	—	50	50	—	—	—	—	76	59	—	—
geo50.20.d4.75.81	52	52	—	50	—	—	59	59	—	—	—	—	57	68	—	—
geo50.20.d4.75.82	52	52	—	49	—	—	48	48	—	—	—	—	71	51	—	—
geo50.20.d4.75.83	85	85	—	104	—	—	1052	1052	—	—	—	—	267	344	—	—
geo50.20.d4.75.84	54	54	—	48	—	—	49	49	—	—	—	—	50	59	—	—
geo50.20.d4.75.85	763	763	—	5106	—	—	14340	14340	—	—	—	—	1616	7518	—	—
geo50.20.d4.75.87	2180	2180	—	454	—	—	7525	7525	—	—	—	—	—	2601	—	—
geo50.20.d4.75.88	50	50	—	49	—	—	48	48	—	—	—	—	54	55	—	—
geo50.20.d4.75.89	15059	15059	—	9185	—	—	5806	5806	—	—	—	—	—	10255	—	—

Table 365. Number of visited nodes required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.6`–`geo50.20.d4.75.89`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.8	1920	1920	—	71015	—	—	21143	21143	—	—	—	—	—	—	—	—
geo50.20.d4.75.90	155695	155695	—	40251	—	—	29806	29806	—	—	—	—	—	6154	—	—
geo50.20.d4.75.91	50	50	—	46	—	—	50	50	—	—	—	—	51	50	—	—
geo50.20.d4.75.92	51	51	—	46	—	—	137	137	—	—	—	—	426	150	—	—
geo50.20.d4.75.93	50	50	—	48	—	—	53	53	—	—	—	—	58	57	—	—
geo50.20.d4.75.95	82	82	—	85	—	—	178	178	—	—	—	—	67	152	—	—
geo50.20.d4.75.96	2539	2539	—	2035	—	—	6931	6931	—	—	—	—	1020	4997	—	—
geo50.20.d4.75.97	73	73	—	68	—	—	60	60	—	—	—	—	75	301	—	—
geo50.20.d4.75.98	50	50	—	45	—	—	51	51	—	—	—	—	67	77	—	—
geo50.20.d4.75.99	51	51	—	48	—	—	55	55	—	—	—	—	145	56	—	—
geo50.20.d4.75.9	715	715	—	679	—	—	878	878	—	—	—	—	6441	18488	—	—
geo50.20.d4.75.100	52	52	—	45	—	—	48	48	—	—	—	—	51	53	—	—
geo50.20.d4.75.12	—	—	—	376866	—	—	371100	371100	—	—	—	—	—	—	—	—
geo50.20.d4.75.14	—	—	—	260700	—	—	260488	260488	—	—	—	—	—	—	—	—
geo50.20.d4.75.41	—	—	—	198669	—	—	208196	208196	—	—	—	—	—	—	—	—
geo50.20.d4.75.52	—	—	—	168365	—	—	171699	171699	—	—	—	—	—	—	—	—
geo50.20.d4.75.57	—	—	—	135984	—	—	134376	134376	—	—	—	—	—	—	—	—
geo50.20.d4.75.70	—	—	—	226286	—	—	221490	221490	—	—	—	—	—	—	—	—
geo50.20.d4.75.86	—	—	—	329554	—	—	334008	334008	—	—	—	—	—	—	—	—
geo50.20.d4.75.94	—	—	—	304479	—	—	307247	307247	—	—	—	—	—	—	—	—
Grand total:	571938	571938	—	3049803	—	—	3863166	3863166	—	—	—	—	86354	117814	—	—

Table 366. Number of visited nodes required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.94`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi_3`	6	6	—	4	—	—	0	0	—	—	—	—	6	6	—	—
`hanoi_4`	14	14	—	12	—	—	0	0	—	—	—	—	14	14	—	—
`hanoi_5`	30	30	—	28	—	—	0	0	—	—	—	—	30	30	—	—
`hanoi_6`	62	62	—	60	—	—	0	0	—	—	—	—	62	62	—	—
`hanoi_7`	126	126	—	124	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	238	238	—	228	—	—	0	0	—	—	—	—	112	112	—	—

Table 367. Number of visited nodes required for solved instances belonging to class `hanoi1`. Problem range: `hanoi_3`–`hanoi_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr1-10-by-5-1`	234	234	—	46	—	—	3870102	3870102	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-2`	95	95	—	88176	—	—	—	—	—	—	—	—	50	—	—	—
`e0ddr1-10-by-5-3`	438	438	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-4`	50	50	—	56	—	—	421485	421485	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-5`	160	160	—	213	—	—	62173	62173	—	—	—	—	50	50	—	—
`e0ddr1-10-by-5-6`	120	120	—	37093	—	—	46	46	—	—	—	—	50	50	—	—
`e0ddr1-10-by-5-7`	926	926	—	22373742	—	—	46	46	—	—	—	—	50	50	—	—
`e0ddr1-10-by-5-8`	1832	1832	—	552	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-9`	50	50	—	48	—	—	46	46	—	—	—	—	50	50	—	—
`e0ddr1-10-by-5-10`	1319	1319	—	27952213	—	—	1507719	1507719	—	—	—	—	50	—	—	—
Grand total:	5224	5224	—	50452139	—	—	5861617	5861617	—	—	—	—	300	200	—	—

Table 368. Number of visited nodes required for solved instances belonging to class `js-e0ddr1`. Problem range: `e0ddr1-10-by-5-1`–`e0ddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr2-10-by-5-1`	219	219	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-2`	352	352	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-3`	231	231	—	206	—	—	935504	935504	—	—	—	—	58	—	—	—
`e0ddr2-10-by-5-4`	50	50	—	48	—	—	47	47	—	—	—	—	50	50	—	—
`e0ddr2-10-by-5-5`	50	50	—	48	—	—	47	47	—	—	—	—	50	50	—	—
`e0ddr2-10-by-5-6`	60	60	—	126	—	—	46	46	—	—	—	—	50	50	—	—
`e0ddr2-10-by-5-7`	50	50	—	9606	—	—	62637	62637	—	—	—	—	50	—	—	—
`e0ddr2-10-by-5-8`	64	64	—	47	—	—	2582758	2582758	—	—	—	—	50	—	—	—
`e0ddr2-10-by-5-9`	670	670	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-10`	50	50	—	51	—	—	47	47	—	—	—	—	50	50	—	—
Grand total:	1796	1796	—	10132	—	—	3581086	3581086	—	—	—	—	358	200	—	—

Table 369. Number of visited nodes required for solved instances belonging to class `js-e0ddr2`. Problem range: `e0ddr2-10-by-5-1`–`e0ddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr1-10-by-5-1`	99	99	—	1524	—	—	24399	24399	—	—	—	—	50	17214	—	—
`enddr1-10-by-5-2`	50	50	—	48	—	—	45	45	—	—	—	—	50	50	—	—
`enddr1-10-by-5-3`	442	442	—	5871921	—	—	46	46	—	—	—	—	—	—	—	—
`enddr1-10-by-5-4`	339	339	—	48	—	—	46	46	—	—	—	—	50	50	—	—
`enddr1-10-by-5-5`	50	50	—	48	—	—	46	46	—	—	—	—	50	50	—	—
`enddr1-10-by-5-6`	50	50	—	47	—	—	46	46	—	—	—	—	50	50	—	—
`enddr1-10-by-5-7`	101	101	—	1245	—	—	46	46	—	—	—	—	50	50	—	—
`enddr1-10-by-5-8`	173	173	—	1823	—	—	46	46	—	—	—	—	50	50	—	—
`enddr1-10-by-5-9`	50	50	—	48	—	—	46	46	—	—	—	—	50	50	—	—
`enddr1-10-by-5-10`	92	92	—	4026	—	—	—	—	—	—	—	—	50	—	—	—
Grand total:	1446	1446	—	5880778	—	—	24766	24766	—	—	—	—	450	17564	—	—

Table 370. Number of visited nodes required for solved instances belonging to class `js-enddr1`. Problem range: `enddr1-10-by-5-1`–`enddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr2-10-by-5-1`	148	148	—	82211	—	—	—	—	—	—	—	—	50	—	—	—
`enddr2-10-by-5-2`	330	330	—	—	—	—	2052106	2052106	—	—	—	—	—	—	—	—
`enddr2-10-by-5-3`	55	55	—	1637833	—	—	—	—	—	—	—	—	50	—	—	—
`enddr2-10-by-5-4`	50	50	—	47	—	—	47	47	—	—	—	—	50	50	—	—
`enddr2-10-by-5-5`	50	50	—	65	—	—	47	47	—	—	—	—	50	50	—	—
`enddr2-10-by-5-10`	50	50	—	49	—	—	46	46	—	—	—	—	50	50	—	—
Grand total:	683	683	—	1720205	—	—	2052246	2052246	—	—	—	—	250	150	—	—

Table 371. Number of visited nodes required for solved instances belonging to class `js-enddr2`. Problem range: `enddr2-10-by-5-1`–`enddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`ewddr2-10-by-5-1`	64	64	—	48	—	—	46	46	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-2`	50	50	—	47	—	—	46	46	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-3`	102	102	—	177	—	—	143356	143356	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-4`	50	50	—	47	—	—	46	46	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-5`	50	50	—	47	—	—	47	47	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-6`	50	50	—	55	—	—	47	47	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-7`	50	50	—	47	—	—	70102	70102	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-8`	50	50	—	47	—	—	47	47	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-9`	50	50	—	56	—	—	47	47	—	—	—	—	50	50	—	—
`ewddr2-10-by-5-10`	50	50	—	47	—	—	47	47	—	—	—	—	50	50	—	—
Grand total:	566	566	—	618	—	—	213831	213831	—	—	—	—	500	500	—	—

Table 372. Number of visited nodes required for solved instances belonging to class `js-ewddr2`. Problem range: `ewddr2-10-by-5-1`–`ewddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`lsq_dg_5`	25	25	—	24	—	—	24	24	—	—	—	—	25	25	—	—
`lsq_dg_7`	76	76	—	82	—	—	69	69	—	—	—	—	58	84	—	—
`lsq_dg_3`	6	6	—	9	—	—	9	9	—	—	—	—	9	9	—	—
`lsq_dg_4`	40	40	—	40	—	—	40	40	—	—	—	—	40	40	—	—
`lsq_dg_6`	1286	1286	—	4249	—	—	4279	4279	—	—	—	—	1236	3870	—	—
Grand total:	1433	1433	—	4404	—	—	4421	4421	—	—	—	—	1368	4028	—	—

Table 373. Number of visited nodes required for solved instances belonging to class `lsq-dg1`. Problem range: `lsq_dg_5`–`lsq_dg_6`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
large_80_sat	—	—	—	79	—	—	0	0	—	—	—	—	—	—	—	—
large_84_sat	—	—	—	83	—	—	0	0	—	—	—	—	—	—	—	—
large_88_sat	—	—	—	87	—	—	0	0	—	—	—	—	—	—	—	—
large_92_sat	—	—	—	91	—	—	0	0	—	—	—	—	—	—	—	—
large_96_sat	—	—	—	95	—	—	0	0	—	—	—	—	—	—	—	—
large_80_unsat	—	—	—	80	—	—	80	0	—	—	—	—	—	—	—	—
large_84_unsat	—	—	—	84	—	—	84	0	—	—	—	—	—	—	—	—
large_88_unsat	—	—	—	88	—	—	88	0	—	—	—	—	—	—	—	—
large_92_unsat	—	—	—	92	—	—	92	0	—	—	—	—	—	—	—	—
large_96_unsat	—	—	—	96	—	—	96	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	875	—	—	440	0	—	—	—	—	—	—	—	—

Table 374. Number of visited nodes required for solved instances belonging to class `marc`. Problem range: `large_80_sat`–`large_96_unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
pigeons5	24	24	—	40	—	—	40	40	—	—	—	—	40	40	—	—
pigeons6	168	168	—	205	—	—	205	205	—	—	—	—	205	205	—	—
pigeons7	1312	1312	—	1236	—	—	1236	1236	—	—	—	—	1236	1236	—	—
pigeons8	9844	9844	—	8659	—	—	8659	8659	—	—	—	—	8659	8659	—	—
pigeons9	73056	73056	—	69280	—	—	69280	69280	—	—	—	—	69280	69280	—	—
pigeons10	658113	658113	—	623529	—	—	623529	623529	—	—	—	—	623529	623529	—	—
pigeons11	6226710	6226710	—	6235300	—	—	6235300	6235300	—	—	—	—	—	6235300	—	—
pigeons12	—	—	—	68588311	—	—	68588311	68588311	—	—	—	—	—	—	—	—
pigeons13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	6969227	6969227	—	75526560	—	—	75526560	75526560	—	—	—	—	702949	6938249	—	—

Table 375. Number of visited nodes required for solved instances belonging to class `pigeons`. Problem range: `pigeons5`–`pigeons50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qa_5	87051	87051	—	2485	—	—	186	186	—	—	—	—	50267	99060	—	—
qa_6	—	—	—	1387782	—	—	2643601	3640685	—	—	—	—	—	—	—	—
qa_7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_3	47	47	—	47	—	—	59	59	—	—	—	—	24	51	—	—
qa_4	1020	1020	—	889	—	—	849	849	—	—	—	—	582	765	—	—
Grand total:	88118	88118	—	1391203	—	—	2644695	3641779	—	—	—	—	50873	99876	—	—

Table 376. Number of visited nodes required for solved instances belonging to class qa1. Problem range: qa_5–qa_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qk_8_0_5	92	0	—	64	—	—	64	0	—	—	—	—	64	64	—	—
qk_8_8_5_add	376	0	—	1343	—	—	1483	0	—	—	—	—	6204	1130	—	—
qk_8_8_5_mul	551	0	—	1193	—	—	1415	0	—	—	—	—	5468	1193	—	—
qk_10_0_5	147	0	—	100	—	—	100	0	—	—	—	—	100	100	—	—
qk_10_10_5_add	416	0	—	3358	—	—	4041	0	—	—	—	—	76832	2967	—	—
qk_10_10_5_mul	1243	0	—	3185	—	—	3834	0	—	—	—	—	69592	3049	—	—
qk_12_0_5	210	0	—	144	—	—	144	0	—	—	—	—	144	144	—	—
qk_12_12_5_add	637	0	—	26094	—	—	25053	0	—	—	—	—	—	8782	—	—
qk_12_12_5_mul	892	0	—	33927	—	—	26161	0	—	—	—	—	—	20228	—	—
qk_15_0_5	331	0	—	225	—	—	225	0	—	—	—	—	225	225	—	—
qk_15_15_5_add	983	0	—	180003	—	—	152185	0	—	—	—	—	—	—	—	—
qk_15_15_5_mul	1357	0	—	202828	—	—	219443	0	—	—	—	—	—	—	—	—
qk_20_0_5	594	0	—	400	—	—	400	0	—	—	—	—	400	400	—	—
qk_20_20_5_add	1960	0	—	—	—	—	256534	0	—	—	—	—	—	—	—	—
qk_20_20_5_mul	2929	2929	—	—	—	—	—	0	—	—	—	—	—	—	—	—
qk_25_0_5	931	0	—	625	—	—	625	0	—	—	—	—	625	625	—	—
qk_25_25_5_add	2348	0	—	—	—	—	123131	0	—	—	—	—	—	—	—	—
qk_25_25_5_mul	2979	2979	—	—	—	—	—	0	—	—	—	—	—	—	—	—
Grand total:	18976	5908	—	453489	—	—	814838	0	—	—	—	—	159654	38907	—	—

Table 377. Number of visited nodes required for solved instances belonging to class qk1. Problem range: qk_8_0_5–qk_25_25_5_mul. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-23-23-253-131-48021`	—	—	—	283203	—	—	163552	163552	—	—	—	—	—	—	—	—
`random-23-23-253-131-49021`	5427	5427	—	308697	—	—	519535	519535	—	—	—	—	38990	41181	—	—
`random-23-23-253-131-50021`	—	—	—	146909	—	—	36909	36909	—	—	—	—	—	—	—	—
`random-23-23-253-131-53021`	—	—	—	191008	—	—	256001	256001	—	—	—	—	—	—	—	—
`random-23-23-253-131-54021`	—	—	—	218928	—	—	167853	167853	—	—	—	—	—	—	—	—
`random-23-23-253-131-46021`	—	—	—	550398	—	—	552261	552261	—	—	—	—	—	—	—	—
`random-23-23-253-131-47021`	—	—	—	524011	—	—	527869	527869	—	—	—	—	—	—	—	—
`random-23-23-253-131-51021`	—	—	—	611714	—	—	614075	614075	—	—	—	—	—	—	—	—
`random-23-23-253-131-52021`	—	—	—	534943	—	—	537846	537846	—	—	—	—	—	—	—	—
`random-23-23-253-131-55021`	—	—	—	544543	—	—	542500	542500	—	—	—	—	—	—	—	—
Grand total:	5427	5427	—	3914354	—	—	3918401	3918401	—	—	—	—	38990	41181	—	—

Table 378. Number of visited nodes required for solved instances belonging to class `random-23-23-253`. Problem range: `random-23-23-253-131-48021`–`random-23-23-253-131-55021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-24-24-276-139-48021`	—	—	—	109064	—	—	73457	73457	—	—	—	—	—	—	—	—
`random-24-24-276-139-50021`	33393	33393	—	30544	—	—	127327	127327	—	—	—	—	—	—	—	—
`random-24-24-276-139-55021`	16123	16123	—	144916	—	—	980423	980423	—	—	—	—	—	—	—	—
`random-24-24-276-139-49021`	—	—	—	1134708	—	—	1139105	1139105	—	—	—	—	—	—	—	—
`random-24-24-276-139-51021`	—	—	—	1220136	—	—	1216627	1216627	—	—	—	—	—	—	—	—
`random-24-24-276-139-52021`	—	—	—	1215966	—	—	1210447	1210447	—	—	—	—	—	—	—	—
`random-24-24-276-139-53021`	—	—	—	1245633	—	—	1238128	1238128	—	—	—	—	—	—	—	—
`random-24-24-276-139-54021`	—	—	—	1241247	—	—	1241481	1241481	—	—	—	—	—	—	—	—
`random-24-24-276-139-56021`	—	—	—	1236108	—	—	1230027	1230027	—	—	—	—	—	—	—	—
`random-24-24-276-139-57021`	—	—	—	1188072	—	—	1182545	1182545	—	—	—	—	—	—	—	—
Grand total:	49516	49516	—	8766394	—	—	9639567	9639567	—	—	—	—	—	—	—	—

Table 379. Number of visited nodes required for solved instances belonging to class `random-24-24-276`. Problem range: `random-24-24-276-139-48021`–`random-24-24-276-139-57021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-25-25-300-147-51021	—	—	—	356241	—	—	1114369	1114369	—	—	—	—	—	—	—	—
random-25-25-300-147-52021	—	—	—	268599	—	—	2283515	2283515	—	—	—	—	—	—	—	—
random-25-25-300-147-53021	123922	123922	—	589935	—	—	662753	662753	—	—	—	—	—	—	—	—
random-25-25-300-147-54021	201979	201979	—	2257202	—	—	2406754	2406754	—	—	—	—	—	—	—	—
random-25-25-300-147-56021	—	—	—	1850066	—	—	2694694	2694694	—	—	—	—	—	—	—	—
random-25-25-300-147-59021	—	—	—	631763	—	—	1409106	1409106	—	—	—	—	—	—	—	—
random-25-25-300-147-50021	—	—	—	2631564	—	—	2623079	2623079	—	—	—	—	—	—	—	—
random-25-25-300-147-55021	—	—	—	2551552	—	—	2544471	2544471	—	—	—	—	—	—	—	—
random-25-25-300-147-57021	—	—	—	2535310	—	—	2523643	2523643	—	—	—	—	—	—	—	—
random-25-25-300-147-58021	—	—	—	2719936	—	—	2701788	2701788	—	—	—	—	—	—	—	—
Grand total:	325901	325901	—	16392168	—	—	20964172	20964172	—	—	—	—	—	—	—	—

Table 380. Number of visited nodes required for solved instances belonging to class `random-25-25-300`. Problem range: `random-25-25-300-147-51021`–`random-25-25-300-147-58021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-26-26-325-155-53021`	—	—	—	3039980	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-54021`	—	—	—	298984	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-55021`	228411	228411	—	2038885	—	—	633821	633821	—	—	—	—	—	—	—	—
`random-26-26-325-155-59021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-61021`	—	—	—	3253264	—	—	907256	907256	—	—	—	—	—	—	—	—
`random-26-26-325-155-52021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-56021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-57021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-58021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-26-26-325-155-60021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	228411	228411	—	8631113	—	—	1541077	1541077	—	—	—	—	—	—	—	—

Table 381. Number of visited nodes required for solved instances belonging to class `random-26-26-325`. Problem range: `random-26-26-325-155-53021`–`random-26-26-325-155-60021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-27-27-351-163-54021`	—	—	—	—	—	—	659989	659989	—	—	—	—	—	—	—	—
`random-27-27-351-163-56021`	—	—	—	2814923	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-60021`	—	—	—	2796893	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-63021`	—	—	—	2128803	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-55021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-57021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-58021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-59021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-61021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-62021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	7740619	—	—	659989	659989	—	—	—	—	—	—	—	—

Table 382. Number of visited nodes required for solved instances belonging to class `random-27-27-351`. Problem range: `random-27-27-351-163-54021`–`random-27-27-351-163-62021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph1`	200	200	—	179	—	—	169	169	—	—	—	—	—	—	—	—
`graph2`	400	400	—	367	—	—	351	351	—	—	—	—	—	—	—	—
`graph3`	201	201	—	184	—	—	185	1677	—	—	—	—	—	—	—	—
`graph4`	400	401	—	378	—	—	1032	375	—	—	—	—	—	—	—	—
`graph8`	680	680	—	621	—	—	590	594	—	—	—	—	—	—	—	—
`graph9`	916	916	—	835	—	—	780	780	—	—	—	—	—	—	—	—
`graph10`	682	682	—	634	—	—	623	746	—	—	—	—	—	—	—	—
`graph14`	916	916	—	835	—	—	801	801	—	—	—	—	—	—	—	—
`graph5`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`graph6`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`graph7`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`graph11`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`graph12`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`graph13`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	4395	4396	—	4033	—	—	4531	5493	—	—	—	—	—	—	—	—

Table 383. Number of visited nodes required for solved instances belonging to class `rlfapGraphs`. Problem range: `graph1`–`graph13`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph2_f24`	407	425	—	591	—	—	379	475	—	—	—	—	—	—	—	—
`graph8_f10`	5122	2838	—	9745	—	—	1606	5075	—	—	—	—	—	—	—	—
`graph9_f9`	9758	9758	—	3333	—	—	24124	25158	—	—	—	—	—	—	—	—
`graph12_w0`	680	680	—	340	—	—	340	340	—	—	—	—	—	—	—	—
`graph13_w0`	916	916	—	458	—	—	458	458	—	—	—	—	—	—	—	—
`graph14_f27`	5171	6506	—	20131	—	—	27812	13858	—	—	—	—	—	—	—	—
`graph2_f25`	4632	772	—	4156	—	—	3537	1367	—	—	—	—	—	—	—	—
`graph8_f11`	429	523	—	982	—	—	1645	1090	—	—	—	—	—	—	—	—
`graph9_f10`	698	2749	—	33796	—	—	12547	7885	—	—	—	—	—	—	—	—
`graph12_w1`	197	0	—	81	—	—	90	0	—	—	—	—	—	—	—	—
`graph13_w1`	94	0	—	201	—	—	114	0	—	—	—	—	—	—	—	—
`graph14_f28`	4489	788	—	36160	—	—	24102	370	—	—	—	—	—	—	—	—
Grand total:	32593	25955	—	109974	—	—	96754	56076	—	—	—	—	—	—	—	—

Table 384. Number of visited nodes required for solved instances belonging to class `rlfapModGraphs`. Problem range: `graph2_f24`–`graph14_f28`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen1_f8	917	917	—	818	—	—	792	792	—	—	—	—	—	—	—	—
scen2_f24	461	461	—	220	—	—	356	356	—	—	—	—	—	—	—	—
scen3_f10	707	707	—	7399	—	—	7124	7375	—	—	—	—	—	—	—	—
scen6_w1	202	200	—	152	—	—	149	159	—	—	—	—	—	—	—	—
scen7_w1_f4	409	401	—	314	—	—	410	308	—	—	—	—	—	—	—	—
scen1_f9	669	639	—	2653	—	—	4046	1845	—	—	—	—	—	—	—	—
scen2_f25	800	800	—	39053	—	—	15649	15649	—	—	—	—	—	—	—	—
scen3_f11	391	391	—	7865	—	—	8665	7858	—	—	—	—	—	—	—	—
scen6_w1_f2	332	184	—	57263	—	—	42863	50528	—	—	—	—	—	—	—	—
scen6_w1_f3	168	128	—	30072	—	—	19982	21989	—	—	—	—	—	—	—	—
scen6_w2	133	0	—	910	—	—	946	0	—	—	—	—	—	—	—	—
scen7_w1_f5	162	0	—	1953	—	—	942	0	—	—	—	—	—	—	—	—
scen9_w1_f3	58	0	—	1489	—	—	934	0	—	—	—	—	—	—	—	—
scen10_w1_f3	58	0	—	1489	—	—	934	0	—	—	—	—	—	—	—	—
Grand total:	5467	4828	—	151650	—	—	103792	106859	—	—	—	—	—	—	—	—

Table 385. Number of visited nodes required for solved instances belonging to class `rlfapModScens`. Problem range: `scen1_f8`–`scen10_w1_f3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-l-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen11_f2`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f3`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f4`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f5`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f6`	25508	25508	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f7`	7788	7788	—	3844543	—	—	1368081	1368081	—	—	—	—	—	—	—	—
`scen11_f8`	1177	1177	—	326138	—	—	188464	188464	—	—	—	—	—	—	—	—
`scen11_f10`	338	338	—	9283	—	—	8742	8999	—	—	—	—	—	—	—	—
`scen11_f12`	333	333	—	7816	—	—	6661	7192	—	—	—	—	—	—	—	—
Grand total:	35144	35144	—	4187780	—	—	1571948	1572736	—	—	—	—	—	—	—	—

Table 386. Number of visited nodes required for solved instances belonging to class `rlfapScens11`. Problem range: `scen11_f2`–`scen11_f12`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen1`	916	916	—	803	—	—	777	777	—	—	—	—	—	—	—	—
`scen2`	200	200	—	174	—	—	168	168	—	—	—	—	—	—	—	—
`scen3`	400	400	—	357	—	—	345	345	—	—	—	—	—	—	—	—
`scen4`	1246	681	—	630	—	—	510	475	—	—	—	—	—	—	—	—
`scen5`	729	400	—	503	—	—	365	247	—	—	—	—	—	—	—	—
`scen11`	1975	1975	—	5375	—	—	1513	1513	—	—	—	—	—	—	—	—
`scen6`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`scen7`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`scen8`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`scen9`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
`scen10`	0	0	—	0	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	5466	4572	—	7842	—	—	3678	3525	—	—	—	—	—	—	—	—

Table 387. Number of visited nodes required for solved instances belonging to class `rlfapScens`. Problem range: `scen1`–`scen10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bh-4-4-easy-sat-0001-BlackHole-4-4	5676741	5744392	—	229398	—	—	254901	307527	—	—	—	—	—	29018558	—	—
bh-4-4-easy-sat-0002-BlackHole-4-4	5676741	5741489	—	229530	—	—	254835	307461	—	—	—	—	—	29766116	—	—
bh-4-4-easy-sat-0003-BlackHole-4-4	5676791	5743455	—	229530	—	—	254835	307461	—	—	—	—	—	29333348	—	—
bh-4-4-easy-sat-0004-BlackHole-4-4	5676756	5745453	—	229134	—	—	255033	307659	—	—	—	—	—	29525531	—	—
bh-4-4-easy-sat-0005-BlackHole-4-4	5676783	5744803	—	229266	—	—	254967	307593	—	—	—	—	—	29251089	—	—
bh-4-4-easy-sat-0006-BlackHole-4-4	5676834	5744870	—	229398	—	—	254901	307527	—	—	—	—	—	30019506	—	—
bh-4-4-easy-sat-0007-BlackHole-4-4	5676729	5744066	—	229398	—	—	254901	307527	—	—	—	—	—	29362846	—	—
bh-4-4-easy-sat-0008-BlackHole-4-4	5676740	5744037	—	229398	—	—	254901	307527	—	—	—	—	—	29395267	—	—
bh-4-4-easy-sat-0009-BlackHole-4-4	5676771	5746401	—	229134	—	—	255033	307659	—	—	—	—	—	29345186	—	—
bh-4-4-easy-sat-0010-BlackHole-4-4	5676802	5744319	—	229266	—	—	254967	307593	—	—	—	—	—	29802150	—	—
Grand total:	56767688	57443285	—	2293452	—	—	2549274	3075534	—	—	—	—	—	294819597	—	—

Table 388. Number of consistency checks required for solved instances belonging to class BH-4-4. Problem range: bh-4-4-easy-sat-0001-BlackHole-4-4–bh-4-4-easy-sat-0010-BlackHole-4-4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-1-QWH-10`	8982	39398	—	24953	—	—	18903	40255	—	—	—	—	432480	72464	—	—
`qcp-order10-holes67-balanced-2-QWH-10`	8597	39777	—	21132	—	—	18091	37621	—	—	—	—	336608	62689	—	—
`qcp-order10-holes67-balanced-3-QWH-10`	10190	40241	—	20933	—	—	19362	39176	—	—	—	—	432847	118124	—	—
`qcp-order10-holes67-balanced-4-QWH-10`	18658	49890	—	21777	—	—	18764	39716	—	—	—	—	398328	218886	—	—
`qcp-order10-holes67-balanced-5-QWH-10`	8653	38380	—	20740	—	—	18071	37669	—	—	—	—	433634	70071	—	—
Grand total:	55080	207686	—	109535	—	—	93191	194437	—	—	—	—	2033897	542234	—	—

Table 389. Number of consistency checks required for solved instances belonging to class `QCP-10-easy`. Problem range: `qcp-order10-holes67-balanced-1-QWH-10`–`qcp-order10-holes67-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-7-QWH-10`	9099	44981	—	22929	—	—	19628	42212	—	—	—	—	433145	72031	—	—
`qcp-order10-holes67-balanced-17-QWH-10`	11434	42781	—	26055	—	—	57790	78982	—	—	—	—	—	252982	—	—
`qcp-order10-holes67-balanced-186-QWH-10`	9340	44051	—	23551	—	—	248359	270091	—	—	—	—	390878	82678	—	—
`qcp-order10-holes67-balanced-267-QWH-10`	15189	53447	—	30217	—	—	67549	89537	—	—	—	—	4706508	251395	—	—
`qcp-order10-holes67-balanced-315-QWH-10`	8548	38929	—	21320	—	—	18465	39140	—	—	—	—	413498	69420	—	—
Grand total:	53610	224189	—	124072	—	—	411791	519962	—	—	—	—	5944029	728506	—	—

Table 390. Number of consistency checks required for solved instances belonging to class `QCP-10-hard`. Problem range: `qcp-order10-holes67-balanced-7-QWH-10`–`qcp-order10-holes67-balanced-315-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2pl/1	table2pl/2
`qcp-order10-holes67-balanced-33-QWH-10`	90580	120588	—	31878	—	—	40260	60984	—	—	—	—	—	1530117	—	—
`qcp-order10-holes67-balanced-140-QWH-10`	34586	67936	—	23611	—	—	34667	56469	—	—	—	—	—	744865	—	—
`qcp-order10-holes67-balanced-150-QWH-10`	15954	48276	—	28189	—	—	20152	41130	—	—	—	—	—	260943	—	—
`qcp-order10-holes67-balanced-160-QWH-10`	7147	36794	—	20860	—	—	17477	51168	—	—	—	—	225890	55978	—	—
`qcp-order10-holes67-balanced-946-QWH-10`	8497	42743	—	20922	—	—	19287	39907	—	—	—	—	328923	171229	—	—
Grand total:	156764	316337	—	125460	—	—	131843	249658	—	—	—	—	554813	2763132	—	—

Table 391. Number of consistency checks required for solved instances belonging to class `QCP-10`. Problem range: `qcp-order10-holes67-balanced-33-QWH-10`–`qcp-order10-holes67-balanced-946-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-20-QWH-15`	450162	511730	—	200395	—	—	102827	151285	—	—	—	—	5685716	1907507	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	5350503	5407757	—	3527056	—	—	265753	312224	—	—	—	—	—	3960721	—	—
`qcp-order15-holes120-balanced-22-QWH-15`	131582	191915	—	91114	—	—	109121	156558	—	—	—	—	58943933	1423980	—	—
`qcp-order15-holes120-balanced-23-QWH-15`	666343	731608	—	66189	—	—	993974	1042054	—	—	—	—	—	5764366	—	—
`qcp-order15-holes120-balanced-24-QWH-15`	224548	288788	—	364546	—	—	712283	762324	—	—	—	—	—	—	—	—
Grand total:	6823138	7131798	—	4249300	—	—	2183958	2424445	—	—	—	—	64629649	13056574	—	—

Table 392. Number of consistency checks required for solved instances belonging to class `QCP-15-easy`. Problem range: `qcp-order15-holes120-balanced-20-QWH-15`–`qcp-order15-holes120-balanced-24-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order15-holes120-balanced-225-QWH-15	441074	503384	—	166563	—	—	8309278	8357014	—	—	—	—	—	1124759	—	—
qcp-order15-holes120-balanced-245-QWH-15	431770	491001	—	576252	—	—	2761554	2807181	—	—	—	—	4875768	3877372	—	—
qcp-order15-holes120-balanced-259-QWH-15	6189612	565956	—	915617	—	—	330067	631879	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-278-QWH-15	292317	352817	—	60148970	—	—	3283686	3330370	—	—	—	—	28402824	1268622	—	—
qcp-order15-holes120-balanced-363-QWH-15	105942	168153	—	125040	—	—	552385	600441	—	—	—	—	—	33743044	—	—
qcp-order15-holes120-balanced-488-QWH-15	10841248	10896573	—	9616936	—	—	19021663	19064535	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-711-QWH-15	1120409	1181075	—	652601	—	—	9796923	9842872	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-736-QWH-15	1715202	1775522	—	736261	—	—	1302083	1348042	—	—	—	—	—	13088139	—	—
qcp-order15-holes120-balanced-819-QWH-15	198813	263110	—	141278	—	—	704149	751163	—	—	—	—	64496319	—	—	—
qcp-order15-holes120-balanced-941-QWH-15	10047336	10107004	—	9266622	—	—	623957369	624004016	—	—	—	—	—	—	—	—
Grand total:	31383723	26304595	—	82346140	—	—	670019157	670737513	—	—	—	—	97774911	53101936	—	—

Table 393. Number of consistency checks required for solved instances belonging to class `QCP-15-hard`. Problem range: `qcp-order15-holes120-balanced-225-QWH-15`–`qcp-order15-holes120-balanced-941-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-90-QWH-15`	17275581	17337418	—	62887680	—	—	14394587	14441800	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-100-QWH-15`	34754	93914	—	59936	—	—	63050	109406	—	—	—	—	2493705	2120497	—	—
`qcp-order15-holes120-balanced-103-QWH-15`	85087	148734	—	71022	—	—	59611	107696	—	—	—	—	—	1429795	—	—
`qcp-order15-holes120-balanced-268-QWH-15`	—	—	—	5549607	—	—	32608107	32654281	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-999-QWH-15`	47569	108410	—	369777112	—	—	62319	109114	—	—	—	—	—	1647176	—	—
Grand total:	17442991	17688476	—	438345357	—	—	47187674	47422297	—	—	—	—	2493705	5197468	—	—

Table 394. Number of consistency checks required for solved instances belonging to class `QCP-15`. Problem range: `qcp-order15-holes120-balanced-90-QWH-15`–`qcp-order15-holes120-balanced-999-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-11-QWH-20`	4401440	4529252	—	—	—	—	13621457	13727379	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-19-QWH-20`	—	—	—	4433951	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-24-QWH-20`	—	—	—	22826596	—	—	84906617	85010102	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	—	—	—	1748957	—	—	25983399	26090359	—	—	—	—	59101512	—	—	—
`qcp-order20-holes187-balanced-30-QWH-20`	2113839	2240750	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	6515279	6770002	—	29009504	—	—	124511473	124827840	—	—	—	—	59101512	—	—	—

Table 395. Number of consistency checks required for solved instances belonging to class `QCP-20-easy`. Problem range: `qcp-order20-holes187-balanced-11-QWH-20`–`qcp-order20-holes187-balanced-30-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order20-holes187-balanced-6-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-10-QWH-20	—	—	—	5810093	—	—	290517430	290620467	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-32-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-214-QWH-20	—	—	—	226131764	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-217-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-332-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-380-QWH-20	—	—	—	—	—	—	460555938	460656942	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-597-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-702-QWH-20	—	—	—	230786605	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-981-QWH-20	—	—	—	—	—	—	267944903	268044733	—	—	—	—	—	—	—	—
Grand total:	—	—	—	462728462	—	—	1019018271	1019322142	—	—	—	—	—	—	—	—

Table 396. Number of consistency checks required for solved instances belonging to class `QCP-20-hard`. Problem range: `qcp-order20-holes187-balanced-6-QWH-20`–`qcp-order20-holes187-balanced-981-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-375-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-378-QWH-20`	1392516	590435	—	326569	—	—	365891	2304102	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-580-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-602-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-722-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	1392516	590435	—	326569	—	—	365891	2304102	—	—	—	—	—	—	—	—

Table 397. Number of consistency checks required for solved instances belonging to class `QCP-20`. Problem range: `qcp-order20-holes187-balanced-375-QWH-20`–`qcp-order20-holes187-balanced-722-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-23-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-31-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-64-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 398. Number of consistency checks required for solved instances belonging to class `QCP-25-easy`. Problem range: `qcp-order25-holes264-balanced-23-QWH-25`–`qcp-order25-holes264-balanced-64-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-3-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-6-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-9-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-11-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-14-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-22-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-29-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-68-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-79-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 399. Number of consistency checks required for solved instances belonging to class `QCP-25-hard`. Problem range: `qcp-order25-holes264-balanced-3-QWH-25`–`qcp-order25-holes264-balanced-79-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-15-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-32-QWH-25`	1049944	1182423	—	765209	—	—	659951	854395	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-33-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-34-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-75-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	1049944	1182423	—	765209	—	—	659951	854395	—	—	—	—	—	—	—	—

Table 400. Number of consistency checks required for solved instances belonging to class `QCP-25`. Problem range: `qcp-order25-holes264-balanced-15-QWH-25`–`qcp-order25-holes264-balanced-75-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-1-QWH-10`	14319	41758	—	19881	—	—	57055	75427	—	—	—	—	347404	375725	—	—
`qcp-order10-holes64-balanced-15-QWH-10`	8168	37645	—	20871	—	—	18423	39309	—	—	—	—	348127	63920	—	—
`qcp-order10-holes64-balanced-22-QWH-10`	8369	36925	—	20744	—	—	17778	36976	—	—	—	—	428753	64556	—	—
`qcp-order10-holes64-balanced-52-QWH-10`	8223	35680	—	22192	—	—	18253	38743	—	—	—	—	457370	79266	—	—
`qcp-order10-holes64-balanced-70-QWH-10`	10068	37020	—	19700	—	—	19019	37341	—	—	—	—	357392	97693	—	—
Grand total:	49147	189028	—	103388	—	—	130528	227796	—	—	—	—	1939046	681160	—	—

Table 401. Number of consistency checks required for solved instances belonging to class `QCPp-10-easy`. Problem range: `qcp-order10-holes64-balanced-1-QWH-10`–`qcp-order10-holes64-balanced-70-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-221-QWH-10`	15090	51437	—	22394	—	—	19240	41202	—	—	—	—	460961	392576	—	—
`qcp-order10-holes64-balanced-280-QWH-10`	7905	37113	—	20689	—	—	18174	37846	—	—	—	—	525757	65223	—	—
`qcp-order10-holes64-balanced-351-QWH-10`	9281	42875	—	22866	—	—	19856	42508	—	—	—	—	492036	72895	—	—
`qcp-order10-holes64-balanced-511-QWH-10`	24875	54398	—	686480	—	—	28590	48250	—	—	—	—	365788	174521	—	—
`qcp-order10-holes64-balanced-558-QWH-10`	8605	38037	—	21883	—	—	19977	41423	—	—	—	—	465335	69911	—	—
`qcp-order10-holes64-balanced-698-QWH-10`	9871	43265	—	35339	—	—	18955	40223	—	—	—	—	443116	81480	—	—
`qcp-order10-holes64-balanced-701-QWH-10`	8641	36285	—	20619	—	—	18139	37992	—	—	—	—	417014	72987	—	—
`qcp-order10-holes64-balanced-731-QWH-10`	8690	39112	—	21967	—	—	19090	40830	—	—	—	—	439419	67669	—	—
`qcp-order10-holes64-balanced-764-QWH-10`	7837	35321	—	19920	—	—	17241	35739	—	—	—	—	384767	63786	—	—
`qcp-order10-holes64-balanced-885-QWH-10`	8924	40418	—	23215	—	—	20056	43342	—	—	—	—	529412	75199	—	—
Grand total:	109719	418261	—	895372	—	—	199318	409355	—	—	—	—	4523605	1136247	—	—

Table 402. Number of consistency checks required for solved instances belonging to class `QCPp-10-hard`. Problem range: `qcp-order10-holes64-balanced-221-QWH-10`–`qcp-order10-holes64-balanced-885-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2pl/1	table2pl/2
`qcp-order10-holes64-balanced-16-QWH-10`	15780	47227	—	33718	—	—	28684	49185	—	—	—	—	—	1016898	—	—
`qcp-order10-holes64-balanced-32-QWH-10`	16371	43467	—	26404	—	—	19531	37577	—	—	—	—	—	473634	—	—
`qcp-order10-holes64-balanced-45-QWH-10`	25604	55264	—	32447	—	—	30219	49859	—	—	—	—	—	1988774	—	—
`qcp-order10-holes64-balanced-109-QWH-10`	80874	115562	—	61033	—	—	88711	109989	—	—	—	—	—	2384292	—	—
`qcp-order10-holes64-balanced-140-QWH-10`	13051	42833	—	22376	—	—	18618	36748	—	—	—	—	270858	704298	—	—
Grand total:	151680	304353	—	175978	—	—	185763	283358	—	—	—	—	270858	6567896	—	—

Table 403. Number of consistency checks required for solved instances belonging to class `QCPp-10`. Problem range: `qcp-order10-holes64-balanced-16-QWH-10`–`qcp-order10-holes64-balanced-140-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-73-QWH-15`	46071	129753	—	74975	—	—	96868	157271	—	—	—	—	2619447	51456401	—	—
`qcp-order15-holes120-balanced-74-QWH-15`	42914	123575	—	71094	—	—	63662	125254	—	—	—	—	2908971	905244	—	—
`qcp-order15-holes120-balanced-75-QWH-15`	114015	196844	—	82041	—	—	10219858	10277750	—	—	—	—	10408561	—	—	—
`qcp-order15-holes120-balanced-76-QWH-15`	30833	114358	—	75079	—	—	79135	140016	—	—	—	—	2630210	347010	—	—
`qcp-order15-holes120-balanced-77-QWH-15`	59105	142843	—	67296	—	—	65793	126811	—	—	—	—	2583654	733435	—	—
Grand total:	292938	707373	—	370485	—	—	10525316	10827102	—	—	—	—	21150843	53442090	—	—

Table 404. Number of consistency checks required for solved instances belonging to class `QCPp-15-easy`. Problem range: `qcp-order15-holes120-balanced-73-QWH-15`–`qcp-order15-holes120-balanced-77-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-3-QWH-15`	244686	328296	—	151209810	—	—	284699216	284761928	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-25-QWH-15`	42357	122023	—	73988	—	—	72089	133166	—	—	—	—	2484669	2522408	—	—
`qcp-order15-holes120-balanced-48-QWH-15`	62461	141912	—	228323	—	—	76730	136472	—	—	—	—	—	1359234	—	—
`qcp-order15-holes120-balanced-127-QWH-15`	29799	115117	—	76124	—	—	66391	127855	—	—	—	—	—	320643	—	—
`qcp-order15-holes120-balanced-135-QWH-15`	39957	119772	—	81202	—	—	114456	172788	—	—	—	—	—	3175619	—	—
`qcp-order15-holes120-balanced-171-QWH-15`	133892	213457	—	105962	—	—	88061	146259	—	—	—	—	17292858	5050743	—	—
Grand total:	553152	1040577	—	151775409	—	—	285116943	285478468	—	—	—	—	19777527	12428647	—	—

Table 405. Number of consistency checks required for solved instances belonging to class `QCPp-15-hard`. Problem range: `qcp-order15-holes120-balanced-3-QWH-15`–`qcp-order15-holes120-balanced-171-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-1-QWH-15`	44435	122729	—	101106	—	—	79130	139750	—	—	—	—	—	4229640	—	—
`qcp-order15-holes120-balanced-2-QWH-15`	6058320	6147376	—	3926230	—	—	6031804	6095708	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-17-QWH-15`	64962	153128	—	167975	—	—	105963	168234	—	—	—	—	—	7309625	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	29243	104721	—	65512	—	—	60614	158571	—	—	—	—	1392805	723171	—	—
`qcp-order15-holes120-balanced-54-QWH-15`	90339	164807	—	1707961	—	—	156743	212723	—	—	—	—	—	17229240	—	—
Grand total:	6287299	6692761	—	5968784	—	—	6434254	6774986	—	—	—	—	1392805	29491676	—	—

Table 406. Number of consistency checks required for solved instances belonging to class `QCPp-15`. Problem range: `qcp-order15-holes120-balanced-1-QWH-15`–`qcp-order15-holes120-balanced-54-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-13-QWH-20`	—	—	—	19089545	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-14-QWH-20`	2588998	2758993	—	50757363	—	—	1299015	1434706	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-15-QWH-20`	228409	391157	—	162595	—	—	744151	877191	—	—	—	—	—	4875878	—	—
`qcp-order20-holes187-balanced-16-QWH-20`	137101	292599	—	747178	—	—	314455	450553	—	—	—	—	—	3346327	—	—
`qcp-order20-holes187-balanced-17-QWH-20`	190743	354845	—	179333	—	—	1849459	1977255	—	—	—	—	14479559	—	—	—
Grand total:	3145251	3797594	—	70936014	—	—	4207080	4739705	—	—	—	—	14479559	8222205	—	—

Table 407. Number of consistency checks required for solved instances belonging to class `QCPp-20-easy`. Problem range: `qcp-order20-holes187-balanced-13-QWH-20`–`qcp-order20-holes187-balanced-17-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-3-QWH-20`	188367	339727	—	171203	—	—	390679	517241	—	—	—	—	—	24699870	—	—
`qcp-order20-holes187-balanced-12-QWH-20`	347142	498521	—	159651	—	—	232586	364414	—	—	—	—	20144243	1590427	—	—
`qcp-order20-holes187-balanced-18-QWH-20`	428952	588895	—	184956	—	—	381766	513284	—	—	—	—	—	6572434	—	—
`qcp-order20-holes187-balanced-22-QWH-20`	487817	634686	—	168534	—	—	189920	320782	—	—	—	—	—	3577228	—	—
`qcp-order20-holes187-balanced-23-QWH-20`	162416	327915	—	258432	—	—	—	—	—	—	—	—	14362502	4930320	—	—
Grand total:	1614694	2389744	—	942776	—	—	1194951	1715721	—	—	—	—	34506745	41370279	—	—

Table 408. Number of consistency checks required for solved instances belonging to class `QCPp-20-hard`. Problem range: `qcp-order20-holes187-balanced-3-QWH-20`–`qcp-order20-holes187-balanced-23-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-8-QWH-20`	198124	364570	—	534658	—	—	489151	620544	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-25-QWH-20`	118296	272260	—	216454	—	—	259259	385693	—	—	—	—	—	22057684	—	—
`qcp-order20-holes187-balanced-27-QWH-20`	113514	271633	—	215536	—	—	195792	324582	—	—	—	—	—	17064800	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	158116	327993	—	299763	—	—	242287	375942	—	—	—	—	—	23344122	—	—
Grand total:	588050	1236456	—	1266411	—	—	1186489	1706761	—	—	—	—	—	62466606	—	—

Table 409. Number of consistency checks required for solved instances belonging to class `QCPp-20`. Problem range: `qcp-order20-holes187-balanced-8-QWH-20`–`qcp-order20-holes187-balanced-29-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	8166	25256	—	13668	—	—	12193	34536	—	—	—	—	220733	80618	—	—
`qwh-order10-holes57-balanced-2-QWH-10`	5820	20012	—	15641	—	—	11884	31084	—	—	—	—	176717	22714	—	—
`qwh-order10-holes57-balanced-3-QWH-10`	6927	22013	—	15614	—	—	11998	22658	—	—	—	—	159126	62052	—	—
`qwh-order10-holes57-balanced-4-QWH-10`	7509	22215	—	13752	—	—	15673	33412	—	—	—	—	178134	72098	—	—
`qwh-order10-holes57-balanced-5-QWH-10`	11571	23689	—	13232	—	—	12609	34411	—	—	—	—	139035	104304	—	—
Grand total:	39993	113185	—	71907	—	—	64357	156101	—	—	—	—	873745	341786	—	—

Table 410. Number of consistency checks required for solved instances belonging to class `QWH-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-35-QWH-10`	5922	20794	—	13672	—	—	14167	32043	—	—	—	—	168027	37087	—	—
`qwh-order10-holes57-balanced-54-QWH-10`	7122	21452	—	12802	—	—	22974	29991	—	—	—	—	194111	46963	—	—
`qwh-order10-holes57-balanced-187-QWH-10`	6253	21716	—	14090	—	—	12618	23893	—	—	—	—	205656	28740	—	—
`qwh-order10-holes57-balanced-219-QWH-10`	14068	32232	—	15176	—	—	13378	26002	—	—	—	—	198749	584431	—	—
`qwh-order10-holes57-balanced-647-QWH-10`	5779	21510	—	15989	—	—	12555	30924	—	—	—	—	170522	21433	—	—
Grand total:	39144	117704	—	71729	—	—	75692	142853	—	—	—	—	937065	718654	—	—

Table 411. Number of consistency checks required for solved instances belonging to class `QWH-10-hard`. Problem range: `qwh-order10-holes57-balanced-35-QWH-10`–`qwh-order10-holes57-balanced-647-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-14-QWH-15`	85820	123823	—	110614	—	—	103047	152527	—	—	—	—	1967790	464244	—	—
`qwh-order15-holes106-balanced-15-QWH-15`	119722	98209	—	46887	—	—	75444	96837	—	—	—	—	4658340	1220777	—	—
`qwh-order15-holes106-balanced-16-QWH-15`	22497	59533	—	48287	—	—	52031	114423	—	—	—	—	29927035	109224	—	—
`qwh-order15-holes106-balanced-17-QWH-15`	72466	115374	—	50599	—	—	104643	138060	—	—	—	—	3293682	871723	—	—
`qwh-order15-holes106-balanced-18-QWH-15`	101096	161592	—	63578	—	—	60634	160066	—	—	—	—	3294345	1832949	—	—
Grand total:	401601	558531	—	319965	—	—	395799	661913	—	—	—	—	43141192	4498917	—	—

Table 412. Number of consistency checks required for solved instances belonging to class `QWH-15-easy`. Problem range: `qwh-order15-holes106-balanced-14-QWH-15`–`qwh-order15-holes106-balanced-18-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-26-QWH-15`	66777	2296795	—	217037	—	—	638300	1632523	—	—	—	—	51711191	—	—	—
`qwh-order15-holes106-balanced-155-QWH-15`	1255815	1295030	—	66637	—	—	431802	462560	—	—	—	—	8900225	5430755	—	—
`qwh-order15-holes106-balanced-369-QWH-15`	36905	84243	—	65438	—	—	56087	94012	—	—	—	—	2256603	414471	—	—
`qwh-order15-holes106-balanced-392-QWH-15`	41788	114837	—	204110	—	—	67309	363271	—	—	—	—	2387246	1755253	—	—
`qwh-order15-holes106-balanced-413-QWH-15`	222275	262493	—	621029	—	—	843947	876963	—	—	—	—	—	15280475	—	—
`qwh-order15-holes106-balanced-461-QWH-15`	54348	148143	—	148552	—	—	57150	111939	—	—	—	—	1132247	575639	—	—
`qwh-order15-holes106-balanced-463-QWH-15`	288541	92237	—	62968	—	—	542846	141822	—	—	—	—	21744817	7257676	—	—
`qwh-order15-holes106-balanced-586-QWH-15`	54677	184240	—	113899	—	—	229274	166323	—	—	—	—	10001008	4610127	—	—
`qwh-order15-holes106-balanced-974-QWH-15`	26605	67703	—	203384	—	—	116236	150200	—	—	—	—	44602290	230051	—	—
Grand total:	2047731	4545721	—	1703054	—	—	2982951	3999613	—	—	—	—	142735627	35554447	—	—

Table 413. Number of consistency checks required for solved instances belonging to class `QWH-15-hard`. Problem range: `qwh-order15-holes106-balanced-26-QWH-15`–`qwh-order15-holes106-balanced-974-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-17-QWH-20`	1137977	235735	—	194011	—	—	590506	1101717	—	—	—	—	16544160	2460419	—	—
`qwh-order20-holes166-balanced-18-QWH-20`	7638772	6817496	—	148715	—	—	1148183	916943	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-19-QWH-20`	327963	288362	—	439901	—	—	307199	362416	—	—	—	—	—	5779900	—	—
`qwh-order20-holes166-balanced-20-QWH-20`	4762443	12271980	—	430019	—	—	6433535	559531	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-26-QWH-20`	1027565	796288	—	123839	—	—	613336	1076512	—	—	—	—	20211201	14719572	—	—
Grand total:	14894720	20409861	—	1336485	—	—	9092759	4017119	—	—	—	—	36755361	22959891	—	—

Table 414. Number of consistency checks required for solved instances belonging to class `QWH-20-easy`. Problem range: `qwh-order20-holes166-balanced-17-QWH-20`–`qwh-order20-holes166-balanced-26-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-156-QWH-20`	238183	—	—	567556	—	—	72744971	2706875	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-285-QWH-20`	—	3857667	—	6898229	—	—	233091	21789906	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-457-QWH-20`	—	—	—	73630357	—	—	281181060	182657770	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-522-QWH-20`	4488944	—	—	6800964	—	—	77865047	430750	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-578-QWH-20`	2843307	2921155	—	18118351	—	—	18537974	18610869	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-624-QWH-20`	—	417555	—	4620178	—	—	47253677	9865522	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-707-QWH-20`	—	—	—	106767176	—	—	203303728	203379493	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-862-QWH-20`	—	1132261	—	2574580	—	—	181607276	53378168	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-900-QWH-20`	2310567	—	—	5077059	—	—	4389711	1253442	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-988-QWH-20`	—	—	—	821913	—	—	7511617	7581579	—	—	—	—	—	—	—	—
Grand total:	9881001	8328638	—	225876363	—	—	894628152	501654374	—	—	—	—	—	—	—	—

Table 415. Number of consistency checks required for solved instances belonging to class `QWH-20-hard`. Problem range: `qwh-order20-holes166-balanced-156-QWH-20`–`qwh-order20-holes166-balanced-988-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-2-QWH-25`	—	—	—	48842905	—	—	426621485	27282895	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-4-QWH-25`	—	—	—	164698305	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-13-QWH-25`	5541080	—	—	562957	—	—	1680839	1384237	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-26-QWH-25`	7765167	—	—	2453962	—	—	17459980	2844916	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-27-QWH-25`	—	—	—	—	—	—	—	414773072	—	—	—	—	—	—	—	—
Grand total:	13306247	—	—	216558129	—	—	445762304	446285120	—	—	—	—	—	—	—	—

Table 416. Number of consistency checks required for solved instances belonging to class `QWH-25-easy`. Problem range: `qwh-order25-holes235-balanced-2-QWH-25`–`qwh-order25-holes235-balanced-27-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qwh-order25-holes235-balanced-5-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-99-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-111-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-114-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-164-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-228-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-288-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-394-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-795-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-918-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qwh-order25-holes235-balanced-993-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 417. Number of consistency checks required for solved instances belonging to class `QWH-25-hard`. Problem range: `qwh-order25-holes235-balanced-5-QWH-25`–`qwh-order25-holes235-balanced-993-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	6527	24410	—	15417	—	—	13748	33227	—	—	—	—	253556	37257	—	—
`qwh-order10-holes57-balanced-33-QWH-10`	7081	33347	—	17029	—	—	39424	39624	—	—	—	—	1005523	50914	—	—
`qwh-order10-holes57-balanced-43-QWH-10`	6505	23420	—	13676	—	—	15027	27305	—	—	—	—	210471	42908	—	—
`qwh-order10-holes57-balanced-46-QWH-10`	5998	22726	—	14097	—	—	14058	33207	—	—	—	—	173586	31368	—	—
`qwh-order10-holes57-balanced-111-QWH-10`	8318	25561	—	16838	—	—	13359	25873	—	—	—	—	1360506	69426	—	—
Grand total:	34429	129464	—	77057	—	—	95616	159236	—	—	—	—	3003642	231873	—	—

Table 418. Number of consistency checks required for solved instances belonging to class `QWHp-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-111-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-8-QWH-10`	6302	21495	—	15180	—	—	13067	32433	—	—	—	—	177444	37728	—	—
`qwh-order10-holes57-balanced-10-QWH-10`	7547	29855	—	29399	—	—	15832	32270	—	—	—	—	41191995	48900	—	—
`qwh-order10-holes57-balanced-48-QWH-10`	6514	24601	—	15474	—	—	13508	33830	—	—	—	—	218642	36722	—	—
`qwh-order10-holes57-balanced-154-QWH-10`	6898	26897	—	16548	—	—	14677	29450	—	—	—	—	298746	48915	—	—
`qwh-order10-holes57-balanced-210-QWH-10`	6773	26496	—	16992	—	—	14599	29209	—	—	—	—	306768	46667	—	—
`qwh-order10-holes57-balanced-295-QWH-10`	6242	25081	—	15515	—	—	13157	33886	—	—	—	—	316312	39108	—	—
`qwh-order10-holes57-balanced-535-QWH-10`	6544	24896	—	16151	—	—	14164	28075	—	—	—	—	271641	43271	—	—
`qwh-order10-holes57-balanced-623-QWH-10`	6891	26263	—	16301	—	—	14268	28521	—	—	—	—	262216	48404	—	—
`qwh-order10-holes57-balanced-634-QWH-10`	6970	25496	—	15683	—	—	14151	37701	—	—	—	—	345104	37546	—	—
`qwh-order10-holes57-balanced-987-QWH-10`	7011	26827	—	15731	—	—	13738	26724	—	—	—	—	1546786	41575	—	—
Grand total:	67692	257907	—	172974	—	—	141161	312099	—	—	—	—	44935654	428836	—	—

Table 419. Number of consistency checks required for solved instances belonging to class `QWHp-10-hard`. Problem range: `qwh-order10-holes57-balanced-8-QWH-10`–`qwh-order10-holes57-balanced-987-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-4-QWH-15`	25393	79588	—	51922	—	—	51322	121563	—	—	—	—	1788173	220669	—	—
`qwh-order15-holes106-balanced-5-QWH-15`	42376	99019	—	64736	—	—	54379	96141	—	—	—	—	2155853	1487703	—	—
`qwh-order15-holes106-balanced-6-QWH-15`	33688	89956	—	73922	—	—	78148	118610	—	—	—	—	1577151	1721775	—	—
`qwh-order15-holes106-balanced-7-QWH-15`	24626	80262	—	55553	—	—	52198	97704	—	—	—	—	5446350	211963	—	—
`qwh-order15-holes106-balanced-8-QWH-15`	38994	95686	—	72765	—	—	136423	179327	—	—	—	—	—	3631434	—	—
Grand total:	165077	444511	—	318898	—	—	372470	613345	—	—	—	—	10967527	7273544	—	—

Table 420. Number of consistency checks required for solved instances belonging to class `QWHp-15-easy`. Problem range: `qwh-order15-holes106-balanced-4-QWH-15`–`qwh-order15-holes106-balanced-8-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-3-QWH-15`	35599	87362	—	54769	—	—	53790	123806	—	—	—	—	1741660	327317	—	—
Grand total:	35599	87362	—	54769	—	—	53790	123806	—	—	—	—	1741660	327317	—	—

Table 421. Number of consistency checks required for solved instances belonging to class `QWHp-15-hard`. Problem: `qwh-order15-holes106-balanced-3-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-15-106-0	74808	180820	—	128369	—	—	365133	166300	—	—	—	—	914698	7505230	—	—
bqwh-15-106-17	20434	50636	—	22428	—	—	27710	58237	—	—	—	—	374458	369707	—	—
bqwh-15-106-22	10212	37018	—	15983	—	—	28786	67128	—	—	—	—	2039417	304509	—	—
bqwh-15-106-29	265277	92852	—	24833	—	—	184643	151761	—	—	—	—	1367173	10106964	—	—
bqwh-15-106-34	72188	43635	—	52527	—	—	147403	48536	—	—	—	—	280064	2207940	—	—
bqwh-15-106-39	19111	49571	—	39855	—	—	49350	67694	—	—	—	—	3485152	414434	—	—
bqwh-15-106-53	63833	91379	—	49627	—	—	51854	82467	—	—	—	—	4972767	236509	—	—
bqwh-15-106-64	38721	97010	—	23556	—	—	95259	117424	—	—	—	—	722882	658768	—	—
bqwh-15-106-67	301170	44640	—	123058	—	—	161045	178537	—	—	—	—	6530616	2754506	—	—
bqwh-15-106-76	7241	42276	—	34163	—	—	47680	59426	—	—	—	—	365075	582860	—	—
bqwh-15-106-77	31453	50314	—	28605	—	—	85141	55984	—	—	—	—	753473	313836	—	—
bqwh-15-106-78	76448	107850	—	21571	—	—	96402	89408	—	—	—	—	1671768	1689766	—	—
bqwh-15-106-83	212479	452078	—	353697	—	—	130911	148881	—	—	—	—	2571288	11293260	—	—
bqwh-15-106-87	36904	165179	—	16727	—	—	46698	75415	—	—	—	—	1103827	1566933	—	—
bqwh-15-106-89	455394	89389	—	32259	—	—	103235	74154	—	—	—	—	1329041	441065	—	—
bqwh-15-106-90	6182	33736	—	35817	—	—	53076	93254	—	—	—	—	600225	431209	—	—
bqwh-15-106-93	139193	174340	—	15171	—	—	17470	138507	—	—	—	—	11341569	214679	—	—
bqwh-15-106-96	57450	141300	—	25879	—	—	48756	66801	—	—	—	—	5045083	1520145	—	—
bqwh-15-106-97	71246	173725	—	20157	—	—	68933	76856	—	—	—	—	2327145	1178273	—	—
Grand total:	1959744	2117748	—	1064282	—	—	1809485	1816770	—	—	—	—	47795721	43790593	—	—

Table 422. Number of consistency checks required for solved instances belonging to class bqwh15-106. Problem range: bqwh-15-106-0–bqwh-15-106-97. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-18-141-10	292866	206911	—	39742	—	—	4591409	891498	—	—	—	—	10443517	—	—	—
bqwh-18-141-23	15576201	5360783	—	2641029	—	—	7626415	2738288	—	—	—	—	4997044	63328408	—	—
bqwh-18-141-28	96885	176101	—	1852308	—	—	2666702	3151483	—	—	—	—	5320466	23543859	—	—
bqwh-18-141-29	66181	112142	—	184855	—	—	330772	359991	—	—	—	—	1218987	11011573	—	—
bqwh-18-141-33	133793	92268	—	44153	—	—	213853	189467	—	—	—	—	1360052	1164259	—	—
bqwh-18-141-36	936298	242647	—	112022	—	—	510339	1290595	—	—	—	—	90895749	11724484	—	—
bqwh-18-141-37	708070	152750	—	55038	—	—	294073	322250	—	—	—	—	48118519	19759652	—	—
bqwh-18-141-39	2027330	197704	—	84222	—	—	340353	486894	—	—	—	—	1137054	20159639	—	—
bqwh-18-141-40	390851	259400	—	596069	—	—	108942	148788	—	—	—	—	12661685	2553153	—	—
bqwh-18-141-44	185018	194995	—	69707	—	—	302347	502766	—	—	—	—	2374251	14434861	—	—
bqwh-18-141-59	633793	188422	—	366771	—	—	1270955	318392	—	—	—	—	86323842	41545367	—	—
bqwh-18-141-62	620363	399171	—	338334	—	—	395335	1207283	—	—	—	—	797399	33848728	—	—
bqwh-18-141-65	108509	602179	—	531010	—	—	1935509	227470	—	—	—	—	12770563	48573444	—	—
bqwh-18-141-68	1408982	1104756	—	48863	—	—	8045120	2754539	—	—	—	—	—	—	—	—
bqwh-18-141-73	6299475	1376745	—	4402525	—	—	8330365	8360947	—	—	—	—	—	—	—	—
bqwh-18-141-89	201138	313451	—	73466	—	—	5791739	5333512	—	—	—	—	—	4497467	—	—
bqwh-18-141-90	262641	810488	—	41833	—	—	1808533	460977	—	—	—	—	11414744	33180198	—	—
bqwh-18-141-92	437372	223394	—	104137	—	—	159274	189609	—	—	—	—	778349	39960827	—	—
bqwh-18-141-96	532372	762382	—	204743	—	—	270891	371004	—	—	—	—	36981836	3814741	—	—
Grand total:	30918138	12776689	—	11790827	—	—	44992926	29305753	—	—	—	—	327594057	373100660	—	—

Table 423. Number of consistency checks required for solved instances belonging to class `bqwh18-141`. Problem range: `bqwh-18-141-10`–`bqwh-18-141-96`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-25-0`	13224	74177	—	83970	—	—	81750	28602	—	—	—	—	91513	1053830	—	—
`composed-25-1-25-1`	12371	72284	—	53777	—	—	70014	27585	—	—	—	—	94497	700840	—	—
`composed-25-1-25-2`	16407	74934	—	94666	—	—	108913	29031	—	—	—	—	97997	1139875	—	—
`composed-25-1-25-3`	15887	77228	—	78492	—	—	94084	28781	—	—	—	—	100830	918785	—	—
`composed-25-1-25-4`	30139	75401	—	103451	—	—	110314	29355	—	—	—	—	106935	1154888	—	—
`composed-25-1-25-5`	13933	72539	—	67898	—	—	76473	28661	—	—	—	—	91504	965241	—	—
`composed-25-1-25-6`	12856	74458	—	98928	—	—	94612	28905	—	—	—	—	106568	909243	—	—
`composed-25-1-25-7`	13814	73175	—	95424	—	—	93783	28682	—	—	—	—	106540	1073495	—	—
`composed-25-1-25-8`	15440	76198	—	83152	—	—	105298	28451	—	—	—	—	100770	868796	—	—
`composed-25-1-25-9`	13825	75647	—	91820	—	—	115039	28799	—	—	—	—	97361	1065530	—	—
Grand total:	157896	746041	—	851578	—	—	950280	286852	—	—	—	—	994515	9850523	—	—

Table 424. Number of consistency checks required for solved instances belonging to class `composed-25-1-25`. Problem range: `composed-25-1-25-0`–`composed-25-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-2-0`	12212	68902	—	84722	—	—	71309	25807	—	—	—	—	84293	895876	—	—
`composed-25-1-2-1`	11218	66362	—	67568	—	—	66259	25365	—	—	—	—	88128	754822	—	—
`composed-25-1-2-2`	24969	68951	—	102516	—	—	82624	26679	—	—	—	—	90440	1118237	—	—
`composed-25-1-2-3`	11785	68530	—	65530	—	—	73457	26018	—	—	—	—	93495	1077580	—	—
`composed-25-1-2-4`	24752	68749	—	99650	—	—	90665	27561	—	—	—	—	99061	1162849	—	—
`composed-25-1-2-5`	24675	66539	—	61481	—	—	66443	26248	—	—	—	—	84631	1061369	—	—
`composed-25-1-2-6`	24043	68785	—	106148	—	—	92620	27412	—	—	—	—	99149	966905	—	—
`composed-25-1-2-7`	24632	66870	—	88418	—	—	80331	26404	—	—	—	—	98848	1141265	—	—
`composed-25-1-2-8`	11980	70175	—	79733	—	—	64341	27334	—	—	—	—	93880	1083397	—	—
`composed-25-1-2-9`	24937	69905	—	99191	—	—	94550	27053	—	—	—	—	89686	927423	—	—
Grand total:	195203	683768	—	854957	—	—	782599	265881	—	—	—	—	921611	10189723	—	—

Table 425. Number of consistency checks required for solved instances belonging to class `composed-25-1-2`. Problem range: `composed-25-1-2-0`–`composed-25-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-40-0`	14418	77888	—	86590	—	—	99384	30452	—	—	—	—	96018	855096	—	—
`composed-25-1-40-1`	13980	76195	—	67539	—	—	76700	29442	—	—	—	—	99129	771323	—	—
`composed-25-1-40-2`	28984	78813	—	87066	—	—	121622	31621	—	—	—	—	102744	1091149	—	—
`composed-25-1-40-3`	17915	81671	—	78040	—	—	83216	30473	—	—	—	—	105486	823716	—	—
`composed-25-1-40-4`	16854	79686	—	100306	—	—	121532	31647	—	—	—	—	112152	1163766	—	—
`composed-25-1-40-5`	14892	76668	—	67527	—	—	88996	30373	—	—	—	—	96225	990837	—	—
`composed-25-1-40-6`	15301	77965	—	97331	—	—	151679	30937	—	—	—	—	111511	944664	—	—
`composed-25-1-40-7`	15758	76864	—	106073	—	—	102865	31301	—	—	—	—	111788	1081923	—	—
`composed-25-1-40-8`	16841	80845	—	85489	—	—	112856	30677	—	—	—	—	105520	908727	—	—
`composed-25-1-40-9`	16923	79348	—	93684	—	—	119541	30585	—	—	—	—	102091	1131586	—	—
Grand total:	171866	785943	—	869645	—	—	1078391	307508	—	—	—	—	1042664	9762787	—	—

Table 426. Number of consistency checks required for solved instances belonging to class `composed-25-1-40`. Problem range: `composed-25-1-40-0`–`composed-25-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-80-0`	19266	87881	—	92069	—	—	124012	34992	—	—	—	—	108409	1089205	—	—
`composed-25-1-80-1`	8247	87448	—	36890	—	—	33118	33063	—	—	—	—	110781	43452	—	—
`composed-25-1-80-2`	21049	89719	—	102248	—	—	153188	36522	—	—	—	—	116386	1184384	—	—
`composed-25-1-80-3`	22870	96757	—	94955	—	—	88119	34959	—	—	—	—	117603	755286	—	—
`composed-25-1-80-4`	22589	92134	—	133880	—	—	148949	37045	—	—	—	—	125483	1203111	—	—
`composed-25-1-80-5`	22433	92077	—	45488	—	—	50149	34763	—	—	—	—	108230	935410	—	—
`composed-25-1-80-6`	21302	91481	—	114658	—	—	129869	35760	—	—	—	—	124208	1061032	—	—
`composed-25-1-80-7`	20008	88071	—	131276	—	—	156683	36794	—	—	—	—	126347	1113958	—	—
`composed-25-1-80-8`	9101	91708	—	38250	—	—	35341	36347	—	—	—	—	118393	55652	—	—
`composed-25-1-80-9`	19976	90593	—	108862	—	—	156162	35952	—	—	—	—	114896	1444383	—	—
Grand total:	186841	907869	—	898576	—	—	1075590	356197	—	—	—	—	1170736	8885873	—	—

Table 427. Number of consistency checks required for solved instances belonging to class `composed-25-1-80`. Problem range: `composed-25-1-80-0`–`composed-25-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-10-20-0`	25410	280499	—	88989	—	—	197345	494383	—	—	—	—	3060314	4329067	—	—
`composed-25-10-20-1`	159276	255879	—	131573	—	—	140084	395561	—	—	—	—	2539335	3779223	—	—
`composed-25-10-20-2`	93528	259163	—	158082	—	—	212913	488292	—	—	—	—	2119028	4113249	—	—
`composed-25-10-20-3`	25710	271233	—	88019	—	—	285639	468253	—	—	—	—	3777459	3907594	—	—
`composed-25-10-20-4`	67948	280829	—	103622	—	—	160718	479405	—	—	—	—	3157162	392181	—	—
`composed-25-10-20-5`	24252	278562	—	88762	—	—	85806	457077	—	—	—	—	2080630	2026359	—	—
`composed-25-10-20-6`	24711	266791	—	86684	—	—	414093	485410	—	—	—	—	—	10736869	—	—
`composed-25-10-20-7`	25334	274274	—	88225	—	—	85914	451609	—	—	—	—	1976918	495378	—	—
`composed-25-10-20-8`	24668	280797	—	250742	—	—	208055	496164	—	—	—	—	2175679	402395	—	—
`composed-25-10-20-9`	94946	279805	—	141754	—	—	114889	385581	—	—	—	—	2156413	1020851	—	—
Grand total:	565783	2727832	—	1226452	—	—	1905456	4601735	—	—	—	—	23042938	31203166	—	—

Table 428. Number of consistency checks required for solved instances belonging to class `composed-25-10-20`. Problem range: `composed-25-10-20-0`–`composed-25-10-20-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-25-0`	50132	210894	—	197296	—	—	216132	73174	—	—	—	—	259757	5980956	—	—
`composed-75-1-25-1`	27456	211364	—	211609	—	—	280637	74232	—	—	—	—	289655	6897019	—	—
`composed-75-1-25-2`	51642	211108	—	237457	—	—	260843	74368	—	—	—	—	275049	6636603	—	—
`composed-75-1-25-3`	50789	213117	—	187923	—	—	254249	73964	—	—	—	—	275943	7239619	—	—
`composed-75-1-25-4`	26721	213221	—	159670	—	—	183134	72973	—	—	—	—	216757	4929376	—	—
`composed-75-1-25-5`	53884	213179	—	233864	—	—	220498	74629	—	—	—	—	275936	6165577	—	—
`composed-75-1-25-6`	50970	214718	—	225953	—	—	253287	75392	—	—	—	—	277182	7359910	—	—
`composed-75-1-25-7`	51999	215893	—	250041	—	—	222353	74264	—	—	—	—	261889	6844510	—	—
`composed-75-1-25-8`	52392	215167	—	159248	—	—	203378	73984	—	—	—	—	275082	4937595	—	—
`composed-75-1-25-9`	53955	212997	—	248629	—	—	271442	74430	—	—	—	—	290550	6423937	—	—
Grand total:	469940	2131658	—	2111690	—	—	2365953	741410	—	—	—	—	2697800	63415102	—	—

Table 429. Number of consistency checks required for solved instances belonging to class `composed-75-1-25`. Problem range: `composed-75-1-25-0`–`composed-75-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-2-0`	50056	205277	—	190452	—	—	182261	71496	—	—	—	—	252746	6533689	—	—
`composed-75-1-2-1`	49945	205860	—	228851	—	—	196193	71509	—	—	—	—	281749	6878503	—	—
`composed-75-1-2-2`	49809	205088	—	239953	—	—	182328	73059	—	—	—	—	267944	6552889	—	—
`composed-75-1-2-3`	47620	206541	—	258274	—	—	183368	71347	—	—	—	—	268176	6362573	—	—
`composed-75-1-2-4`	25447	208302	—	171394	—	—	152734	71231	—	—	—	—	211026	4921258	—	—
`composed-75-1-2-5`	48243	207406	—	238387	—	—	197278	72150	—	—	—	—	268848	6733877	—	—
`composed-75-1-2-6`	49422	208494	—	240447	—	—	211169	192563	—	—	—	—	269062	7156296	—	—
`composed-75-1-2-7`	47807	210344	—	240619	—	—	212175	72961	—	—	—	—	254161	6739793	—	—
`composed-75-1-2-8`	52012	209558	—	201587	—	—	187630	71199	—	—	—	—	267788	5330567	—	—
`composed-75-1-2-9`	71039	206954	—	259929	—	—	243758	72780	—	—	—	—	282506	7079389	—	—
Grand total:	491400	2073824	—	2269893	—	—	1948894	840295	—	—	—	—	2624006	64288834	—	—

Table 430. Number of consistency checks required for solved instances belonging to class `composed-75-1-2`. Problem range: `composed-75-1-2-0`–`composed-75-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-40-0`	28214	214633	—	184354	—	—	245976	74738	—	—	—	—	264075	5289678	—	—
`composed-75-1-40-1`	28700	214839	—	215496	—	—	271050	75563	—	—	—	—	294509	6960111	—	—
`composed-75-1-40-2`	28187	215210	—	196367	—	—	271996	76246	—	—	—	—	279866	6593082	—	—
`composed-75-1-40-3`	28989	217103	—	211814	—	—	303401	75552	—	—	—	—	281136	7248136	—	—
`composed-75-1-40-4`	29094	216558	—	169597	—	—	204238	74505	—	—	—	—	220594	4766221	—	—
`composed-75-1-40-5`	28878	216723	—	213789	—	—	208801	76350	—	—	—	—	280890	5799415	—	—
`composed-75-1-40-6`	30011	218833	—	199965	—	—	271413	77441	—	—	—	—	282257	6328457	—	—
`composed-75-1-40-7`	29765	219848	—	270940	—	—	235636	76859	—	—	—	—	266463	6307170	—	—
`composed-75-1-40-8`	61880	219011	—	171907	—	—	220807	75621	—	—	—	—	279944	4984434	—	—
`composed-75-1-40-9`	55041	216987	—	264418	—	—	339338	76314	—	—	—	—	295794	6527138	—	—
Grand total:	348759	2169745	—	2098647	—	—	2572656	759189	—	—	—	—	2745528	60803842	—	—

Table 431. Number of consistency checks required for solved instances belonging to class `composed-75-1-40`. Problem range: `composed-75-1-40-0`–`composed-75-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-80-0`	17318	224249	—	86535	—	—	78861	78861	—	—	—	—	275889	125327	—	—
`composed-75-1-80-1`	33854	225214	—	200018	—	—	358345	80192	—	—	—	—	307821	6792174	—	—
`composed-75-1-80-2`	17171	226077	—	88363	—	—	82327	80663	—	—	—	—	292201	153481	—	—
`composed-75-1-80-3`	33063	227842	—	206474	—	—	368849	81179	—	—	—	—	294827	5833911	—	—
`composed-75-1-80-4`	17157	225916	—	86931	—	—	78204	78193	—	—	—	—	230902	96506	—	—
`composed-75-1-80-5`	32105	227084	—	248739	—	—	238680	80913	—	—	—	—	293767	5745455	—	—
`composed-75-1-80-6`	33499	229190	—	201487	—	—	309421	79976	—	—	—	—	296108	6744138	—	—
`composed-75-1-80-7`	32792	230392	—	229171	—	—	276995	81710	—	—	—	—	279452	5580033	—	—
`composed-75-1-80-8`	34309	229737	—	176686	—	—	173239	79034	—	—	—	—	292888	4663676	—	—
`composed-75-1-80-9`	32531	227078	—	326898	—	—	421259	81458	—	—	—	—	310250	6953587	—	—
Grand total:	283799	2272779	—	1851302	—	—	2386180	802179	—	—	—	—	2874105	42688288	—	—

Table 432. Number of consistency checks required for solved instances belonging to class `composed-75-1-80`. Problem range: `composed-75-1-80-0`–`composed-75-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`cril_unsat_b_1`	3219408	4494763	—	437203028	—	—	361865005	432778218	—	—	—	—	—	—	—	—
`cril_unsat_b_2`	1655945	2145282	—	—	—	—	—	153352	—	—	—	—	565505	—	—	—
`cril_unsat_b_3`	2731130	3239693	—	—	—	—	—	414012	—	—	—	—	682538	—	—	—
`cril_unsat_b_4`	274761478	282485781	—	—	—	—	—	160415346	—	—	—	—	—	—	—	—
`cril_unsat_b_5`	99979579	4844429	—	177024491	—	—	301295932	10380407	—	—	—	—	—	—	—	—
Grand total:	382347540	297209948	—	614227519	—	—	663160937	604141335	—	—	—	—	1248043	—	—	—

Table 433. Number of consistency checks required for solved instances belonging to class `cril`. Problem range: `cril_unsat_b_1`–`cril_unsat_b_5`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
domino-100-100	990398	990398	—	18165248	—	—	16680150	16680350	—	—	—	—	18169901	18159999	—	—
domino-100-200	3980798	3980798	—	139320398	—	—	133370300	133370500	—	—	—	—	139309901	139299999	—	—
domino-100-300	8971198	8971198	—	463465548	—	—	450070450	450070650	—	—	—	—	463429901	463419999	—	—
domino-300-100	2970398	2970398	—	54505448	—	—	50030150	50030750	—	—	—	—	54589701	54499999	—	—
domino-300-200	11940798	11940798	—	418000598	—	—	400070300	400070900	—	—	—	—	418069701	417979999	—	—
domino-300-300	26911198	26911198	—	1390485748	—	—	1350120450	1350121050	—	—	—	—	—	—	—	—
domino-500-100	4950398	4950398	—	90845648	—	—	83380150	83381150	—	—	—	—	—	—	—	—
domino-500-200	19900798	19900798	—	696680798	—	—	666770300	666771300	—	—	—	—	—	—	—	—
domino-500-300	44851198	44851198	—	2317505948	—	—	2250170450	2250171450	—	—	—	—	—	—	—	—
domino-1000-10	90038	90038	—	320963	—	—	175065	177065	—	—	—	—	—	—	—	—
Grand total:	125557220	125557220	—	5589296345	—	—	5400837765	5400845165	—	—	—	—	1093569105	1093359995	—	—

Table 434. Number of consistency checks required for solved instances belonging to class `domino1`. Problem range: `domino-100-100`–`domino-1000-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-0	169215	98942	—	3427002	—	—	5741510	362130	—	—	—	—	1164958	48616793	—	—
dual_ehi-85-297-10	358347	96282	—	2090053	—	—	5886600	294437	—	—	—	—	889619	23269269	—	—
dual_ehi-85-297-11	170529	95483	—	374996	—	—	333175	276782	—	—	—	—	784095	1946455	—	—
dual_ehi-85-297-12	168680	97546	—	5868548	—	—	2590420	271526	—	—	—	—	514285	16370301	—	—
dual_ehi-85-297-13	185790	94752	—	8440796	—	—	27734771	321152	—	—	—	—	976328	—	—	—
dual_ehi-85-297-14	103802	94598	—	408404	—	—	376522	284188	—	—	—	—	617071	1016220	—	—
dual_ehi-85-297-15	176085	99782	—	4270911	—	—	9693038	356778	—	—	—	—	808159	48882393	—	—
dual_ehi-85-297-16	171952	101776	—	1018826	—	—	1862673	323156	—	—	—	—	1719310	25726463	—	—
dual_ehi-85-297-17	179111	99635	—	9536599	—	—	4252279	344934	—	—	—	—	804895	20681788	—	—
dual_ehi-85-297-18	164114	100183	—	3046065	—	—	5021807	304525	—	—	—	—	618007	18013532	—	—
dual_ehi-85-297-19	96468	92843	—	394821	—	—	360660	275993	—	—	—	—	804482	896865	—	—
dual_ehi-85-297-1	177306	98298	—	3492641	—	—	6843225	279947	—	—	—	—	714671	25404258	—	—
dual_ehi-85-297-20	169751	94346	—	4574514	—	—	18965546	325497	—	—	—	—	610000	33788930	—	—
dual_ehi-85-297-21	169038	96833	—	770870	—	—	318330	276905	—	—	—	—	1168076	4663464	—	—
dual_ehi-85-297-22	181340	98034	—	337810	—	—	284335	275349	—	—	—	—	973643	219900	—	—
dual_ehi-85-297-23	154612	93132	—	348444	—	—	301276	257157	—	—	—	—	512052	412911	—	—
dual_ehi-85-297-24	167028	97555	—	6435685	—	—	12950114	291329	—	—	—	—	610677	77418742	—	—
dual_ehi-85-297-25	188721	94647	—	2959692	—	—	8668842	290723	—	—	—	—	702691	33779634	—	—
dual_ehi-85-297-26	175163	98382	—	5673829	—	—	12547938	317029	—	—	—	—	—	50746957	—	—
dual_ehi-85-297-27	95902	94366	—	342861	—	—	293102	264909	—	—	—	—	707552	500308	—	—

Table 435. Number of consistency checks required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-28	92953	96001	—	340872	—	—	291781	295189	—	—	—	—	604710	403092	—	—
dual_ehi-85-297-29	113311	92741	—	340299	—	—	288628	266999	—	—	—	—	703743	392827	—	—
dual_ehi-85-297-2	364456	97503	—	5573920	—	—	15651979	286988	—	—	—	—	518405	37151408	—	—
dual_ehi-85-297-30	175822	101004	—	12163983	—	—	8115802	3193085	—	—	—	—	796653	61712660	—	—
dual_ehi-85-297-31	95295	97219	—	345329	—	—	292824	297855	—	—	—	—	1076416	516594	—	—
dual_ehi-85-297-32	121986	99210	—	508412	—	—	401005	278873	—	—	—	—	707656	14998930	—	—
dual_ehi-85-297-33	163331	95378	—	1290520	—	—	5067600	304182	—	—	—	—	—	25617251	—	—
dual_ehi-85-297-34	95371	93496	—	357915	—	—	314155	280098	—	—	—	—	707249	210481	—	—
dual_ehi-85-297-35	188315	95045	—	12166410	—	—	9419599	317244	—	—	—	—	1086364	40744381	—	—
dual_ehi-85-297-36	92854	92486	—	344431	—	—	294832	268352	—	—	—	—	510046	410622	—	—
dual_ehi-85-297-37	171993	98921	—	1995898	—	—	2275359	330935	—	—	—	—	796072	17101888	—	—
dual_ehi-85-297-38	183592	96630	—	8442772	—	—	10993331	310518	—	—	—	—	—	37844132	—	—
dual_ehi-85-297-39	172869	99773	—	4688154	—	—	8295941	318129	—	—	—	—	1855044	39053368	—	—
dual_ehi-85-297-3	171744	93376	—	10414395	—	—	19046849	292851	—	—	—	—	518067	43887002	—	—
dual_ehi-85-297-40	155025	97542	—	7481196	—	—	13797002	358451	—	—	—	—	722779	27377836	—	—
dual_ehi-85-297-41	179772	95954	—	2773836	—	—	1919150	303853	—	—	—	—	703270	21183106	—	—
dual_ehi-85-297-42	100291	94997	—	388242	—	—	350160	296568	—	—	—	—	917998	694133	—	—
dual_ehi-85-297-43	93743	93668	—	367339	—	—	324350	319367	—	—	—	—	701076	116138	—	—
dual_ehi-85-297-44	175361	96877	—	3555939	—	—	11364299	309229	—	—	—	—	2196718	28862224	—	—
dual_ehi-85-297-45	94400	95988	—	343118	—	—	292976	344060	—	—	—	—	1056065	405720	—	—

Table 436. Number of consistency checks required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-28`–`dual_ehi-85-297-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-46	158956	94910	—	2241164	—	—	7926773	334776	—	—	—	—	988025	50828543	—	—
dual_ehi-85-297-47	109082	94506	—	356221	—	—	311220	284824	—	—	—	—	601577	421594	—	—
dual_ehi-85-297-48	322228	94693	—	3824840	—	—	9135315	309115	—	—	—	—	802923	50056754	—	—
dual_ehi-85-297-49	182139	95742	—	3779489	—	—	3067300	319162	—	—	—	—	621773	61481962	—	—
dual_ehi-85-297-4	172238	94833	—	5968664	—	—	9864736	296921	—	—	—	—	520712	28080563	—	—
dual_ehi-85-297-50	180077	99255	—	4307516	—	—	18878000	356534	—	—	—	—	1269889	37939569	—	—
dual_ehi-85-297-51	169671	94870	—	3090404	—	—	4371173	303076	—	—	—	—	614094	29432822	—	—
dual_ehi-85-297-52	408031	95274	—	408612	—	—	377662	287780	—	—	—	—	617571	1199071	—	—
dual_ehi-85-297-53	192657	94939	—	5348890	—	—	13520718	270067	—	—	—	—	803099	44536249	—	—
dual_ehi-85-297-54	176904	95010	—	4756588	—	—	1214372	287507	—	—	—	—	610257	12320822	—	—
dual_ehi-85-297-55	179374	98596	—	4860966	—	—	13096600	338881	—	—	—	—	—	33833431	—	—
dual_ehi-85-297-56	386847	95149	—	1358122	—	—	1324690	323785	—	—	—	—	619079	10146952	—	—
dual_ehi-85-297-57	416956	95403	—	6225716	—	—	8117461	288214	—	—	—	—	714004	27834369	—	—
dual_ehi-85-297-58	94838	93615	—	345853	—	—	295469	278564	—	—	—	—	514255	309375	—	—
dual_ehi-85-297-59	189641	99075	—	7079207	—	—	8354637	321609	—	—	—	—	891509	31285381	—	—
dual_ehi-85-297-5	147672	104091	—	934138	—	—	552489	372127	—	—	—	—	523906	7269987	—	—
dual_ehi-85-297-60	94813	94204	—	353703	—	—	304713	279807	—	—	—	—	702784	320328	—	—
dual_ehi-85-297-61	179036	97869	—	22942068	—	—	8517155	273100	—	—	—	—	710549	41259466	—	—
dual_ehi-85-297-62	177155	99483	—	6648385	—	—	7193414	320431	—	—	—	—	1076482	32445294	—	—
dual_ehi-85-297-63	159701	99044	—	5197784	—	—	14695929	334406	—	—	—	—	794793	56722411	—	—

Table 437. Number of consistency checks required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-46`–`dual_ehi-85-297-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-64	159200	95068	—	337131	—	—	286588	295409	—	—	—	—	604679	215402	—	—
dual_ehi-85-297-65	168200	96877	—	356944	—	—	313504	288461	—	—	—	—	694045	118784	—	—
dual_ehi-85-297-66	97818	107265	—	364245	—	—	317937	367255	—	—	—	—	1829143	1082110	—	—
dual_ehi-85-297-67	645076	94346	—	351310	—	—	302058	286144	—	—	—	—	902089	404586	—	—
dual_ehi-85-297-68	170037	97949	—	5267681	—	—	12787399	304545	—	—	—	—	1189998	35770227	—	—
dual_ehi-85-297-69	186952	94982	—	4949172	—	—	1401135	308202	—	—	—	—	1179347	15949578	—	—
dual_ehi-85-297-6	358822	95378	—	4879229	—	—	7057684	302130	—	—	—	—	722652	62036886	—	—
dual_ehi-85-297-70	166072	95407	—	3467279	—	—	5188968	306502	—	—	—	—	988481	16725634	—	—
dual_ehi-85-297-71	141756	95386	—	6839747	—	—	6441532	308673	—	—	—	—	802949	29257124	—	—
dual_ehi-85-297-72	185429	95493	—	1742420	—	—	1449399	271594	—	—	—	—	609882	6609376	—	—
dual_ehi-85-297-73	329577	97879	—	8379442	—	—	5920402	344166	—	—	—	—	515104	13556941	—	—
dual_ehi-85-297-74	155949	97784	—	347616	—	—	299690	275243	—	—	—	—	514261	310273	—	—
dual_ehi-85-297-75	154698	93330	—	331676	—	—	278535	286992	—	—	—	—	606950	209036	—	—
dual_ehi-85-297-76	169189	98877	—	964392	—	—	1566502	327784	—	—	—	—	705124	13681829	—	—
dual_ehi-85-297-77	558116	95100	—	354054	—	—	308273	280370	—	—	—	—	513948	415462	—	—
dual_ehi-85-297-78	173474	95720	—	3987083	—	—	7916676	308869	—	—	—	—	794030	44931806	—	—
dual_ehi-85-297-79	167856	94136	—	340591	—	—	289516	261771	—	—	—	—	608853	313288	—	—
dual_ehi-85-297-7	202029	98181	—	9143002	—	—	20475904	281123	—	—	—	—	614539	47090853	—	—
dual_ehi-85-297-80	92794	93254	—	350004	—	—	302917	280511	—	—	—	—	512083	117065	—	—
dual_ehi-85-297-81	343366	96109	—	6057695	—	—	7330465	353646	—	—	—	—	993247	43260333	—	—

Table 438. Number of consistency checks required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-64`–`dual_ehi-85-297-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-82	93544	96672	—	320075	—	—	264704	263464	—	—	—	—	607023	116778	—	—
dual_ehi-85-297-83	174957	100320	—	7602702	—	—	1067497	273453	—	—	—	—	516974	14892671	—	—
dual_ehi-85-297-84	565975	99168	—	5968274	—	—	7221975	319038	—	—	—	—	523612	37159705	—	—
dual_ehi-85-297-85	321860	96121	—	7254121	—	—	2689285	333752	—	—	—	—	898284	16320876	—	—
dual_ehi-85-297-86	185284	95373	—	883636	—	—	1130301	291682	—	—	—	—	1178730	15925350	—	—
dual_ehi-85-297-87	170265	99485	—	903087	—	—	6008352	287005	—	—	—	—	802206	36335310	—	—
dual_ehi-85-297-88	91602	93741	—	327014	—	—	271672	263378	—	—	—	—	511592	113578	—	—
dual_ehi-85-297-89	351136	100218	—	6038370	—	—	7206858	273756	—	—	—	—	895123	25341939	—	—
dual_ehi-85-297-8	891168	97970	—	342576	—	—	294236	313241	—	—	—	—	895625	605739	—	—
dual_ehi-85-297-90	191017	94586	—	369467	—	—	331111	298893	—	—	—	—	987240	984001	—	—
dual_ehi-85-297-91	169420	95915	—	15777222	—	—	20657054	303461	—	—	—	—	811724	38194901	—	—
dual_ehi-85-297-92	178444	97935	—	2054971	—	—	7459351	308134	—	—	—	—	521436	39054044	—	—
dual_ehi-85-297-93	162320	101669	—	9223406	—	—	6644063	347663	—	—	—	—	1146794	26388828	—	—
dual_ehi-85-297-94	95414	92901	—	347718	—	—	299984	267726	—	—	—	—	603228	307188	—	—
dual_ehi-85-297-95	376129	94155	—	13092498	—	—	8257144	262057	—	—	—	—	701350	29325170	—	—
dual_ehi-85-297-96	97084	97691	—	342797	—	—	291638	312541	—	—	—	—	605353	210865	—	—
dual_ehi-85-297-97	193480	102634	—	3242018	—	—	4569222	363349	—	—	—	—	622252	26175193	—	—
dual_ehi-85-297-98	200167	96110	—	5300811	—	—	13013213	269749	—	—	—	—	519290	36864796	—	—
dual_ehi-85-297-99	181320	97697	—	5481894	—	—	5830101	283934	—	—	—	—	620914	30393390	—	—
dual_ehi-85-297-9	92683	92322	—	332116	—	—	279532	262236	—	—	—	—	509651	117011	—	—
Grand total:	19933133	9662989	—	371740163	—	—	538965988	33085860	—	—	—	—	76255988	2095647845	—	—

Table 439. Number of consistency checks required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-0	101527	105698	—	370965	—	—	322095	376129	—	—	—	—	1219989	334344	—	—
dual_ehi-90-315-10	183236	101495	—	3469937	—	—	9899020	324338	—	—	—	—	954297	41772676	—	—
dual_ehi-90-315-11	158742	100483	—	1528012	—	—	342164	296714	—	—	—	—	845786	1470762	—	—
dual_ehi-90-315-12	385883	103142	—	6649190	—	—	8067560	285897	—	—	—	—	751457	25682100	—	—
dual_ehi-90-315-13	187500	100567	—	2094054	—	—	3025728	339259	—	—	—	—	1050327	26819102	—	—
dual_ehi-90-315-14	102967	100226	—	399527	—	—	358210	295040	—	—	—	—	657584	236372	—	—
dual_ehi-90-315-15	194076	104727	—	3298368	—	—	22547241	360295	—	—	—	—	856782	19822419	—	—
dual_ehi-90-315-16	374793	107826	—	8923861	—	—	13962635	321585	—	—	—	—	—	46037206	—	—
dual_ehi-90-315-17	187316	106166	—	2419720	—	—	4124082	378287	—	—	—	—	856443	33410962	—	—
dual_ehi-90-315-18	179648	106172	—	10619307	—	—	6561877	309158	—	—	—	—	656744	37424458	—	—
dual_ehi-90-315-19	367408	98340	—	367549	—	—	317603	290006	—	—	—	—	856448	735181	—	—
dual_ehi-90-315-1	183012	104426	—	4258296	—	—	5054892	299462	—	—	—	—	761149	77143096	—	—
dual_ehi-90-315-20	182074	100112	—	4142321	—	—	17283165	351001	—	—	—	—	649986	35636505	—	—
dual_ehi-90-315-21	202527	102142	—	3146886	—	—	2828083	292143	—	—	—	—	1259211	23969080	—	—
dual_ehi-90-315-22	101416	103400	—	354838	—	—	301222	290788	—	—	—	—	648604	227372	—	—
dual_ehi-90-315-23	166253	98754	—	353385	—	—	299662	272701	—	—	—	—	545191	226997	—	—
dual_ehi-90-315-24	201359	102848	—	2320812	—	—	7239459	308835	—	—	—	—	650292	25751272	—	—
dual_ehi-90-315-25	121494	101539	—	538186	—	—	513857	310652	—	—	—	—	751620	2043463	—	—
dual_ehi-90-315-26	438189	109175	—	7931632	—	—	4519227	324358	—	—	—	—	656688	14473580	—	—
dual_ehi-90-315-27	102009	100309	—	371145	—	—	318557	281343	—	—	—	—	751231	529054	—	—

Table 440. Number of consistency checks required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-28	160620	102950	—	361222	—	—	308906	308720	—	—	—	—	646717	430028	—	—
dual_ehi-90-315-29	98077	98365	—	357447	—	—	303814	282827	—	—	—	—	751068	420544	—	—
dual_ehi-90-315-2	103013	104982	—	427068	—	—	388067	312791	—	—	—	—	549688	331476	—	—
dual_ehi-90-315-30	189735	106722	—	5102819	—	—	9757626	3347547	—	—	—	—	852580	51694595	—	—
dual_ehi-90-315-31	105371	103175	—	383045	—	—	336626	314276	—	—	—	—	1152454	551343	—	—
dual_ehi-90-315-32	298939	104565	—	4112760	—	—	3900874	294759	—	—	—	—	754686	33027429	—	—
dual_ehi-90-315-33	180203	101391	—	14371067	—	—	10253261	310897	—	—	—	—	1350694	60929883	—	—
dual_ehi-90-315-34	125885	99580	—	365749	—	—	314897	292075	—	—	—	—	652623	226291	—	—
dual_ehi-90-315-35	333413	101307	—	450526	—	—	634581	324903	—	—	—	—	866209	6965213	—	—
dual_ehi-90-315-36	106279	98527	—	389624	—	—	345469	283117	—	—	—	—	542814	936131	—	—
dual_ehi-90-315-37	183811	105333	—	1579011	—	—	1667633	349166	—	—	—	—	850635	13431216	—	—
dual_ehi-90-315-38	614693	102261	—	9446939	—	—	16140242	328200	—	—	—	—	952207	32799308	—	—
dual_ehi-90-315-39	229162	105699	—	2816600	—	—	12479648	347130	—	—	—	—	1978710	32220469	—	—
dual_ehi-90-315-3	189023	99381	—	7974086	—	—	13566515	287559	—	—	—	—	552083	31999132	—	—
dual_ehi-90-315-40	179810	101886	—	6198947	—	—	7459874	375145	—	—	—	—	767257	50711219	—	—
dual_ehi-90-315-41	175423	102354	—	3421664	—	—	7935516	324236	—	—	—	—	752216	35254922	—	—
dual_ehi-90-315-42	174414	100311	—	5022270	—	—	5335692	306897	—	—	—	—	973248	32156843	—	—
dual_ehi-90-315-43	99157	99069	—	367360	—	—	320901	336030	—	—	—	—	746014	122784	—	—
dual_ehi-90-315-44	375339	102652	—	6876269	—	—	9807444	308854	—	—	—	—	2357920	56364557	—	—
dual_ehi-90-315-45	100337	100793	—	368471	—	—	316637	364710	—	—	—	—	1023080	424768	—	—

Table 441. Number of consistency checks required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-28`–`dual_ehi-90-315-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-46	405810	100496	—	5359648	—	—	6532615	352736	—	—	—	—	1359982	47867362	—	—
dual_ehi-90-315-47	100677	100725	—	363914	—	—	310331	303109	—	—	—	—	744048	229107	—	—
dual_ehi-90-315-48	356937	100152	—	4237419	—	—	5931628	325684	—	—	—	—	853059	34388539	—	—
dual_ehi-90-315-49	174257	101633	—	6350654	—	—	3150461	344366	—	—	—	—	658527	24302691	—	—
dual_ehi-90-315-4	181837	100449	—	10144647	—	—	7422685	292846	—	—	—	—	650557	73003148	—	—
dual_ehi-90-315-50	113072	104907	—	385385	—	—	338019	351325	—	—	—	—	1360265	1291726	—	—
dual_ehi-90-315-51	200483	100625	—	8715277	—	—	6321301	319330	—	—	—	—	758570	25088582	—	—
dual_ehi-90-315-52	186761	101462	—	4070315	—	—	5576330	301158	—	—	—	—	658470	17676390	—	—
dual_ehi-90-315-53	206260	100822	—	376342	—	—	326047	287161	—	—	—	—	854566	227091	—	—
dual_ehi-90-315-54	189095	100514	—	8095835	—	—	5013786	297392	—	—	—	—	651685	52501569	—	—
dual_ehi-90-315-55	346121	103726	—	5676507	—	—	8055559	335775	—	—	—	—	864327	—	—	—
dual_ehi-90-315-56	179770	103950	—	8863147	—	—	3465736	343938	—	—	—	—	654897	25278898	—	—
dual_ehi-90-315-57	170475	101148	—	5595473	—	—	5306352	308639	—	—	—	—	653840	46389271	—	—
dual_ehi-90-315-58	101183	99380	—	361482	—	—	308413	299114	—	—	—	—	546450	326178	—	—
dual_ehi-90-315-59	164536	104720	—	1485122	—	—	5622616	335140	—	—	—	—	949777	21722555	—	—
dual_ehi-90-315-5	391128	109380	—	369855	—	—	315835	380396	—	—	—	—	657998	759893	—	—
dual_ehi-90-315-60	100264	99827	—	378705	—	—	330613	294961	—	—	—	—	747851	231579	—	—
dual_ehi-90-315-61	193693	104238	—	6911907	—	—	20337275	305192	—	—	—	—	755238	75305292	—	—
dual_ehi-90-315-62	192526	104796	—	3680376	—	—	13128967	331830	—	—	—	—	1151034	41075115	—	—
dual_ehi-90-315-63	190771	104208	—	4179447	—	—	13939320	357557	—	—	—	—	855661	40549543	—	—

Table 442. Number of consistency checks required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-46`–`dual_ehi-90-315-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-64	176453	100711	—	356510	—	—	301761	309963	—	—	—	—	643368	229318	—	—
dual_ehi-90-315-65	100497	103117	—	373214	—	—	324068	311475	—	—	—	—	744446	126344	—	—
dual_ehi-90-315-66	108687	113912	—	385131	—	—	333157	401853	—	—	—	—	2040117	1040759	—	—
dual_ehi-90-315-67	654667	100619	—	370464	—	—	320419	307925	—	—	—	—	956348	533703	—	—
dual_ehi-90-315-68	397342	104311	—	6231496	—	—	7650609	323747	—	—	—	—	857801	41268650	—	—
dual_ehi-90-315-69	180147	101130	—	6830216	—	—	4520539	297409	—	—	—	—	1266549	19174490	—	—
dual_ehi-90-315-6	157346	102176	—	1904479	—	—	3399562	319067	—	—	—	—	771803	30091500	—	—
dual_ehi-90-315-70	158280	101231	—	373717	—	—	323117	327331	—	—	—	—	759848	334339	—	—
dual_ehi-90-315-71	166704	101372	—	5879075	—	—	5868582	332100	—	—	—	—	749699	25995102	—	—
dual_ehi-90-315-72	664004	101201	—	20095791	—	—	26321633	292418	—	—	—	—	649696	41562317	—	—
dual_ehi-90-315-73	147905	103187	—	365553	—	—	312257	333345	—	—	—	—	838623	724266	—	—
dual_ehi-90-315-74	157793	103632	—	363068	—	—	306839	290811	—	—	—	—	548358	430200	—	—
dual_ehi-90-315-75	99886	99620	—	358724	—	—	302253	305707	—	—	—	—	648107	224089	—	—
dual_ehi-90-315-76	183233	104284	—	2842814	—	—	11966415	331210	—	—	—	—	649533	—	—	—
dual_ehi-90-315-77	101058	100861	—	387107	—	—	341491	301167	—	—	—	—	546519	438706	—	—
dual_ehi-90-315-78	103199	102091	—	386655	—	—	337564	326857	—	—	—	—	848632	746132	—	—
dual_ehi-90-315-79	308095	100228	—	367446	—	—	316836	279312	—	—	—	—	650097	432924	—	—
dual_ehi-90-315-7	333636	104304	—	17012260	—	—	10606696	297912	—	—	—	—	653789	38674200	—	—
dual_ehi-90-315-80	158419	99403	—	367410	—	—	311774	297115	—	—	—	—	546781	124797	—	—
dual_ehi-90-315-81	176667	102066	—	4450554	—	—	12986091	376631	—	—	—	—	755934	68256999	—	—

Table 443. Number of consistency checks required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-64`–`dual_ehi-90-315-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-82	99134	102049	—	342038	—	—	281738	277359	—	—	—	—	648920	123235	—	—
dual_ehi-90-315-83	189001	106716	—	2991775	—	—	6578332	291386	—	—	—	—	550794	44720146	—	—
dual_ehi-90-315-84	174501	104463	—	7844598	—	—	9337721	336202	—	—	—	—	1775653	38984137	—	—
dual_ehi-90-315-85	175146	102105	—	10903698	—	—	8774283	338577	—	—	—	—	958361	46881361	—	—
dual_ehi-90-315-86	186703	101582	—	10942851	—	—	7490476	306978	—	—	—	—	865803	51263180	—	—
dual_ehi-90-315-87	191448	106496	—	1813682	—	—	15517465	302937	—	—	—	—	855129	30878014	—	—
dual_ehi-90-315-88	98137	99476	—	345709	—	—	289068	281937	—	—	—	—	544654	120207	—	—
dual_ehi-90-315-89	119515	106231	—	3889239	—	—	3863451	289627	—	—	—	—	952541	36234428	—	—
dual_ehi-90-315-8	336720	104135	—	361220	—	—	309443	336017	—	—	—	—	947994	640719	—	—
dual_ehi-90-315-90	176710	100065	—	364632	—	—	311408	316663	—	—	—	—	1044841	636896	—	—
dual_ehi-90-315-91	178077	101682	—	8002733	—	—	10036257	317789	—	—	—	—	865555	29236300	—	—
dual_ehi-90-315-92	187229	103097	—	935125	—	—	1441291	324472	—	—	—	—	762959	18004550	—	—
dual_ehi-90-315-93	153774	106450	—	3308132	—	—	12679013	359584	—	—	—	—	1244309	52137103	—	—
dual_ehi-90-315-94	136247	99112	—	369155	—	—	319759	285113	—	—	—	—	645867	327799	—	—
dual_ehi-90-315-95	138259	99831	—	396890	—	—	609314	285573	—	—	—	—	547688	5847483	—	—
dual_ehi-90-315-96	122790	103495	—	372281	—	—	318969	330328	—	—	—	—	647304	535080	—	—
dual_ehi-90-315-97	183663	107798	—	13914561	—	—	30419122	369182	—	—	—	—	663955	—	—	—
dual_ehi-90-315-98	163709	102092	—	2156939	—	—	9335706	281443	—	—	—	—	550701	26635579	—	—
dual_ehi-90-315-99	866726	103422	—	446956	—	—	416788	295505	—	—	—	—	658954	1192641	—	—
dual_ehi-90-315-9	100298	98032	—	351805	—	—	298306	273627	—	—	—	—	541115	123439	—	—
Grand total:	20801594	10253793	—	359308095	—	—	526974024	34739133	—	—	—	—	83238679	2037889813	—	—

Table 444. Number of consistency checks required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp01_0200_4-bis`	4786920	18795534	—	10449299	—	—	8827740	42466105	—	—	—	—	—	—	—	—
`fapp01_0200_5-bis`	4866613	72215742	—	11196012	—	—	9467852	48575158	—	—	—	—	—	—	—	—
`fapp01_0200_6-bis`	11665659	38586737	—	12645339	—	—	11458344	57992912	—	—	—	—	—	—	—	—
`fapp01_0200_7-bis`	5663192	31928967	—	13236305	—	—	11383021	59805785	—	—	—	—	—	—	—	—
`fapp01_0200_8-bis`	6315207	28523559	—	15005824	—	—	13005634	72450523	—	—	—	—	—	—	—	—
`fapp01_0200_9-bis`	6589062	28945799	—	16897247	—	—	15020085	79847602	—	—	—	—	—	—	—	—
`fapp01_0200_10-bis`	7249985	28132041	—	19097431	—	—	16846574	83908503	—	—	—	—	—	—	—	—
`fapp01_0200_0-bis`	253790	253790	—	226537	—	—	158892	158892	—	—	—	—	—	—	—	—
`fapp01_0200_1-bis`	460899	460899	—	267242	—	—	316906	316906	—	—	—	—	—	—	—	—
`fapp01_0200_2-bis`	1547881	1547881	—	3183938	—	—	1238763	1238763	—	—	—	—	—	—	—	—
`fapp01_0200_3-bis`	2792284	16692826	—	8508187	—	—	6570717	6344053	—	—	—	—	—	—	—	—
Grand total:	52191492	266083775	—	110713361	—	—	94294528	453105202	—	—	—	—	—	—	—	—

Table 445. Number of consistency checks required for solved instances belonging to class `fapp01`. Problem range: `fapp01_0200_4-bis`–`fapp01_0200_3-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp02_0250_2-bis`	—	—	—	2596717794	—	—	23817187	63931893	—	—	—	—	—	—	—	—
`fapp02_0250_3-bis`	—	—	—	15179626	—	—	14898368	71946877	—	—	—	—	—	—	—	—
`fapp02_0250_4-bis`	—	—	—	18958567	—	—	529023634	82727665	—	—	—	—	—	—	—	—
`fapp02_0250_5-bis`	—	—	—	19044457	—	—	15535698	92546018	—	—	—	—	—	—	—	—
`fapp02_0250_6-bis`	—	—	—	19344559	—	—	16723266	96521531	—	—	—	—	—	—	—	—
`fapp02_0250_7-bis`	—	—	—	2327541022	—	—	48421027	225967383	—	—	—	—	—	—	—	—
`fapp02_0250_8-bis`	—	—	—	25518872	—	—	22795790	149577604	—	—	—	—	—	—	—	—
`fapp02_0250_9-bis`	—	—	—	30946321	—	—	27888881	190300058	—	—	—	—	—	—	—	—
`fapp02_0250_10-bis`	—	—	—	39198277	—	—	36484897	257743763	—	—	—	—	—	—	—	—
`fapp02_0250_0-bis`	—	—	—	226348	—	—	188812	188812	—	—	—	—	—	—	—	—
`fapp02_0250_1-bis`	—	—	—	834645	—	—	686867	686867	—	—	—	—	—	—	—	—
Grand total:	—	—	—	5093510488	—	—	736464427	1232138471	—	—	—	—	—	—	—	—

Table 446. Number of consistency checks required for solved instances belonging to class `fapp02`. Problem range: `fapp02_0250_2-bis`–`fapp02_0250_1-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb30-15-1-bis`	83054	410694	—	270269	—	—	4084830	4346070	—	—	—	—	43096346	1651391	—	—
`frb30-15-2-bis`	2379979	2715045	—	1740618	—	—	4157935	4426136	—	—	—	—	46819972	15966098	—	—
`frb30-15-3-bis`	301563	633310	—	1295931	—	—	446967	725165	—	—	—	—	35965255	11588879	—	—
`frb30-15-4-bis`	110713	452006	—	1344828	—	—	5459341	5730968	—	—	—	—	33973721	4681191	—	—
`frb30-15-5-bis`	1085222	1416854	—	815067	—	—	901780	1177930	—	—	—	—	16485726	6419036	—	—
Grand total:	3960531	5627909	—	5466713	—	—	15050853	16406269	—	—	—	—	176341020	40306595	—	—

Table 447. Number of consistency checks required for solved instances belonging to class `frb30-15`. Problem range: `frb30-15-1-bis`–`frb30-15-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb35-17-1-bis`	9621725	10155169	—	10476003	—	—	3102882	3494297	—	—	—	—	75184348	90569003	—	—
`frb35-17-2-bis`	28678442	29205679	—	371472	—	—	18431333	18818192	—	—	—	—	135642809	151188146	—	—
`frb35-17-3-bis`	7972919	8507306	—	4017687	—	—	13701478	14104161	—	—	—	—	105194462	40733490	—	—
`frb35-17-4-bis`	5569064	6121287	—	7289070	—	—	2334514	2760268	—	—	—	—	135787052	55756854	—	—
`frb35-17-5-bis`	11114371	11646113	—	30189211	—	—	31100559	31481977	—	—	—	—	20127933	—	—	—
Grand total:	62956521	65635554	—	52343443	—	—	68670766	70658895	—	—	—	—	471936604	338247493	—	—

Table 448. Number of consistency checks required for solved instances belonging to class `frb35-17`. Problem range: `frb35-17-1-bis`–`frb35-17-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb40-19-1-bis`	4841881	5673997	—	624393	—	—	8585970	9189278	—	—	—	—	—	—	—	—
`frb40-19-2-bis`	337771	1153956	—	189061	—	—	138895487	139446597	—	—	—	—	—	—	—	—
`frb40-19-3-bis`	88461612	89259199	—	360541666	—	—	624218752	624731925	—	—	—	—	—	—	—	—
`frb40-19-4-bis`	35989240	36800882	—	102705532	—	—	442510144	443015388	—	—	—	—	—	—	—	—
`frb40-19-5-bis`	59040149	59855027	—	124655100	—	—	564027780	564537655	—	—	—	—	—	—	—	—
Grand total:	188670653	192743061	—	588715752	—	—	1778238133	1780920843	—	—	—	—	—	—	—	—

Table 449. Number of consistency checks required for solved instances belonging to class `frb40-19`. Problem range: `frb40-19-1-bis`–`frb40-19-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb45-21-1-bis`	—	—	—	2821612551	—	—	—	—	—	—	—	—	—	—	—	—
`frb45-21-2-bis`	—	—	—	659791216	—	—	1460100453	1460814741	—	—	—	—	—	—	—	—
`frb45-21-3-bis`	—	—	—	362388299	—	—	247929294	248623151	—	—	—	—	—	—	—	—
`frb45-21-4-bis`	26008697	27217384	—	485691430	—	—	2662626130	—	—	—	—	—	—	—	—	—
`frb45-21-5-bis`	—	—	—	399887284	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	26008697	27217384	—	4729370780	—	—	4370655877	1709437892	—	—	—	—	—	—	—	—

Table 450. Number of consistency checks required for solved instances belonging to class `frb45-21`. Problem range: `frb45-21-1-bis`–`frb45-21-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb50-23-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-4-bis`	—	—	—	212900740	—	—	781340423	782242275	—	—	—	—	—	—	—	—
`frb50-23-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	212900740	—	—	781340423	782242275	—	—	—	—	—	—	—	—

Table 451. Number of consistency checks required for solved instances belonging to class `frb50-23`. Problem range: `frb50-23-1-bis`–`frb50-23-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb53-24-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 452. Number of consistency checks required for solved instances belonging to class `frb53-24`. Problem range: `frb53-24-1-bis`–`frb53-24-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb56-25-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 453. Number of consistency checks required for solved instances belonging to class `frb56-25`. Problem range: `frb56-25-1-bis`–`frb56-25-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb59-26-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 454. Number of consistency checks required for solved instances belonging to class `frb59-26`. Problem range: `frb59-26-1-bis`–`frb59-26-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.10	42250	1031557	—	392338	—	—	455533	866140	—	—	—	—	112596312	45004390	—	—
geo50.20.d4.75.11	55447	983144	—	227985	—	—	1272288	1639645	—	—	—	—	—	9647382	—	—
geo50.20.d4.75.13	111615	993452	—	362127	—	—	245778	624522	—	—	—	—	1816983	556127	—	—
geo50.20.d4.75.15	92009	1031465	—	399497	—	—	218538	595208	—	—	—	—	11003354	1037324	—	—
geo50.20.d4.75.16	83349	983607	—	352996	—	—	323453	702289	—	—	—	—	2309263	1111831	—	—
geo50.20.d4.75.17	41355	876970	—	208899	—	—	287121	641725	—	—	—	—	48159018	674474	—	—
geo50.20.d4.75.18	135496	1038755	—	447311	—	—	298909	676071	—	—	—	—	2454018	624238	—	—
geo50.20.d4.75.19	116259281	117415722	—	194775113	—	—	1192618424	1193071967	—	—	—	—	—	—	—	—
geo50.20.d4.75.1	151445484	152526529	—	246822307	—	—	296719767	297152499	—	—	—	—	—	—	—	—
geo50.20.d4.75.20	2239734	3193611	—	429115	—	—	1283513	1678705	—	—	—	—	—	11665199	—	—
geo50.20.d4.75.21	30403	750595	—	184320	—	—	183152	519168	—	—	—	—	3402167	142103	—	—
geo50.20.d4.75.22	47511	978542	—	226553	—	—	827206	1211198	—	—	—	—	9065824	4000020	—	—
geo50.20.d4.75.23	92697	1001641	—	289045	—	—	486969	863628	—	—	—	—	3318134	734062	—	—
geo50.20.d4.75.24	34023	790571	—	192959	—	—	200747	539395	—	—	—	—	2646040	224885	—	—
geo50.20.d4.75.25	33020	797848	—	190549	—	—	192622	527837	—	—	—	—	3419435	444552	—	—
geo50.20.d4.75.26	41154	831515	—	193762	—	—	190057	547017	—	—	—	—	2051062	253086	—	—
geo50.20.d4.75.27	56461	918427	—	217217	—	—	207860	573657	—	—	—	—	1514712	179949	—	—
geo50.20.d4.75.28	282177	1338064	—	6886667	—	—	2335922	2753788	—	—	—	—	515528293	85880979	—	—
geo50.20.d4.75.29	281792	1189173	—	12534935	—	—	1736302	2115678	—	—	—	—	4593635	11988161	—	—
geo50.20.d4.75.2	629957	1671555	—	9050631	—	—	20869980	21294744	—	—	—	—	99531634	42712309	—	—

Table 455. Number of consistency checks required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.2`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.30	35655	855939	—	194234	—	—	199112	556250	—	—	—	—	2734960	1411903	—	—
geo50.20.d4.75.31	31611	735183	—	182479	—	—	183563	502089	—	—	—	—	2113950	182587	—	—
geo50.20.d4.75.32	80763	947481	—	212226	—	—	235522	600195	—	—	—	—	2193178	1047469	—	—
geo50.20.d4.75.33	74856	920165	—	272898	—	—	201754	566623	—	—	—	—	1903993	868535	—	—
geo50.20.d4.75.34	32823	814499	—	191767	—	—	194756	534825	—	—	—	—	2497755	484807	—	—
geo50.20.d4.75.35	8348722	9378356	—	14619879	—	—	237139	655547	—	—	—	—	89047732	17601151	—	—
geo50.20.d4.75.36	54371	647114	—	171084	—	—	164090	451340	—	—	—	—	2972873	175978	—	—
geo50.20.d4.75.37	32709	752703	—	182035	—	—	185550	513033	—	—	—	—	2316194	190820	—	—
geo50.20.d4.75.38	37360	946002	—	219969	—	—	232982	614302	—	—	—	—	16189024	3817985	—	—
geo50.20.d4.75.39	30138	684097	—	172607	—	—	173217	470678	—	—	—	—	2791966	184872	—	—
geo50.20.d4.75.3	32093	832511	—	190647	—	—	205411	547128	—	—	—	—	1849720	345933	—	—
geo50.20.d4.75.40	31025	753666	—	182418	—	—	180476	509028	—	—	—	—	1741229	145329	—	—
geo50.20.d4.75.42	33557	846632	—	196658	—	—	212131	568090	—	—	—	—	4020012	208252	—	—
geo50.20.d4.75.43	104480	993064	—	286861	—	—	244159	628637	—	—	—	—	82825017	696669	—	—
geo50.20.d4.75.44	31958	778285	—	181754	—	—	184257	510581	—	—	—	—	2169140	136686	—	—
geo50.20.d4.75.45	52818	874696	—	224966	—	—	292351	635487	—	—	—	—	3557423	2894836	—	—
geo50.20.d4.75.46	43581	970928	—	214363	—	—	819525	1198349	—	—	—	—	19415840	15719794	—	—
geo50.20.d4.75.47	32813	786554	—	186340	—	—	186229	520660	—	—	—	—	2744968	180148	—	—
geo50.20.d4.75.48	35740	876609	—	206900	—	—	194426	548071	—	—	—	—	1979608	132111	—	—
geo50.20.d4.75.49	90935	972021	—	258969	—	—	222923	595238	—	—	—	—	2951923	618156	—	—

Table 456. Number of consistency checks required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.30`–`geo50.20.d4.75.49`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.4	37683	903784	—	203419	—	—	201668	561229	—	—	—	—	1646295	142625	—	—
geo50.20.d4.75.50	42794	922656	—	215600	—	—	204341	577573	—	—	—	—	3994260	550336	—	—
geo50.20.d4.75.51	250745	1259567	—	1264750	—	—	4908024	5311035	—	—	—	—	50640459	3411142	—	—
geo50.20.d4.75.53	2627153	3639958	—	1790498	—	—	2914870	3321818	—	—	—	—	—	22225716	—	—
geo50.20.d4.75.54	43084	880873	—	211214	—	—	211230	576566	—	—	—	—	2043692	158273	—	—
geo50.20.d4.75.55	14739562	15802384	—	8297529	—	—	146776869	147188389	—	—	—	—	—	—	—	—
geo50.20.d4.75.56	39022	1008615	—	217381	—	—	330442	733932	—	—	—	—	26488464	875141	—	—
geo50.20.d4.75.58	171208	1161127	—	227363	—	—	498248	906009	—	—	—	—	101667538	3635203	—	—
geo50.20.d4.75.59	41670	783975	—	188000	—	—	234393	571231	—	—	—	—	3189477	526387	—	—
geo50.20.d4.75.5	33285	736782	—	178151	—	—	178671	499338	—	—	—	—	4465554	660821	—	—
geo50.20.d4.75.60	97002	1114018	—	309641	—	—	2080768	2478854	—	—	—	—	—	27894934	—	—
geo50.20.d4.75.61	37046	768568	—	184957	—	—	182942	505401	—	—	—	—	1619215	348633	—	—
geo50.20.d4.75.62	11489279	12647007	—	10740823	—	—	389087083	389527368	—	—	—	—	—	—	—	—
geo50.20.d4.75.63	12057129	13130638	—	119970113	—	—	794901	1231034	—	—	—	—	—	9573677	—	—
geo50.20.d4.75.64	28420	692781	—	174403	—	—	179513	485731	—	—	—	—	3585069	251681	—	—
geo50.20.d4.75.65	174170	1032764	—	397942	—	—	691769	1056946	—	—	—	—	7623168	5085413	—	—
geo50.20.d4.75.66	34439	859431	—	205063	—	—	277249	631275	—	—	—	—	2431529	303758	—	—
geo50.20.d4.75.67	1758521	2772008	—	5301957	—	—	1680346	2096833	—	—	—	—	39666814	1671962	—	—
geo50.20.d4.75.68	36491	901713	—	206709	—	—	2588196	2955653	—	—	—	—	138464521	6297512	—	—
geo50.20.d4.75.69	34811	771174	—	184966	—	—	183161	509042	—	—	—	—	2401706	133800	—	—

Table 457. Number of consistency checks required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.4`–`geo50.20.d4.75.69`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-rzchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.6	30613	759804	—	183429	—	—	182389	519515	—	—	—	—	1807429	208452	—	—
geo50.20.d4.75.71	33664	846735	—	194146	—	—	206460	552730	—	—	—	—	1664652	1286209	—	—
geo50.20.d4.75.72	35733	842425	—	195538	—	—	199891	551008	—	—	—	—	2821185	288832	—	—
geo50.20.d4.75.73	15007005	16058342	—	502231	—	—	20593335	21029066	—	—	—	—	—	—	—	—
geo50.20.d4.75.74	43105	899184	—	307451	—	—	206553	569550	—	—	—	—	1538310	181718	—	—
geo50.20.d4.75.75	80330	1041618	—	1078865	—	—	1217329	1615082	—	—	—	—	74440182	6164109	—	—
geo50.20.d4.75.76	30423	692341	—	176360	—	—	177505	492264	—	—	—	—	2982894	165438	—	—
geo50.20.d4.75.77	120758	1069161	—	258951	—	—	281776	678132	—	—	—	—	16150832	984231	—	—
geo50.20.d4.75.78	33844	795800	—	194088	—	—	194822	532241	—	—	—	—	2006885	473506	—	—
geo50.20.d4.75.79	36079	778550	—	187692	—	—	189654	525324	—	—	—	—	1490164	137984	—	—
geo50.20.d4.75.7	21489214	22553219	—	62925176	—	—	4950286	5374766	—	—	—	—	450748255	34525444	—	—
geo50.20.d4.75.80	38826	793783	—	188960	—	—	187872	531056	—	—	—	—	2253013	177754	—	—
geo50.20.d4.75.81	33286	841277	—	195447	—	—	202080	555673	—	—	—	—	1713894	194777	—	—
geo50.20.d4.75.82	32171	799540	—	193598	—	—	192649	532524	—	—	—	—	2253702	159760	—	—
geo50.20.d4.75.83	62368	980712	—	245878	—	—	1307549	1690182	—	—	—	—	7746648	2219268	—	—
geo50.20.d4.75.84	30425	726508	—	177716	—	—	177763	493176	—	—	—	—	2286566	193584	—	—
geo50.20.d4.75.85	596721	1469337	—	3322707	—	—	14143283	14515985	—	—	—	—	28085680	55552652	—	—
geo50.20.d4.75.87	1975305	2935277	—	488821	—	—	9211957	9613568	—	—	—	—	—	19640415	—	—
geo50.20.d4.75.88	28884	662329	—	171793	—	—	170458	475208	—	—	—	—	2402934	183882	—	—
geo50.20.d4.75.89	12682780	13658827	—	6413519	—	—	6616097	7024457	—	—	—	—	—	81512313	—	—

Table 458. Number of consistency checks required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.6`–`geo50.20.d4.75.89`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`geo50.20.d4.75.8`	1412172	2480357	—	47114389	—	—	18693179	19120136	—	—	—	—	—	—	—	—
`geo50.20.d4.75.90`	152026828	153114506	—	32683434	—	—	38876134	39300060	—	—	—	—	—	38418562	—	—
`geo50.20.d4.75.91`	28983	738231	—	181843	—	—	182223	501236	—	—	—	—	1928015	156522	—	—
`geo50.20.d4.75.92`	33859	863290	—	199059	—	—	261165	623888	—	—	—	—	19379981	1005353	—	—
`geo50.20.d4.75.93`	30180	791595	—	188319	—	—	193417	529681	—	—	—	—	1710423	185329	—	—
`geo50.20.d4.75.95`	42172	792287	—	199880	—	—	270384	605222	—	—	—	—	2630749	666417	—	—
`geo50.20.d4.75.96`	2183871	3099312	—	1474462	—	—	7788761	8157286	—	—	—	—	45558193	36975970	—	—
`geo50.20.d4.75.97`	37171	818580	—	195198	—	—	188736	519828	—	—	—	—	2216751	1601364	—	—
`geo50.20.d4.75.98`	29216	755636	—	182299	—	—	181927	509718	—	—	—	—	2026764	184994	—	—
`geo50.20.d4.75.99`	34869	832477	—	192741	—	—	197051	546107	—	—	—	—	7728020	232176	—	—
`geo50.20.d4.75.9`	582013	1578125	—	598930	—	—	1045563	1449689	—	—	—	—	93897020	122056534	—	—
`geo50.20.d4.75.100`	32862	790488	—	191080	—	—	189686	526353	—	—	—	—	1408320	163455	—	—
`geo50.20.d4.75.12`	—	—	—	350628880	—	—	554904316	555374074	—	—	—	—	—	—	—	—
`geo50.20.d4.75.14`	—	—	—	216120545	—	—	332719619	333109720	—	—	—	—	—	—	—	—
`geo50.20.d4.75.41`	—	—	—	162788269	—	—	271417369	271832928	—	—	—	—	—	—	—	—
`geo50.20.d4.75.52`	—	—	—	141544441	—	—	232435036	232868140	—	—	—	—	—	—	—	—
`geo50.20.d4.75.57`	—	—	—	143885391	—	—	237377386	237880443	—	—	—	—	—	—	—	—
`geo50.20.d4.75.70`	—	—	—	179569063	—	—	280733181	281133140	—	—	—	—	—	—	—	—
`geo50.20.d4.75.86`	—	—	—	283696158	—	—	448867006	449281093	—	—	—	—	—	—	—	—
`geo50.20.d4.75.94`	—	—	—	264021058	—	—	421910674	422356933	—	—	—	—	—	—	—	—
Grand total:	533952467	613358724	—	2546661664	—	—	4988950919	5026143471	—	—	—	—	2242231611	753569110	—	—

Table 459. Number of consistency checks required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.94`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi_3`	437	437	—	620	—	—	424	434	—	—	—	—	743	713	—	—
`hanoi_4`	9768	9768	—	20490	—	—	9316	9342	—	—	—	—	22751	22569	—	—
`hanoi_5`	188437	188437	—	500629	—	—	172048	172106	—	—	—	—	525852	524982	—	—
`hanoi_6`	3496023	3496023	—	10460007	—	—	3100944	3101066	—	—	—	—	10707014	10703232	—	—
`hanoi_7`	67825943	67825943	—	202463044	—	—	55793224	55793474	—	—	—	—	—	—	—	—
Grand total:	71520608	71520608	—	213444790	—	—	59075956	59076422	—	—	—	—	11256360	11251496	—	—

Table 460. Number of consistency checks required for solved instances belonging to class `hanoi1`. Problem range: `hanoi_3`–`hanoi_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr1-10-by-5-1`	1643862	5542756	—	3545441	—	—	166185540	172322414	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-2`	910165	5009137	—	61307027	—	—	—	—	—	—	—	—	65669458	—	—	—
`e0ddr1-10-by-5-3`	2484928	6684897	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-4`	472117	5385161	—	3558303	—	—	775296403	781422615	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-5`	1310461	5427953	—	3914854	—	—	69596040	76139414	—	—	—	—	77085909	2664265	—	—
`e0ddr1-10-by-5-6`	946375	5018864	—	35727226	—	—	3892496	10733530	—	—	—	—	79898336	2633252	—	—
`e0ddr1-10-by-5-7`	3815901	7869013	—	20267421573	—	—	3557007	9785819	—	—	—	—	68897536	2776175	—	—
`e0ddr1-10-by-5-8`	5190183	9333703	—	3901258	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-9`	489019	4842043	—	3877970	—	—	3792038	10513018	—	—	—	—	82439431	2603697	—	—
`e0ddr1-10-by-5-10`	4664197	9307101	—	22274902288	—	—	2757512245	2764007659	—	—	—	—	75985334	—	—	—
Grand total:	21927208	64420628	—	42658155940	—	—	3779831769	3824924469	—	—	—	—	449976004	10677389	—	—

Table 461. Number of consistency checks required for solved instances belonging to class `js-e0ddr1`. Problem range: `e0ddr1-10-by-5-1`–`e0ddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr2-10-by-5-1`	2149625	7064212	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-2`	3464785	8214176	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-3`	2348983	7239282	—	4961528	—	—	1619587271	1627736875	—	—	—	—	95011818	—	—	—
`e0ddr2-10-by-5-4`	650913	5981066	—	4985738	—	—	5052823	13642671	—	—	—	—	102929512	3704908	—	—
`e0ddr2-10-by-5-5`	629083	5615896	—	5023171	—	—	5101306	13744722	—	—	—	—	107320501	4257214	—	—
`e0ddr2-10-by-5-6`	645742	5892242	—	5120339	—	—	5064124	13640716	—	—	—	—	101988140	3459835	—	—
`e0ddr2-10-by-5-7`	655716	5846136	—	12709520	—	—	61302512	69492046	—	—	—	—	101675918	—	—	—
`e0ddr2-10-by-5-8`	656360	5421985	—	4730855	—	—	2661941035	2670038983	—	—	—	—	92801535	—	—	—
`e0ddr2-10-by-5-9`	4473056	9776531	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-10`	656743	5969866	—	5043872	—	—	5052491	13655869	—	—	—	—	106178545	3869950	—	—
Grand total:	16331006	67021392	—	42575023	—	—	4363101562	4421951882	—	—	—	—	707905969	15291907	—	—

Table 462. Number of consistency checks required for solved instances belonging to class `js-e0ddr2`. Problem range: `e0ddr2-10-by-5-1`–`e0ddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr1-10-by-5-1`	870309	4834362	—	4534625	—	—	31299461	37996879	—	—	—	—	72155555	272237324	—	—
`enddr1-10-by-5-2`	551779	5001480	—	4013254	—	—	3928859	10890173	—	—	—	—	75248483	3452362	—	—
`enddr1-10-by-5-3`	2619168	6908820	—	7279000229	—	—	3844608	10566020	—	—	—	—	—	—	—	—
`enddr1-10-by-5-4`	2179536	5924782	—	3820290	—	—	3757466	10371664	—	—	—	—	67378578	2697701	—	—
`enddr1-10-by-5-5`	526313	4811581	—	4187263	—	—	4124259	11418999	—	—	—	—	89554690	3315141	—	—
`enddr1-10-by-5-6`	560190	5113074	—	4456661	—	—	4431619	12192435	—	—	—	—	92869883	3155515	—	—
`enddr1-10-by-5-7`	922796	5335642	—	4835293	—	—	4112712	11294664	—	—	—	—	81330070	3107236	—	—
`enddr1-10-by-5-8`	1435655	5992903	—	5319248	—	—	3998571	10935719	—	—	—	—	78012182	3111082	—	—
`enddr1-10-by-5-9`	528366	5410027	—	4421137	—	—	4436242	12172590	—	—	—	—	96808706	3023249	—	—
`enddr1-10-by-5-10`	995821	6037934	—	6940920	—	—	—	—	—	—	—	—	83795745	—	—	—
Grand total:	11189933	55370605	—	7321528920	—	—	63933797	127839143	—	—	—	—	737153892	294099610	—	—

Table 463. Number of consistency checks required for solved instances belonging to class `js-enddr1`. Problem range: `enddr1-10-by-5-1`–`enddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr2-10-by-5-1`	1897324	7391739	—	128321153	—	—	—	—	—	—	—	—	100626738	—	—	—
`enddr2-10-by-5-2`	3184897	8710174	—	—	—	—	3939598892	3948054944	—	—	—	—	—	—	—	—
`enddr2-10-by-5-3`	710841	6091806	—	1271041556	—	—	—	—	—	—	—	—	110480744	—	—	—
`enddr2-10-by-5-4`	700019	6606738	—	5432602	—	—	5567416	14944416	—	—	—	—	112355372	3533345	—	—
`enddr2-10-by-5-5`	721138	5717156	—	5573820	—	—	5635268	15181870	—	—	—	—	121274279	4387768	—	—
`enddr2-10-by-5-10`	685648	6031970	—	5454299	—	—	5574540	14993942	—	—	—	—	119860621	4624574	—	—
Grand total:	7899867	40549583	—	1415823430	—	—	3956376116	3993175172	—	—	—	—	564597754	12545687	—	—

Table 464. Number of consistency checks required for solved instances belonging to class `js-enddr2`. Problem range: `enddr2-10-by-5-1`–`enddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`ewddr2-10-by-5-1`	753815	6680545	—	5525859	—	—	5529240	15105294	—	—	—	—	111685750	3782999	—	—
`ewddr2-10-by-5-2`	765617	7212717	—	5272055	—	—	5322044	14367586	—	—	—	—	95834515	4282386	—	—
`ewddr2-10-by-5-3`	1331899	7156809	—	5904829	—	—	230578346	240602062	—	—	—	—	125312053	4583436	—	—
`ewddr2-10-by-5-4`	720415	7121848	—	5725374	—	—	5817663	15770327	—	—	—	—	119444275	5567786	—	—
`ewddr2-10-by-5-5`	785314	5616153	—	5932974	—	—	6081821	16385887	—	—	—	—	133365246	5337236	—	—
`ewddr2-10-by-5-6`	688489	5837029	—	6094297	—	—	6232643	16801165	—	—	—	—	132520766	4496090	—	—
`ewddr2-10-by-5-7`	676019	7464683	—	5534088	—	—	173087417	182736613	—	—	—	—	119679176	4315910	—	—
`ewddr2-10-by-5-8`	794514	6536278	—	5896178	—	—	6058865	16286843	—	—	—	—	126226666	4939881	—	—
`ewddr2-10-by-5-9`	795510	5979568	—	5557890	—	—	5623936	15172974	—	—	—	—	109603728	5410932	—	—
`ewddr2-10-by-5-10`	806287	5972493	—	5838482	—	—	5953211	16036027	—	—	—	—	131746828	5250853	—	—
Grand total:	8117879	65578123	—	57282026	—	—	450285186	549264778	—	—	—	—	1205419003	47967509	—	—

Table 465. Number of consistency checks required for solved instances belonging to class `js-ewddr2`. Problem range: `ewddr2-10-by-5-1`–`ewddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
lsq_dg_5	3630	37187	—	7967	—	—	7508	17508	—	—	—	—	35985	8029	—	—
lsq_dg_7	20767	189402	—	43500	—	—	40229	97853	—	—	—	—	372416	116759	—	—
lsq_dg_3	438	2921	—	714	—	—	642	1290	—	—	—	—	2274	954	—	—
lsq_dg_4	3959	14210	—	3090	—	—	2738	5554	—	—	—	—	31362	10801	—	—
lsq_dg_6	402922	479284	—	165762	—	—	166988	191612	—	—	—	—	7529384	5175476	—	—
Grand total:	431716	723004	—	221033	—	—	218105	313817	—	—	—	—	7971421	5312019	—	—

Table 466. Number of consistency checks required for solved instances belonging to class `lsq-dg1`. Problem range: `lsq_dg_5`–`lsq_dg_6`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
large_80_sat	—	—	—	120358	—	—	60432	66752	—	—	—	—	—	—	—	—
large_84_sat	—	—	—	120476	—	—	39937	46909	—	—	—	—	—	—	—	—
large_88_sat	—	—	—	151182	—	—	107551	115207	—	—	—	—	—	—	—	—
large_92_sat	—	—	—	154505	—	—	53113	61485	—	—	—	—	—	—	—	—
large_96_sat	—	—	—	159352	—	—	54070	63190	—	—	—	—	—	—	—	—
large_80_unsat	—	—	—	21123418	—	—	20680892	20680892	—	—	—	—	—	—	—	—
large_84_unsat	—	—	—	25638214	—	—	25125631	25125631	—	—	—	—	—	—	—	—
large_88_unsat	—	—	—	30840736	—	—	30251050	30251050	—	—	—	—	—	—	—	—
large_92_unsat	—	—	—	36797448	—	—	36123417	36123417	—	—	—	—	—	—	—	—
large_96_unsat	—	—	—	43578130	—	—	42811859	42811859	—	—	—	—	—	—	—	—
Grand total:	—	—	—	158683819	—	—	155307952	155346392	—	—	—	—	—	—	—	—

Table 467. Number of consistency checks required for solved instances belonging to class `marc`. Problem range: `large_80_sat`–`large_96_unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
pigeons5	368	877	—	552	—	—	512	832	—	—	—	—	1840	800	—	—
pigeons6	2616	3692	—	2140	—	—	2095	2845	—	—	—	—	10255	4305	—	—
pigeons7	19596	21689	—	10776	—	—	10671	12183	—	—	—	—	63552	26340	—	—
pigeons8	139206	142939	—	70245	—	—	70133	72877	—	—	—	—	448399	185171	—	—
pigeons9	1016155	1022313	—	550864	—	—	550648	555256	—	—	—	—	3592960	1482528	—	—
pigeons10	9139501	9149079	—	4936482	—	—	4936257	4943547	—	—	—	—	32345559	13344381	—	—
pigeons11	86565313	86579540	—	49327080	—	—	49326695	49337695	—	—	—	—	—	133446020	—	—
pigeons12	—	—	—	542534971	—	—	542534575	542550547	—	—	—	—	—	—	—	—
pigeons13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	96882755	96920129	—	597433110	—	—	597431586	597475782	—	—	—	—	36462565	148489545	—	—

Table 468. Number of consistency checks required for solved instances belonging to class `pigeons`. Problem range: `pigeons5`–`pigeons50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qa_5	25345455	28120616	—	634112	—	—	273525	3337105	—	—	—	—	146679583	104740570	—	—
qa_6	—	—	—	403714104	—	—	755252916	1064074564	—	—	—	—	—	—	—	—
qa_7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_3	6403	26141	—	8780	—	—	8159	21281	—	—	—	—	16563	15079	—	—
qa_4	245598	616688	—	146846	—	—	161723	476976	—	—	—	—	958566	424078	—	—
Grand total:	25597456	28763445	—	404503842	—	—	755696323	1067909926	—	—	—	—	147654712	105179727	—	—

Table 469. Number of consistency checks required for solved instances belonging to class qa1. Problem range: qa_5–qa_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qk_8_0_5	105250	69611	—	144339	—	—	145959	145959	—	—	—	—	219649	137729	—	—
qk_8_8_5_add	494241	76097	—	1731225	—	—	2093230	149996	—	—	—	—	30912930	3803081	—	—
qk_8_8_5_mul	664977	122029	—	1670188	—	—	3532179	199370	—	—	—	—	29745069	4005512	—	—
qk_10_0_5	277022	174883	—	395055	—	—	394036	394036	—	—	—	—	589107	389107	—	—
qk_10_10_5_add	906447	190668	—	8011474	—	—	10183319	404929	—	—	—	—	823025214	21177022	—	—
qk_10_10_5_mul	2430458	299835	—	9485409	—	—	22153172	523362	—	—	—	—	810211853	23282646	—	—
qk_12_0_5	608031	366938	—	887164	—	—	854855	854855	—	—	—	—	1308257	893537	—	—
qk_12_12_5_add	2034064	399015	—	92281360	—	—	92746183	879038	—	—	—	—	—	135122424	—	—
qk_12_12_5_mul	2775158	621643	—	217697632	—	—	312840574	1121442	—	—	—	—	—	303032508	—	—
qk_15_0_5	1538784	903527	—	2339536	—	—	2235696	2235696	—	—	—	—	3433352	2420852	—	—
qk_15_15_5_add	4823548	980094	—	1107803962	—	—	977189699	2299242	—	—	—	—	—	—	—	—
qk_15_15_5_mul	6734592	1523342	—	3512761656	—	—	6412874784	2883065	—	—	—	—	—	—	—	—
qk_20_0_5	4966208	2878522	—	7935367	—	—	7386791	7386791	—	—	—	—	11681497	8481497	—	—
qk_20_20_5_add	17299089	3103322	—	—	—	—	3321751951	7600618	—	—	—	—	—	—	—	—
qk_20_20_5_mul	25420791	27112101	—	—	—	—	—	9420826	—	—	—	—	—	—	—	—
qk_25_0_5	12403209	7068867	—	20144202	—	—	18712906	18712906	—	—	—	—	29803542	21991042	—	—
qk_25_25_5_add	32621164	7600878	—	—	—	—	2830824997	19253733	—	—	—	—	—	—	—	—
qk_25_25_5_mul	45776247	47833788	—	—	—	—	—	23662581	—	—	—	—	—	—	—	—
Grand total:	161879280	101325160	—	4983288569	—	—	14015920331	98128445	—	—	—	—	1740930470	524736957	—	—

Table 470. Number of consistency checks required for solved instances belonging to class qk1. Problem range: qk_8_0_5–qk_25_25_5_mul. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-23-23-253-131-48021`	—	—	—	176042470	—	—	140688331	140974017	—	—	—	—	—	—	—	—
`random-23-23-253-131-49021`	2840455	3539270	—	189419959	—	—	446531358	446818150	—	—	—	—	165838623	64122451	—	—
`random-23-23-253-131-50021`	—	—	—	88289953	—	—	30826258	31110371	—	—	—	—	—	—	—	—
`random-23-23-253-131-53021`	—	—	—	118723798	—	—	220572987	220851657	—	—	—	—	—	—	—	—
`random-23-23-253-131-54021`	—	—	—	134010583	—	—	143583448	143860914	—	—	—	—	—	—	—	—
`random-23-23-253-131-46021`	—	—	—	340381083	—	—	471927887	472216672	—	—	—	—	—	—	—	—
`random-23-23-253-131-47021`	—	—	—	325366923	—	—	450916391	451194293	—	—	—	—	—	—	—	—
`random-23-23-253-131-51021`	—	—	—	377406670	—	—	518307266	518582250	—	—	—	—	—	—	—	—
`random-23-23-253-131-52021`	—	—	—	332726845	—	—	459185129	459470487	—	—	—	—	—	—	—	—
`random-23-23-253-131-55021`	—	—	—	336433874	—	—	460168226	460451201	—	—	—	—	—	—	—	—
Grand total:	2840455	3539270	—	2418802158	—	—	3342707281	3345530012	—	—	—	—	165838623	64122451	—	—

Table 471. Number of consistency checks required for solved instances belonging to class `random-23-23-253`. Problem range: `random-23-23-253-131-48021`–`random-23-23-253-131-55021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-24-24-276-139-48021	—	—	—	70827688	—	—	65673698	66002876	—	—	—	—	—	—	—	—
random-24-24-276-139-50021	17246456	18090295	—	19578654	—	—	113096396	113422172	—	—	—	—	—	—	—	—
random-24-24-276-139-55021	8602501	9441373	—	94783238	—	—	885373810	885698801	—	—	—	—	—	—	—	—
random-24-24-276-139-49021	—	—	—	756869770	—	—	1040012712	1040337122	—	—	—	—	—	—	—	—
random-24-24-276-139-51021	—	—	—	811613585	—	—	1107376530	1107701606	—	—	—	—	—	—	—	—
random-24-24-276-139-52021	—	—	—	808214258	—	—	1101965673	1102292813	—	—	—	—	—	—	—	—
random-24-24-276-139-53021	—	—	—	818772517	—	—	1115387965	1115715135	—	—	—	—	—	—	—	—
random-24-24-276-139-54021	—	—	—	820100661	—	—	1118855670	1119182742	—	—	—	—	—	—	—	—
random-24-24-276-139-56021	—	—	—	815116926	—	—	1111445423	1111770872	—	—	—	—	—	—	—	—
random-24-24-276-139-57021	—	—	—	792510777	—	—	1080367547	1080697054	—	—	—	—	—	—	—	—
Grand total:	25848957	27531668	—	5808388074	—	—	8739555424	8742821193	—	—	—	—	—	—	—	—

Table 472. Number of consistency checks required for solved instances belonging to class `random-24-24-276`. Problem range: `random-24-24-276-139-48021`–`random-24-24-276-139-57021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-25-25-300-147-51021`	—	—	—	247374995	—	—	1067588603	1067966394	—	—	—	—	—	—	—	—
`random-25-25-300-147-52021`	—	—	—	185873319	—	—	2190347021	2190726605	—	—	—	—	—	—	—	—
`random-25-25-300-147-53021`	68367185	69367731	—	413487276	—	—	630014179	630394330	—	—	—	—	—	—	—	—
`random-25-25-300-147-54021`	109792713	110778812	—	1579267113	—	—	2286290113	2286672833	—	—	—	—	—	—	—	—
`random-25-25-300-147-56021`	—	—	—	1294144643	—	—	2572025430	2572403894	—	—	—	—	—	—	—	—
`random-25-25-300-147-59021`	—	—	—	438954551	—	—	1360187871	1360568665	—	—	—	—	—	—	—	—
`random-25-25-300-147-50021`	—	—	—	1864011665	—	—	2518361536	2518743306	—	—	—	—	—	—	—	—
`random-25-25-300-147-55021`	—	—	—	1808364873	—	—	2458639995	2459021353	—	—	—	—	—	—	—	—
`random-25-25-300-147-57021`	—	—	—	1803864842	—	—	2442362879	2442740945	—	—	—	—	—	—	—	—
`random-25-25-300-147-58021`	—	—	—	1925770051	—	—	2596209254	2596589781	—	—	—	—	—	—	—	—
Grand total:	178159898	180146543	—	11561113328	—	—	20122026881	20125828106	—	—	—	—	—	—	—	—

Table 473. Number of consistency checks required for solved instances belonging to class `random-25-25-300`. Problem range: `random-25-25-300-147-51021`–`random-25-25-300-147-58021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-26-26-325-155-53021	—	—	—	2269595790	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-54021	—	—	—	216460561	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-55021	129554722	130723893	—	1518061773	—	—	639366711	639807661	—	—	—	—	—	—	—	—
random-26-26-325-155-59021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-61021	—	—	—	2410855267	—	—	922318671	922759152	—	—	—	—	—	—	—	—
random-26-26-325-155-52021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-56021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-57021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-58021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-60021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	129554722	130723893	—	6414973391	—	—	1561685382	1562566813	—	—	—	—	—	—	—	—

Table 474. Number of consistency checks required for solved instances belonging to class `random-26-26-325`. Problem range: `random-26-26-325-155-53021`–`random-26-26-325-155-60021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`random-27-27-351-163-54021`	—	—	—	—	—	—	696928728	697443482	—	—	—	—	—	—	—	—
`random-27-27-351-163-56021`	—	—	—	2210321920	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-60021`	—	—	—	2200182369	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-63021`	—	—	—	1655386478	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-55021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-57021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-58021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-59021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-61021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`random-27-27-351-163-62021`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	6065890767	—	—	696928728	697443482	—	—	—	—	—	—	—	—

Table 475. Number of consistency checks required for solved instances belonging to class `random-27-27-351`. Problem range: `random-27-27-351-163-54021`–`random-27-27-351-163-62021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
graph1	229969	2687820	—	1830372	—	—	1701587	27377686	—	—	—	—	—	—	—	—
graph2	525596	3092581	—	4190884	—	—	3904876	66228407	—	—	—	—	—	—	—	—
graph3	500530	29441980	—	2384894	—	—	2181528	72526866	—	—	—	—	—	—	—	—
graph4	975734	29109037	—	4627977	—	—	8112845	98898555	—	—	—	—	—	—	—	—
graph8	921108	3850507	—	7251898	—	—	6742938	96310373	—	—	—	—	—	—	—	—
graph9	1306788	4105431	—	10740775	—	—	9971419	119020601	—	—	—	—	—	—	—	—
graph10	1851133	28331090	—	8808032	—	—	8525347	202008964	—	—	—	—	—	—	—	—
graph14	1175269	3958683	—	9859777	—	—	9087381	234748003	—	—	—	—	—	—	—	—
graph5	23104	23104	—	122679	—	—	19049	19049	—	—	—	—	—	—	—	—
graph6	6593	6593	—	310687	—	—	5925	5925	—	—	—	—	—	—	—	—
graph7	6370	6370	—	298211	—	—	5271	5271	—	—	—	—	—	—	—	—
graph11	6389	6389	—	611120	—	—	6880	6880	—	—	—	—	—	—	—	—
graph12	12128	12128	—	438253	—	—	48811	48811	—	—	—	—	—	—	—	—
graph13	28683	28683	—	456455	—	—	17652	17652	—	—	—	—	—	—	—	—
Grand total:	7569394	104660396	—	51932014	—	—	50331509	917223043	—	—	—	—	—	—	—	—

Table 476. Number of consistency checks required for solved instances belonging to class `rlfapGraphs`. Problem range: `graph1`–`graph13`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph2_f24`	188775	4777204	—	1067090	—	—	956717	10730984	—	—	—	—	—	—	—	—
`graph8_f10`	4497153	10881700	—	7296758	—	—	2723546	21019872	—	—	—	—	—	—	—	—
`graph9_f9`	8940547	10407667	—	5161713	—	—	18195929	41768852	—	—	—	—	—	—	—	—
`graph12_w0`	278883	1040200	—	1065764	—	—	611527	1132203	—	—	—	—	—	—	—	—
`graph13_w0`	386808	1177745	—	1478712	—	—	847760	1570104	—	—	—	—	—	—	—	—
`graph14_f27`	2063062	7297654	—	5308056	—	—	5015286	18600403	—	—	—	—	—	—	—	—
`graph2_f25`	2923634	4674858	—	2890129	—	—	2404901	9603485	—	—	—	—	—	—	—	—
`graph8_f11`	1076023	8370227	—	2548426	—	—	2781082	17473483	—	—	—	—	—	—	—	—
`graph9_f10`	1539100	10679805	—	23822709	—	—	12569218	29782978	—	—	—	—	—	—	—	—
`graph12_w1`	853352	2045937	—	2088015	—	—	1622761	1667404	—	—	—	—	—	—	—	—
`graph13_w1`	942770	851750	—	3114865	—	—	2334734	2364628	—	—	—	—	—	—	—	—
`graph14_f28`	2307458	4780627	—	10681436	—	—	6281459	11643221	—	—	—	—	—	—	—	—
Grand total:	25997565	66985374	—	66523673	—	—	56344920	167357617	—	—	—	—	—	—	—	—

Table 477. Number of consistency checks required for solved instances belonging to class `rlfapModGraphs`. Problem range: `graph2_f24`–`graph14_f28`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen1_f8	959989	2445190	—	5033112	—	—	4691918	40334958	—	—	—	—	—	—	—	—
scen2_f24	457011	2051669	—	726194	—	—	695492	5506758	—	—	—	—	—	—	—	—
scen3_f10	925492	2327235	—	5857155	—	—	6290702	23242837	—	—	—	—	—	—	—	—
scen6_w1	205090	7232381	—	734294	—	—	571763	4797861	—	—	—	—	—	—	—	—
scen7_w1_f4	361349	4098718	—	1063928	—	—	902504	3618728	—	—	—	—	—	—	—	—
scen1_f9	1708511	7801851	—	6342145	—	—	7558419	36649498	—	—	—	—	—	—	—	—
scen2_f25	1191146	2689812	—	32582478	—	—	16018729	20202154	—	—	—	—	—	—	—	—
scen3_f11	947346	2279008	—	6033495	—	—	7293868	20852866	—	—	—	—	—	—	—	—
scen6_w1_f2	353022	5458594	—	35684872	—	—	25780927	32095701	—	—	—	—	—	—	—	—
scen6_w1_f3	260066	3742793	—	21639945	—	—	14946467	17678107	—	—	—	—	—	—	—	—
scen6_w2	489947	301162	—	6678039	—	—	7335223	1325608	—	—	—	—	—	—	—	—
scen7_w1_f5	370521	1563357	—	2184109	—	—	1323226	854371	—	—	—	—	—	—	—	—
scen9_w1_f3	588223	1927844	—	2274589	—	—	1936197	1432381	—	—	—	—	—	—	—	—
scen10_w1_f3	588223	1927844	—	2274589	—	—	1936197	1432381	—	—	—	—	—	—	—	—
Grand total:	9405936	45847458	—	129108944	—	—	97281632	210024209	—	—	—	—	—	—	—	—

Table 478. Number of consistency checks required for solved instances belonging to class `rlfapModScens`. Problem range: `scen1_f8`–`scen10_w1_f3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen11_f2`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f3`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f4`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f5`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f6`	32497347	34033882	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`scen11_f7`	11923593	13405171	—	2912267135	—	—	1213967552	1253745756	—	—	—	—	—	—	—	—
`scen11_f8`	3079091	4486965	—	271879323	—	—	182391060	214419413	—	—	—	—	—	—	—	—
`scen11_f10`	1088924	2312379	—	7783429	—	—	8135566	29897899	—	—	—	—	—	—	—	—
`scen11_f12`	1053640	7445445	—	6604670	—	—	6579329	27051295	—	—	—	—	—	—	—	—
Grand total:	49642595	61683842	—	3198534557	—	—	1411073507	1525114363	—	—	—	—	—	—	—	—

Table 479. Number of consistency checks required for solved instances belonging to class `rlfapScens11`. Problem range: `scen11_f2`–`scen11_f12`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`scen1`	1292209	3141360	—	11065805	—	—	10405208	150249242	—	—	—	—	—	—	—	—
`scen2`	302917	2383554	—	2593757	—	—	2438725	41939157	—	—	—	—	—	—	—	—
`scen3`	651234	2696069	—	5708120	—	—	5394987	105363223	—	—	—	—	—	—	—	—
`scen4`	767392	1655424	—	2574150	—	—	1262440	2262526	—	—	—	—	—	—	—	—
`scen5`	361674	2002579	—	1041223	—	—	563259	1389311	—	—	—	—	—	—	—	—
`scen11`	3363256	5277465	—	12127284	—	—	8664010	136303909	—	—	—	—	—	—	—	—
`scen6`	100387	100387	—	739723	—	—	97139	97139	—	—	—	—	—	—	—	—
`scen7`	39161	39161	—	532107	—	—	16838	16838	—	—	—	—	—	—	—	—
`scen8`	39795	39795	—	1140521	—	—	25936	25936	—	—	—	—	—	—	—	—
`scen9`	151318	151318	—	1032718	—	—	127704	127704	—	—	—	—	—	—	—	—
`scen10`	151318	151318	—	1032718	—	—	127704	127704	—	—	—	—	—	—	—	—
Grand total:	7220661	17638430	—	39588126	—	—	29123950	437902689	—	—	—	—	—	—	—	—

Table 480. Number of consistency checks required for solved instances belonging to class `rlfapScens`. Problem range: `scen1`–`scen10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bh-4-4-easy-sat-0001-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0002-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0003-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0004-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0005-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0006-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0007-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0008-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0009-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
bh-4-4-easy-sat-0010-BlackHole-4-4	—	—	—	—	—	—	329	329	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	3290	3290	—	—	—	—	—	—	—	—

Table 481. Number of removed universal constraints required for solved instances belonging to class `BH-4-4`. Problem range: `bh-4-4-easy-sat-0001-BlackHole-4-4`–`bh-4-4-easy-sat-0010-BlackHole-4-4`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-rzchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-1-QWH-10`	—	—	—	—	—	—	517	517	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-2-QWH-10`	—	—	—	—	—	—	517	517	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-3-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-4-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-5-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2582	2582	—	—	—	—	—	—	—	—

Table 482. Number of removed universal constraints required for solved instances belonging to class `QCP-10-easy`. Problem range: `qcp-order10-holes67-balanced-1-QWH-10`–`qcp-order10-holes67-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-7-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-17-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-186-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-267-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-315-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2580	2580	—	—	—	—	—	—	—	—

Table 483. Number of removed universal constraints required for solved instances belonging to class `QCP-10-hard`. Problem range: `qcp-order10-holes67-balanced-7-QWH-10`–`qcp-order10-holes67-balanced-315-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes67-balanced-33-QWH-10`	—	—	—	—	—	—	517	517	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-140-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-150-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-160-QWH-10`	—	—	—	—	—	—	517	522	—	—	—	—	—	—	—	—
`qcp-order10-holes67-balanced-946-QWH-10`	—	—	—	—	—	—	516	516	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2582	2587	—	—	—	—	—	—	—	—

Table 484. Number of removed universal constraints required for solved instances belonging to class `QCP-10`. Problem range: `qcp-order10-holes67-balanced-33-QWH-10`–`qcp-order10-holes67-balanced-946-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-20-QWH-15`	—	—	—	—	—	—	2337	2337	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	—	—	—	—	—	—	2355	2355	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-22-QWH-15`	—	—	—	—	—	—	2345	2345	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-23-QWH-15`	—	—	—	—	—	—	2333	2333	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-24-QWH-15`	—	—	—	—	—	—	2339	2339	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	11709	11709	—	—	—	—	—	—	—	—

Table 485. Number of removed universal constraints required for solved instances belonging to class `QCP-15-easy`. Problem range: `qcp-order15-holes120-balanced-20-QWH-15`–`qcp-order15-holes120-balanced-24-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order15-holes120-balanced-225-QWH-15	—	—	—	—	—	—	2349	2349	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-245-QWH-15	—	—	—	—	—	—	2341	2341	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-259-QWH-15	—	—	—	—	—	—	2335	2340	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-278-QWH-15	—	—	—	—	—	—	2347	2347	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-363-QWH-15	—	—	—	—	—	—	2338	2338	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-488-QWH-15	—	—	—	—	—	—	2347	2347	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-711-QWH-15	—	—	—	—	—	—	2351	2351	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-736-QWH-15	—	—	—	—	—	—	2343	2343	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-819-QWH-15	—	—	—	—	—	—	2340	2340	—	—	—	—	—	—	—	—
qcp-order15-holes120-balanced-941-QWH-15	—	—	—	—	—	—	2351	2351	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	23442	23447	—	—	—	—	—	—	—	—

Table 486. Number of removed universal constraints required for solved instances belonging to class `QCP-15-hard`. Problem range: `qcp-order15-holes120-balanced-225-QWH-15`–`qcp-order15-holes120-balanced-941-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-90-QWH-15`	—	—	—	—	—	—	2337	2337	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-100-QWH-15`	—	—	—	—	—	—	2352	2352	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-103-QWH-15`	—	—	—	—	—	—	2347	2347	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-268-QWH-15`	—	—	—	—	—	—	2357	2357	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-999-QWH-15`	—	—	—	—	—	—	2351	2351	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	11744	11744	—	—	—	—	—	—	—	—

Table 487. Number of removed universal constraints required for solved instances belonging to class `QCP-15`. Problem range: `qcp-order15-holes120-balanced-90-QWH-15`–`qcp-order15-holes120-balanced-999-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-11-QWH-20`	—	—	—	—	—	—	6153	6153	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-19-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-24-QWH-20`	—	—	—	—	—	—	6145	6145	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	—	—	—	—	—	—	6115	6115	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-30-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	18413	18413	—	—	—	—	—	—	—	—

Table 488. Number of removed universal constraints required for solved instances belonging to class `QCP-20-easy`. Problem range: `qcp-order20-holes187-balanced-11-QWH-20`–`qcp-order20-holes187-balanced-30-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order20-holes187-balanced-6-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-10-QWH-20	—	—	—	—	—	—	6149	6149	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-32-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-214-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-217-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-332-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-380-QWH-20	—	—	—	—	—	—	6168	6168	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-597-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-702-QWH-20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order20-holes187-balanced-981-QWH-20	—	—	—	—	—	—	6174	6174	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	18491	18491	—	—	—	—	—	—	—	—

Table 489. Number of removed universal constraints required for solved instances belonging to class `QCP-20-hard`. Problem range: `qcp-order20-holes187-balanced-6-QWH-20`–`qcp-order20-holes187-balanced-981-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-375-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-378-QWH-20`	—	—	—	—	—	—	6128	6167	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-580-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-602-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-722-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	6128	6167	—	—	—	—	—	—	—	—

Table 490. Number of removed universal constraints required for solved instances belonging to class `QCP-20`. Problem range: `qcp-order20-holes187-balanced-375-QWH-20`–`qcp-order20-holes187-balanced-722-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-23-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-31-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-64-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 491. Number of removed universal constraints required for solved instances belonging to class `QCP-25-easy`. Problem range: `qcp-order25-holes264-balanced-23-QWH-25`–`qcp-order25-holes264-balanced-64-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order25-holes264-balanced-3-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-6-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-9-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-11-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-14-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-22-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-29-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-68-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qcp-order25-holes264-balanced-79-QWH-25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 492. Number of removed universal constraints required for solved instances belonging to class `QCP-25-hard`. Problem range: `qcp-order25-holes264-balanced-3-QWH-25`–`qcp-order25-holes264-balanced-79-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order25-holes264-balanced-15-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-32-QWH-25`	—	—	—	—	—	—	12671	12671	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-33-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-34-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order25-holes264-balanced-75-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	12671	12671	—	—	—	—	—	—	—	—

Table 493. Number of removed universal constraints required for solved instances belonging to class `QCP-25`. Problem range: `qcp-order25-holes264-balanced-15-QWH-25`–`qcp-order25-holes264-balanced-75-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-1-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-15-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-22-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-52-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-70-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2760	2760	—	—	—	—	—	—	—	—

Table 494. Number of removed universal constraints required for solved instances belonging to class `QCPp-10-easy`. Problem range: `qcp-order10-holes64-balanced-1-QWH-10`–`qcp-order10-holes64-balanced-70-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qcp-order10-holes64-balanced-221-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-280-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-351-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-511-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-558-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-698-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-701-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-731-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-764-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
qcp-order10-holes64-balanced-885-QWH-10	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	5520	5520	—	—	—	—	—	—	—	—

Table 495. Number of removed universal constraints required for solved instances belonging to class `QCPp-10-hard`. Problem range: `qcp-order10-holes64-balanced-221-QWH-10`–`qcp-order10-holes64-balanced-885-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order10-holes64-balanced-16-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-32-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-45-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-109-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
`qcp-order10-holes64-balanced-140-QWH-10`	—	—	—	—	—	—	552	552	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2760	2760	—	—	—	—	—	—	—	—

Table 496. Number of removed universal constraints required for solved instances belonging to class `QCPp-10`. Problem range: `qcp-order10-holes64-balanced-16-QWH-10`–`qcp-order10-holes64-balanced-140-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-73-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-74-QWH-15`	—	—	—	—	—	—	2310	2310	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-75-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-76-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-77-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	11546	11546	—	—	—	—	—	—	—	—

Table 497. Number of removed universal constraints required for solved instances belonging to class `QCPp-15-easy`. Problem range: `qcp-order15-holes120-balanced-73-QWH-15`–`qcp-order15-holes120-balanced-77-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-3-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-25-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-48-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-127-QWH-15`	—	—	—	—	—	—	2310	2310	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-135-QWH-15`	—	—	—	—	—	—	2310	2310	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-171-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	13856	13856	—	—	—	—	—	—	—	—

Table 498. Number of removed universal constraints required for solved instances belonging to class `QCPp-15-hard`. Problem range: `qcp-order15-holes120-balanced-3-QWH-15`–`qcp-order15-holes120-balanced-171-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order15-holes120-balanced-1-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-2-QWH-15`	—	—	—	—	—	—	2310	2310	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-17-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-21-QWH-15`	—	—	—	—	—	—	2309	2315	—	—	—	—	—	—	—	—
`qcp-order15-holes120-balanced-54-QWH-15`	—	—	—	—	—	—	2309	2309	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	11546	11552	—	—	—	—	—	—	—	—

Table 499. Number of removed universal constraints required for solved instances belonging to class `QCPp-15`. Problem range: `qcp-order15-holes120-balanced-1-QWH-15`–`qcp-order15-holes120-balanced-54-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-13-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-14-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-15-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-16-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-17-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	24136	24136	—	—	—	—	—	—	—	—

Table 500. Number of removed universal constraints required for solved instances belonging to class `QCPp-20-easy`. Problem range: `qcp-order20-holes187-balanced-13-QWH-20`–`qcp-order20-holes187-balanced-17-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-3-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-12-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-18-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-22-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-23-QWH-20`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	24136	24136	—	—	—	—	—	—	—	—

Table 501. Number of removed universal constraints required for solved instances belonging to class `QCPp-20-hard`. Problem range: `qcp-order20-holes187-balanced-3-QWH-20`–`qcp-order20-holes187-balanced-23-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qcp-order20-holes187-balanced-8-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-25-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-27-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
`qcp-order20-holes187-balanced-29-QWH-20`	—	—	—	—	—	—	6034	6034	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	24136	24136	—	—	—	—	—	—	—	—

Table 502. Number of removed universal constraints required for solved instances belonging to class `QCPp-20`. Problem range: `qcp-order20-holes187-balanced-8-QWH-20`–`qcp-order20-holes187-balanced-29-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-rzchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	—	—	—	—	—	—	642	670	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-2-QWH-10`	—	—	—	—	—	—	643	654	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-3-QWH-10`	—	—	—	—	—	—	653	653	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-4-QWH-10`	—	—	—	—	—	—	630	683	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-5-QWH-10`	—	—	—	—	—	—	636	661	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	3204	3321	—	—	—	—	—	—	—	—

Table 503. Number of removed universal constraints required for solved instances belonging to class `QWH-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-5-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-35-QWH-10`	—	—	—	—	—	—	630	632	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-54-QWH-10`	—	—	—	—	—	—	651	652	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-187-QWH-10`	—	—	—	—	—	—	631	631	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-219-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-647-QWH-10`	—	—	—	—	—	—	648	651	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	3190	3196	—	—	—	—	—	—	—	—

Table 504. Number of removed universal constraints required for solved instances belonging to class `QWH-10-hard`. Problem range: `qwh-order10-holes57-balanced-35-QWH-10`–`qwh-order10-holes57-balanced-647-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-14-QWH-15`	—	—	—	—	—	—	2566	2567	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-15-QWH-15`	—	—	—	—	—	—	2592	2628	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-16-QWH-15`	—	—	—	—	—	—	2583	2586	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-17-QWH-15`	—	—	—	—	—	—	2595	2609	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-18-QWH-15`	—	—	—	—	—	—	2570	2579	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	12906	12969	—	—	—	—	—	—	—	—

Table 505. Number of removed universal constraints required for solved instances belonging to class `QWH-15-easy`. Problem range: `qwh-order15-holes106-balanced-14-QWH-15`–`qwh-order15-holes106-balanced-18-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-26-QWH-15`	—	—	—	—	—	—	2528	2532	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-155-QWH-15`	—	—	—	—	—	—	2594	2594	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-369-QWH-15`	—	—	—	—	—	—	2531	2531	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-392-QWH-15`	—	—	—	—	—	—	2567	2575	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-413-QWH-15`	—	—	—	—	—	—	2546	2546	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-461-QWH-15`	—	—	—	—	—	—	2535	2554	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-463-QWH-15`	—	—	—	—	—	—	2539	2568	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-586-QWH-15`	—	—	—	—	—	—	2569	2579	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-974-QWH-15`	—	—	—	—	—	—	2535	2535	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	22944	23014	—	—	—	—	—	—	—	—

Table 506. Number of removed universal constraints required for solved instances belonging to class `QWH-15-hard`. Problem range: `qwh-order15-holes106-balanced-26-QWH-15`–`qwh-order15-holes106-balanced-974-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-17-QWH-20`	—	—	—	—	—	—	6598	6616	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-18-QWH-20`	—	—	—	—	—	—	6549	6578	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-19-QWH-20`	—	—	—	—	—	—	6631	6733	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-20-QWH-20`	—	—	—	—	—	—	6527	6539	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-26-QWH-20`	—	—	—	—	—	—	6520	6564	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	32825	33030	—	—	—	—	—	—	—	—

Table 507. Number of removed universal constraints required for solved instances belonging to class `QWH-20-easy`. Problem range: `qwh-order20-holes166-balanced-17-QWH-20`–`qwh-order20-holes166-balanced-26-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order20-holes166-balanced-156-QWH-20`	—	—	—	—	—	—	6506	6561	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-285-QWH-20`	—	—	—	—	—	—	6520	6536	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-457-QWH-20`	—	—	—	—	—	—	6457	6460	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-522-QWH-20`	—	—	—	—	—	—	6540	6552	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-578-QWH-20`	—	—	—	—	—	—	6542	6542	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-624-QWH-20`	—	—	—	—	—	—	6496	6514	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-707-QWH-20`	—	—	—	—	—	—	6497	6497	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-862-QWH-20`	—	—	—	—	—	—	6531	6545	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-900-QWH-20`	—	—	—	—	—	—	6462	6470	—	—	—	—	—	—	—	—
`qwh-order20-holes166-balanced-988-QWH-20`	—	—	—	—	—	—	6544	6544	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	65095	65221	—	—	—	—	—	—	—	—

Table 508. Number of removed universal constraints required for solved instances belonging to class `QWH-20-hard`. Problem range: `qwh-order20-holes166-balanced-156-QWH-20`–`qwh-order20-holes166-balanced-988-QWH-20`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-2-QWH-25`	—	—	—	—	—	—	13357	13378	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-4-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-13-QWH-25`	—	—	—	—	—	—	13394	13507	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-26-QWH-25`	—	—	—	—	—	—	13487	13505	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-27-QWH-25`	—	—	—	—	—	—	—	13363	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	40238	53753	—	—	—	—	—	—	—	—

Table 509. Number of removed universal constraints required for solved instances belonging to class `QWH-25-easy`. Problem range: `qwh-order25-holes235-balanced-2-QWH-25`–`qwh-order25-holes235-balanced-27-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order25-holes235-balanced-5-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-99-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-111-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-114-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-164-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-228-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-288-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-394-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-795-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-918-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`qwh-order25-holes235-balanced-993-QWH-25`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 510. Number of removed universal constraints required for solved instances belonging to class `QWH-25-hard`. Problem range: `qwh-order25-holes235-balanced-5-QWH-25`–`qwh-order25-holes235-balanced-993-QWH-25`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat-zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-1-QWH-10`	—	—	—	—	—	—	630	638	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-33-QWH-10`	—	—	—	—	—	—	630	638	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-43-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-46-QWH-10`	—	—	—	—	—	—	630	665	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-111-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	3150	3201	—	—	—	—	—	—	—	—

Table 511. Number of removed universal constraints required for solved instances belonging to class `QWHp-10-easy`. Problem range: `qwh-order10-holes57-balanced-1-QWH-10`–`qwh-order10-holes57-balanced-111-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order10-holes57-balanced-8-QWH-10`	—	—	—	—	—	—	630	663	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-10-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-48-QWH-10`	—	—	—	—	—	—	630	638	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-154-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-210-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-295-QWH-10`	—	—	—	—	—	—	630	638	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-535-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-623-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-634-QWH-10`	—	—	—	—	—	—	630	636	—	—	—	—	—	—	—	—
`qwh-order10-holes57-balanced-987-QWH-10`	—	—	—	—	—	—	630	630	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	6300	6355	—	—	—	—	—	—	—	—

Table 512. Number of removed universal constraints required for solved instances belonging to class `QWHp-10-hard`. Problem range: `qwh-order10-holes57-balanced-8-QWH-10`–`qwh-order10-holes57-balanced-987-QWH-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-4-QWH-15`	—	—	—	—	—	—	2506	2507	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-5-QWH-15`	—	—	—	—	—	—	2505	2505	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-6-QWH-15`	—	—	—	—	—	—	2506	2506	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-7-QWH-15`	—	—	—	—	—	—	2506	2506	—	—	—	—	—	—	—	—
`qwh-order15-holes106-balanced-8-QWH-15`	—	—	—	—	—	—	2506	2506	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	12529	12530	—	—	—	—	—	—	—	—

Table 513. Number of removed universal constraints required for solved instances belonging to class `QWHp-15-easy`. Problem range: `qwh-order15-holes106-balanced-4-QWH-15`–`qwh-order15-holes106-balanced-8-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`qwh-order15-holes106-balanced-3-QWH-15`	—	—	—	—	—	—	2506	2510	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2506	2510	—	—	—	—	—	—	—	—

Table 514. Number of removed universal constraints required for solved instances belonging to class `QWHp-15-hard`. Problem: `qwh-order15-holes106-balanced-3-QWH-15`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-15-106-0	—	—	—	—	—	—	72	83	—	—	—	—	—	—	—	—
bqwh-15-106-17	—	—	—	—	—	—	56	59	—	—	—	—	—	—	—	—
bqwh-15-106-22	—	—	—	—	—	—	85	143	—	—	—	—	—	—	—	—
bqwh-15-106-29	—	—	—	—	—	—	116	139	—	—	—	—	—	—	—	—
bqwh-15-106-34	—	—	—	—	—	—	30	66	—	—	—	—	—	—	—	—
bqwh-15-106-39	—	—	—	—	—	—	35	35	—	—	—	—	—	—	—	—
bqwh-15-106-53	—	—	—	—	—	—	48	83	—	—	—	—	—	—	—	—
bqwh-15-106-64	—	—	—	—	—	—	47	49	—	—	—	—	—	—	—	—
bqwh-15-106-67	—	—	—	—	—	—	59	59	—	—	—	—	—	—	—	—
bqwh-15-106-76	—	—	—	—	—	—	121	214	—	—	—	—	—	—	—	—
bqwh-15-106-77	—	—	—	—	—	—	104	185	—	—	—	—	—	—	—	—
bqwh-15-106-78	—	—	—	—	—	—	71	159	—	—	—	—	—	—	—	—
bqwh-15-106-83	—	—	—	—	—	—	49	49	—	—	—	—	—	—	—	—
bqwh-15-106-87	—	—	—	—	—	—	75	82	—	—	—	—	—	—	—	—
bqwh-15-106-89	—	—	—	—	—	—	57	62	—	—	—	—	—	—	—	—
bqwh-15-106-90	—	—	—	—	—	—	52	143	—	—	—	—	—	—	—	—
bqwh-15-106-93	—	—	—	—	—	—	47	55	—	—	—	—	—	—	—	—
bqwh-15-106-96	—	—	—	—	—	—	58	58	—	—	—	—	—	—	—	—
bqwh-15-106-97	—	—	—	—	—	—	81	88	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	1263	1811	—	—	—	—	—	—	—	—

Table 515. Number of removed universal constraints required for solved instances belonging to class `bqwh15-106`. Problem range: `bqwh-15-106-0`–`bqwh-15-106-97`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
bqwh-18-141-10	—	—	—	—	—	—	127	158	—	—	—	—	—	—	—	—
bqwh-18-141-23	—	—	—	—	—	—	77	132	—	—	—	—	—	—	—	—
bqwh-18-141-28	—	—	—	—	—	—	138	160	—	—	—	—	—	—	—	—
bqwh-18-141-29	—	—	—	—	—	—	113	113	—	—	—	—	—	—	—	—
bqwh-18-141-33	—	—	—	—	—	—	175	190	—	—	—	—	—	—	—	—
bqwh-18-141-36	—	—	—	—	—	—	109	140	—	—	—	—	—	—	—	—
bqwh-18-141-37	—	—	—	—	—	—	83	83	—	—	—	—	—	—	—	—
bqwh-18-141-39	—	—	—	—	—	—	97	113	—	—	—	—	—	—	—	—
bqwh-18-141-40	—	—	—	—	—	—	60	65	—	—	—	—	—	—	—	—
bqwh-18-141-44	—	—	—	—	—	—	128	131	—	—	—	—	—	—	—	—
bqwh-18-141-59	—	—	—	—	—	—	118	166	—	—	—	—	—	—	—	—
bqwh-18-141-62	—	—	—	—	—	—	99	111	—	—	—	—	—	—	—	—
bqwh-18-141-65	—	—	—	—	—	—	171	186	—	—	—	—	—	—	—	—
bqwh-18-141-68	—	—	—	—	—	—	75	80	—	—	—	—	—	—	—	—
bqwh-18-141-73	—	—	—	—	—	—	89	89	—	—	—	—	—	—	—	—
bqwh-18-141-89	—	—	—	—	—	—	78	92	—	—	—	—	—	—	—	—
bqwh-18-141-90	—	—	—	—	—	—	149	161	—	—	—	—	—	—	—	—
bqwh-18-141-92	—	—	—	—	—	—	72	72	—	—	—	—	—	—	—	—
bqwh-18-141-96	—	—	—	—	—	—	130	134	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	2088	2376	—	—	—	—	—	—	—	—

Table 516. Number of removed universal constraints required for solved instances belonging to class `bqwh18-141`. Problem range: `bqwh-18-141-10`–`bqwh-18-141-96`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-25-0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-25-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 517. Number of removed universal constraints required for solved instances belonging to class `composed-25-1-25`. Problem range: `composed-25-1-25-0`–`composed-25-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-2-0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-2-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 518. Number of removed universal constraints required for solved instances belonging to class `composed-25-1-2`. Problem range: `composed-25-1-2-0`–`composed-25-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-1-40-0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-1-40-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 519. Number of removed universal constraints required for solved instances belonging to class `composed-25-1-40`. Problem range: `composed-25-1-40-0`–`composed-25-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-25-1-80-0	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-25-1-80-9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 520. Number of removed universal constraints required for solved instances belonging to class `composed-25-1-80`. Problem range: `composed-25-1-80-0`–`composed-25-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-25-10-20-0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-10-20-1`	—	—	—	—	—	—	0	1	—	—	—	—	—	—	—	—
`composed-25-10-20-2`	—	—	—	—	—	—	0	3	—	—	—	—	—	—	—	—
`composed-25-10-20-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-10-20-4`	—	—	—	—	—	—	0	2	—	—	—	—	—	—	—	—
`composed-25-10-20-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-10-20-6`	—	—	—	—	—	—	0	23	—	—	—	—	—	—	—	—
`composed-25-10-20-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-10-20-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-25-10-20-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	29	—	—	—	—	—	—	—	—

Table 521. Number of removed universal constraints required for solved instances belonging to class `composed-25-10-20`. Problem range: `composed-25-10-20-0`–`composed-25-10-20-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-75-1-25-0	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-25-9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 522. Number of removed universal constraints required for solved instances belonging to class `composed-75-1-25`. Problem range: `composed-75-1-25-0`–`composed-75-1-25-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-2-0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-2-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 523. Number of removed universal constraints required for solved instances belonging to class `composed-75-1-2`. Problem range: `composed-75-1-2-0`–`composed-75-1-2-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
composed-75-1-40-0	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
composed-75-1-40-9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 524. Number of removed universal constraints required for solved instances belonging to class `composed-75-1-40`. Problem range: `composed-75-1-40-0`–`composed-75-1-40-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`composed-75-1-80-0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`composed-75-1-80-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 525. Number of removed universal constraints required for solved instances belonging to class `composed-75-1-80`. Problem range: `composed-75-1-80-0`–`composed-75-1-80-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`cril_unsat_b_1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`cril_unsat_b_2`	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—
`cril_unsat_b_3`	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—
`cril_unsat_b_4`	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—
`cril_unsat_b_5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 526. Number of removed universal constraints required for solved instances belonging to class `cril`. Problem range: `cril_unsat_b_1`–`cril_unsat_b_5`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`domino-100-100`	—	—	—	—	—	—	100	100	—	—	—	—	—	—	—	—
`domino-100-200`	—	—	—	—	—	—	100	100	—	—	—	—	—	—	—	—
`domino-100-300`	—	—	—	—	—	—	100	100	—	—	—	—	—	—	—	—
`domino-300-100`	—	—	—	—	—	—	300	300	—	—	—	—	—	—	—	—
`domino-300-200`	—	—	—	—	—	—	300	300	—	—	—	—	—	—	—	—
`domino-300-300`	—	—	—	—	—	—	300	300	—	—	—	—	—	—	—	—
`domino-500-100`	—	—	—	—	—	—	500	500	—	—	—	—	—	—	—	—
`domino-500-200`	—	—	—	—	—	—	500	500	—	—	—	—	—	—	—	—
`domino-500-300`	—	—	—	—	—	—	500	500	—	—	—	—	—	—	—	—
`domino-1000-10`	—	—	—	—	—	—	1000	1000	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	3700	3700	—	—	—	—	—	—	—	—

Table 527. Number of removed universal constraints required for solved instances belonging to class `domino1`. Problem range: `domino-100-100`–`domino-1000-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-0	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-11	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-12	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-13	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-14	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-15	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-16	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-17	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-18	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-19	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-20	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-21	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-22	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-23	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-24	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-25	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-26	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-27	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 528. Number of removed universal constraints required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-28	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-29	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-30	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-31	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-32	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-33	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-34	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-35	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-36	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-37	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-38	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-39	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-40	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-41	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-42	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-43	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-44	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-45	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 529. Number of removed universal constraints required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-28`–`dual_ehi-85-297-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-46	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-47	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-48	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-49	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-50	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-51	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-52	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-53	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-54	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-55	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-56	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-57	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-58	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-59	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-60	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-61	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-62	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-63	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 530. Number of removed universal constraints required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-46`–`dual_ehi-85-297-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-64	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-65	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-66	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-67	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-68	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-69	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-70	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-71	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-72	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-73	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-74	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-75	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-76	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-77	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-78	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-79	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-80	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-81	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 531. Number of removed universal constraints required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-64`–`dual_ehi-85-297-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-85-297-82	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-83	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-84	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-85	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-86	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-87	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-88	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-89	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-90	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-91	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-92	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-93	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-94	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-95	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-96	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-97	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-98	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-99	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-85-297-9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 532. Number of removed universal constraints required for solved instances belonging to class `ehi-85`. Problem range: `dual_ehi-85-297-0`–`dual_ehi-85-297-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-0	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-11	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-12	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-13	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-14	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-15	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-16	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-17	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-18	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-19	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-20	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-21	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-22	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-23	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-24	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-25	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-26	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-27	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 533. Number of removed universal constraints required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-27`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-28	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-29	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-30	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-31	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-32	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-33	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-34	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-35	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-36	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-37	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-38	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-39	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-40	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-41	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-42	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-43	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-44	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-45	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 534. Number of removed universal constraints required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-28`–`dual_ehi-90-315-45`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-46	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-47	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-48	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-49	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-50	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-51	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-52	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-53	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-54	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-55	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-56	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-57	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-58	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-59	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-60	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-61	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-62	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-63	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 535. Number of removed universal constraints required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-46`–`dual_ehi-90-315-63`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-64	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-65	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-66	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-67	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-68	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-69	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-70	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-71	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-72	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-73	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-74	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-75	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-76	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-77	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-78	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-79	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-80	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-81	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 536. Number of removed universal constraints required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-64`–`dual_ehi-90-315-81`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
dual_ehi-90-315-82	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-83	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-84	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-85	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-86	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-87	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-88	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-89	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-90	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-91	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-92	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-93	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-94	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-95	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-96	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-97	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-98	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-99	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
dual_ehi-90-315-9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 537. Number of removed universal constraints required for solved instances belonging to class `ehi-90`. Problem range: `dual_ehi-90-315-0`–`dual_ehi-90-315-9`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp01_0200_4-bis`	—	—	—	—	—	—	35	47	—	—	—	—	—	—	—	—
`fapp01_0200_5-bis`	—	—	—	—	—	—	39	39	—	—	—	—	—	—	—	—
`fapp01_0200_6-bis`	—	—	—	—	—	—	43	43	—	—	—	—	—	—	—	—
`fapp01_0200_7-bis`	—	—	—	—	—	—	49	50	—	—	—	—	—	—	—	—
`fapp01_0200_8-bis`	—	—	—	—	—	—	52	52	—	—	—	—	—	—	—	—
`fapp01_0200_9-bis`	—	—	—	—	—	—	70	70	—	—	—	—	—	—	—	—
`fapp01_0200_10-bis`	—	—	—	—	—	—	101	101	—	—	—	—	—	—	—	—
`fapp01_0200_0-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`fapp01_0200_1-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`fapp01_0200_2-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`fapp01_0200_3-bis`	—	—	—	—	—	—	32	32	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	421	434	—	—	—	—	—	—	—	—

Table 538. Number of removed universal constraints required for solved instances belonging to class `fapp01`. Problem range: `fapp01_0200_4-bis`–`fapp01_0200_3-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`fapp02_0250_2-bis`	—	—	—	—	—	—	89	123	—	—	—	—	—	—	—	—
`fapp02_0250_3-bis`	—	—	—	—	—	—	86	89	—	—	—	—	—	—	—	—
`fapp02_0250_4-bis`	—	—	—	—	—	—	81	85	—	—	—	—	—	—	—	—
`fapp02_0250_5-bis`	—	—	—	—	—	—	92	94	—	—	—	—	—	—	—	—
`fapp02_0250_6-bis`	—	—	—	—	—	—	100	101	—	—	—	—	—	—	—	—
`fapp02_0250_7-bis`	—	—	—	—	—	—	81	81	—	—	—	—	—	—	—	—
`fapp02_0250_8-bis`	—	—	—	—	—	—	86	89	—	—	—	—	—	—	—	—
`fapp02_0250_9-bis`	—	—	—	—	—	—	88	89	—	—	—	—	—	—	—	—
`fapp02_0250_10-bis`	—	—	—	—	—	—	120	120	—	—	—	—	—	—	—	—
`fapp02_0250_0-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`fapp02_0250_1-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	823	871	—	—	—	—	—	—	—	—

Table 539. Number of removed universal constraints required for solved instances belonging to class `fapp02`. Problem range: `fapp02_0250_2-bis`–`fapp02_0250_1-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb30-15-1-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb30-15-2-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb30-15-3-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb30-15-4-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb30-15-5-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 540. Number of removed universal constraints required for solved instances belonging to class `frb30-15`. Problem range: `frb30-15-1-bis`–`frb30-15-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb35-17-1-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb35-17-2-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb35-17-3-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb35-17-4-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb35-17-5-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 541. Number of removed universal constraints required for solved instances belonging to class `frb35-17`. Problem range: `frb35-17-1-bis`–`frb35-17-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb40-19-1-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb40-19-2-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb40-19-3-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb40-19-4-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb40-19-5-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 542. Number of removed universal constraints required for solved instances belonging to class `frb40-19`. Problem range: `frb40-19-1-bis`–`frb40-19-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb45-21-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb45-21-2-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb45-21-3-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb45-21-4-bis`	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—	—
`frb45-21-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 543. Number of removed universal constraints required for solved instances belonging to class `frb45-21`. Problem range: `frb45-21-1-bis`–`frb45-21-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb50-23-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb50-23-4-bis`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`frb50-23-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 544. Number of removed universal constraints required for solved instances belonging to class `frb50-23`. Problem range: `frb50-23-1-bis`–`frb50-23-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb53-24-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb53-24-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 545. Number of removed universal constraints required for solved instances belonging to class `frb53-24`. Problem range: `frb53-24-1-bis`–`frb53-24-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb56-25-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb56-25-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 546. Number of removed universal constraints required for solved instances belonging to class `frb56-25`. Problem range: `frb56-25-1-bis`–`frb56-25-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`frb59-26-1-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-2-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-3-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-4-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`frb59-26-5-bis`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 547. Number of removed universal constraints required for solved instances belonging to class `frb59-26`. Problem range: `frb59-26-1-bis`–`frb59-26-5-bis`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.11	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.13	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.15	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.16	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.17	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.18	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.19	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.20	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.21	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.22	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.23	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.24	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.25	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.26	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.27	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.28	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.29	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 548. Number of removed universal constraints required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.2`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.30	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.31	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.32	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.33	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.34	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.35	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.36	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.37	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.38	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.39	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.40	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.42	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.43	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.44	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.45	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.46	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.47	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.48	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.49	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 549. Number of removed universal constraints required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.30`–`geo50.20.d4.75.49`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.50	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.51	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.53	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.54	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.55	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.56	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.58	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.59	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.60	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.61	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.62	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.63	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.64	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.65	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.66	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.67	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.68	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.69	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 550. Number of removed universal constraints required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.4`–`geo50.20.d4.75.69`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.71	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.72	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.73	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.74	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.75	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.76	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.77	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.78	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.79	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.80	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.81	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.82	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.83	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.84	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.85	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.87	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.88	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.89	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 551. Number of removed universal constraints required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.6`–`geo50.20.d4.75.89`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
geo50.20.d4.75.8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.90	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.91	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.92	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.93	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.95	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.96	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.97	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.98	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.99	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.100	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.12	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.14	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.41	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.52	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.57	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.70	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.86	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
geo50.20.d4.75.94	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 552. Number of removed universal constraints required for solved instances belonging to class `geom`. Problem range: `geo50.20.d4.75.10`–`geo50.20.d4.75.94`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`hanoi_3`	—	—	—	—	—	—	5	5	—	—	—	—	—	—	—	—
`hanoi_4`	—	—	—	—	—	—	13	13	—	—	—	—	—	—	—	—
`hanoi_5`	—	—	—	—	—	—	29	29	—	—	—	—	—	—	—	—
`hanoi_6`	—	—	—	—	—	—	61	61	—	—	—	—	—	—	—	—
`hanoi_7`	—	—	—	—	—	—	125	125	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	233	233	—	—	—	—	—	—	—	—

Table 553. Number of removed universal constraints required for solved instances belonging to class `hanoi1`. Problem range: `hanoi_3`–`hanoi_7`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr1-10-by-5-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-2`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-3`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-8`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr1-10-by-5-10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 554. Number of removed universal constraints required for solved instances belonging to class `js-e0ddr1`. Problem range: `e0ddr1-10-by-5-1`–`e0ddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`e0ddr2-10-by-5-1`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-2`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-9`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`e0ddr2-10-by-5-10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 555. Number of removed universal constraints required for solved instances belonging to class `js-e0ddr2`. Problem range: `e0ddr2-10-by-5-1`–`e0ddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr1-10-by-5-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr1-10-by-5-10`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 556. Number of removed universal constraints required for solved instances belonging to class `js-enddr1`. Problem range: `enddr1-10-by-5-1`–`enddr1-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`enddr2-10-by-5-1`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`enddr2-10-by-5-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr2-10-by-5-3`	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
`enddr2-10-by-5-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr2-10-by-5-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`enddr2-10-by-5-10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 557. Number of removed universal constraints required for solved instances belonging to class `js-enddr2`. Problem range: `enddr2-10-by-5-1`–`enddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`ewddr2-10-by-5-1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`ewddr2-10-by-5-10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 558. Number of removed universal constraints required for solved instances belonging to class `js-ewddr2`. Problem range: `ewddr2-10-by-5-1`–`ewddr2-10-by-5-10`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`lsq_dg_5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`lsq_dg_7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`lsq_dg_3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`lsq_dg_4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`lsq_dg_6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 559. Number of removed universal constraints required for solved instances belonging to class `lsq-dg1`. Problem range: `lsq_dg_5`–`lsq_dg_6`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
large_80_sat	—	—	—	—	—	—	3160	3160	—	—	—	—	—	—	—	—
large_84_sat	—	—	—	—	—	—	3486	3486	—	—	—	—	—	—	—	—
large_88_sat	—	—	—	—	—	—	3828	3828	—	—	—	—	—	—	—	—
large_92_sat	—	—	—	—	—	—	4186	4186	—	—	—	—	—	—	—	—
large_96_sat	—	—	—	—	—	—	4560	4560	—	—	—	—	—	—	—	—
large_80_unsat	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
large_84_unsat	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
large_88_unsat	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
large_92_unsat	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
large_96_unsat	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	19220	19220	—	—	—	—	—	—	—	—

Table 560. Number of removed universal constraints required for solved instances belonging to class `marc`. Problem range: `large_80_sat`–`large_96_unsat`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
pigeons5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons11	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons12	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
pigeons13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
pigeons50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 561. Number of removed universal constraints required for solved instances belonging to class `pigeons`. Problem range: `pigeons5`–`pigeons50`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qa_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qa_6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qa_7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
qa_3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qa_4	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 562. Number of removed universal constraints required for solved instances belonging to class qa1. Problem range: qa_5–qa_4. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
qk_8_0_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_8_8_5_add	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_8_8_5_mul	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_10_0_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_10_10_5_add	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_10_10_5_mul	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_12_0_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_12_12_5_add	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_12_12_5_mul	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_15_0_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_15_15_5_add	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_15_15_5_mul	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_20_0_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_20_20_5_add	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_20_20_5_mul	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—
qk_25_0_5	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_25_25_5_add	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
qk_25_25_5_mul	—	—	—	—	—	—	—	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 563. Number of removed universal constraints required for solved instances belonging to class `qk1`. Problem range: `qk_8_0_5`–`qk_25_25_5_mul`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-23-23-253-131-48021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-49021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-50021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-53021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-54021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-46021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-47021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-51021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-52021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-23-23-253-131-55021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 564. Number of removed universal constraints required for solved instances belonging to class `random-23-23-253`. Problem range: `random-23-23-253-131-48021`–`random-23-23-253-131-55021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-24-24-276-139-48021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-50021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-55021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-49021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-51021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-52021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-53021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-54021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-56021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-24-24-276-139-57021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 565. Number of removed universal constraints required for solved instances belonging to class `random-24-24-276`. Problem range: `random-24-24-276-139-48021`–`random-24-24-276-139-57021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-25-25-300-147-51021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-52021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-53021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-54021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-56021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-59021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-50021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-55021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-57021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-25-25-300-147-58021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 566. Number of removed universal constraints required for solved instances belonging to class `random-25-25-300`. Problem range: `random-25-25-300-147-51021`–`random-25-25-300-147-58021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-26-26-325-155-53021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-54021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-55021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-26-26-325-155-59021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-61021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-26-26-325-155-52021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-56021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-57021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-58021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-26-26-325-155-60021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 567. Number of removed universal constraints required for solved instances belonging to class `random-26-26-325`. Problem range: `random-26-26-325-155-53021`–`random-26-26-325-155-60021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
random-27-27-351-163-54021	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
random-27-27-351-163-56021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-60021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-63021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-55021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-57021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-58021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-59021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-61021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
random-27-27-351-163-62021	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 568. Number of removed universal constraints required for solved instances belonging to class `random-27-27-351`. Problem range: `random-27-27-351-163-54021`–`random-27-27-351-163-62021`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph1`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph2`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph3`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph4`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph8`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph14`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph5`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph6`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph7`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph11`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph12`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph13`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 569. Number of removed universal constraints required for solved instances belonging to class `rlfapGraphs`. Problem range: `graph1`–`graph13`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
`graph2_f24`	—	—	—	—	—	—	0	308	—	—	—	—	—	—	—	—
`graph8_f10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph9_f9`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph12_w0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph13_w0`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph14_f27`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph2_f25`	—	—	—	—	—	—	0	308	—	—	—	—	—	—	—	—
`graph8_f11`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph9_f10`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
`graph12_w1`	—	—	—	—	—	—	26	26	—	—	—	—	—	—	—	—
`graph13_w1`	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—
`graph14_f28`	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	27	643	—	—	—	—	—	—	—	—

Table 570. Number of removed universal constraints required for solved instances belonging to class `rlfapModGraphs`. Problem range: `graph2_f24`–`graph14_f28`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen1_f8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen2_f24	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen3_f10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen6_w1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen7_w1_f4	—	—	—	—	—	—	5	49	—	—	—	—	—	—	—	—
scen1_f9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen2_f25	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen3_f11	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen6_w1_f2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen6_w1_f3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen6_w2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen7_w1_f5	—	—	—	—	—	—	9	9	—	—	—	—	—	—	—	—
scen9_w1_f3	—	—	—	—	—	—	3	3	—	—	—	—	—	—	—	—
scen10_w1_f3	—	—	—	—	—	—	3	3	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	20	64	—	—	—	—	—	—	—	—

Table 571. Number of removed universal constraints required for solved instances belonging to class `rlfapModScens`. Problem range: `scen1_f8`–`scen10_w1_f3`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen11_f2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
scen11_f3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
scen11_f4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
scen11_f5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
scen11_f6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
scen11_f7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen11_f8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen11_f10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen11_f12	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—

Table 572. Number of removed universal constraints required for solved instances belonging to class `rlfapScens11`. Problem range: `scen11_f2`–`scen11_f12`. The maximum solution time was set to 600 seconds.

	Abscon/1	Abscon/2	Biere/1	Bsol/1	CSP2SAT4J/1	EFC/1	bordewijk/1	bordewijk/2	csp2sat+zchaff/1	mosar/1	quasi/1	quasi/2	rjw/1	rjw/2	table2opl/1	table2opl/2
scen1	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen2	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen3	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen4	—	—	—	—	—	—	2397	2905	—	—	—	—	—	—	—	—
scen5	—	—	—	—	—	—	1858	1961	—	—	—	—	—	—	—	—
scen11	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen6	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen7	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen8	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen9	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
scen10	—	—	—	—	—	—	0	0	—	—	—	—	—	—	—	—
Grand total:	—	—	—	—	—	—	4255	4866	—	—	—	—	—	—	—	—

Table 573. Number of removed universal constraints required for solved instances belonging to class `rlfapScens`. Problem range: `scen1`–`scen10`. The maximum solution time was set to 600 seconds.

4 Barcharts by Problem Class

This section consists of a listing of barcharts with results organised by problem class. Table 574 indicates where to find the barcharts for a given problem class.
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Class	Link	Class	Link
nb-Golomb	Barcharts 19–24	nb-TSP-20-easy	Barcharts 25–30
nb-TSP-25-easy	Barcharts 31–36	nb-TSP-20-hard	Barcharts 37–42
nb-TSP-25-hard	Barcharts 43–48	nb-allSeries1	Barcharts 49–54
nb-cc1	Barcharts 55–60	nb-cril	Barcharts 61–66
nb-gr1	Barcharts 67–72	nb-ramsey3	Barcharts 73–78
nb-ramsey4	Barcharts 79–84	nb-random-3-20-20-60-632-forced	Barcharts 85–90
nb-random-3-24-24-76-632-forced	Barcharts 91–96	nb-random-3-28-28-93-632-forced	Barcharts 97–102
nb-renault	Barcharts 103–108	nb-schurr	Barcharts 109–114
BH-4-4	Barcharts 115–120	QCP-10	Barcharts 121–126
QCP-15	Barcharts 127–132	QCP-20	Barcharts 133–138
QCP-25	Barcharts 139–144	QCP-10-easy	Barcharts 145–150
QCP-15-easy	Barcharts 151–156	QCP-20-easy	Barcharts 157–162
QCP-25-easy	Barcharts 163–168	QCP-10-hard	Barcharts 169–174
QCP-15-hard	Barcharts 175–180	QCP-20-hard	Barcharts 181–186
QCP-25-hard	Barcharts 187–192	QCPp-10	Barcharts 193–198
QCPp-15	Barcharts 199–204	QCPp-20	Barcharts 205–210
QCPp-10-easy	Barcharts 211–216	QCPp-15-easy	Barcharts 217–222
QCPp-20-easy	Barcharts 223–228	QCPp-10-hard	Barcharts 229–234
QCPp-15-hard	Barcharts 235–240	QCPp-20-hard	Barcharts 241–246
QWH-10-easy	Barcharts 247–252	QWH-15-easy	Barcharts 253–258
QWH-20-easy	Barcharts 259–264	QWH-25-easy	Barcharts 265–270
QWH-10-hard	Barcharts 271–276	QWH-15-hard	Barcharts 277–282
QWH-20-hard	Barcharts 283–288	QWH-25-hard	Barcharts 289–294
QWHp-10-easy	Barcharts 295–300	QWHp-15-easy	Barcharts 301–306
QWHp-10-hard	Barcharts 307–312	QWHp-15-hard	Barcharts 313–318
bqwh15-106	Barcharts 319–324	bqwh18-141	Barcharts 325–330
composed-25-1-2	Barcharts 331–336	composed-25-1-25	Barcharts 337–342
composed-25-1-40	Barcharts 343–348	composed-25-1-80	Barcharts 349–354
composed-25-10-20	Barcharts 355–360	composed-75-1-2	Barcharts 361–366
composed-75-1-25	Barcharts 367–372	composed-75-1-40	Barcharts 373–378
composed-75-1-80	Barcharts 379–384	cril	Barcharts 385–390
ehi-85	Barcharts 391–396	ehi-90	Barcharts 397–402
fapp01	Barcharts 403–408	fapp02	Barcharts 409–414
frb30-15	Barcharts 415–420	frb35-17	Barcharts 421–426
frb40-19	Barcharts 427–432	frb45-21	Barcharts 433–438
frb50-23	Barcharts 439–444	frb53-24	Barcharts 445–450
frb56-25	Barcharts 451–456	frb59-26	Barcharts 457–462
geom	Barcharts 463–468	hanoi1	Barcharts 469–474
js-e0ddr1	Barcharts 475–480	js-e0ddr2	Barcharts 481–486
js-enddr1	Barcharts 487–492	js-enddr2	Barcharts 493–498
js-ewddr2	Barcharts 499–504	lsq-dg1	Barcharts 505–510
marc	Barcharts 511–516	pigeons	Barcharts 517–522
qa1	Barcharts 523–528	qk1	Barcharts 529–534
random-23-23-253	Barcharts 535–540	random-24-24-276	Barcharts 541–546
random-25-25-300	Barcharts 547–552	random-26-26-325	Barcharts 553–558
random-27-27-351	Barcharts 559–564	rlfapGraphs	Barcharts 565–570
rlfapModGraphs	Barcharts 571–576	rlfapScens	Barcharts 577–582
rlfapModScens	Barcharts 583–588	rlfapScens11	Barcharts 589–594

Table 574. Barchart numbers per problem class.

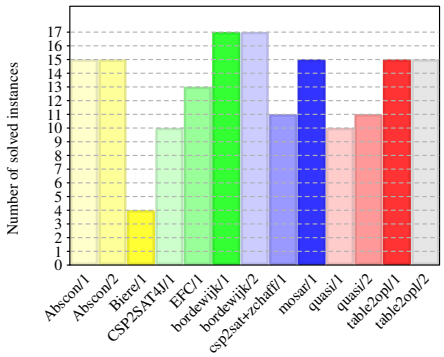

Fig. 19. Number of solved instances for class `nb-Golomb`. The maximum solution time was set to 600 seconds.

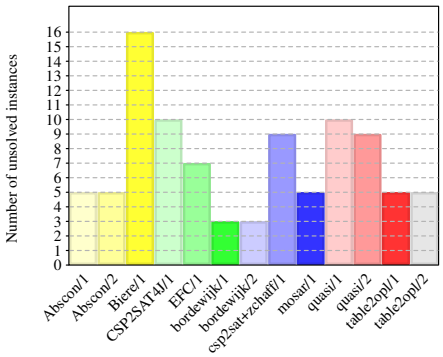

Fig. 20. Number of unsolved instances for class `nb-Golomb`. The maximum solution time was set to 600 seconds.

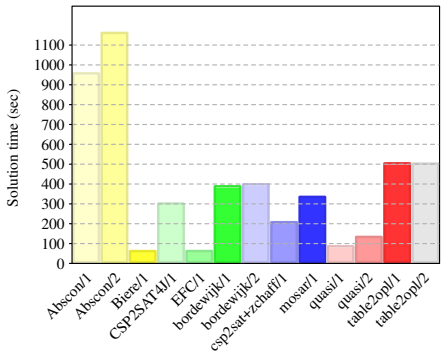

Fig. 21. Solution time in seconds for solved instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

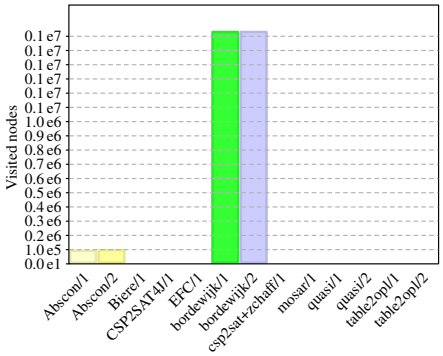

Fig. 22. Visited nodes required for solved instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

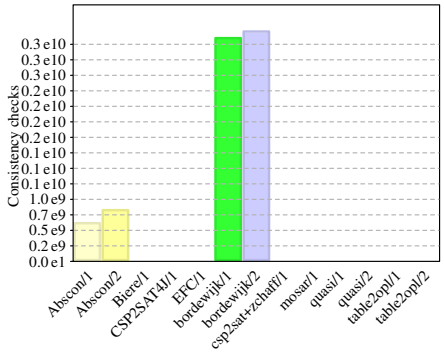

Fig. 23. Consistency checks required for solved instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

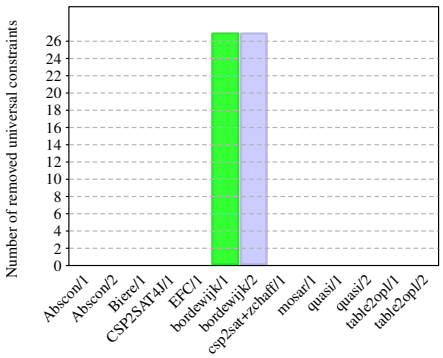

Fig. 24. Number of removed universal constraints for solved instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

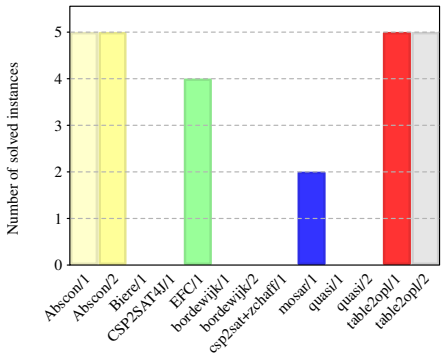

Fig. 25. Number of solved instances for class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

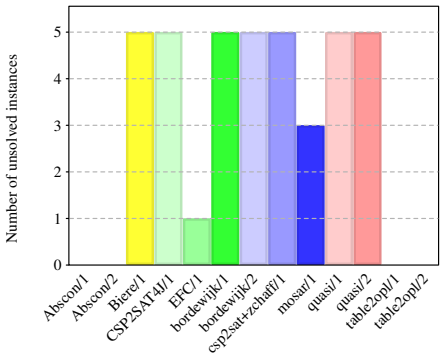

Fig. 26. Number of unsolved instances for class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

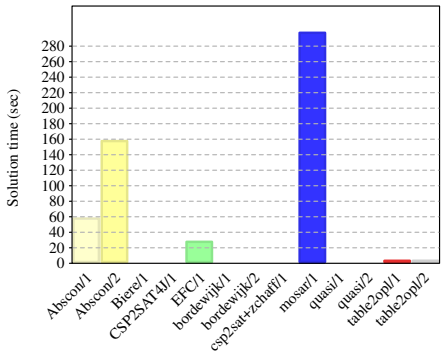

Fig. 27. Solution time in seconds for solved instances from class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

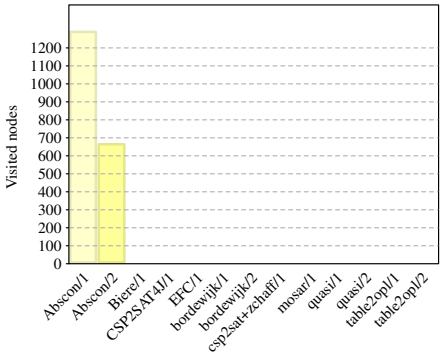

Fig. 28. Visited nodes required for solved instances from class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

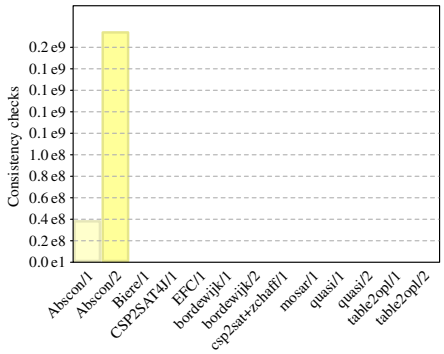

Fig. 29. Consistency checks required for solved instances from class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

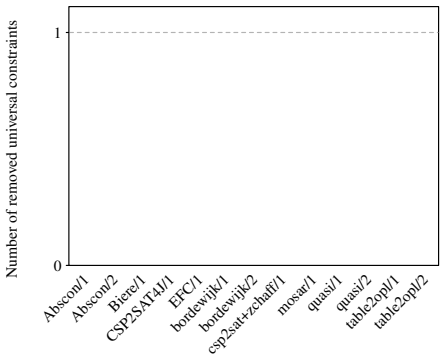

Fig. 30. Number of removed universal constraints for solved instances from class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

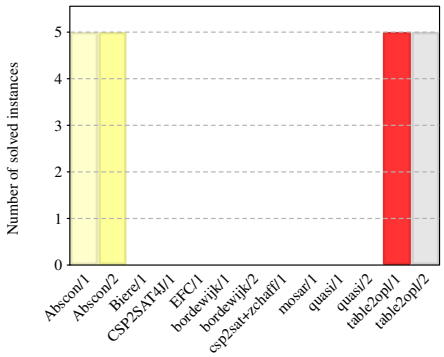

Fig. 31. Number of solved instances for class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

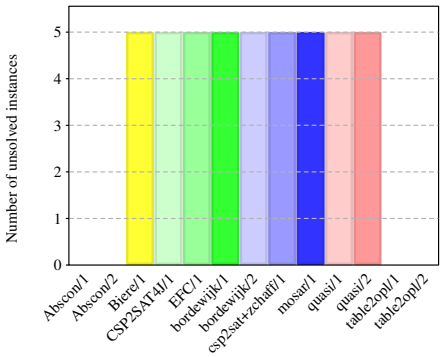

Fig. 32. Number of unsolved instances for class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

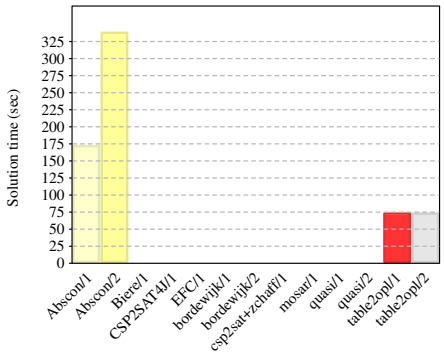

Fig. 33. Solution time in seconds for solved instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

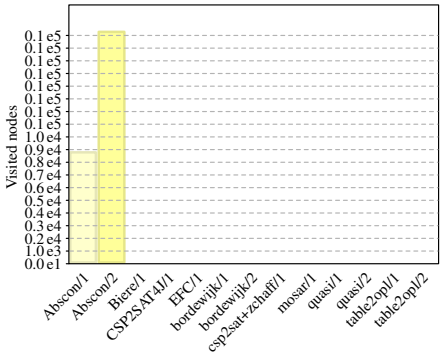

Fig. 34. Visited nodes required for solved instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

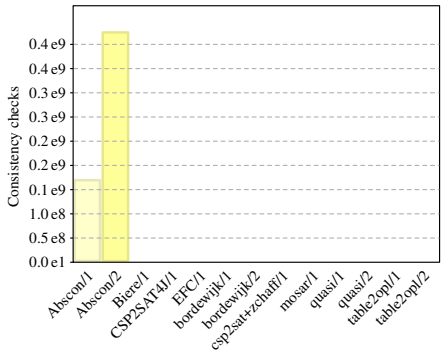

Fig. 35. Consistency checks required for solved instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

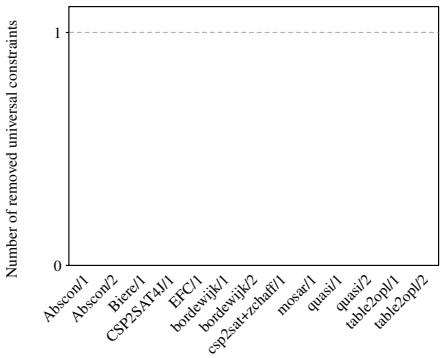

Fig. 36. Number of removed universal constraints for solved instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

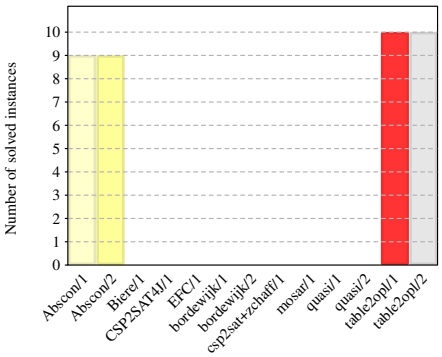

Fig. 37. Number of solved instances for class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

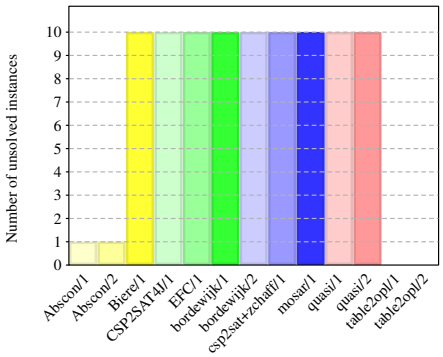

Fig. 38. Number of unsolved instances for class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

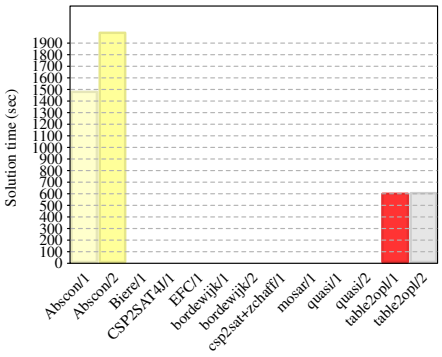

Fig. 39. Solution time in seconds for solved instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

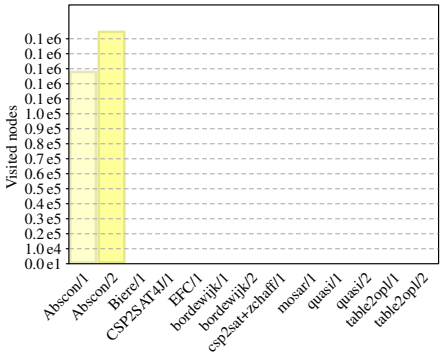

Fig. 40. Visited nodes required for solved instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

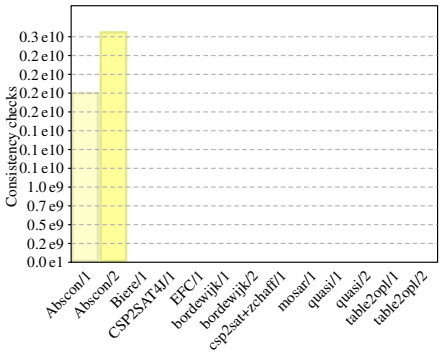

Fig. 41. Consistency checks required for solved instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

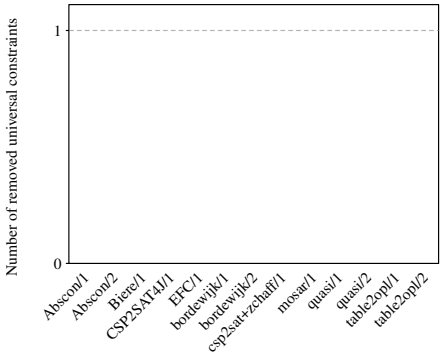

Fig. 42. Number of removed universal constraints for solved instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

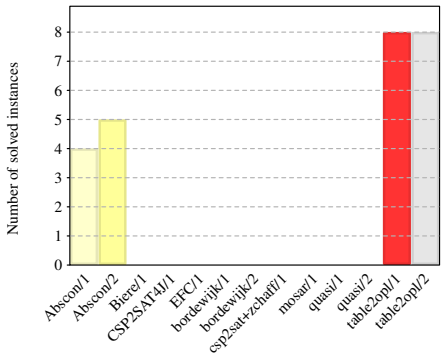

Fig. 43. Number of solved instances for class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

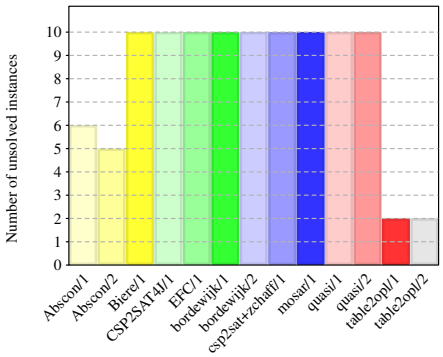

Fig. 44. Number of unsolved instances for class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

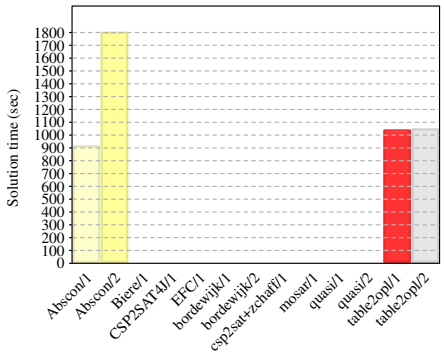

Fig. 45. Solution time in seconds for solved instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

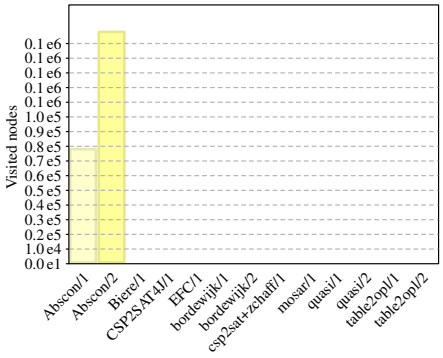

Fig. 46. Visited nodes required for solved instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

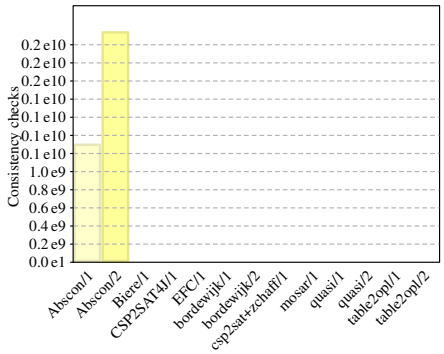

Fig. 47. Consistency checks required for solved instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

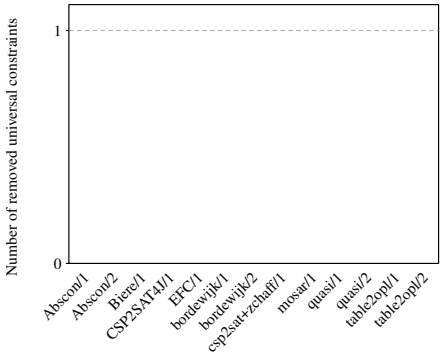

Fig. 48. Number of removed universal constraints for solved instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

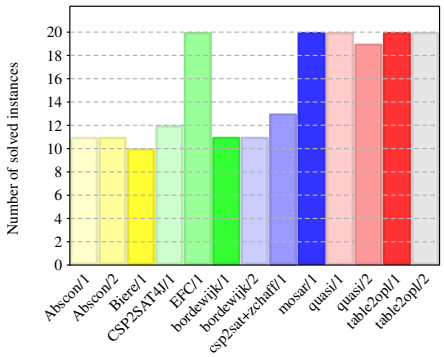

Fig. 49. Number of solved instances for class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

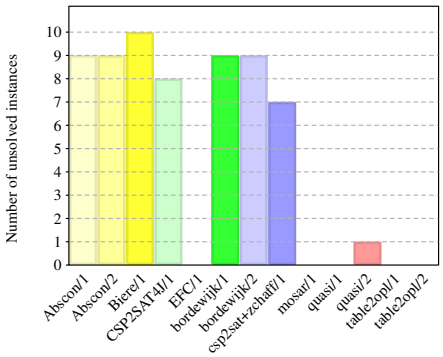

Fig. 50. Number of unsolved instances for class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

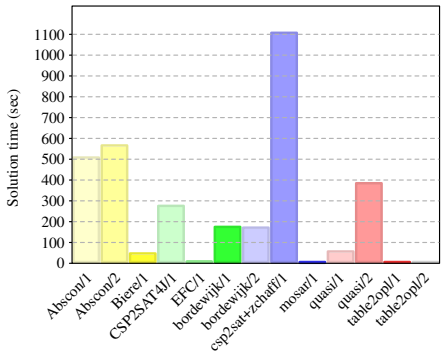

Fig. 51. Solution time in seconds for solved instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

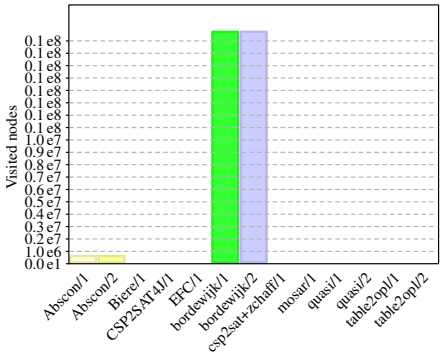

Fig. 52. Visited nodes required for solved instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

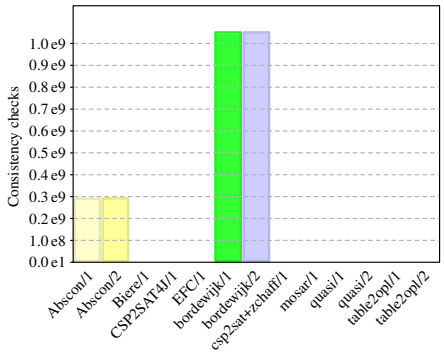

Fig. 53. Consistency checks required for solved instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

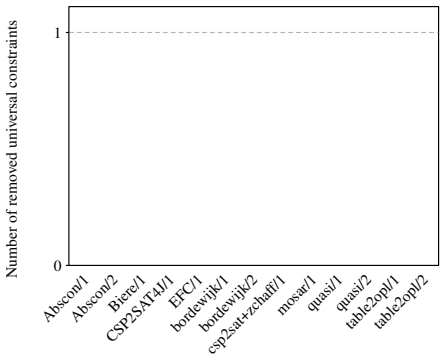

Fig. 54. Number of removed universal constraints for solved instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

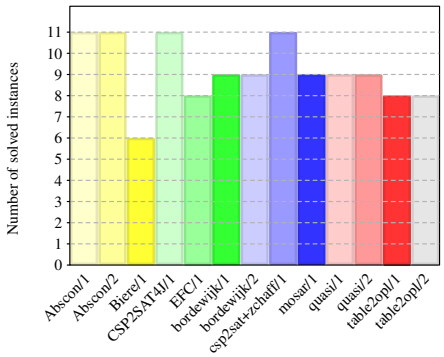

Fig. 55. Number of solved instances for class `nb-cc1`. The maximum solution time was set to 600 seconds.

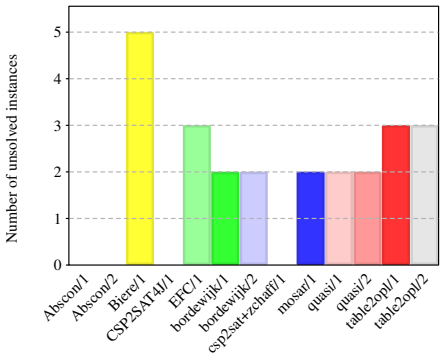

Fig. 56. Number of unsolved instances for class `nb-cc1`. The maximum solution time was set to 600 seconds.

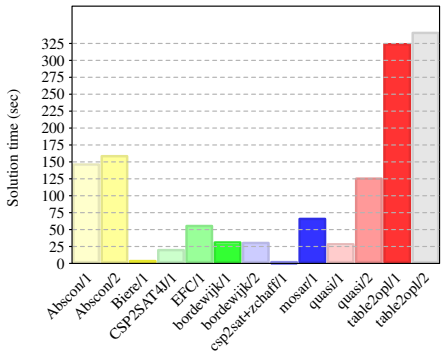

Fig. 57. Solution time in seconds for solved instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

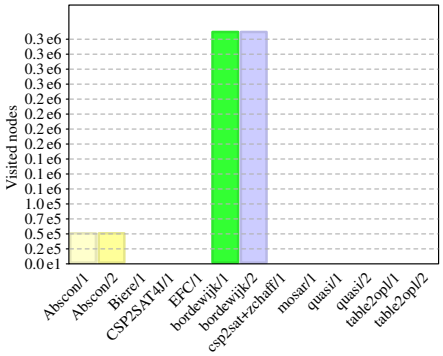

Fig. 58. Visited nodes required for solved instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

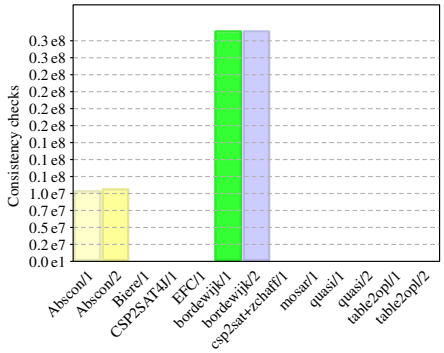

Fig. 59. Consistency checks required for solved instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

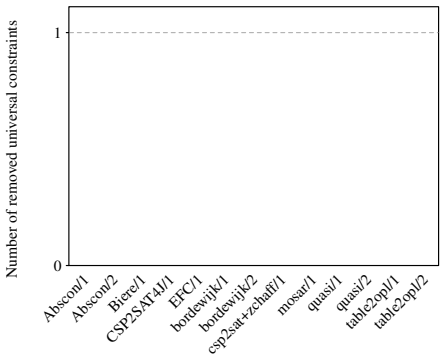

Fig. 60. Number of removed universal constraints for solved instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

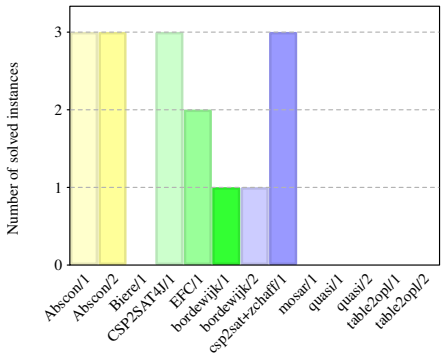

Fig. 61. Number of solved instances for class `nb-cril`. The maximum solution time was set to 600 seconds.

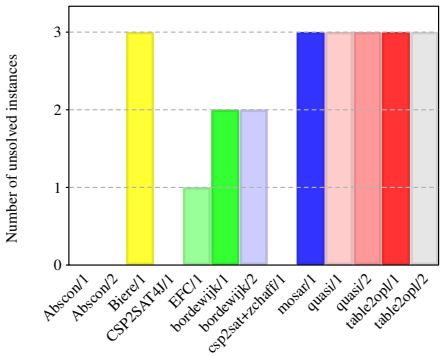

Fig. 62. Number of unsolved instances for class `nb-cril`. The maximum solution time was set to 600 seconds.

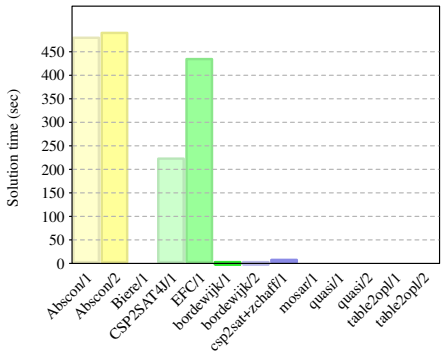

Fig. 63. Solution time in seconds for solved instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

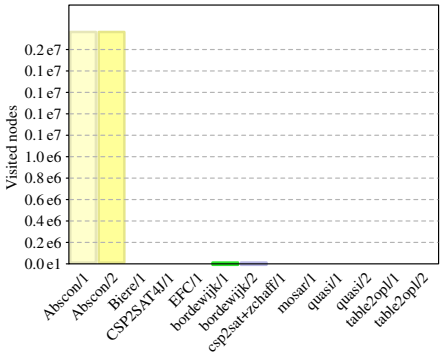

Fig. 64. Visited nodes required for solved instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

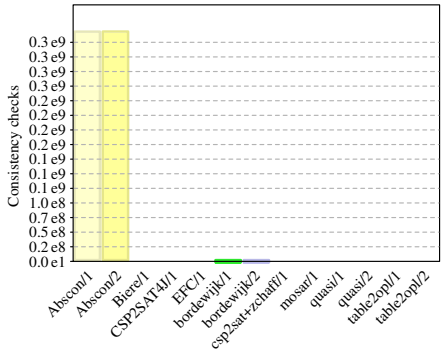

Fig. 65. Consistency checks required for solved instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

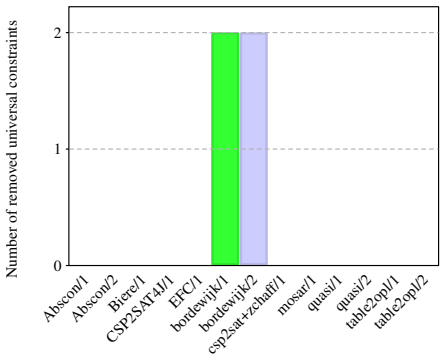

Fig. 66. Number of removed universal constraints for solved instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

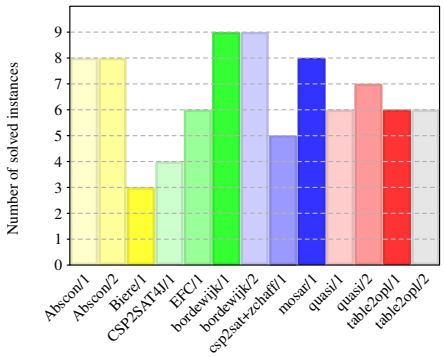

Fig. 67. Number of solved instances for class `nb-gr1`. The maximum solution time was set to 600 seconds.

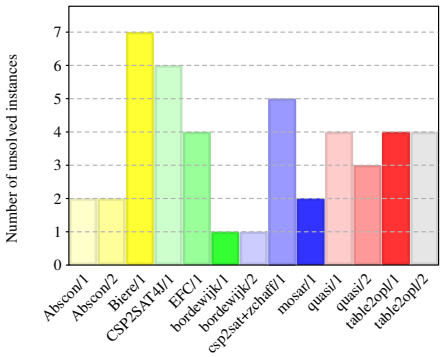

Fig. 68. Number of unsolved instances for class `nb-gr1`. The maximum solution time was set to 600 seconds.

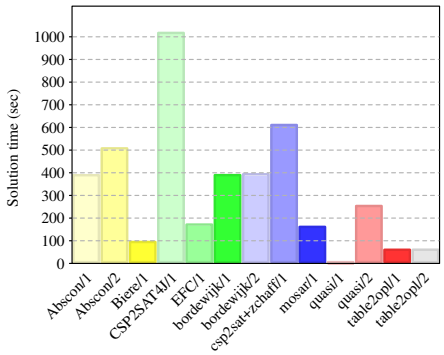

Fig. 69. Solution time in seconds for solved instances from class `nb-gr1`. The maximum solution time was set to 600 seconds.

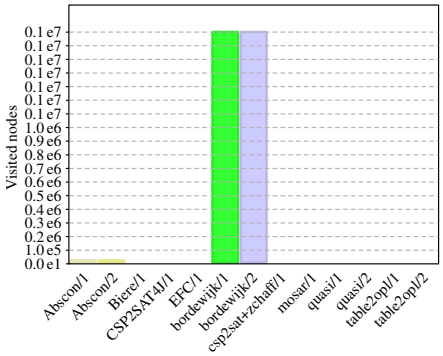

Fig. 70. Visited nodes required for solved instances from class `nb-gr1`. The maximum solution time was set to 600 seconds.

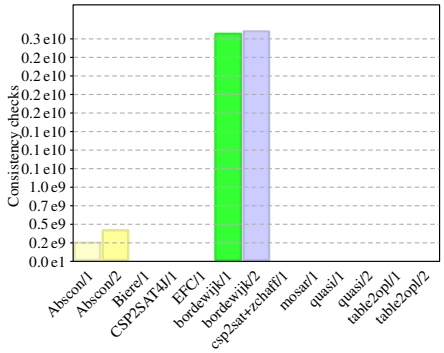

Fig. 71. Consistency checks required for solved instances from class `nb-gr1`. The maximum solution time was set to 600 seconds.

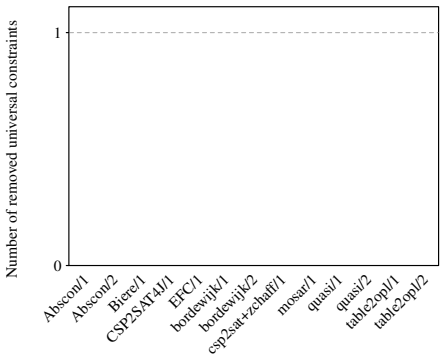

Fig. 72. Number of removed universal constraints for solved instances from class `nb-gr1`. The maximum solution time was set to 600 seconds.

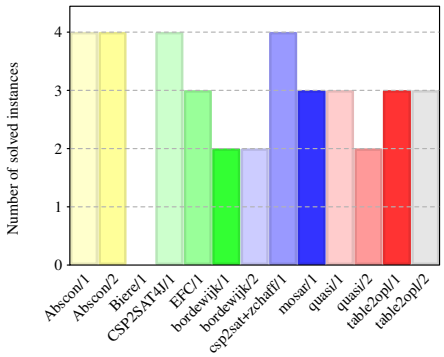

Fig. 73. Number of solved instances for class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

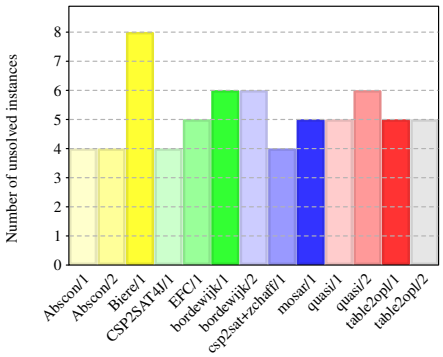

Fig. 74. Number of unsolved instances for class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

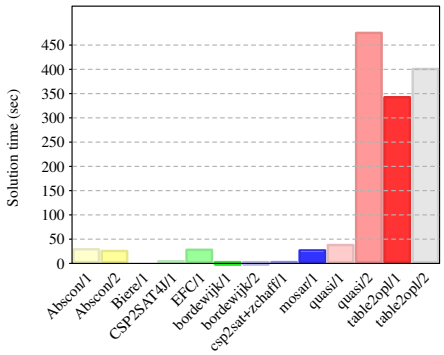

Fig. 75. Solution time in seconds for solved instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

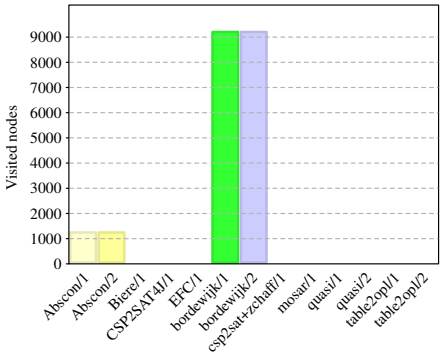

Fig. 76. Visited nodes required for solved instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

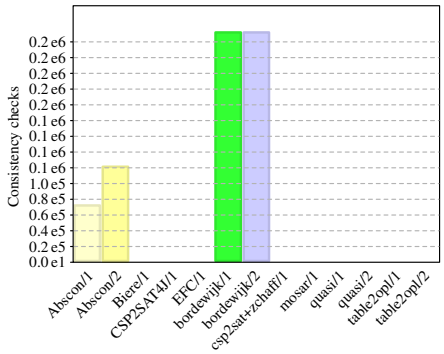

Fig. 77. Consistency checks required for solved instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

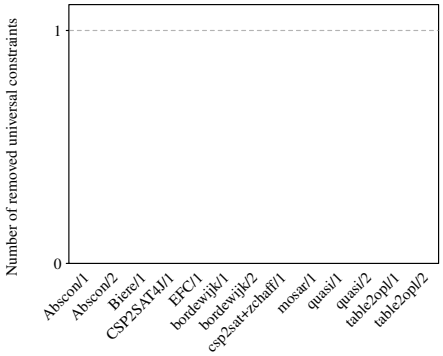

Fig. 78. Number of removed universal constraints for solved instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

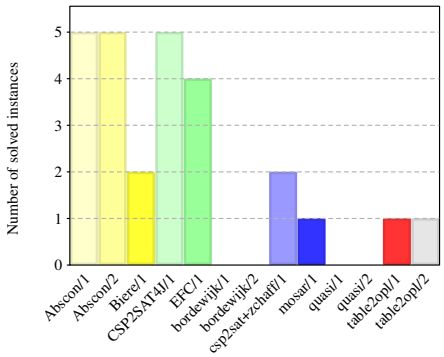

Fig. 79. Number of solved instances for class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

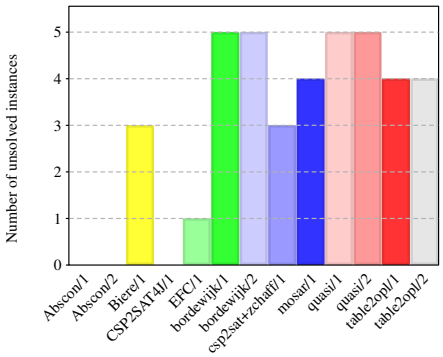

Fig. 80. Number of unsolved instances for class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

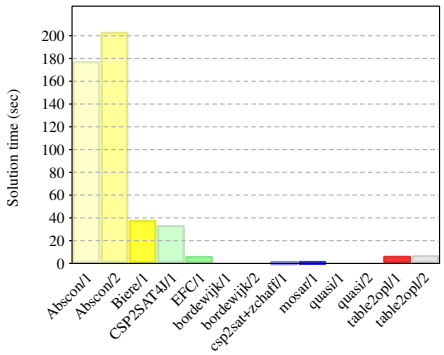

Fig. 81. Solution time in seconds for solved instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

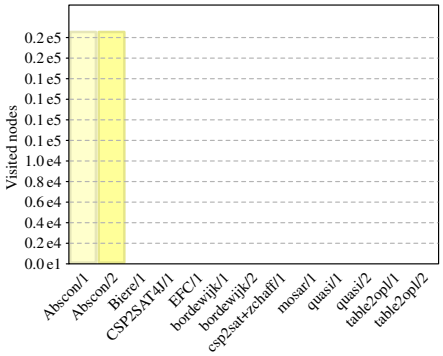

Fig. 82. Visited nodes required for solved instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

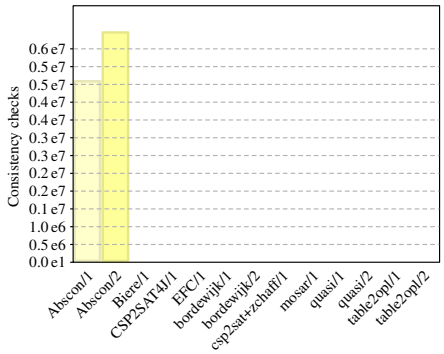

Fig. 83. Consistency checks required for solved instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

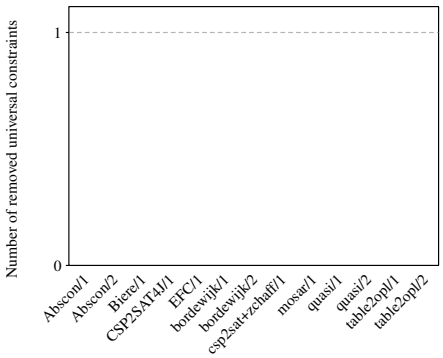

Fig. 84. Number of removed universal constraints for solved instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

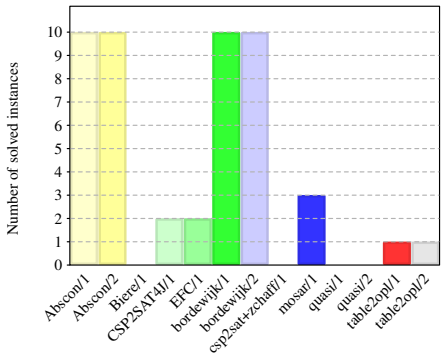

Fig. 85. Number of solved instances for class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

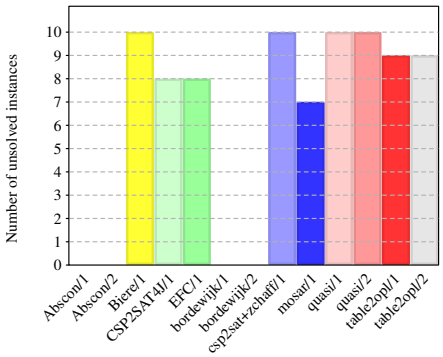

Fig. 86. Number of unsolved instances for class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

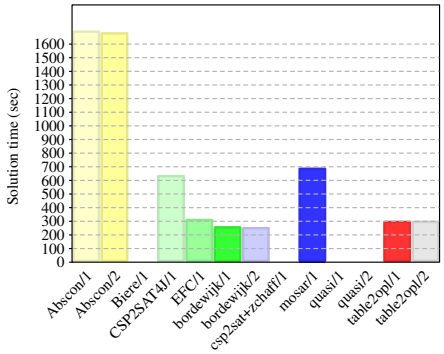

Fig. 87. Solution time in seconds for solved instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

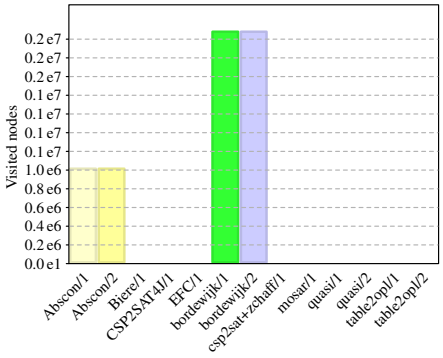

Fig. 88. Visited nodes required for solved instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

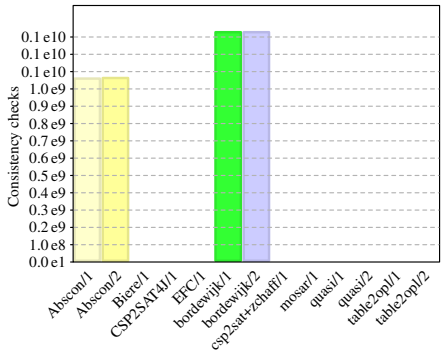

Fig. 89. Consistency checks required for solved instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

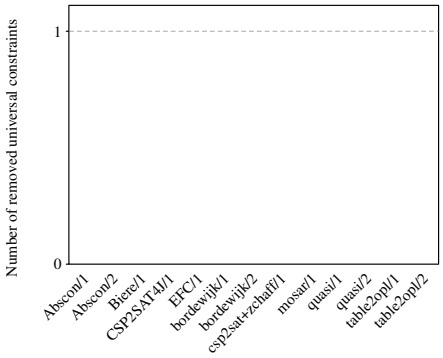

Fig. 90. Number of removed universal constraints for solved instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

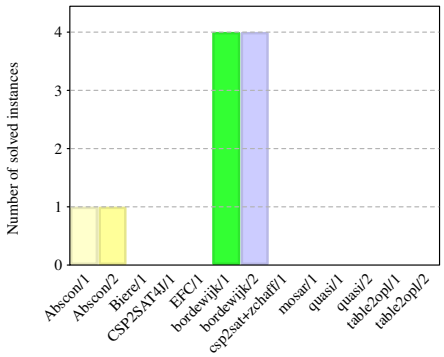

Fig. 91. Number of solved instances for class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

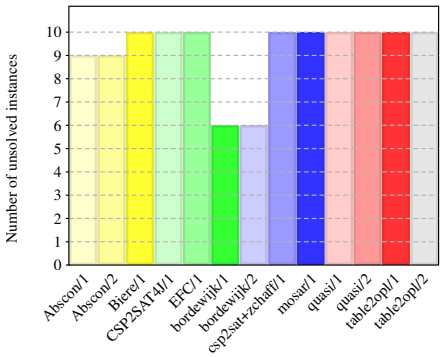

Fig. 92. Number of unsolved instances for class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

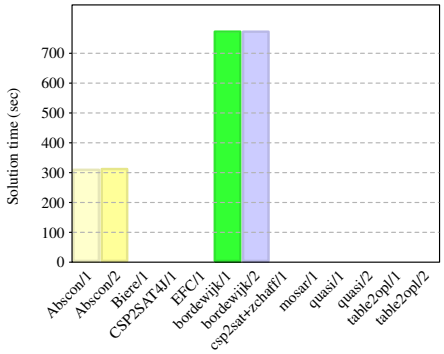

Fig. 93. Solution time in seconds for solved instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

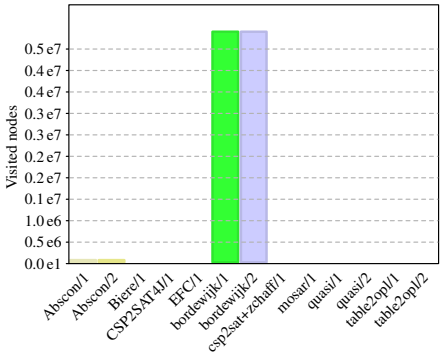

Fig. 94. Visited nodes required for solved instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

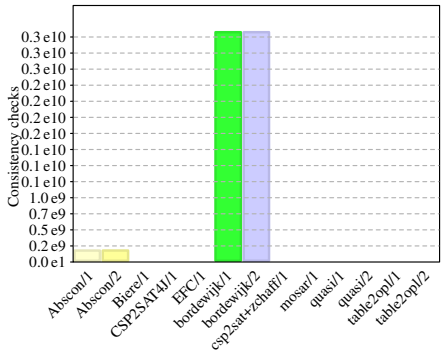

Fig. 95. Consistency checks required for solved instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

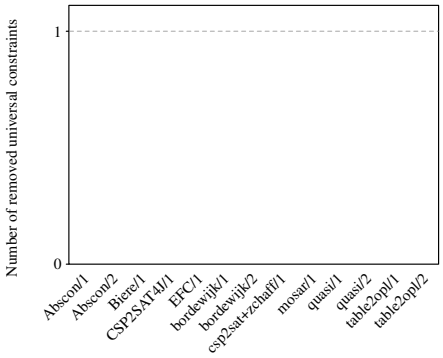

Fig. 96. Number of removed universal constraints for solved instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

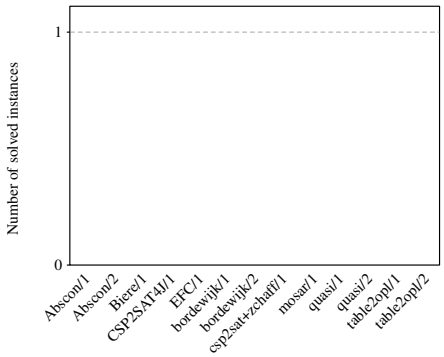

Fig. 97. Number of solved instances for class `nb-random-3-28-28-93-632-forced`. The maximum solution time was set to 600 seconds.

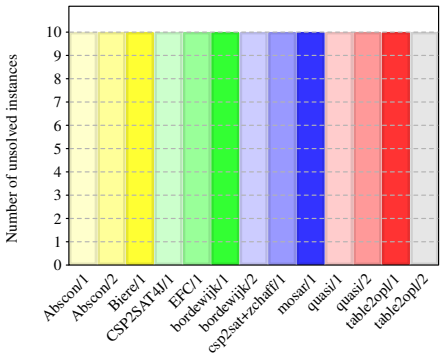

Fig. 98. Number of unsolved instances for class `nb-random-3-28-28-93-632-forced`. The maximum solution time was set to 600 seconds.

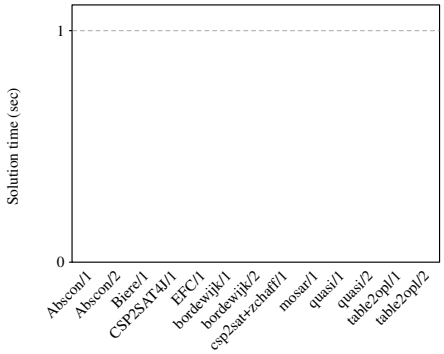

Fig. 99. Solution time in seconds for solved instances from class `nb-random-3-28-28-93-632-forced`. The maximum solution time was set to 600 seconds.

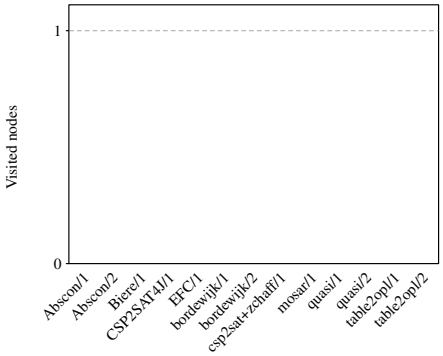

Fig. 100. Visited nodes required for solved instances from class `nb-random-3-28-28-93-632-forced`. The maximum solution time was set to 600 seconds.

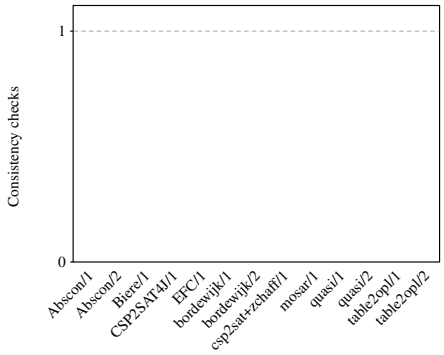

Fig. 101. Consistency checks required for solved instances from class `nb-random-3-28-28-93-632-forced`. The maximum solution time was set to 600 seconds.

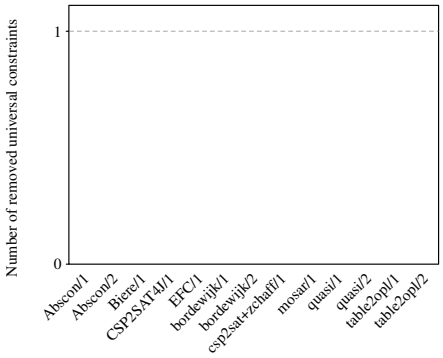

Fig. 102. Number of removed universal constraints for solved instances from class `nb-random-3-28-28-93-632-forced`. The maximum solution time was set to 600 seconds.

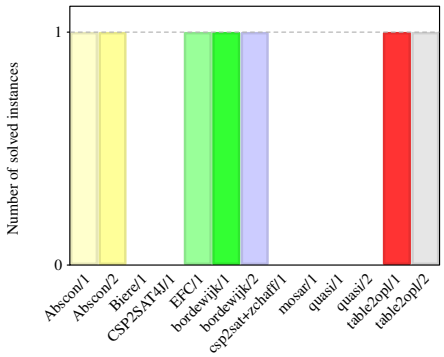

Fig. 103. Number of solved instances for class `nb-renault`. The maximum solution time was set to 600 seconds.

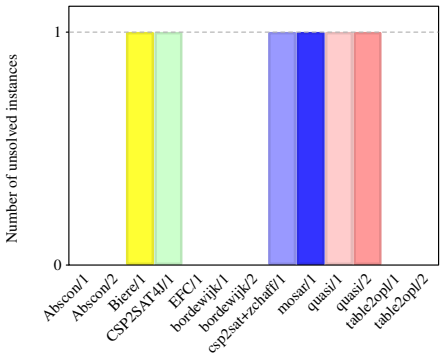

Fig. 104. Number of unsolved instances for class `nb-renault`. The maximum solution time was set to 600 seconds.

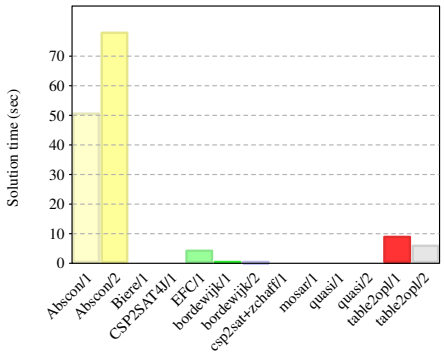

Fig. 105. Solution time in seconds for solved instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

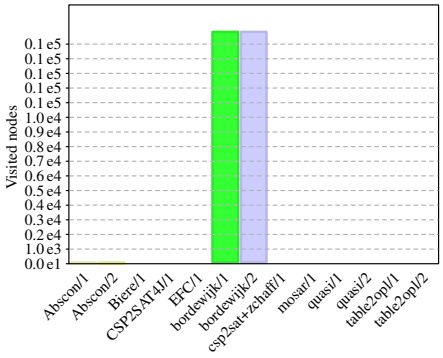

Fig. 106. Visited nodes required for solved instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

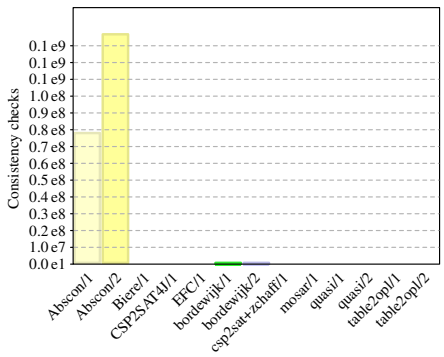

Fig. 107. Consistency checks required for solved instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

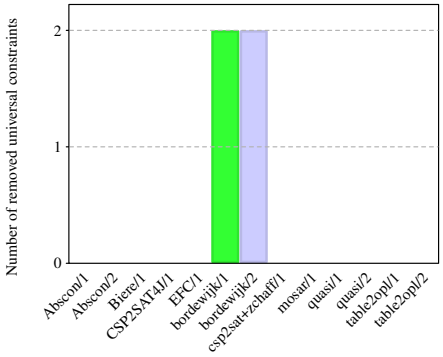

Fig. 108. Number of removed universal constraints for solved instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

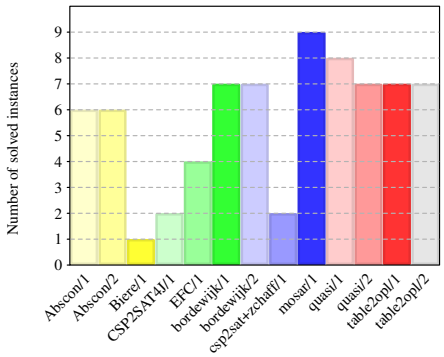

Fig. 109. Number of solved instances for class `nb-schurr`. The maximum solution time was set to 600 seconds.

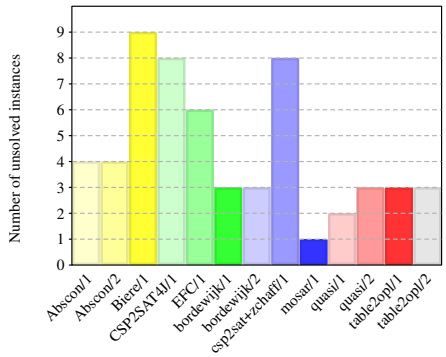

Fig. 110. Number of unsolved instances for class `nb-schurr`. The maximum solution time was set to 600 seconds.

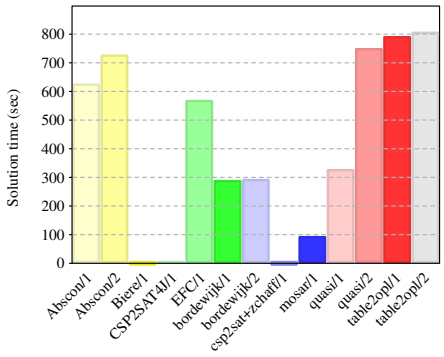

Fig. 111. Solution time in seconds for solved instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

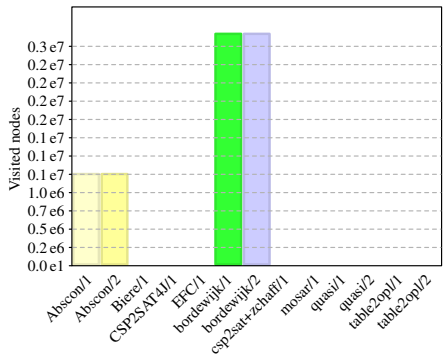

Fig. 112. Visited nodes required for solved instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

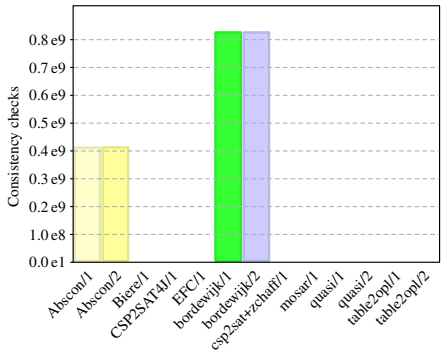

Fig. 113. Consistency checks required for solved instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

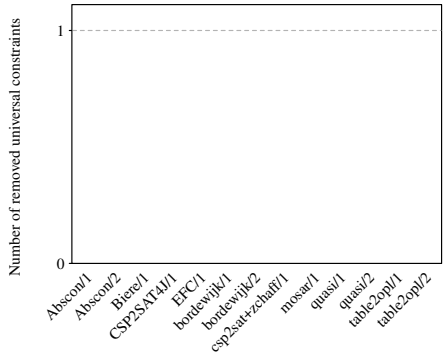

Fig. 114. Number of removed universal constraints for solved instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

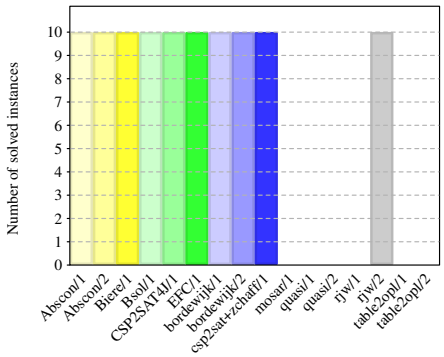

Fig. 115. Number of solved instances for class BH-4-4. The maximum solution time was set to 600 seconds.

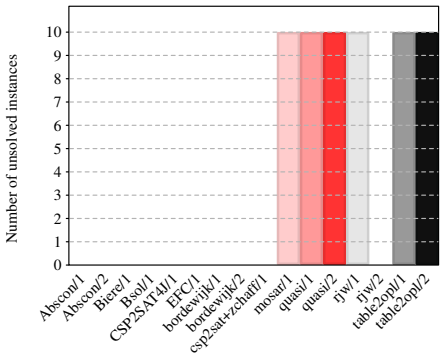

Fig. 116. Number of unsolved instances for class BH-4-4. The maximum solution time was set to 600 seconds.

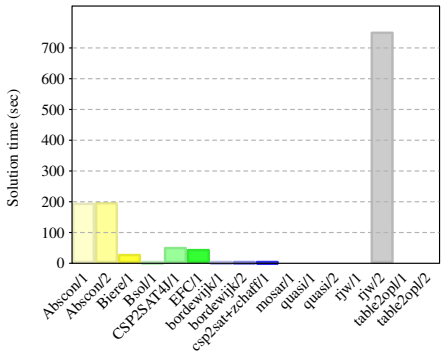

Fig. 117. Solution time in seconds for solved instances from class BH-4-4. The maximum solution time was set to 600 seconds.

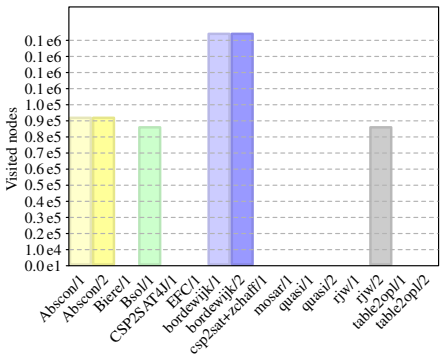

Fig. 118. Visited nodes required for solved instances from class BH-4-4. The maximum solution time was set to 600 seconds.

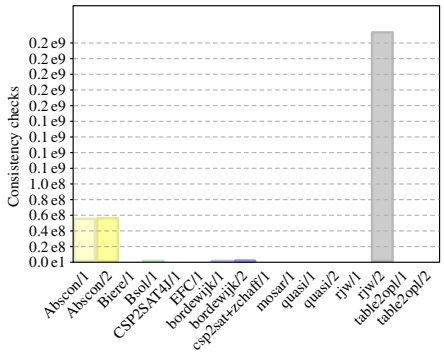

Fig. 119. Consistency checks required for solved instances from class BH-4-4. The maximum solution time was set to 600 seconds.

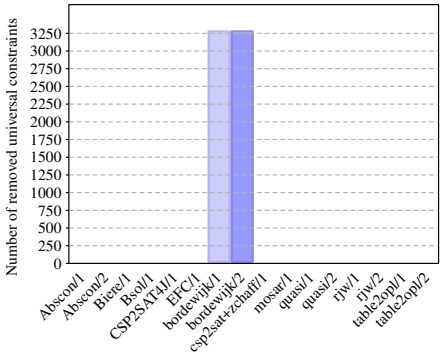

Fig. 120. Number of removed universal constraints for solved instances from class BH-4-4. The maximum solution time was set to 600 seconds.

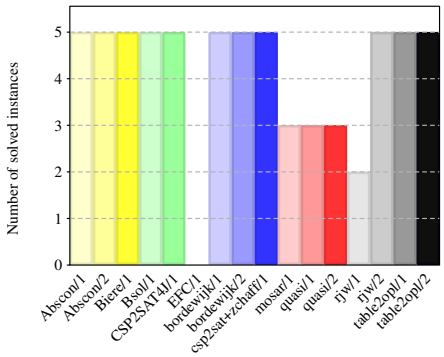

Fig. 121. Number of solved instances for class `QCP-10`. The maximum solution time was set to 600 seconds.

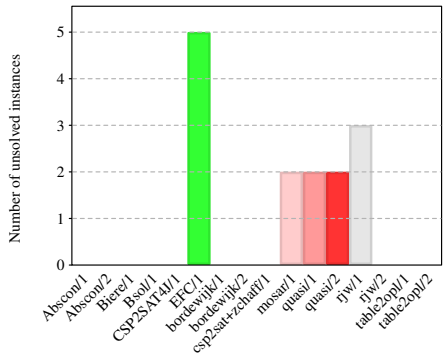

Fig. 122. Number of unsolved instances for class `QCP-10`. The maximum solution time was set to 600 seconds.

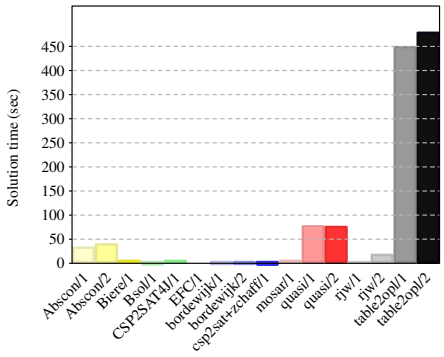

Fig. 123. Solution time in seconds for solved instances from class `QCP-10`. The maximum solution time was set to 600 seconds.

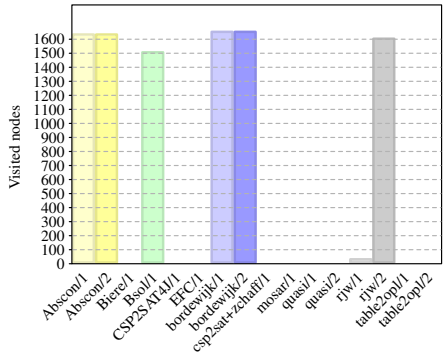

Fig. 124. Visited nodes required for solved instances from class `QCP-10`. The maximum solution time was set to 600 seconds.

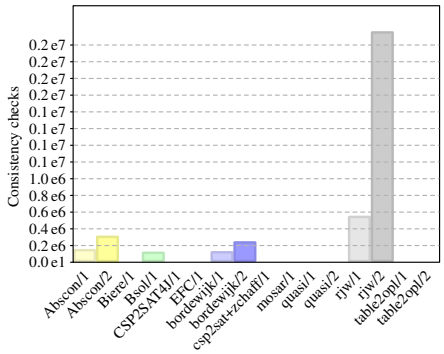

Fig. 125. Consistency checks required for solved instances from class `QCP-10`. The maximum solution time was set to 600 seconds.

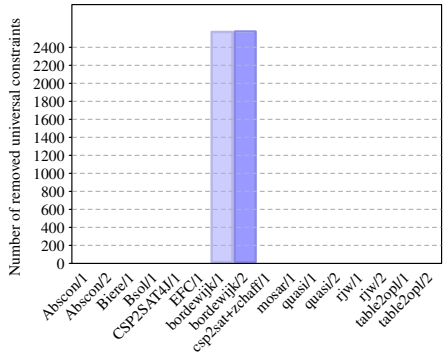

Fig. 126. Number of removed universal constraints for solved instances from class `QCP-10`. The maximum solution time was set to 600 seconds.

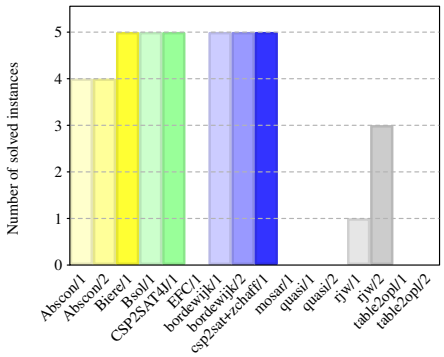

Fig. 127. Number of solved instances for class `QCP-15`. The maximum solution time was set to 600 seconds.

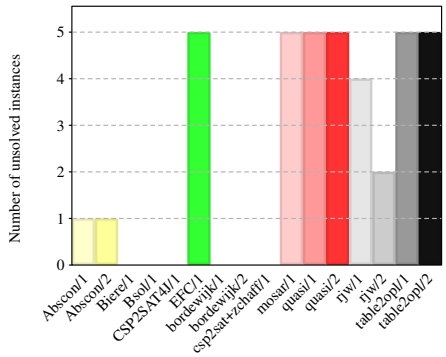

Fig. 128. Number of unsolved instances for class `QCP-15`. The maximum solution time was set to 600 seconds.

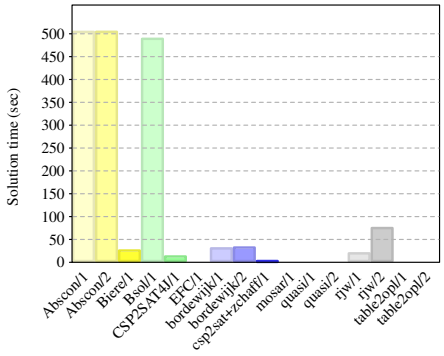

Fig. 129. Solution time in seconds for solved instances from class `QCP-15`. The maximum solution time was set to 600 seconds.

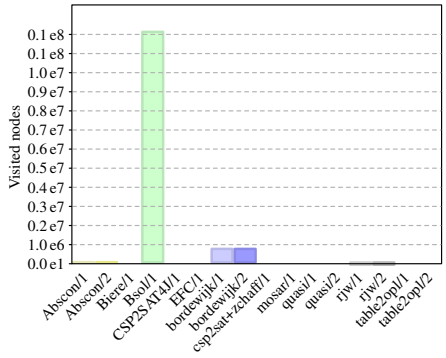

Fig. 130. Visited nodes required for solved instances from class `QCP-15`. The maximum solution time was set to 600 seconds.

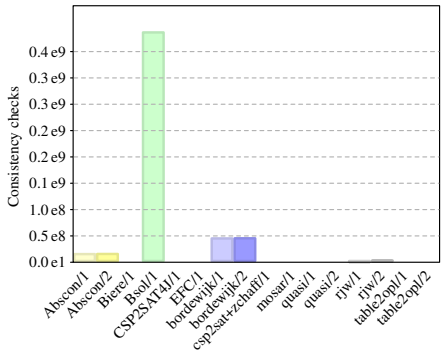

Fig. 131. Consistency checks required for solved instances from class `QCP-15`. The maximum solution time was set to 600 seconds.

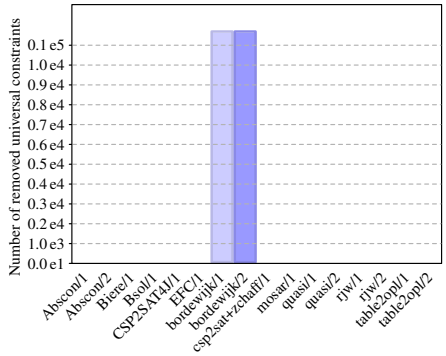

Fig. 132. Number of removed universal constraints for solved instances from class `QCP-15`. The maximum solution time was set to 600 seconds.

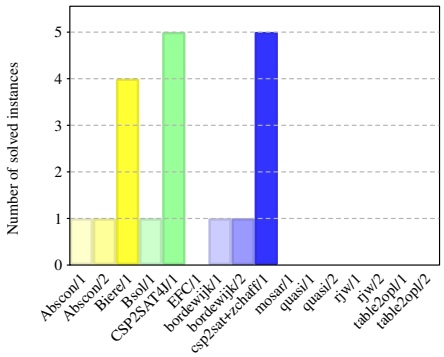

Fig. 133. Number of solved instances for class QCP-20. The maximum solution time was set to 600 seconds.

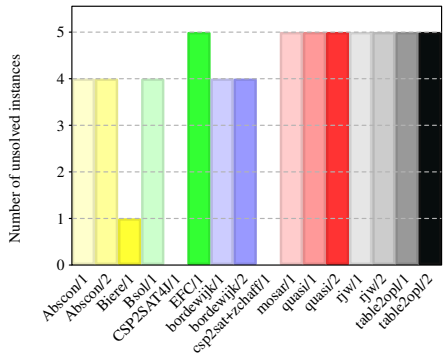

Fig. 134. Number of unsolved instances for class QCP-20. The maximum solution time was set to 600 seconds.

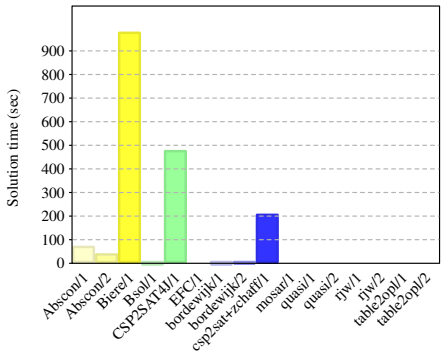

Fig. 135. Solution time in seconds for solved instances from class QCP-20. The maximum solution time was set to 600 seconds.

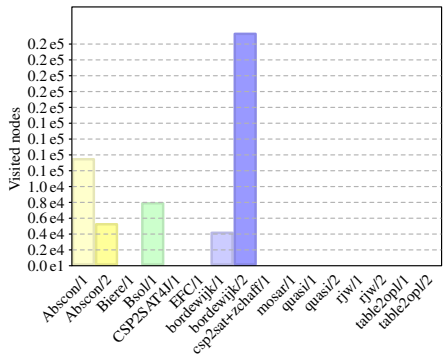

Fig. 136. Visited nodes required for solved instances from class QCP-20. The maximum solution time was set to 600 seconds.

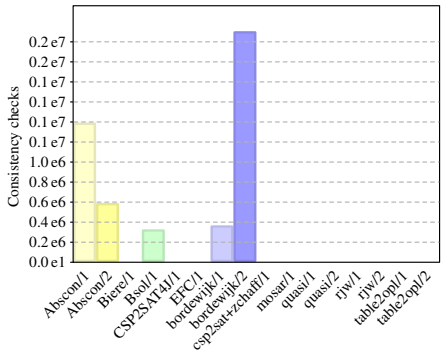

Fig. 137. Consistency checks required for solved instances from class QCP-20. The maximum solution time was set to 600 seconds.

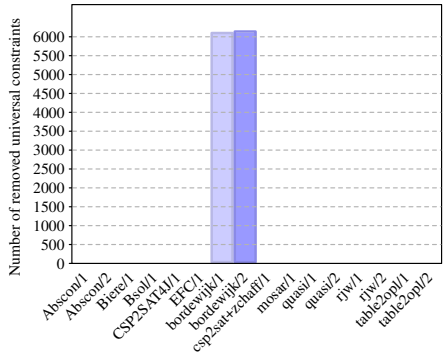

Fig. 138. Number of removed universal constraints for solved instances from class QCP-20. The maximum solution time was set to 600 seconds.

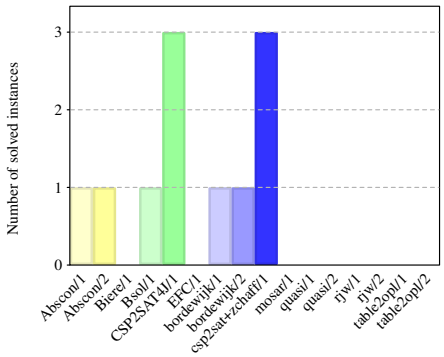

Fig. 139. Number of solved instances for class QCP-25. The maximum solution time was set to 600 seconds.

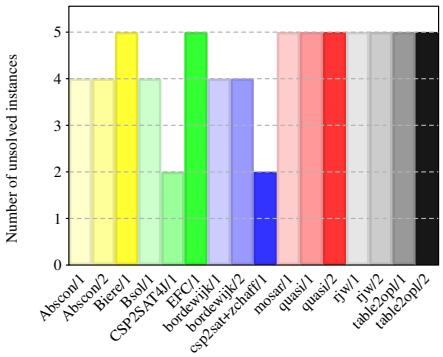

Fig. 140. Number of unsolved instances for class QCP-25. The maximum solution time was set to 600 seconds.

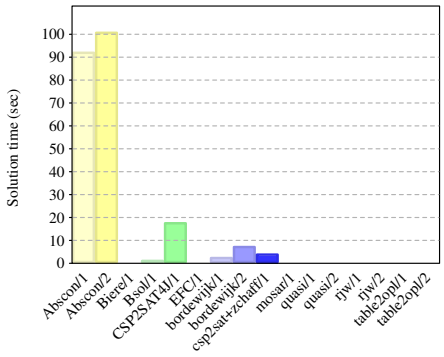

Fig. 141. Solution time in seconds for solved instances from class QCP-25. The maximum solution time was set to 600 seconds.

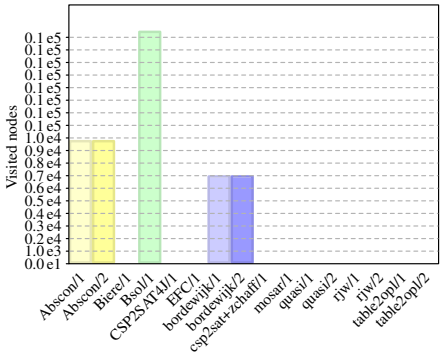

Fig. 142. Visited nodes required for solved instances from class QCP-25. The maximum solution time was set to 600 seconds.

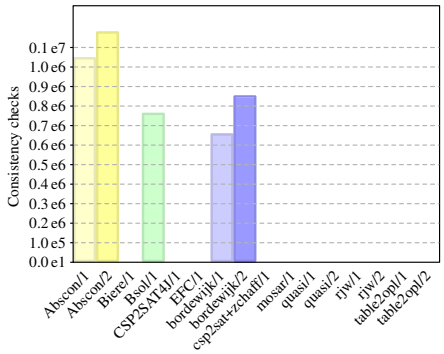

Fig. 143. Consistency checks required for solved instances from class QCP-25. The maximum solution time was set to 600 seconds.

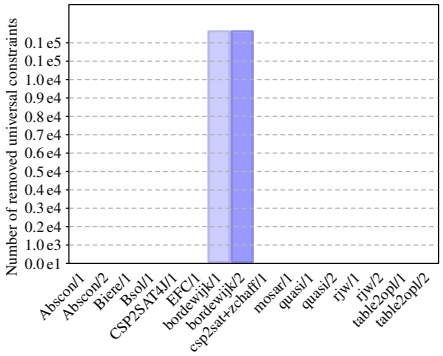

Fig. 144. Number of removed universal constraints for solved instances from class QCP-25. The maximum solution time was set to 600 seconds.

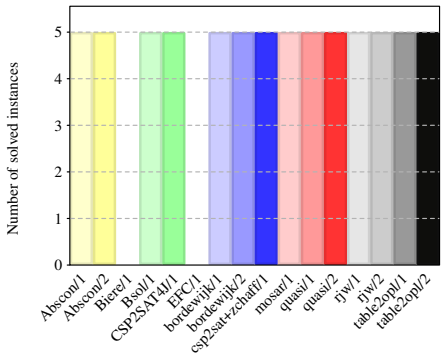

Fig. 145. Number of solved instances for class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

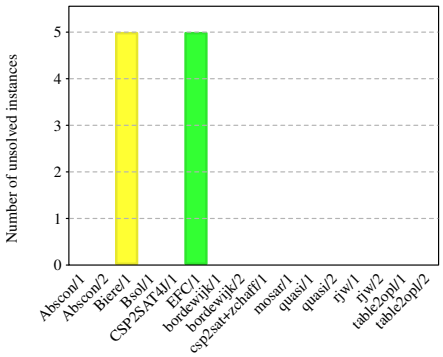

Fig. 146. Number of unsolved instances for class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

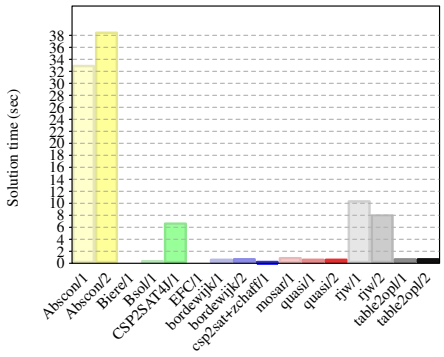

Fig. 147. Solution time in seconds for solved instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

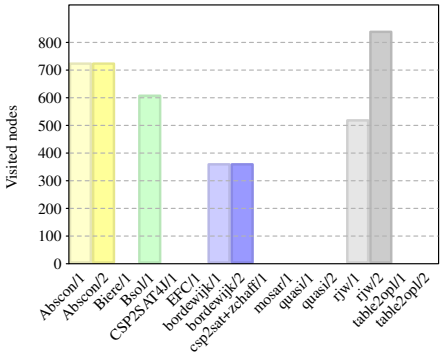

Fig. 148. Visited nodes required for solved instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

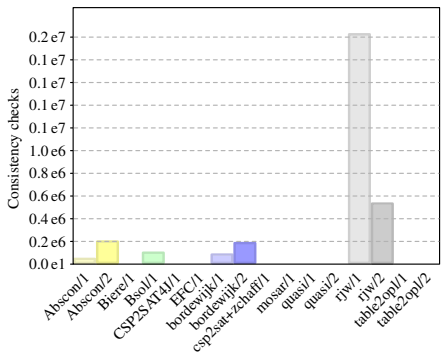

Fig. 149. Consistency checks required for solved instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

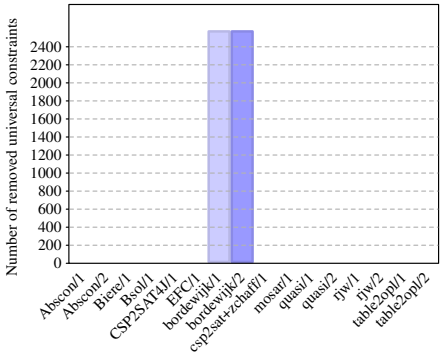

Fig. 150. Number of removed universal constraints for solved instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

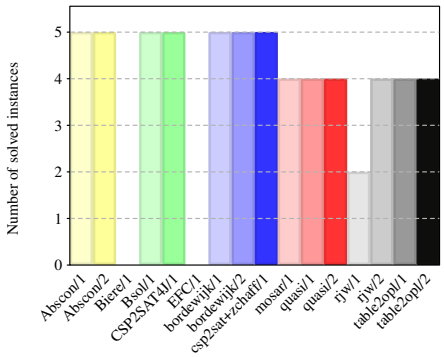

Fig. 151. Number of solved instances for class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

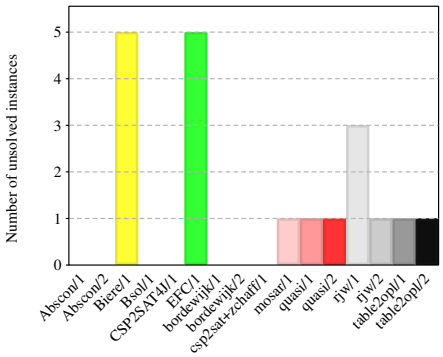

Fig. 152. Number of unsolved instances for class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

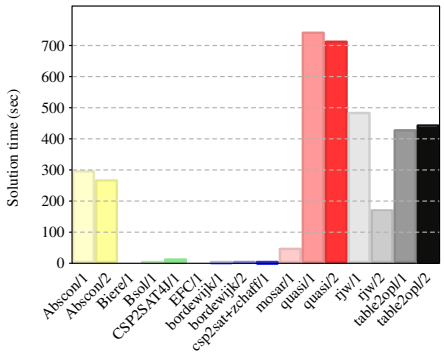

Fig. 153. Solution time in seconds for solved instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

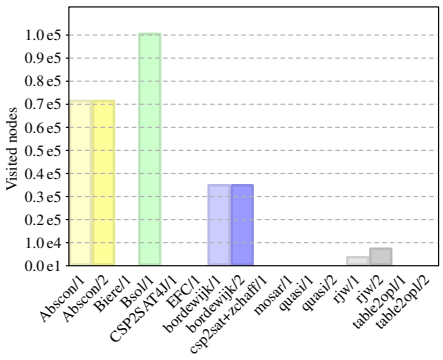

Fig. 154. Visited nodes required for solved instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

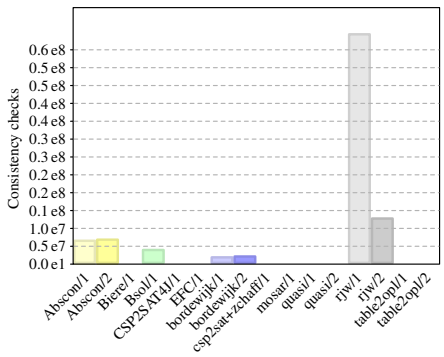

Fig. 155. Consistency checks required for solved instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

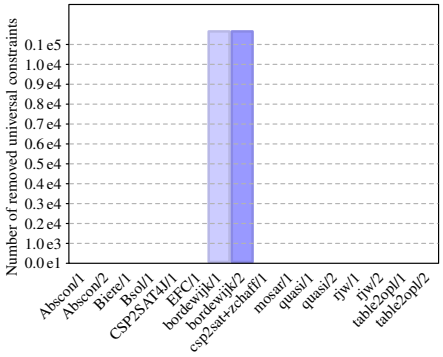

Fig. 156. Number of removed universal constraints for solved instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

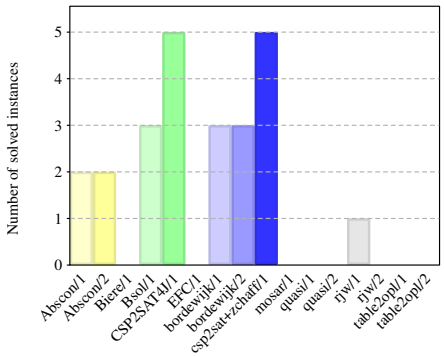

Fig. 157. Number of solved instances for class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

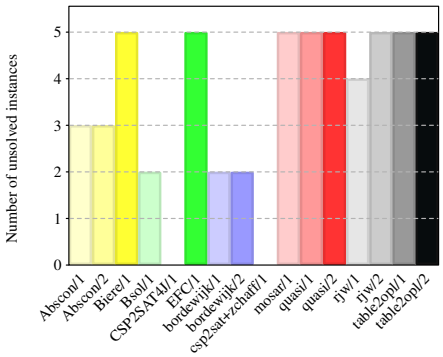

Fig. 158. Number of unsolved instances for class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

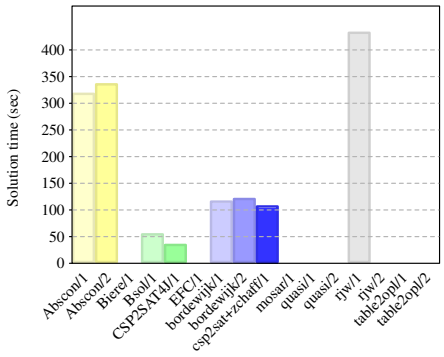

Fig. 159. Solution time in seconds for solved instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

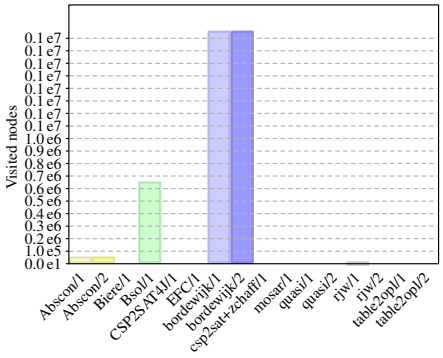

Fig. 160. Visited nodes required for solved instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

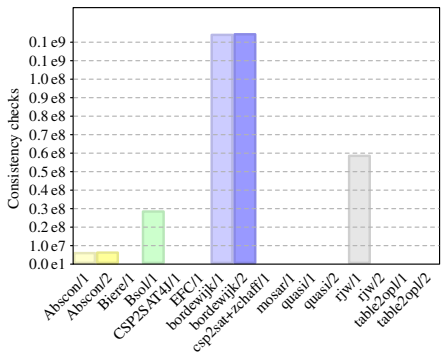

Fig. 161. Consistency checks required for solved instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

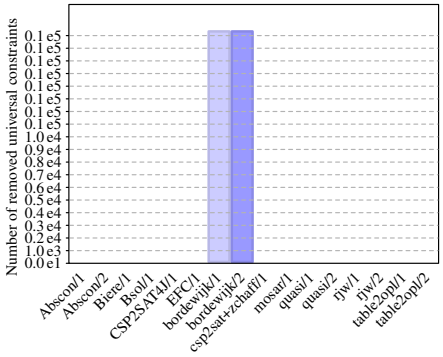

Fig. 162. Number of removed universal constraints for solved instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

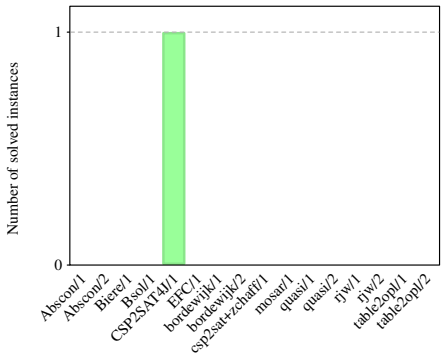

Fig. 163. Number of solved instances for class `QCP-25-easy`. The maximum solution time was set to 600 seconds.

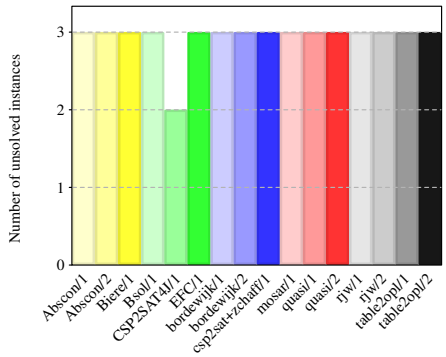

Fig. 164. Number of unsolved instances for class `QCP-25-easy`. The maximum solution time was set to 600 seconds.

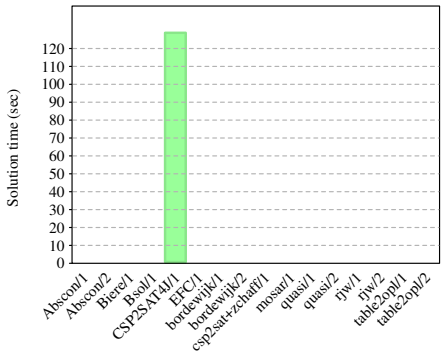

Fig. 165. Solution time in seconds for solved instances from class `QCP-25-easy`. The maximum solution time was set to 600 seconds.

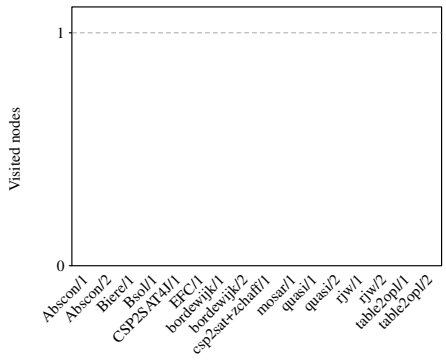

Fig. 166. Visited nodes required for solved instances from class `QCP-25-easy`. The maximum solution time was set to 600 seconds.

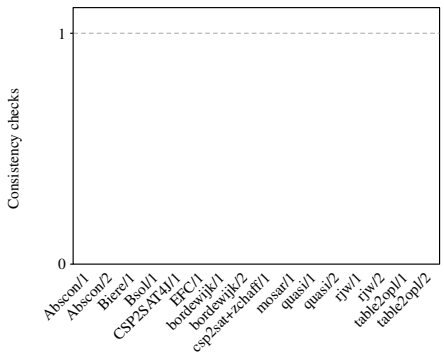

Fig. 167. Consistency checks required for solved instances from class `QCP-25-easy`. The maximum solution time was set to 600 seconds.

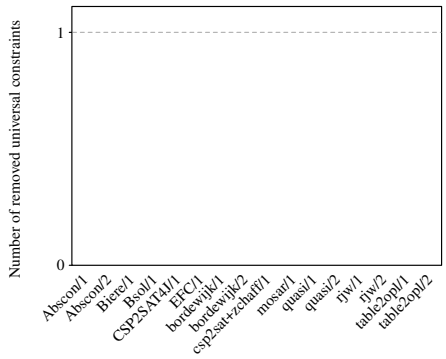

Fig. 168. Number of removed universal constraints for solved instances from class `QCP-25-easy`. The maximum solution time was set to 600 seconds.

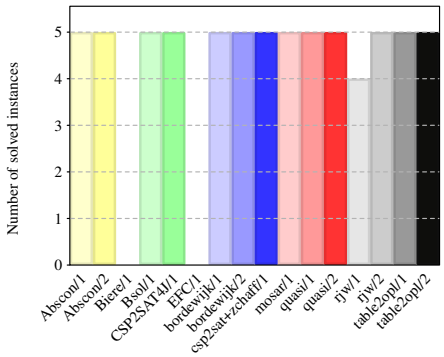

Fig. 169. Number of solved instances for class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

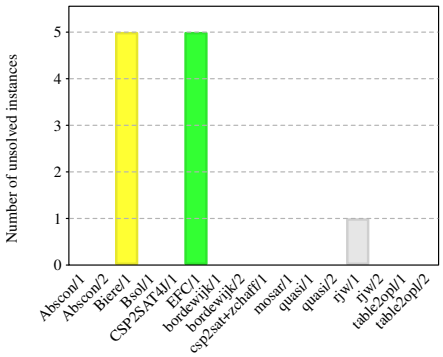

Fig. 170. Number of unsolved instances for class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

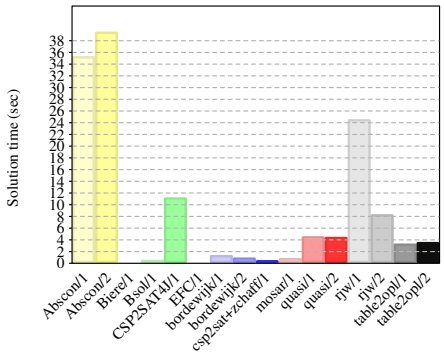

Fig. 171. Solution time in seconds for solved instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

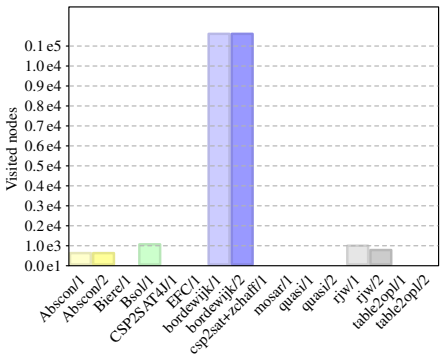

Fig. 172. Visited nodes required for solved instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

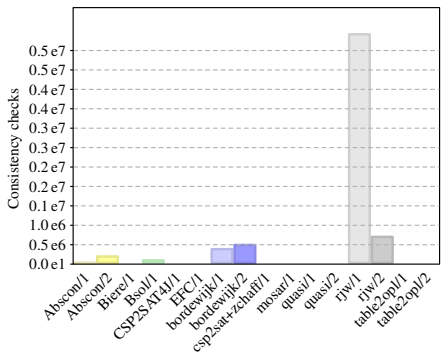

Fig. 173. Consistency checks required for solved instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

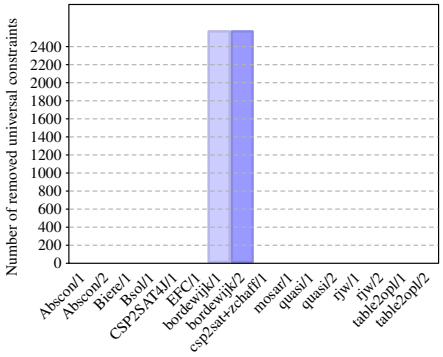

Fig. 174. Number of removed universal constraints for solved instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

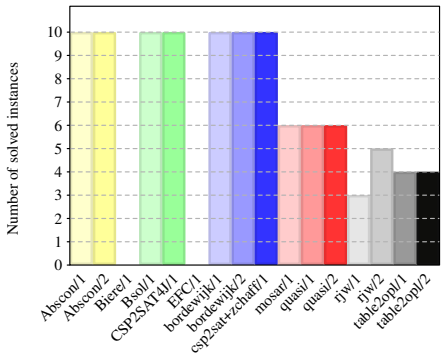

Fig. 175. Number of solved instances for class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

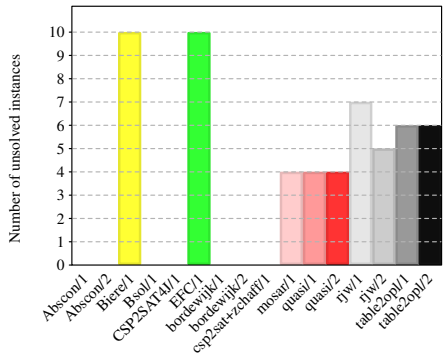

Fig. 176. Number of unsolved instances for class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

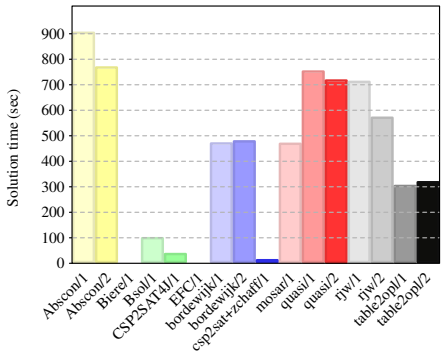

Fig. 177. Solution time in seconds for solved instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

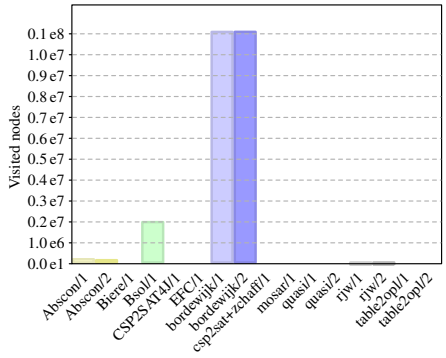

Fig. 178. Visited nodes required for solved instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

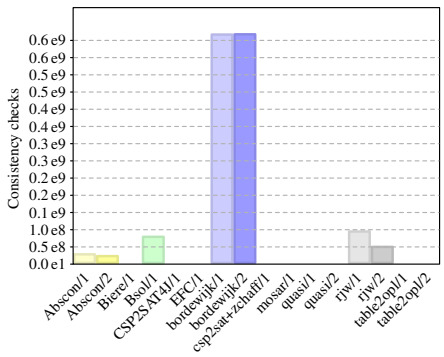

Fig. 179. Consistency checks required for solved instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

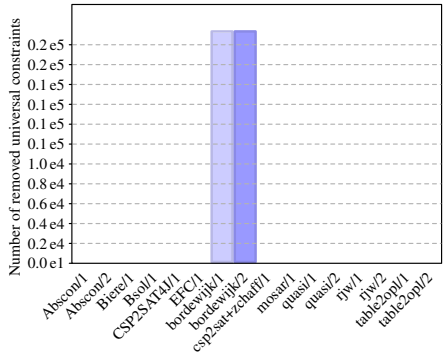

Fig. 180. Number of removed universal constraints for solved instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

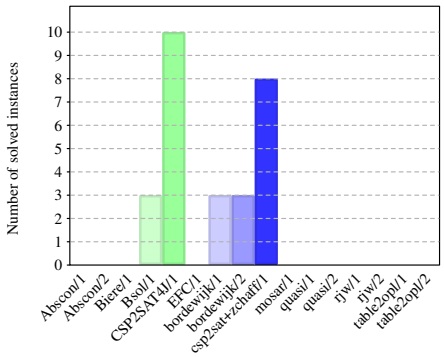

Fig. 181. Number of solved instances for class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

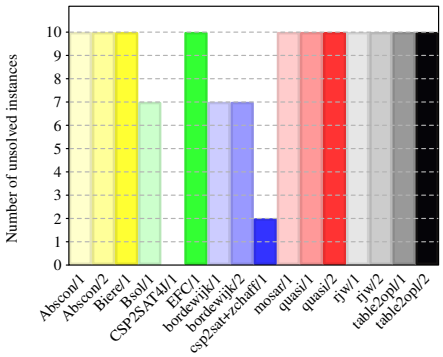

Fig. 182. Number of unsolved instances for class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

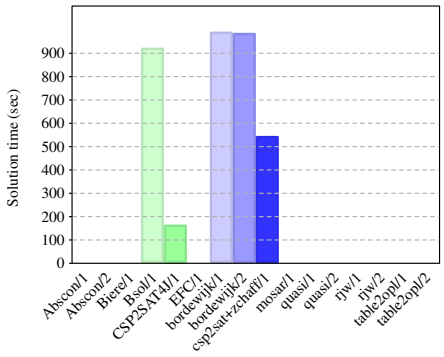

Fig. 183. Solution time in seconds for solved instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

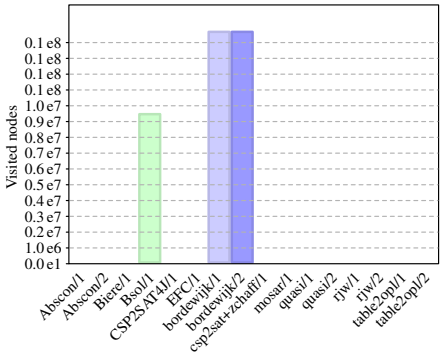

Fig. 184. Visited nodes required for solved instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

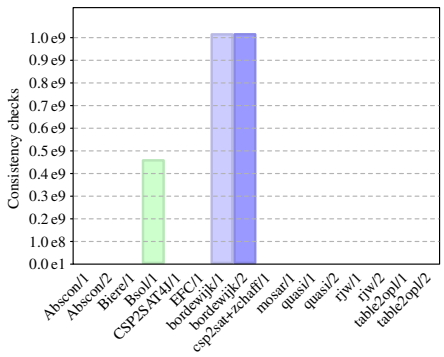

Fig. 185. Consistency checks required for solved instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

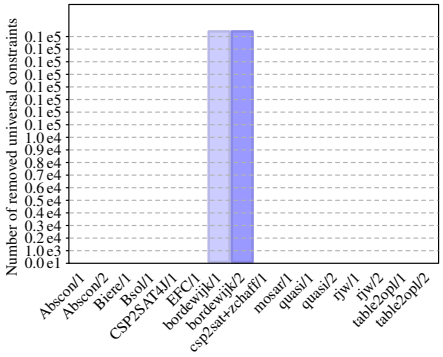

Fig. 186. Number of removed universal constraints for solved instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

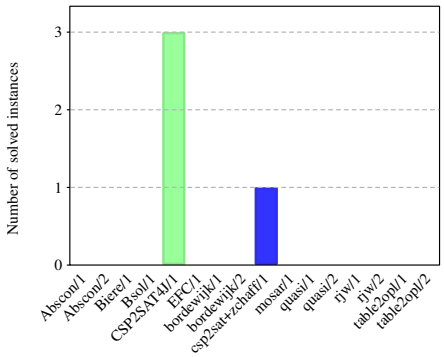

Fig. 187. Number of solved instances for class `QCP-25-hard`. The maximum solution time was set to 600 seconds.

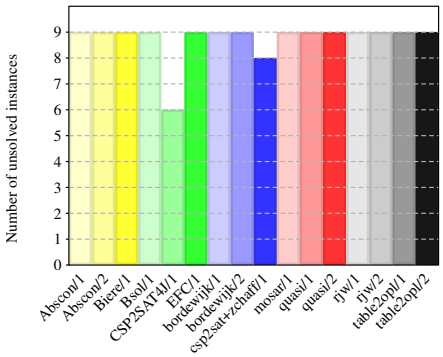

Fig. 188. Number of unsolved instances for class `QCP-25-hard`. The maximum solution time was set to 600 seconds.

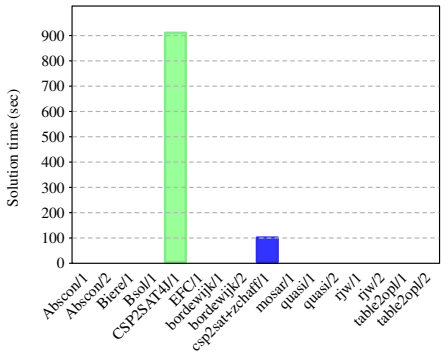

Fig. 189. Solution time in seconds for solved instances from class `QCP-25-hard`. The maximum solution time was set to 600 seconds.

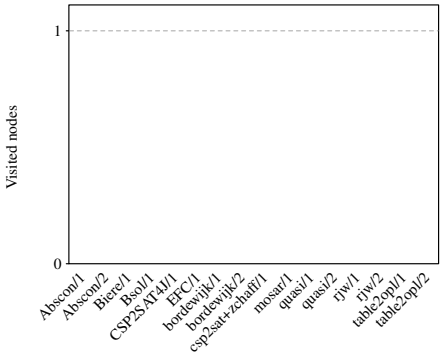

Fig. 190. Visited nodes required for solved instances from class `QCP-25-hard`. The maximum solution time was set to 600 seconds.

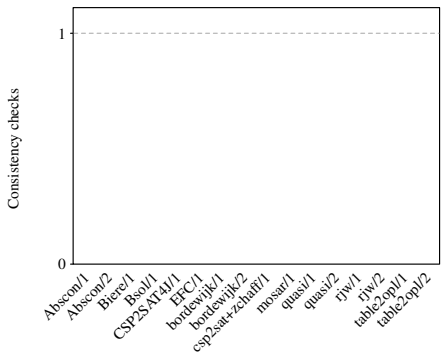

Fig. 191. Consistency checks required for solved instances from class `QCP-25-hard`. The maximum solution time was set to 600 seconds.

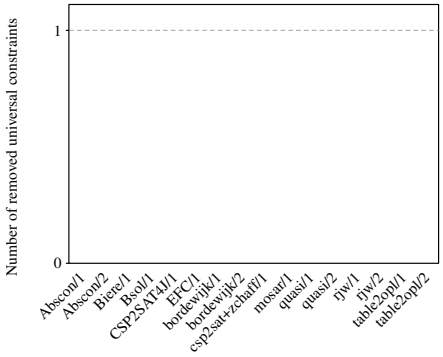

Fig. 192. Number of removed universal constraints for solved instances from class `QCP-25-hard`. The maximum solution time was set to 600 seconds.

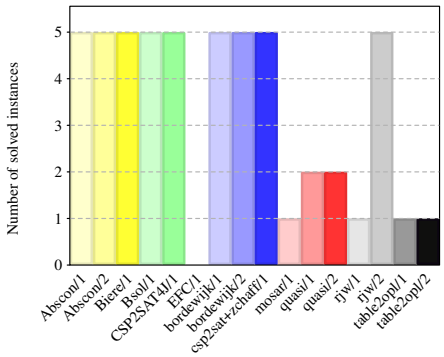

Fig. 193. Number of solved instances for class `QCPp-10`. The maximum solution time was set to 600 seconds.

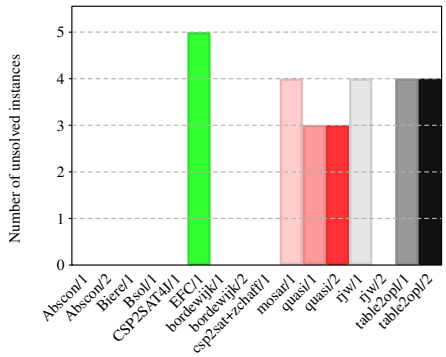

Fig. 194. Number of unsolved instances for class `QCPp-10`. The maximum solution time was set to 600 seconds.

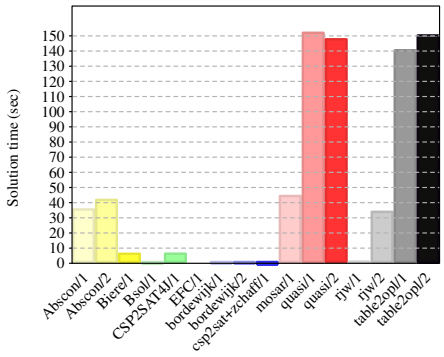

Fig. 195. Solution time in seconds for solved instances from class `QCPp-10`. The maximum solution time was set to 600 seconds.

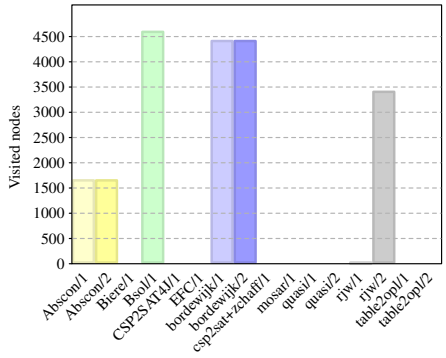

Fig. 196. Visited nodes required for solved instances from class `QCPp-10`. The maximum solution time was set to 600 seconds.

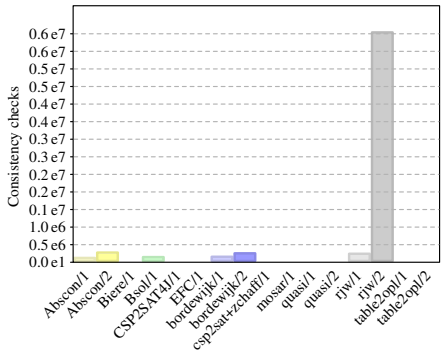

Fig. 197. Consistency checks required for solved instances from class `QCPp-10`. The maximum solution time was set to 600 seconds.

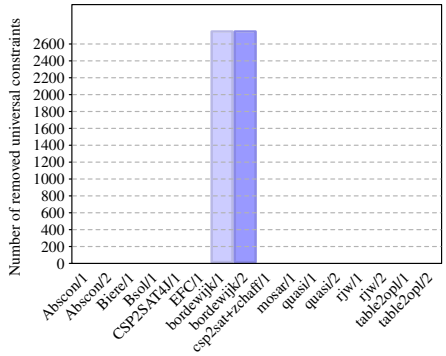

Fig. 198. Number of removed universal constraints for solved instances from class `QCPp-10`. The maximum solution time was set to 600 seconds.

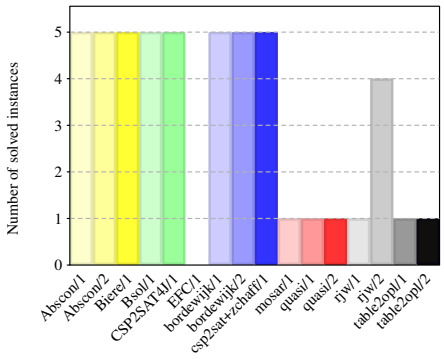

Fig. 199. Number of solved instances for class `QCPp-15`. The maximum solution time was set to 600 seconds.

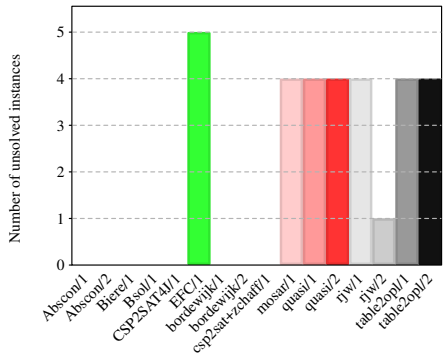

Fig. 200. Number of unsolved instances for class `QCPp-15`. The maximum solution time was set to 600 seconds.

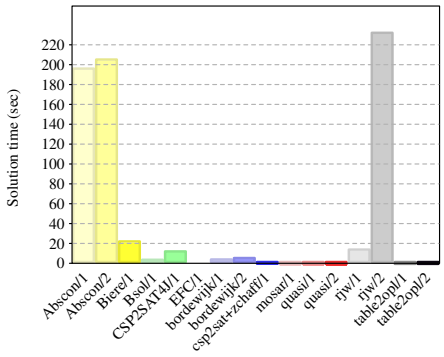

Fig. 201. Solution time in seconds for solved instances from class `QCPp-15`. The maximum solution time was set to 600 seconds.

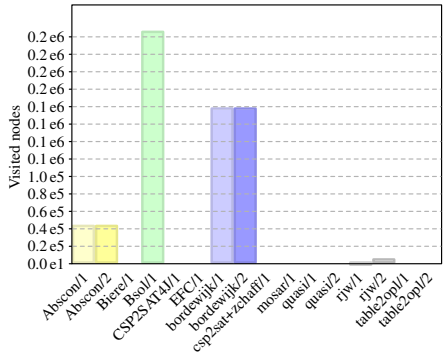

Fig. 202. Visited nodes required for solved instances from class `QCPp-15`. The maximum solution time was set to 600 seconds.

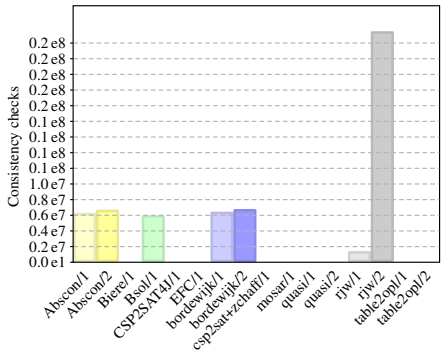

Fig. 203. Consistency checks required for solved instances from class `QCPp-15`. The maximum solution time was set to 600 seconds.

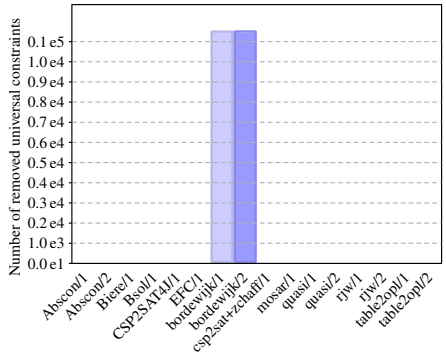

Fig. 204. Number of removed universal constraints for solved instances from class `QCPp-15`. The maximum solution time was set to 600 seconds.

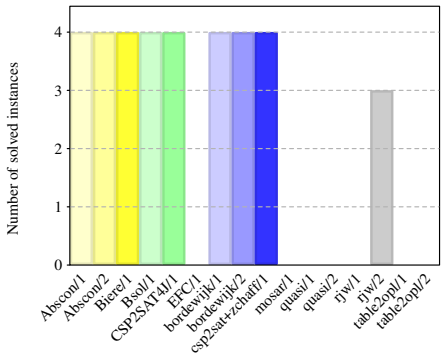

Fig. 205. Number of solved instances for class `QCPp-20`. The maximum solution time was set to 600 seconds.

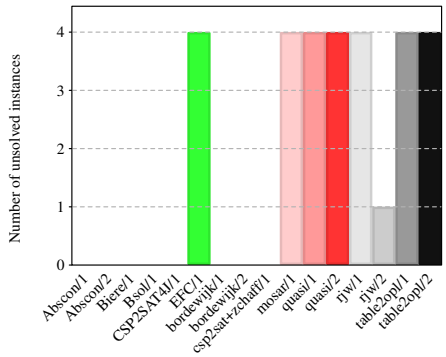

Fig. 206. Number of unsolved instances for class `QCPp-20`. The maximum solution time was set to 600 seconds.

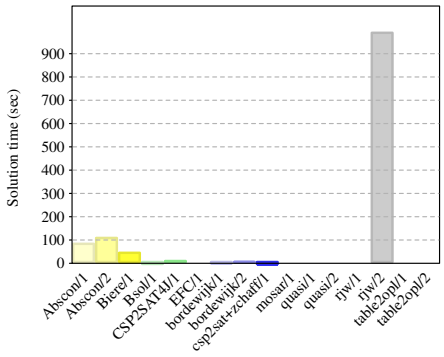

Fig. 207. Solution time in seconds for solved instances from class `QCPp-20`. The maximum solution time was set to 600 seconds.

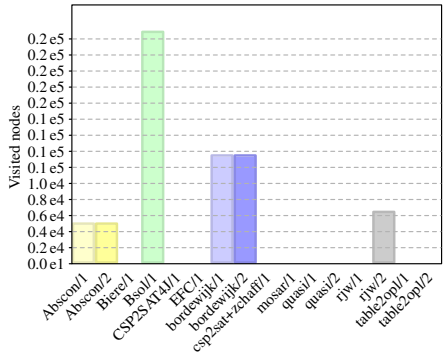

Fig. 208. Visited nodes required for solved instances from class `QCPp-20`. The maximum solution time was set to 600 seconds.

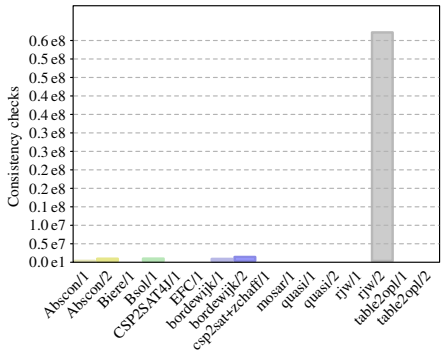

Fig. 209. Consistency checks required for solved instances from class `QCPp-20`. The maximum solution time was set to 600 seconds.

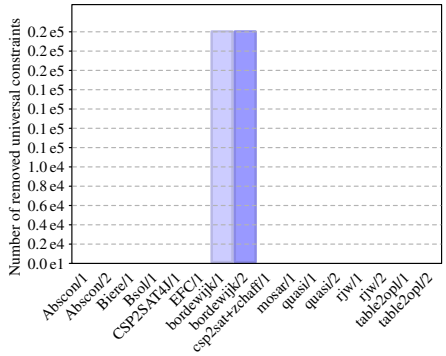

Fig. 210. Number of removed universal constraints for solved instances from class `QCPp-20`. The maximum solution time was set to 600 seconds.

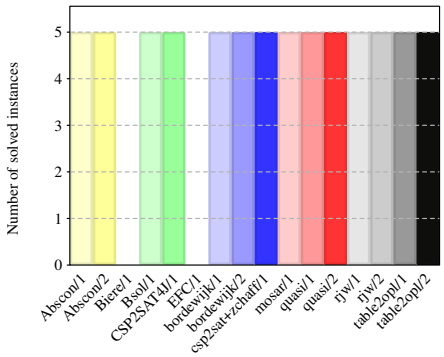

Fig. 211. Number of solved instances for class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

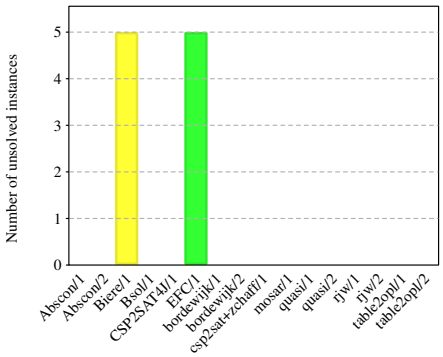

Fig. 212. Number of unsolved instances for class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

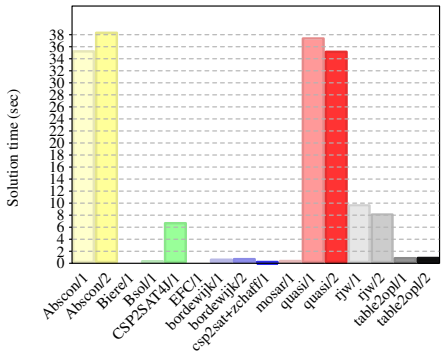

Fig. 213. Solution time in seconds for solved instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

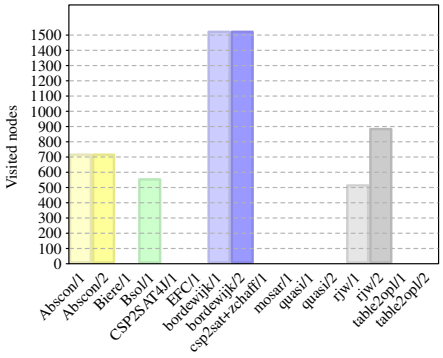

Fig. 214. Visited nodes required for solved instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

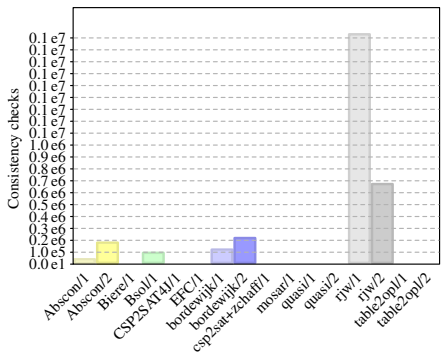

Fig. 215. Consistency checks required for solved instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

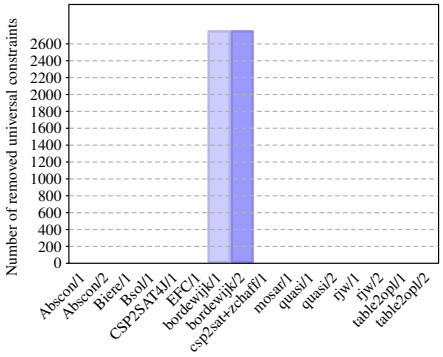

Fig. 216. Number of removed universal constraints for solved instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

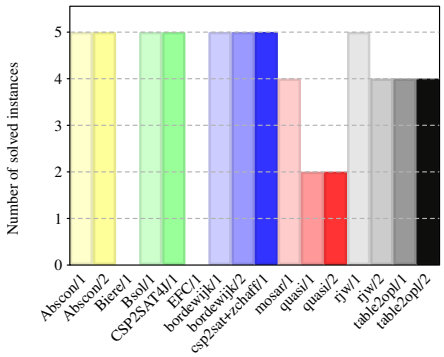

Fig. 217. Number of solved instances for class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

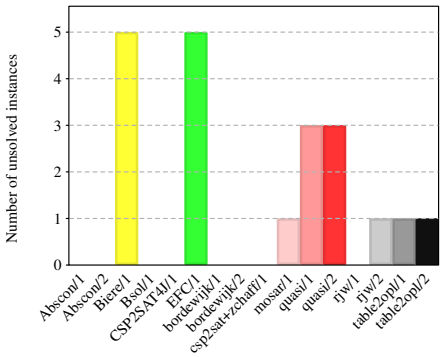

Fig. 218. Number of unsolved instances for class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

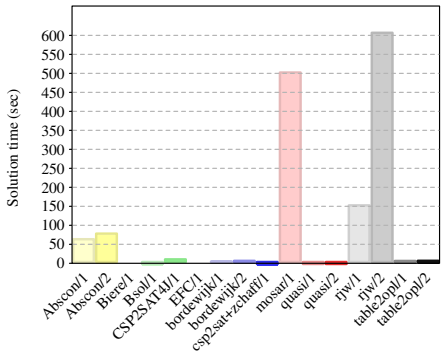

Fig. 219. Solution time in seconds for solved instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

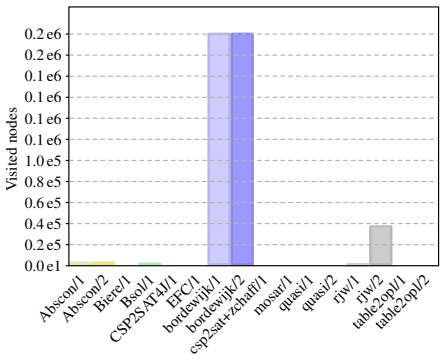

Fig. 220. Visited nodes required for solved instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

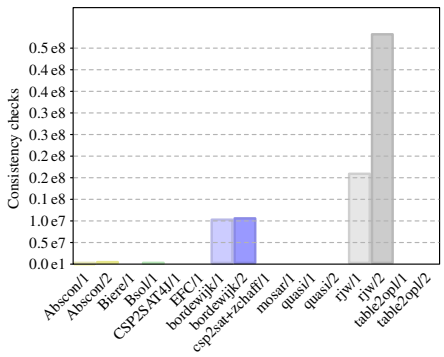

Fig. 221. Consistency checks required for solved instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

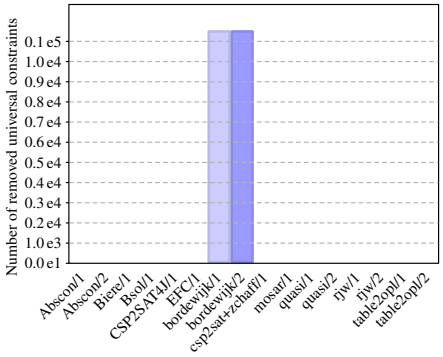

Fig. 222. Number of removed universal constraints for solved instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

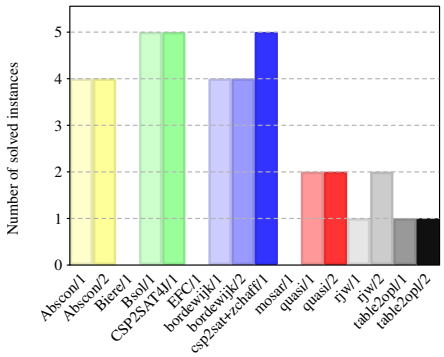

Fig. 223. Number of solved instances for class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

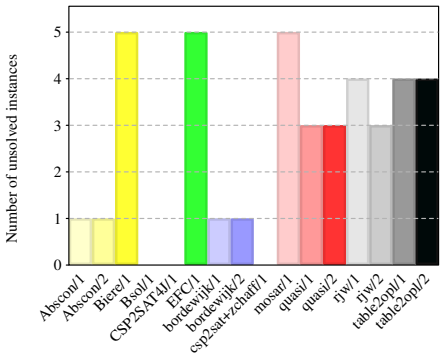

Fig. 224. Number of unsolved instances for class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

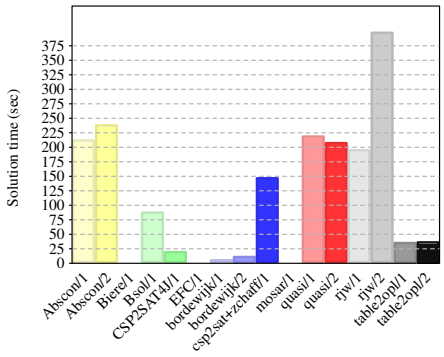

Fig. 225. Solution time in seconds for solved instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

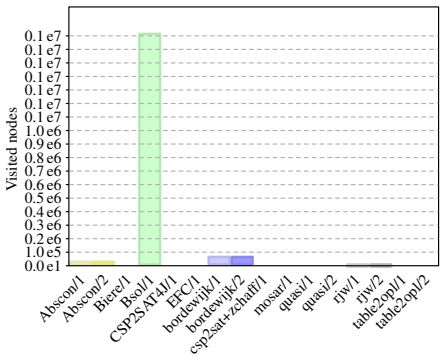

Fig. 226. Visited nodes required for solved instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

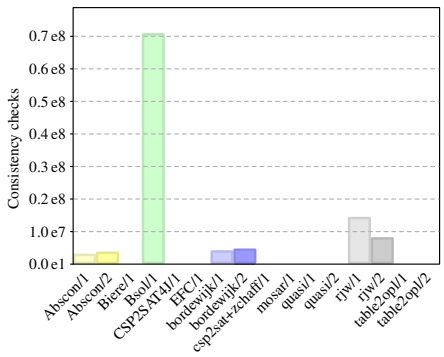

Fig. 227. Consistency checks required for solved instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

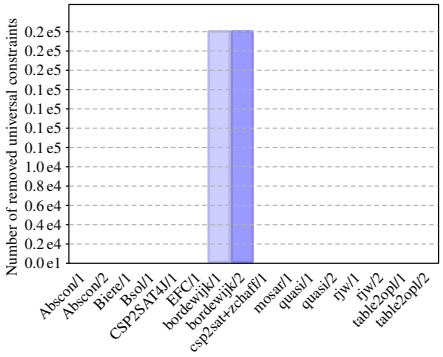

Fig. 228. Number of removed universal constraints for solved instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

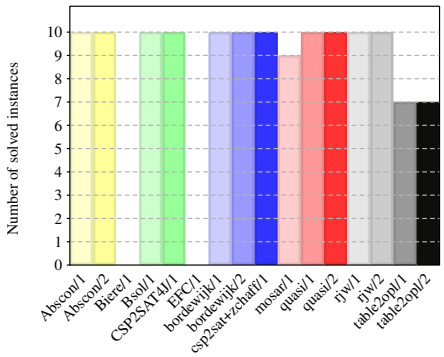

Fig. 229. Number of solved instances for class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

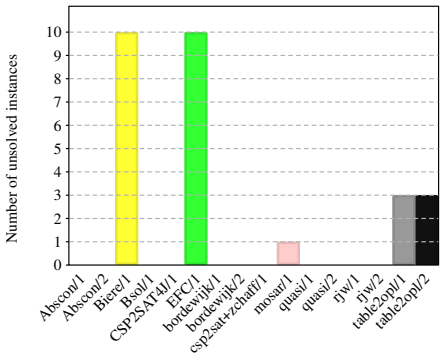

Fig. 230. Number of unsolved instances for class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

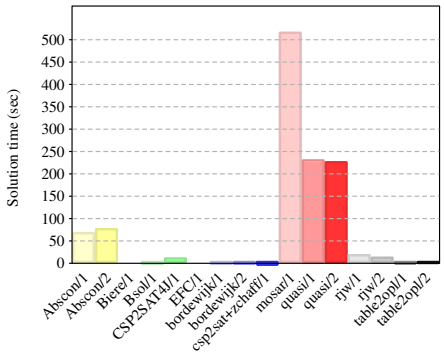

Fig. 231. Solution time in seconds for solved instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

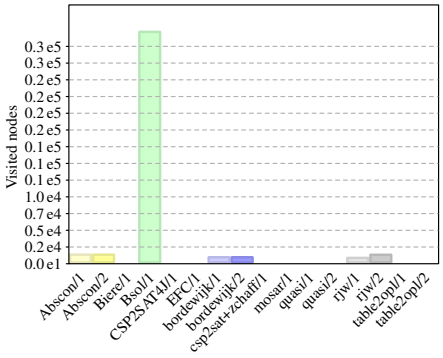

Fig. 232. Visited nodes required for solved instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

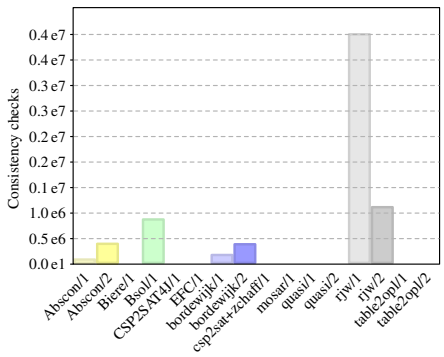

Fig. 233. Consistency checks required for solved instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

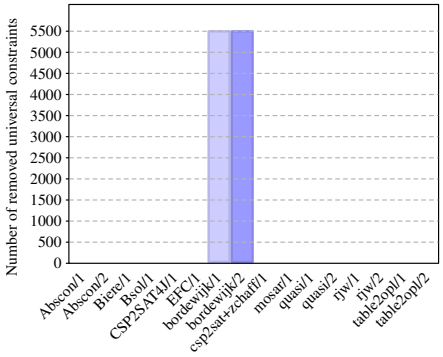

Fig. 234. Number of removed universal constraints for solved instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

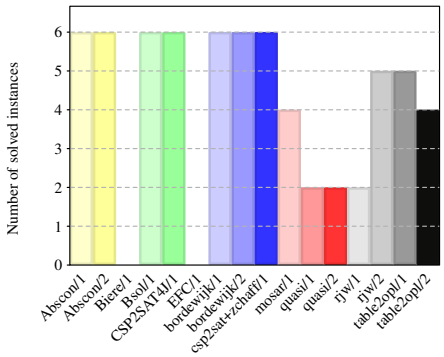

Fig. 235. Number of solved instances for class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

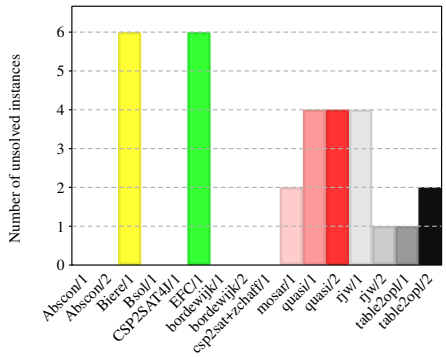

Fig. 236. Number of unsolved instances for class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

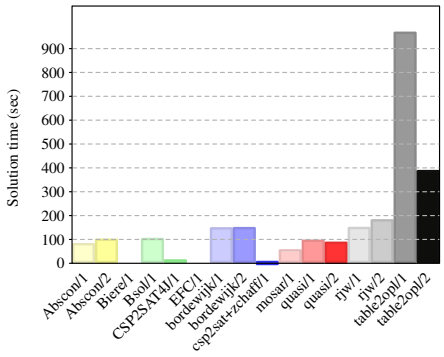

Fig. 237. Solution time in seconds for solved instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

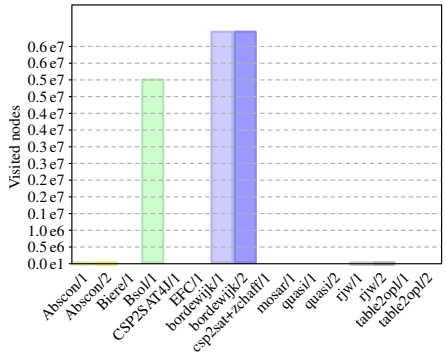

Fig. 238. Visited nodes required for solved instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

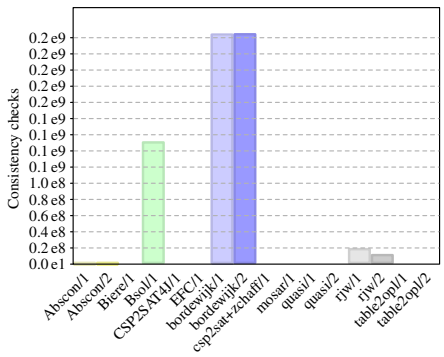

Fig. 239. Consistency checks required for solved instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

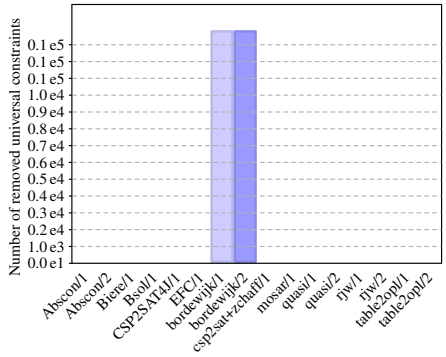

Fig. 240. Number of removed universal constraints for solved instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

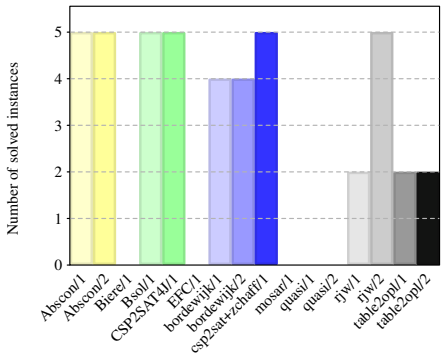

Fig. 241. Number of solved instances for class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

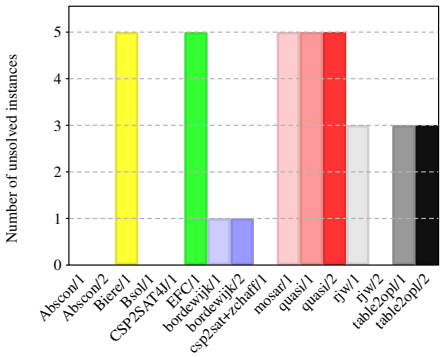

Fig. 242. Number of unsolved instances for class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

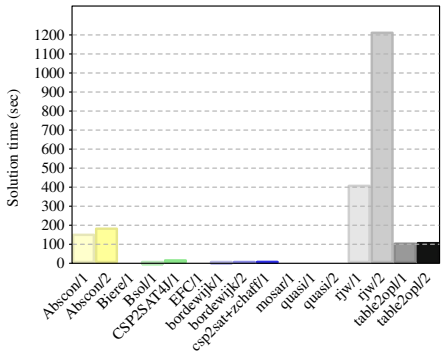

Fig. 243. Solution time in seconds for solved instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

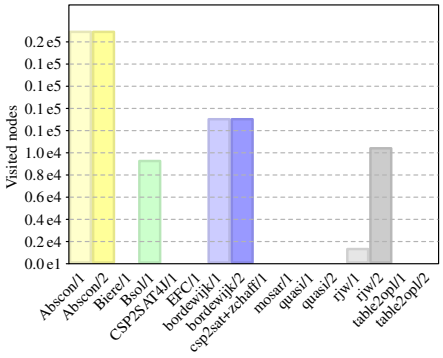

Fig. 244. Visited nodes required for solved instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

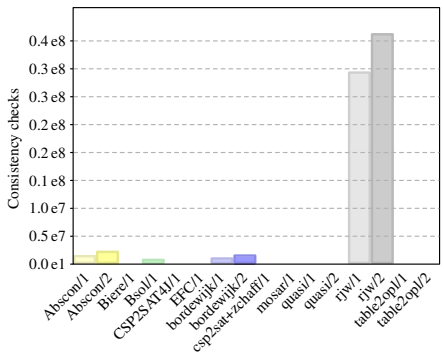

Fig. 245. Consistency checks required for solved instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

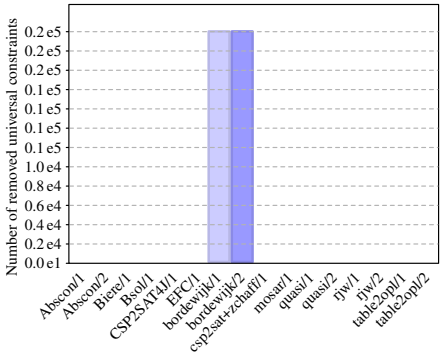

Fig. 246. Number of removed universal constraints for solved instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

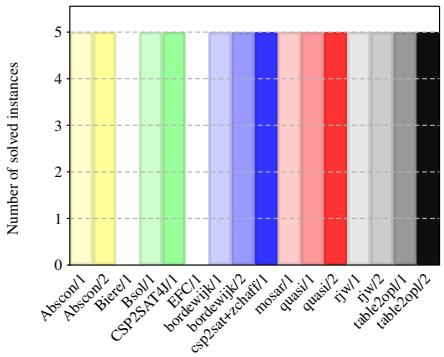

Fig. 247. Number of solved instances for class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

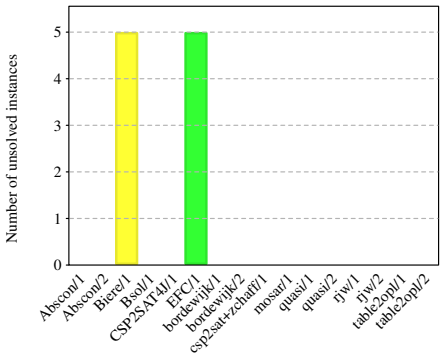

Fig. 248. Number of unsolved instances for class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

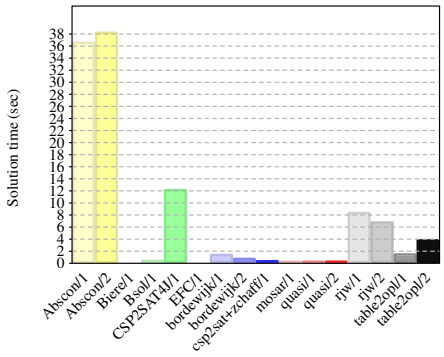

Fig. 249. Solution time in seconds for solved instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

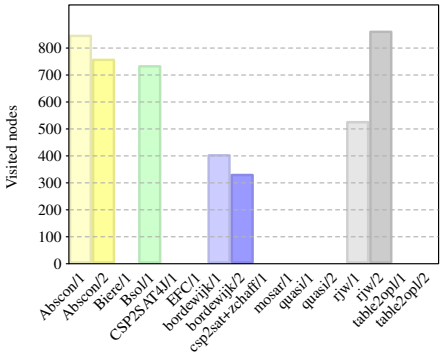

Fig. 250. Visited nodes required for solved instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

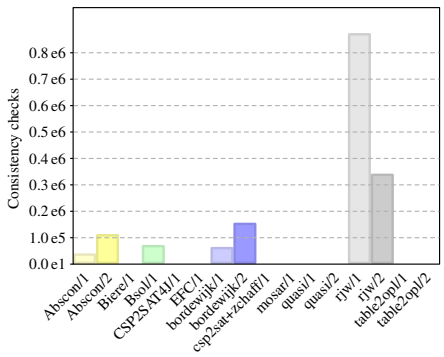

Fig. 251. Consistency checks required for solved instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

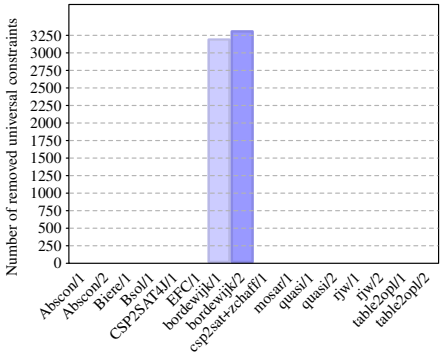

Fig. 252. Number of removed universal constraints for solved instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

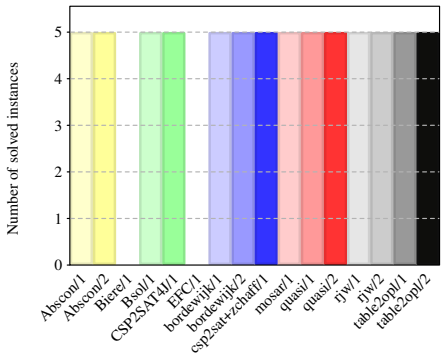

Fig. 253. Number of solved instances for class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

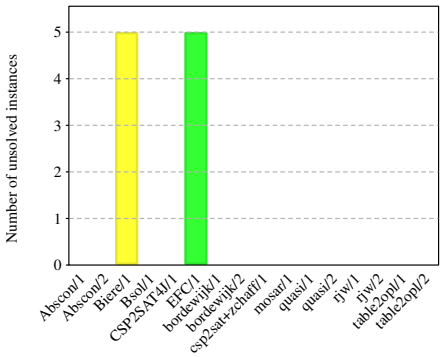

Fig. 254. Number of unsolved instances for class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

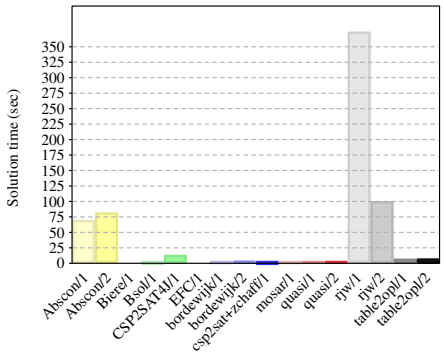

Fig. 255. Solution time in seconds for solved instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

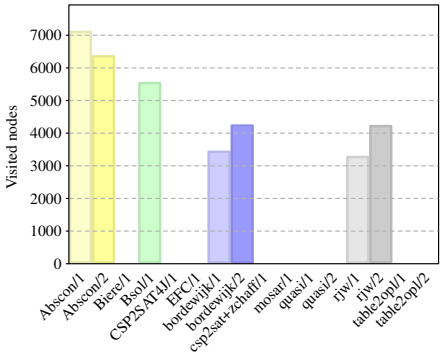

Fig. 256. Visited nodes required for solved instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

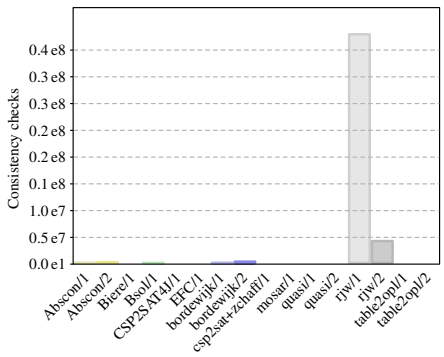

Fig. 257. Consistency checks required for solved instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

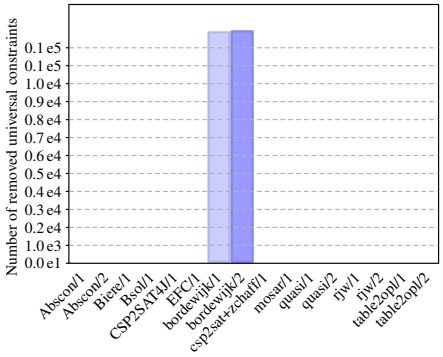

Fig. 258. Number of removed universal constraints for solved instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

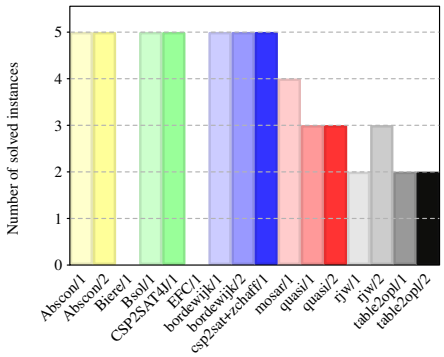

Fig. 259. Number of solved instances for class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

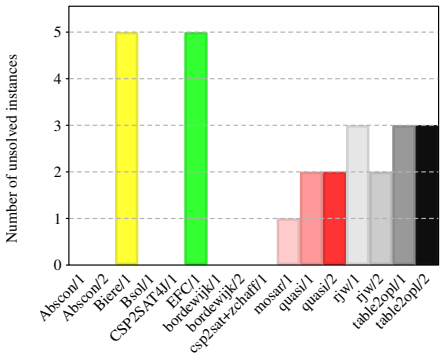

Fig. 260. Number of unsolved instances for class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

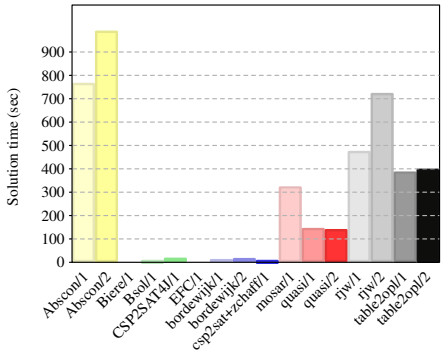

Fig. 261. Solution time in seconds for solved instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

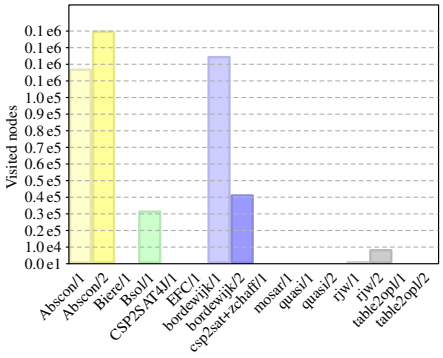

Fig. 262. Visited nodes required for solved instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

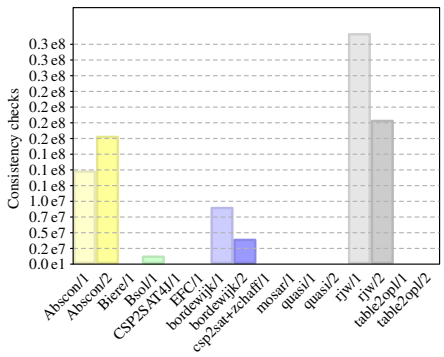

Fig. 263. Consistency checks required for solved instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

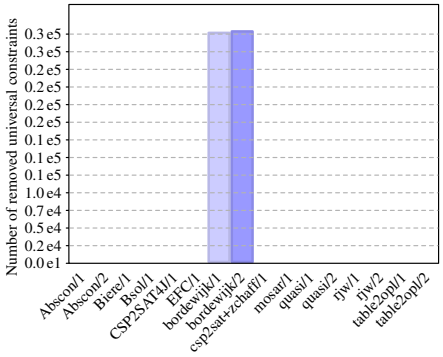

Fig. 264. Number of removed universal constraints for solved instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

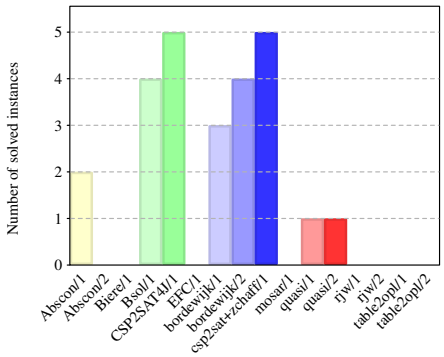

Fig. 265. Number of solved instances for class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

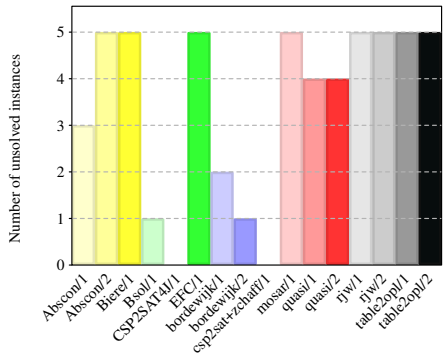

Fig. 266. Number of unsolved instances for class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

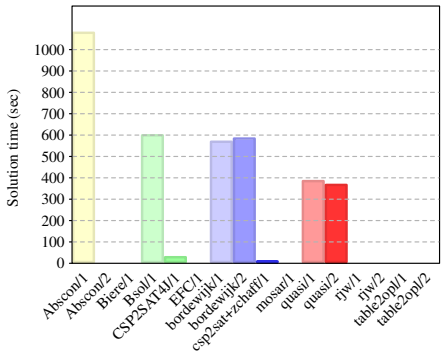

Fig. 267. Solution time in seconds for solved instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

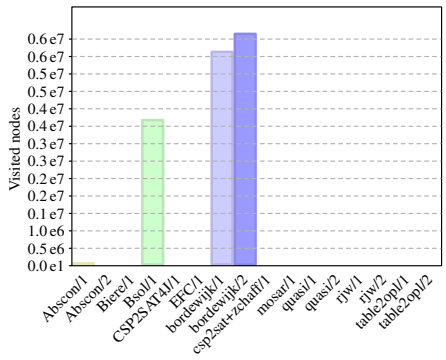

Fig. 268. Visited nodes required for solved instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

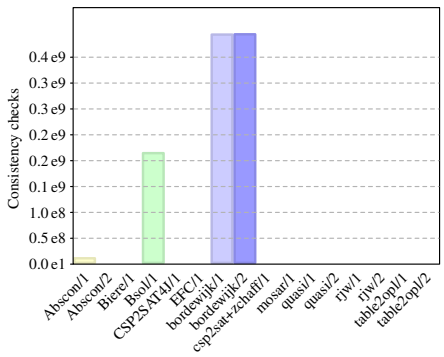

Fig. 269. Consistency checks required for solved instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

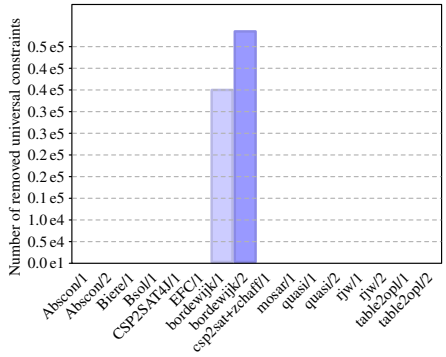

Fig. 270. Number of removed universal constraints for solved instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

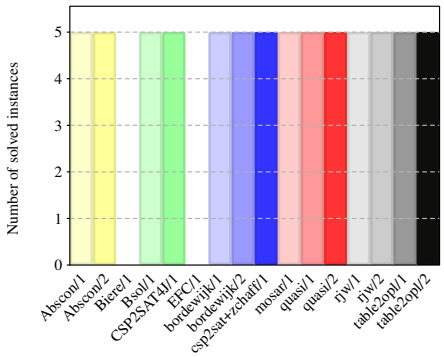

Fig. 271. Number of solved instances for class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

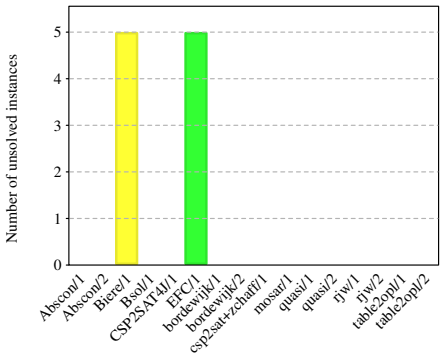

Fig. 272. Number of unsolved instances for class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

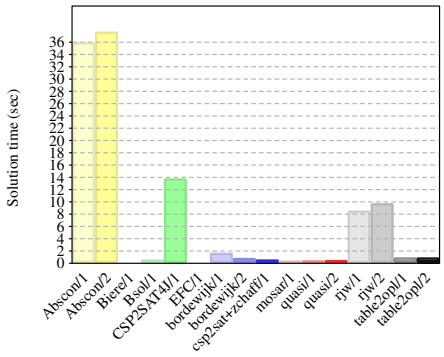

Fig. 273. Solution time in seconds for solved instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

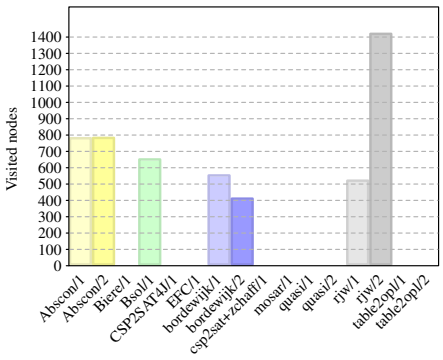

Fig. 274. Visited nodes required for solved instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

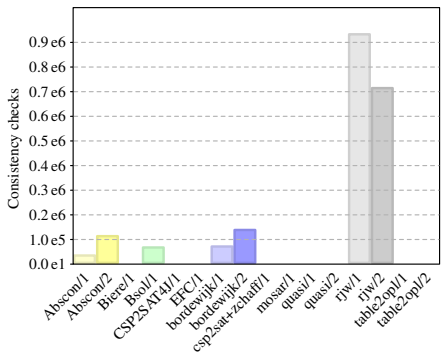

Fig. 275. Consistency checks required for solved instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

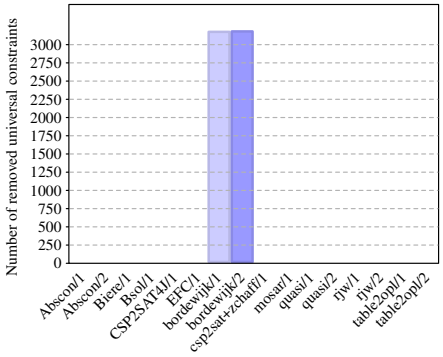

Fig. 276. Number of removed universal constraints for solved instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

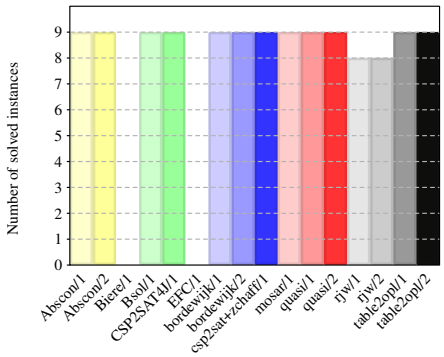

Fig. 277. Number of solved instances for class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

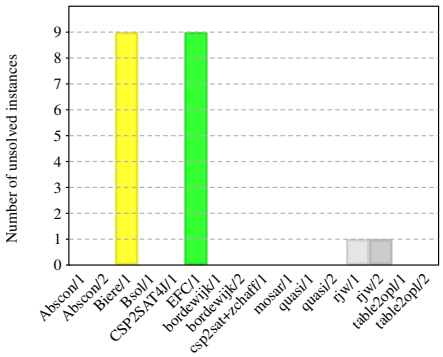

Fig. 278. Number of unsolved instances for class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

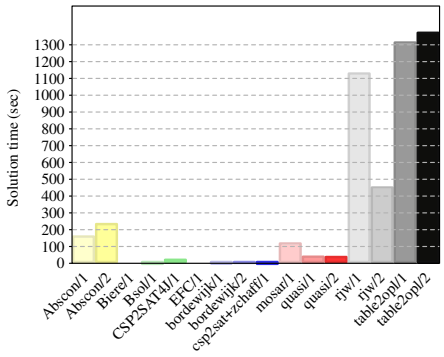

Fig. 279. Solution time in seconds for solved instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

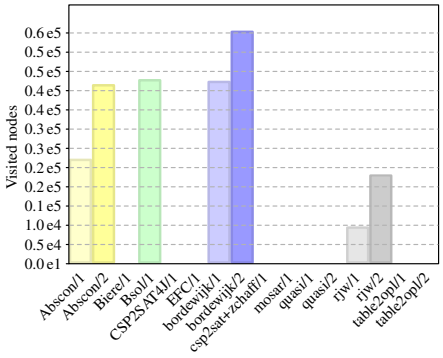

Fig. 280. Visited nodes required for solved instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

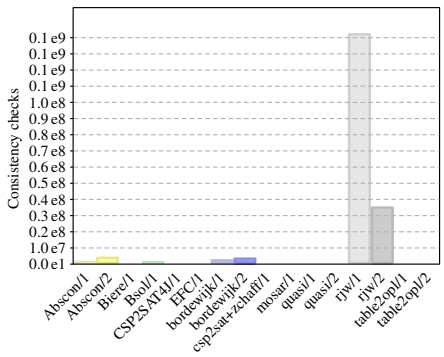

Fig. 281. Consistency checks required for solved instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

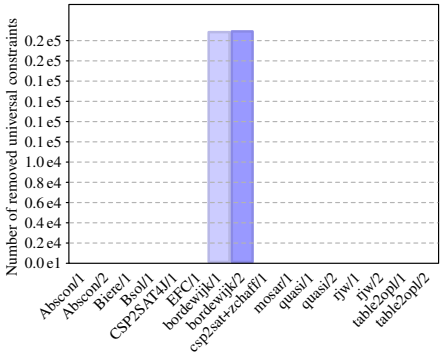

Fig. 282. Number of removed universal constraints for solved instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

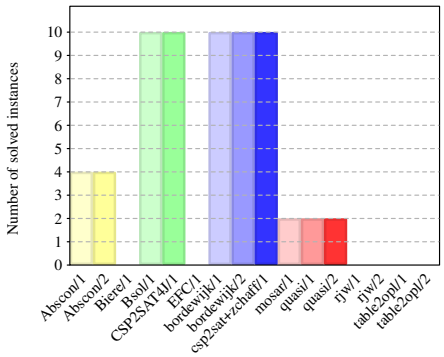

Fig. 283. Number of solved instances for class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

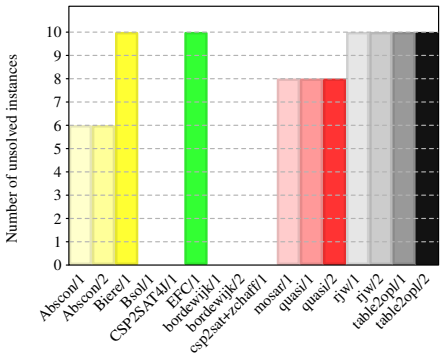

Fig. 284. Number of unsolved instances for class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

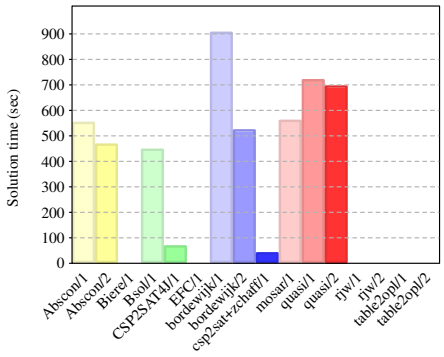

Fig. 285. Solution time in seconds for solved instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

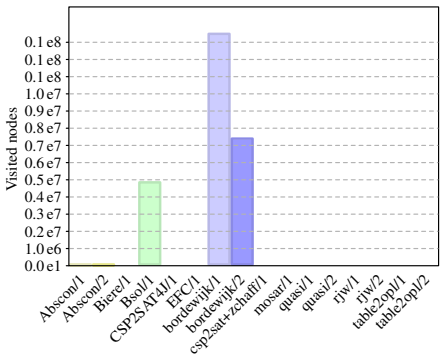

Fig. 286. Visited nodes required for solved instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

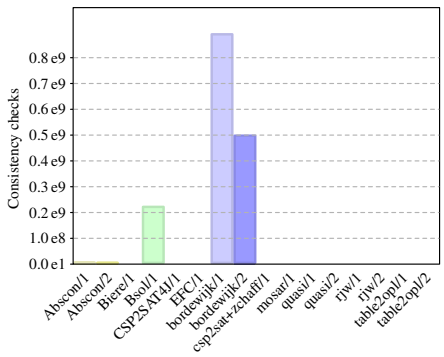

Fig. 287. Consistency checks required for solved instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

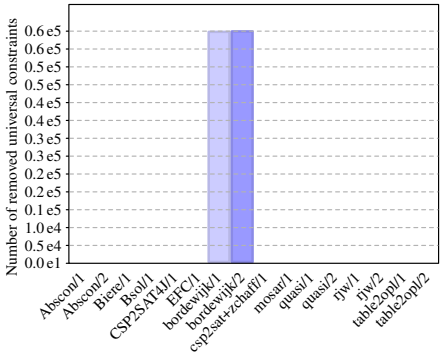

Fig. 288. Number of removed universal constraints for solved instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

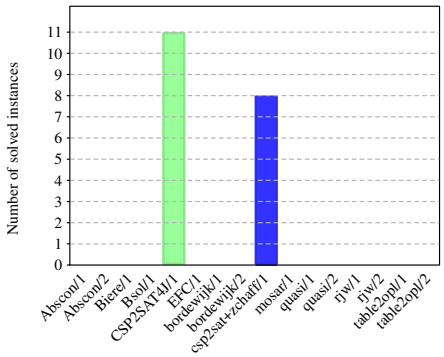

Fig. 289. Number of solved instances for class `QWH-25-hard`. The maximum solution time was set to 600 seconds.

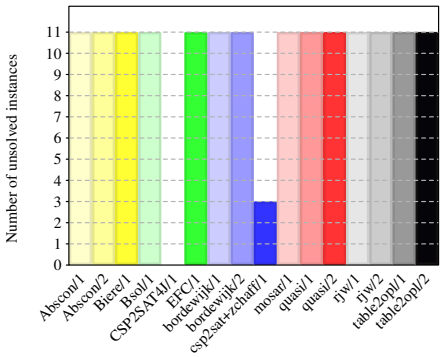

Fig. 290. Number of unsolved instances for class `QWH-25-hard`. The maximum solution time was set to 600 seconds.

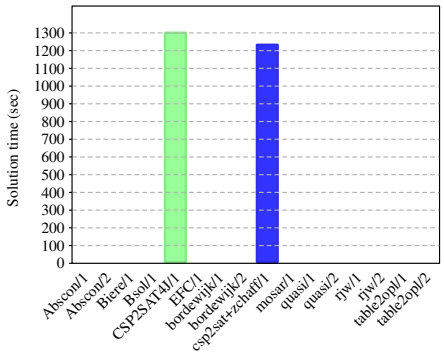

Fig. 291. Solution time in seconds for solved instances from class `QWH-25-hard`. The maximum solution time was set to 600 seconds.

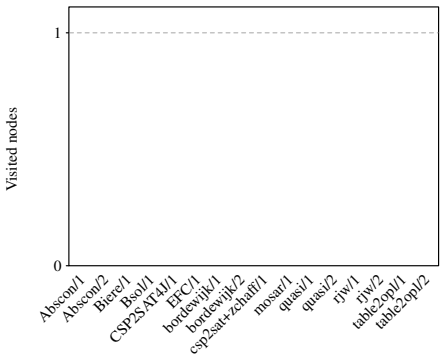

Fig. 292. Visited nodes required for solved instances from class `QWH-25-hard`. The maximum solution time was set to 600 seconds.

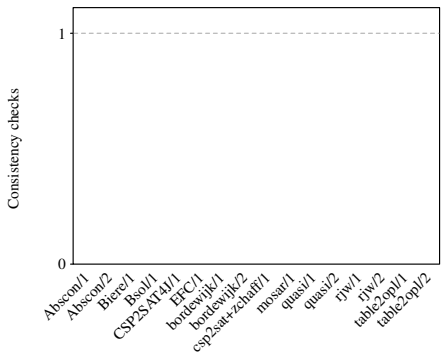

Fig. 293. Consistency checks required for solved instances from class `QWH-25-hard`. The maximum solution time was set to 600 seconds.

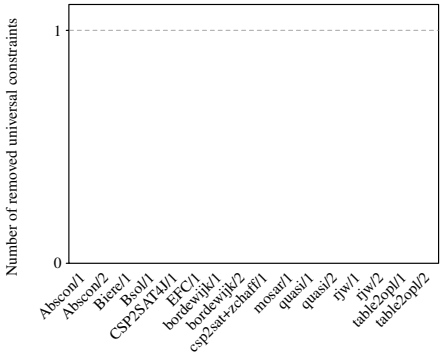

Fig. 294. Number of removed universal constraints for solved instances from class `QWH-25-hard`. The maximum solution time was set to 600 seconds.

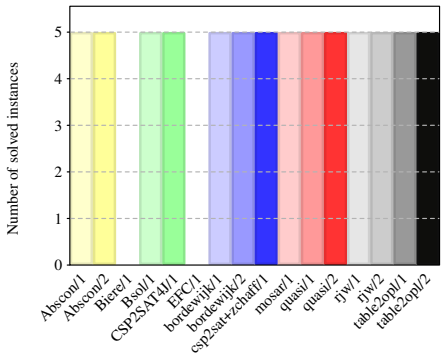

Fig. 295. Number of solved instances for class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

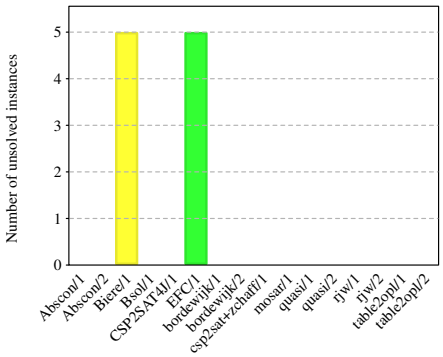

Fig. 296. Number of unsolved instances for class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

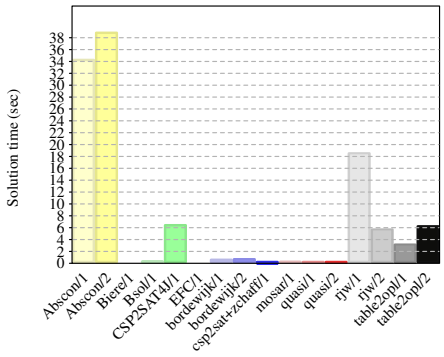

Fig. 297. Solution time in seconds for solved instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

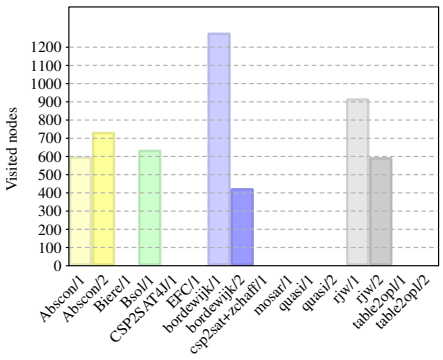

Fig. 298. Visited nodes required for solved instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

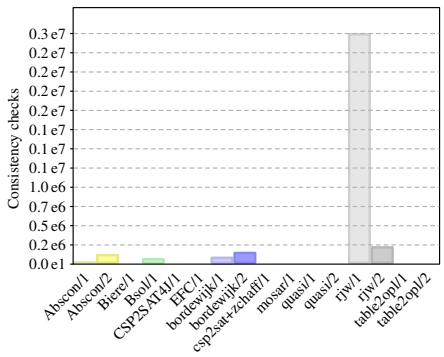

Fig. 299. Consistency checks required for solved instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

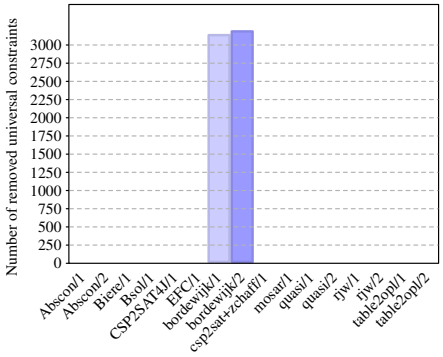

Fig. 300. Number of removed universal constraints for solved instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

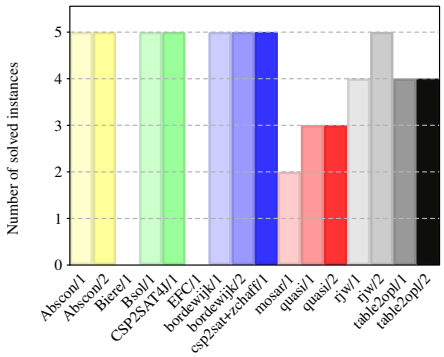

Fig. 301. Number of solved instances for class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

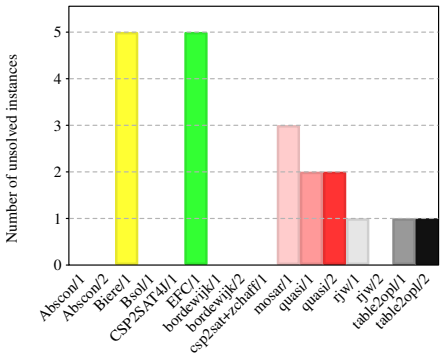

Fig. 302. Number of unsolved instances for class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

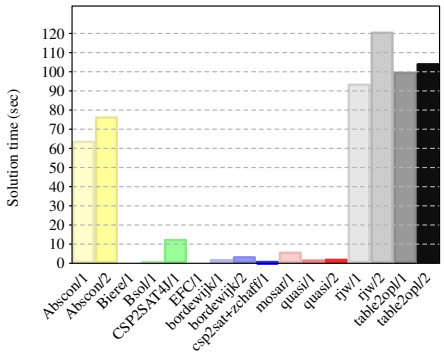

Fig. 303. Solution time in seconds for solved instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

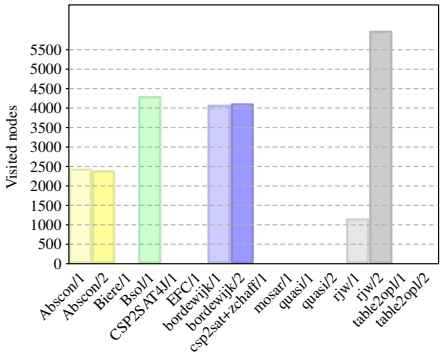

Fig. 304. Visited nodes required for solved instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

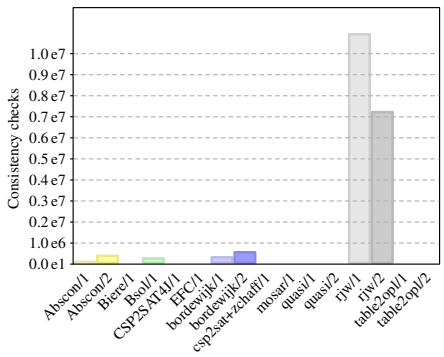

Fig. 305. Consistency checks required for solved instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

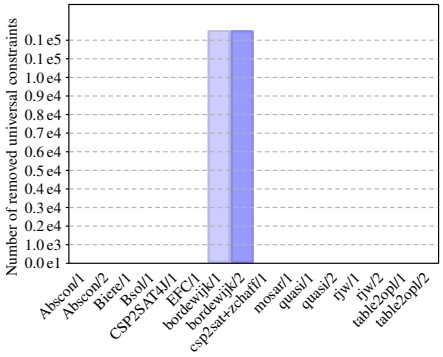

Fig. 306. Number of removed universal constraints for solved instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

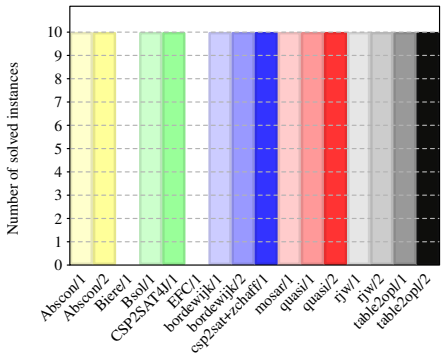

Fig. 307. Number of solved instances for class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

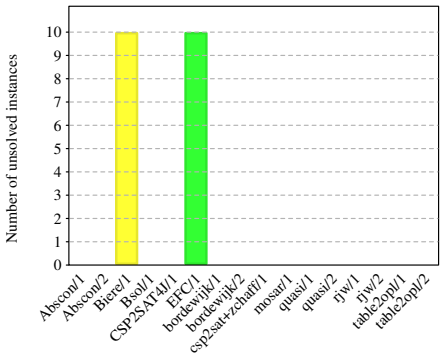

Fig. 308. Number of unsolved instances for class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

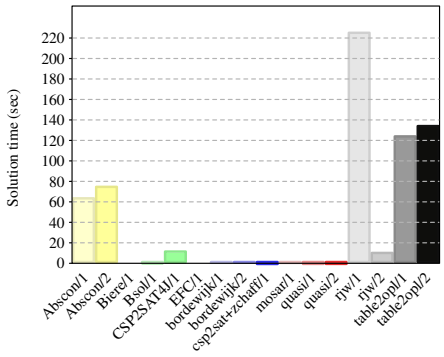

Fig. 309. Solution time in seconds for solved instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

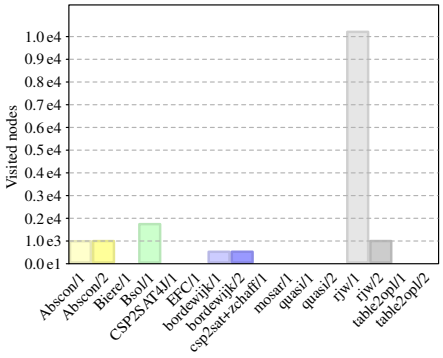

Fig. 310. Visited nodes required for solved instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

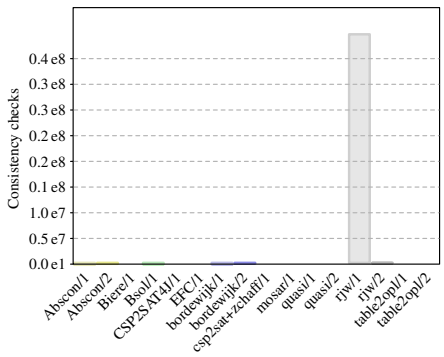

Fig. 311. Consistency checks required for solved instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

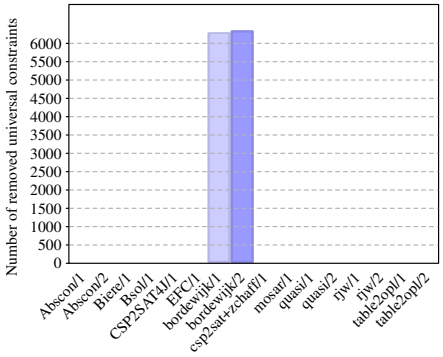

Fig. 312. Number of removed universal constraints for solved instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

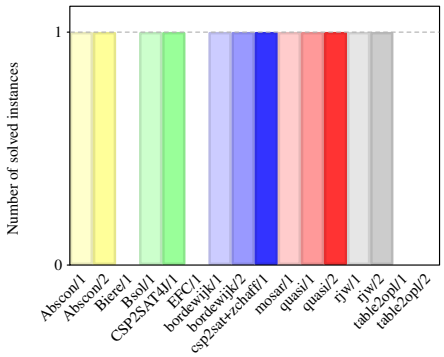

Fig. 313. Number of solved instances for class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

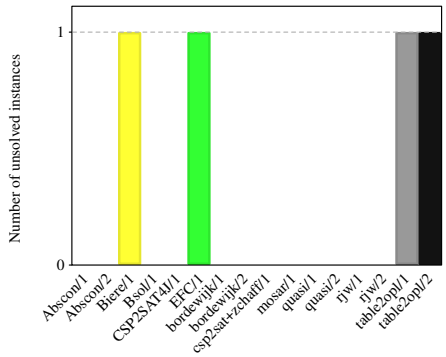

Fig. 314. Number of unsolved instances for class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

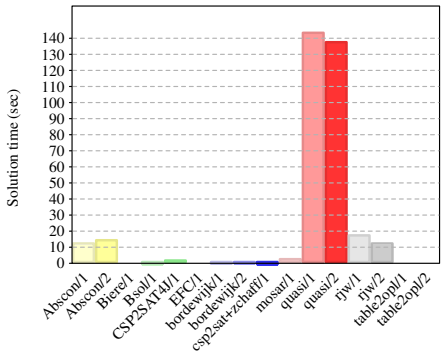

Fig. 315. Solution time in seconds for solved instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

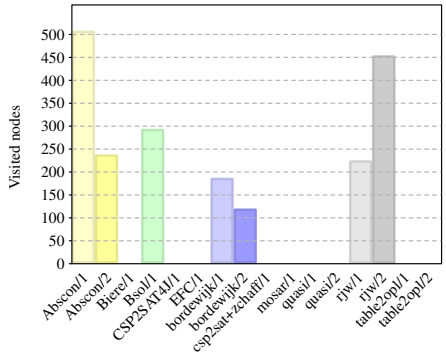

Fig. 316. Visited nodes required for solved instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

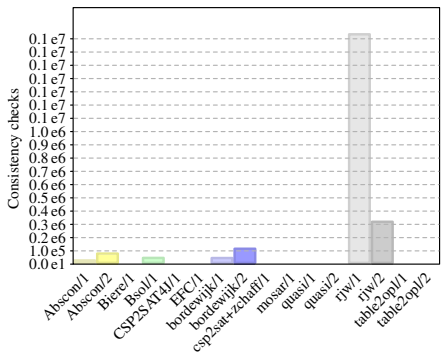

Fig. 317. Consistency checks required for solved instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

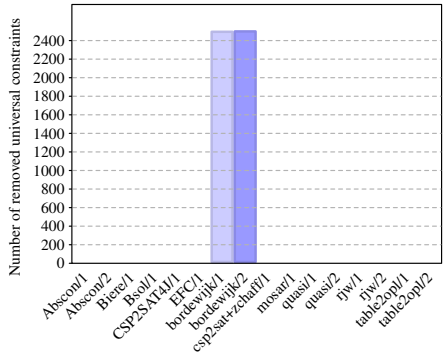

Fig. 318. Number of removed universal constraints for solved instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

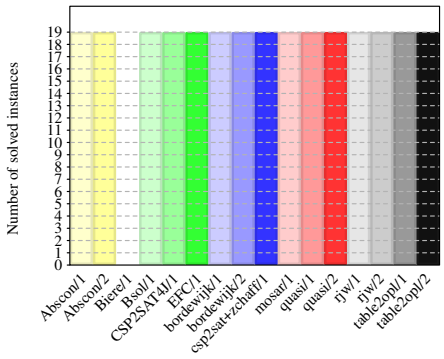

Fig. 319. Number of solved instances for class `bqwh15-106`. The maximum solution time was set to 600 seconds.

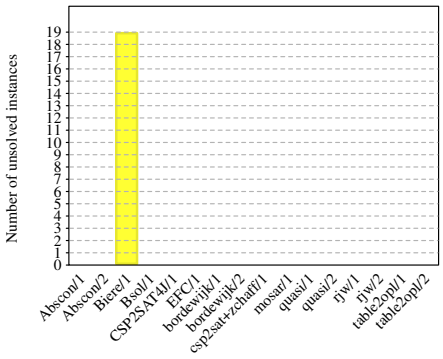

Fig. 320. Number of unsolved instances for class `bqwh15-106`. The maximum solution time was set to 600 seconds.

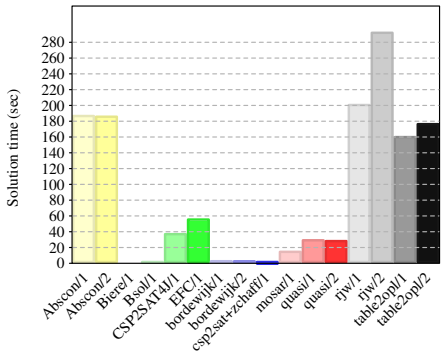

Fig. 321. Solution time in seconds for solved instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

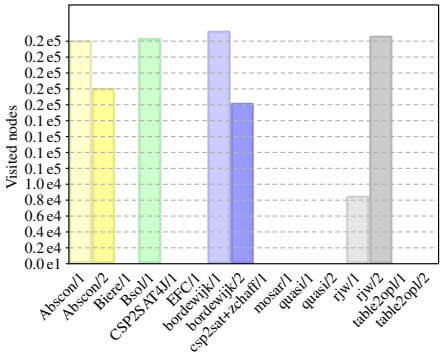

Fig. 322. Visited nodes required for solved instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

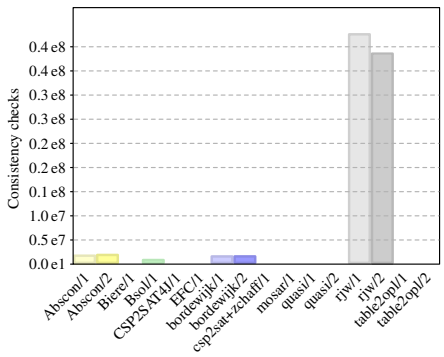

Fig. 323. Consistency checks required for solved instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

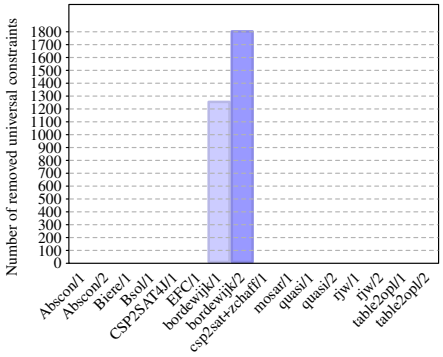

Fig. 324. Number of removed universal constraints for solved instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

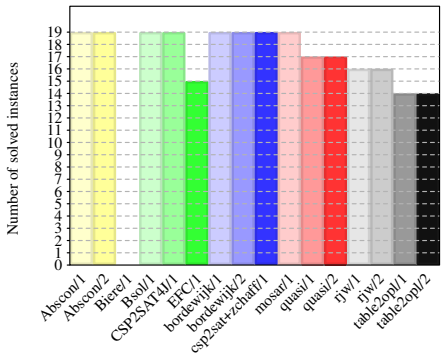

Fig. 325. Number of solved instances for class `bqwh18-141`. The maximum solution time was set to 600 seconds.

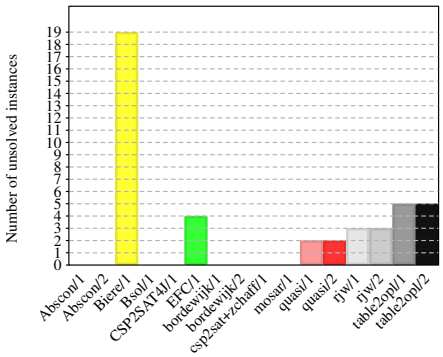

Fig. 326. Number of unsolved instances for class `bqwh18-141`. The maximum solution time was set to 600 seconds.

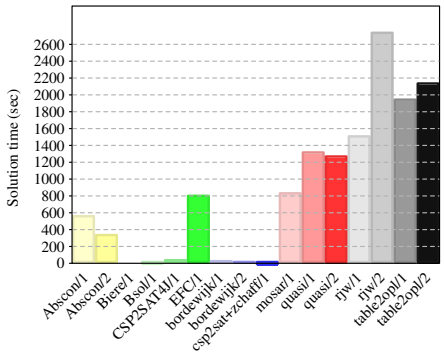

Fig. 327. Solution time in seconds for solved instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

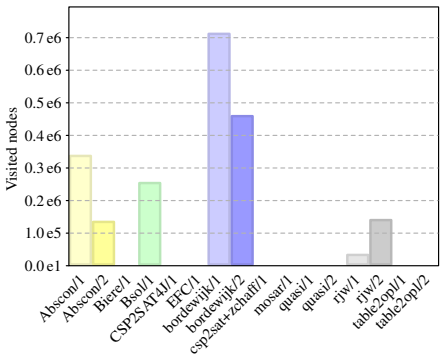

Fig. 328. Visited nodes required for solved instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

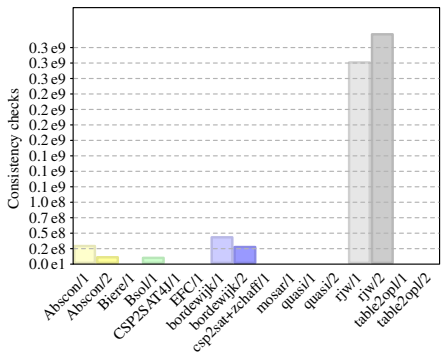

Fig. 329. Consistency checks required for solved instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

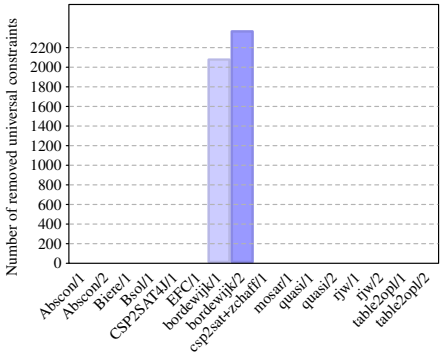

Fig. 330. Number of removed universal constraints for solved instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

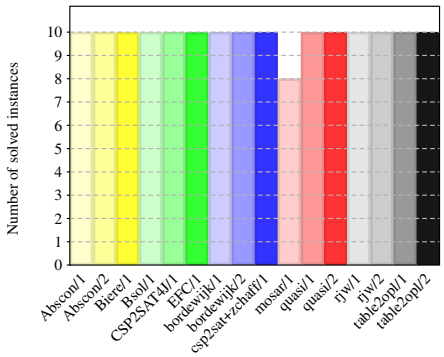

Fig. 331. Number of solved instances for class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

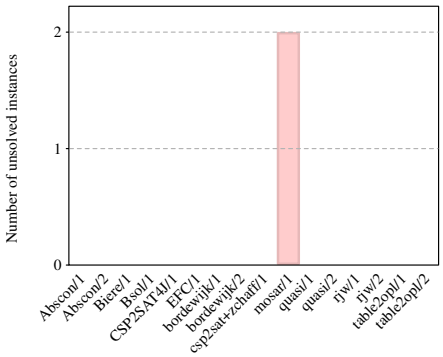

Fig. 332. Number of unsolved instances for class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

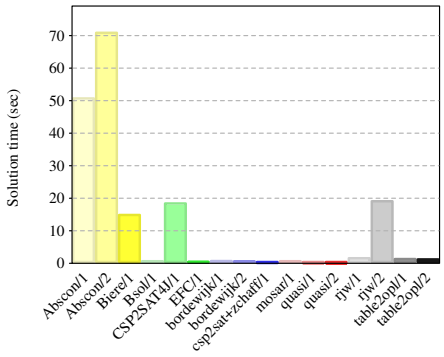

Fig. 333. Solution time in seconds for solved instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

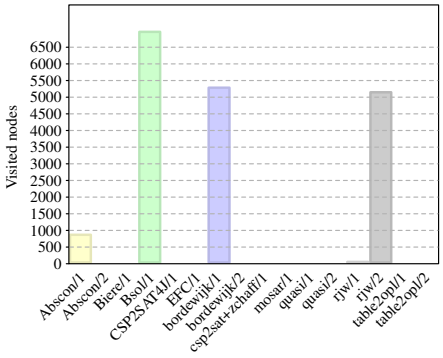

Fig. 334. Visited nodes required for solved instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

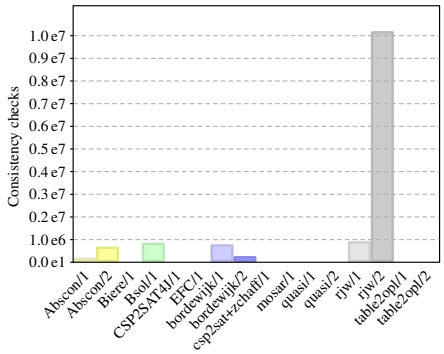

Fig. 335. Consistency checks required for solved instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

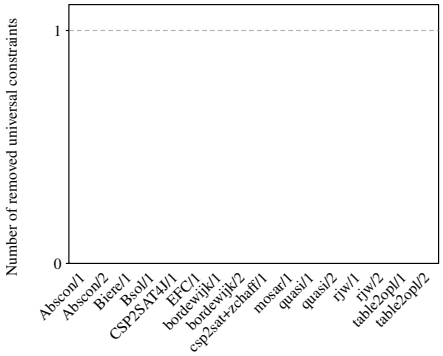

Fig. 336. Number of removed universal constraints for solved instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

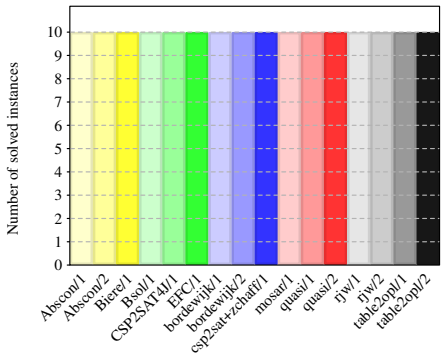

Fig. 337. Number of solved instances for class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

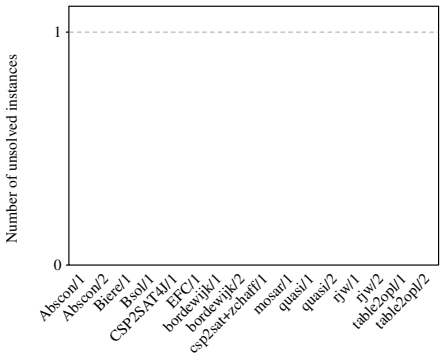

Fig. 338. Number of unsolved instances for class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

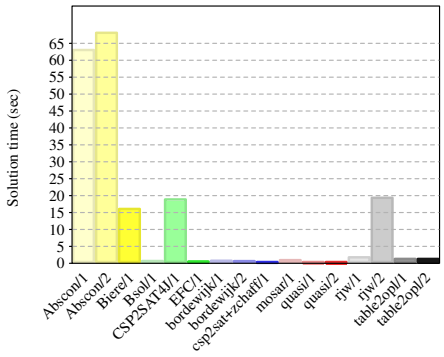

Fig. 339. Solution time in seconds for solved instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

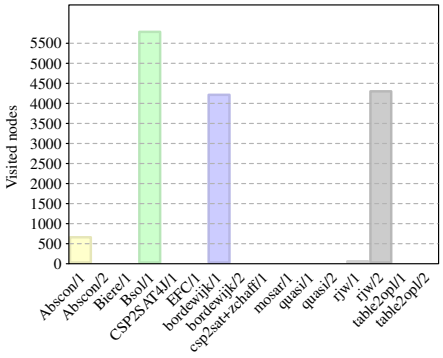

Fig. 340. Visited nodes required for solved instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

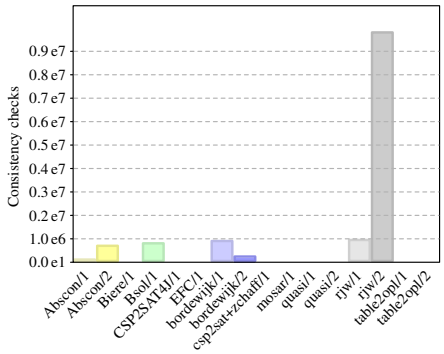

Fig. 341. Consistency checks required for solved instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

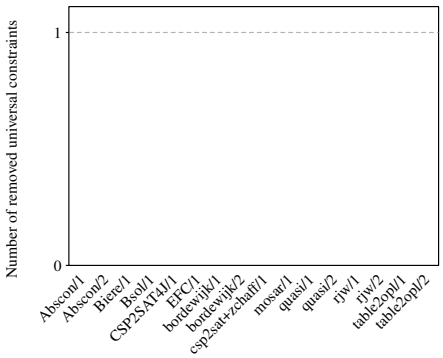

Fig. 342. Number of removed universal constraints for solved instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

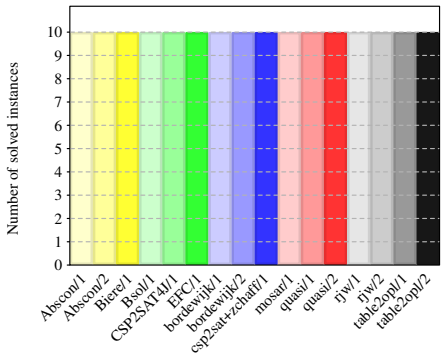

Fig. 343. Number of solved instances for class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

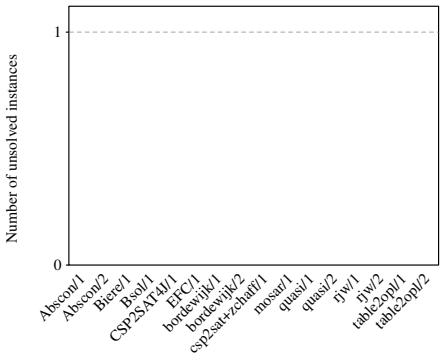

Fig. 344. Number of unsolved instances for class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

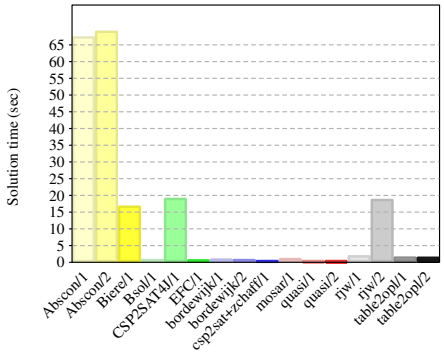

Fig. 345. Solution time in seconds for solved instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

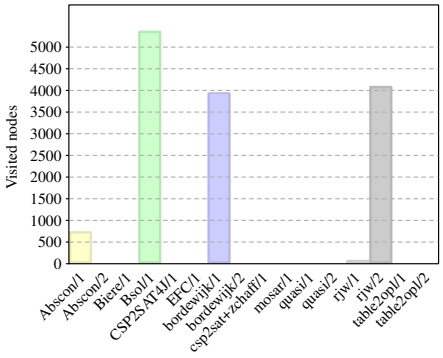

Fig. 346. Visited nodes required for solved instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

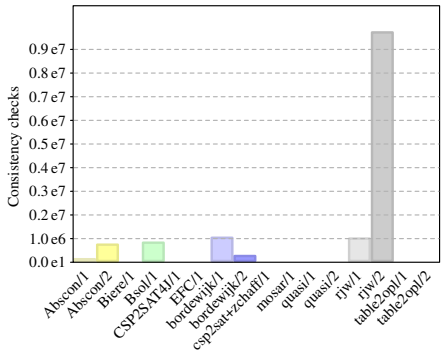

Fig. 347. Consistency checks required for solved instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

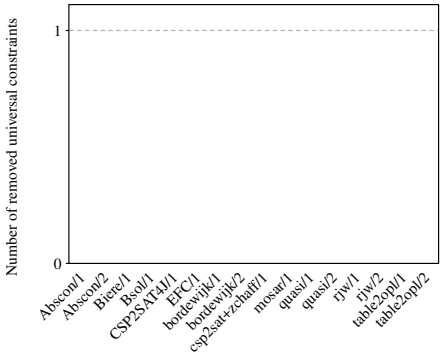

Fig. 348. Number of removed universal constraints for solved instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

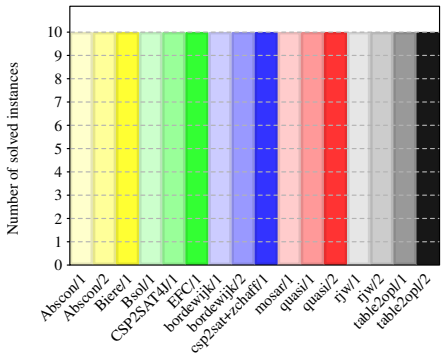

Fig. 349. Number of solved instances for class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

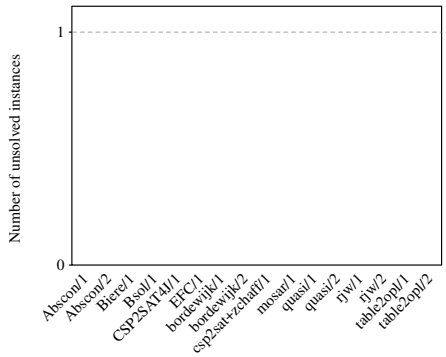

Fig. 350. Number of unsolved instances for class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

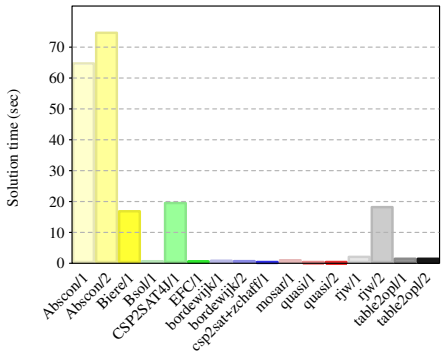

Fig. 351. Solution time in seconds for solved instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

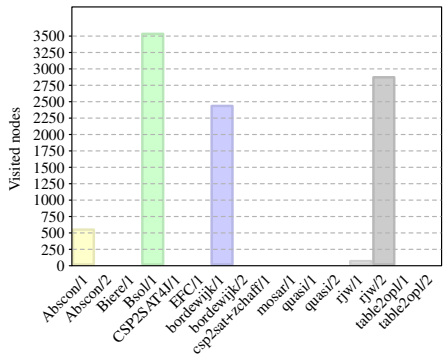

Fig. 352. Visited nodes required for solved instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

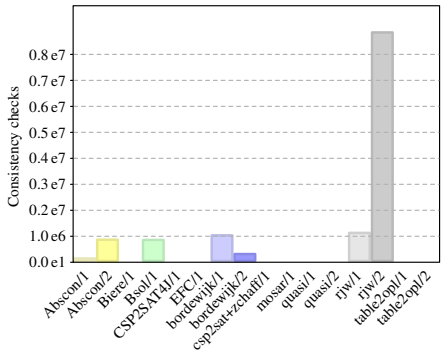

Fig. 353. Consistency checks required for solved instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

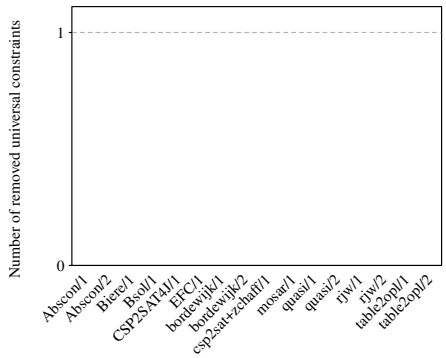

Fig. 354. Number of removed universal constraints for solved instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

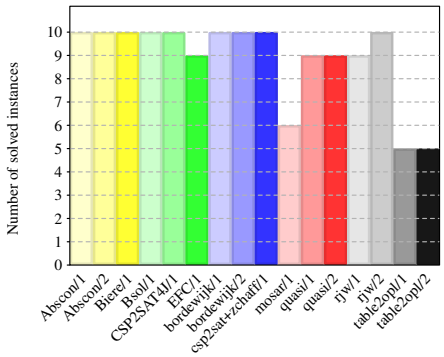

Fig. 355. Number of solved instances for class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

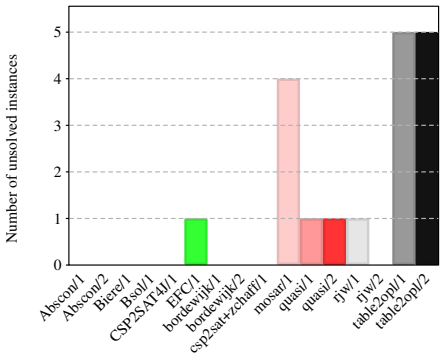

Fig. 356. Number of unsolved instances for class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

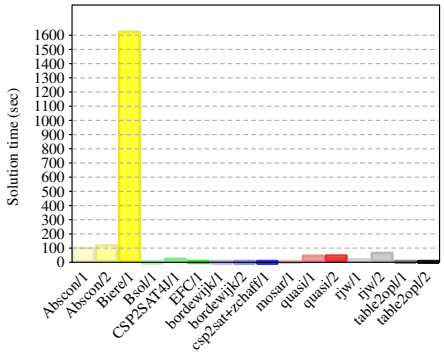

Fig. 357. Solution time in seconds for solved instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

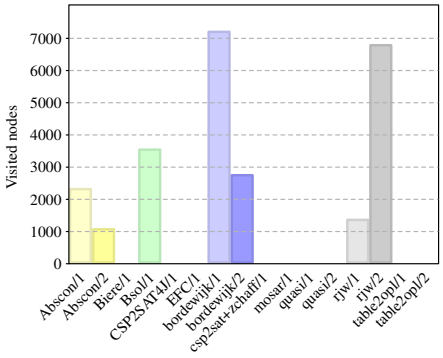

Fig. 358. Visited nodes required for solved instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

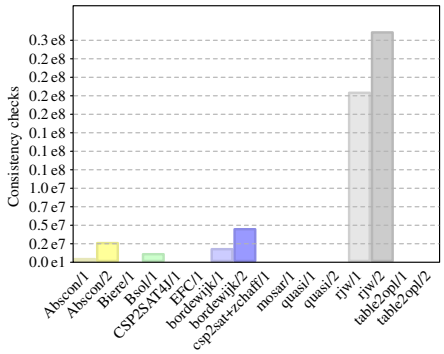

Fig. 359. Consistency checks required for solved instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

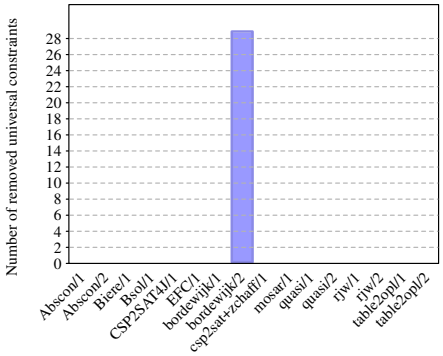

Fig. 360. Number of removed universal constraints for solved instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

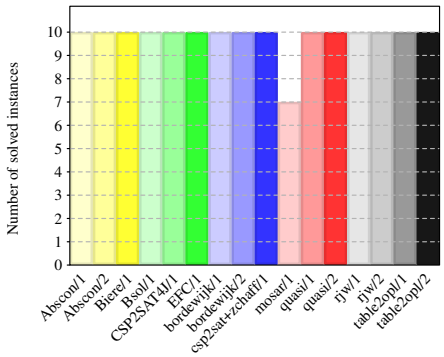

Fig. 361. Number of solved instances for class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

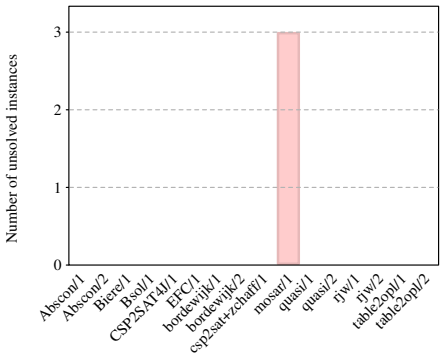

Fig. 362. Number of unsolved instances for class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

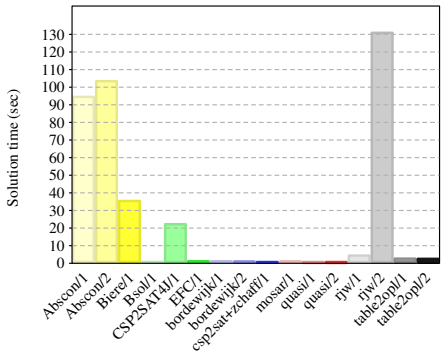

Fig. 363. Solution time in seconds for solved instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

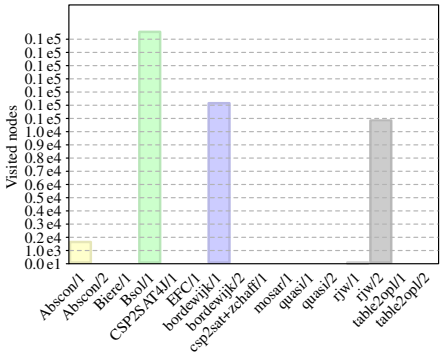

Fig. 364. Visited nodes required for solved instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

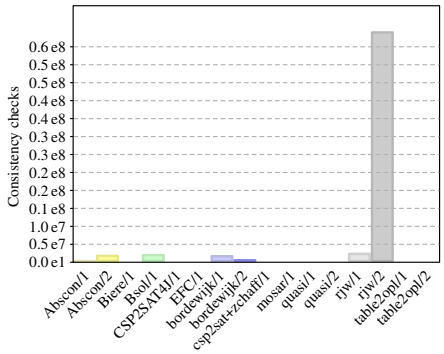

Fig. 365. Consistency checks required for solved instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

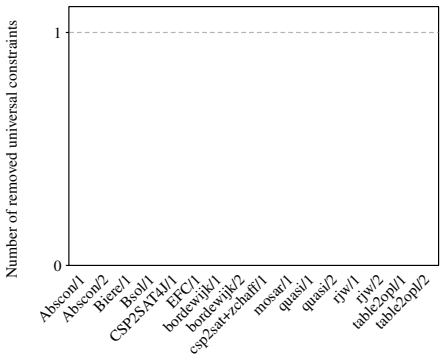

Fig. 366. Number of removed universal constraints for solved instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

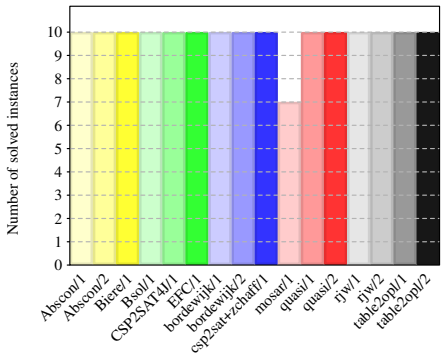

Fig. 367. Number of solved instances for class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

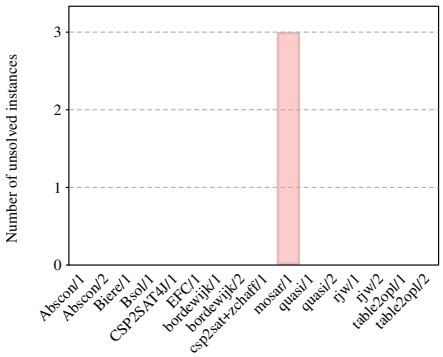

Fig. 368. Number of unsolved instances for class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

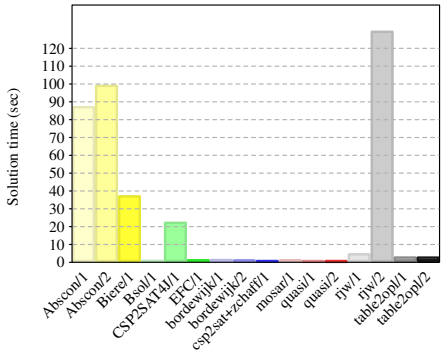

Fig. 369. Solution time in seconds for solved instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

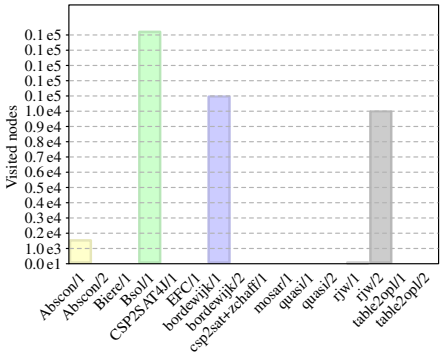

Fig. 370. Visited nodes required for solved instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

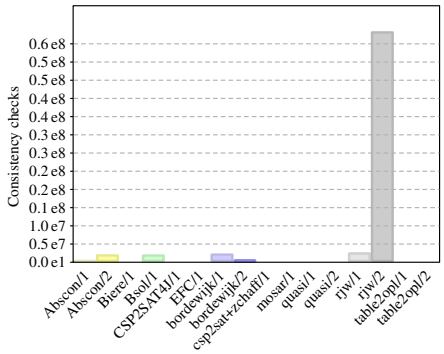

Fig. 371. Consistency checks required for solved instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

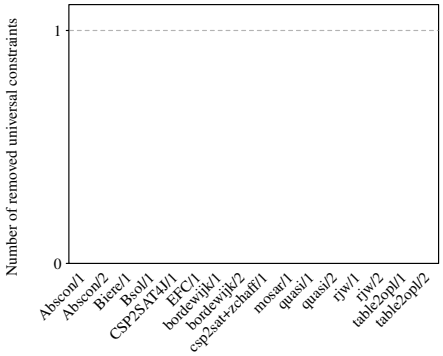

Fig. 372. Number of removed universal constraints for solved instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

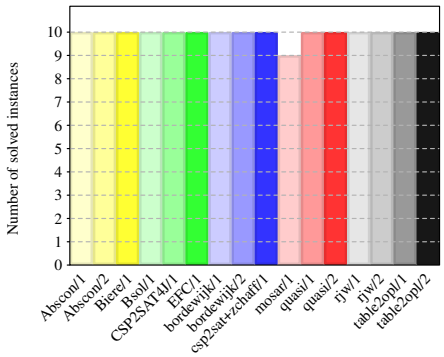

Fig. 373. Number of solved instances for class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

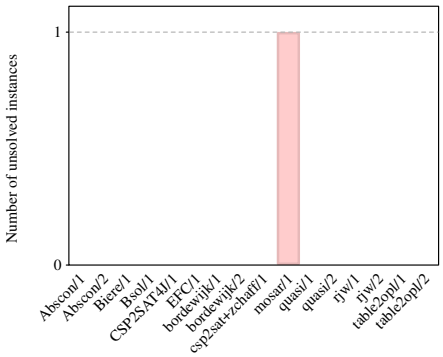

Fig. 374. Number of unsolved instances for class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

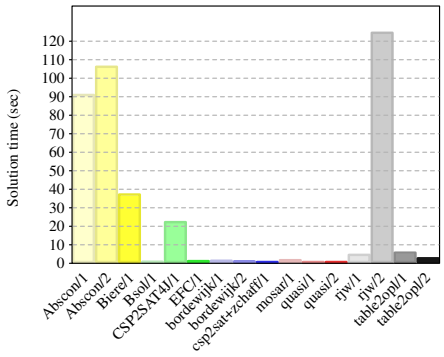

Fig. 375. Solution time in seconds for solved instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

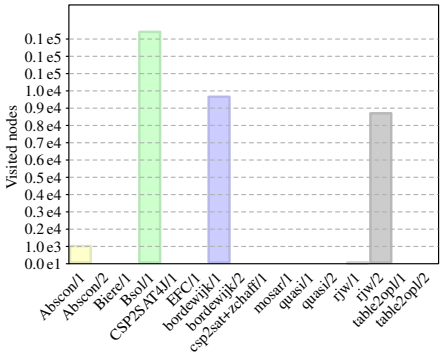

Fig. 376. Visited nodes required for solved instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

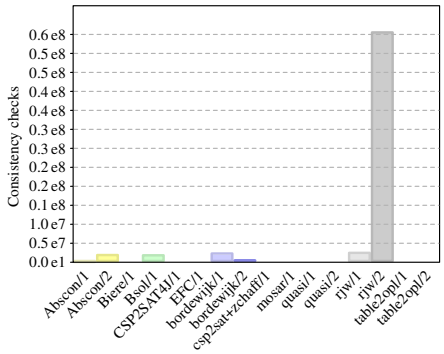

Fig. 377. Consistency checks required for solved instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

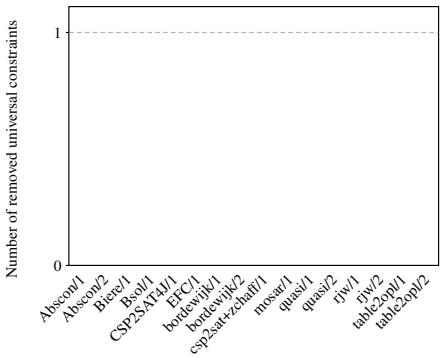

Fig. 378. Number of removed universal constraints for solved instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

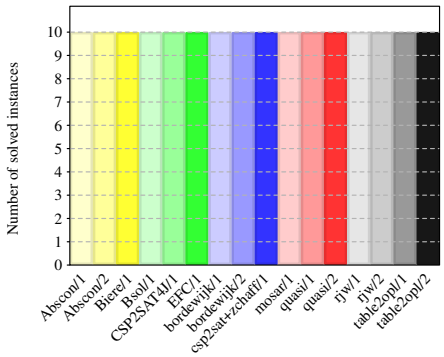

Fig. 379. Number of solved instances for class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

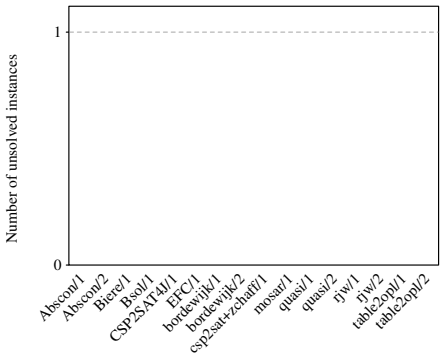

Fig. 380. Number of unsolved instances for class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

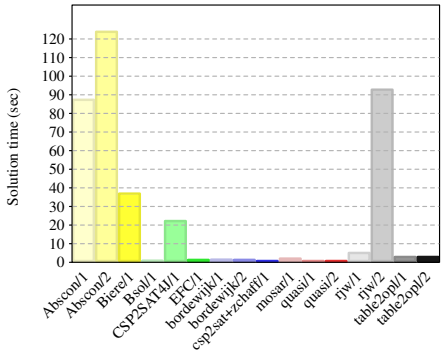

Fig. 381. Solution time in seconds for solved instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

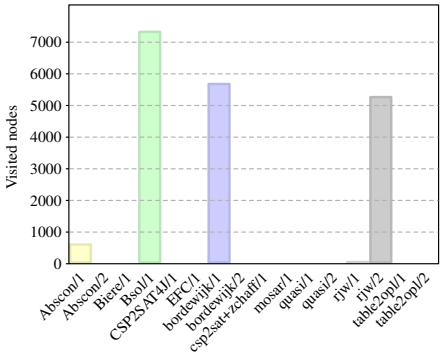

Fig. 382. Visited nodes required for solved instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

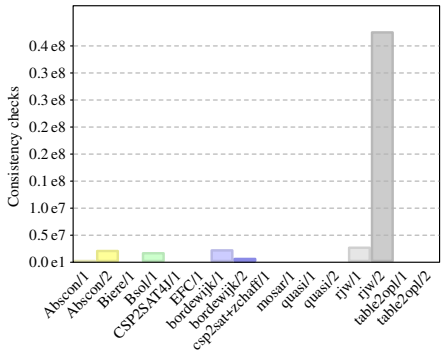

Fig. 383. Consistency checks required for solved instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

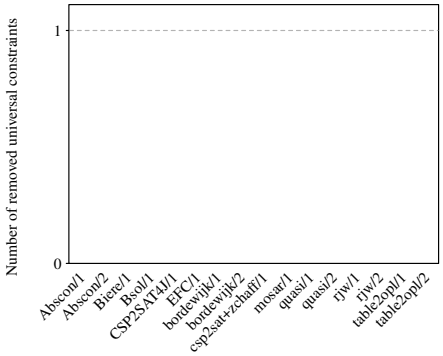

Fig. 384. Number of removed universal constraints for solved instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

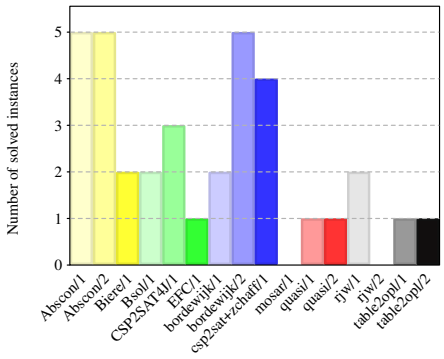

Fig. 385. Number of solved instances for class `cril`. The maximum solution time was set to 600 seconds.

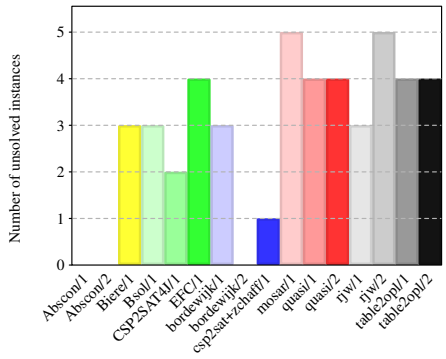

Fig. 386. Number of unsolved instances for class `cril`. The maximum solution time was set to 600 seconds.

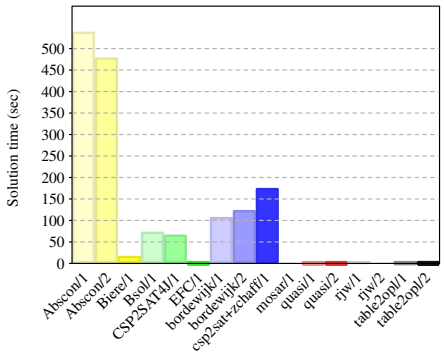

Fig. 387. Solution time in seconds for solved instances from class `cril`. The maximum solution time was set to 600 seconds.

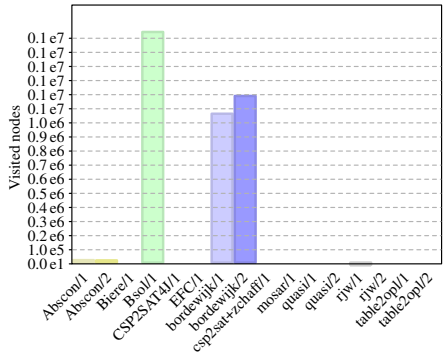

Fig. 388. Visited nodes required for solved instances from class `cril`. The maximum solution time was set to 600 seconds.

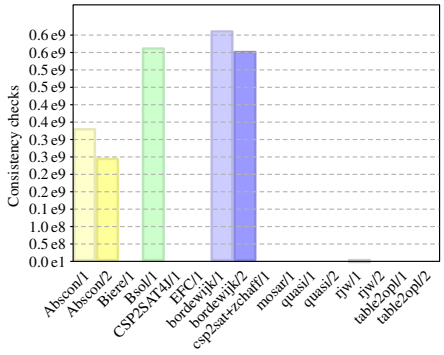

Fig. 389. Consistency checks required for solved instances from class `cril`. The maximum solution time was set to 600 seconds.

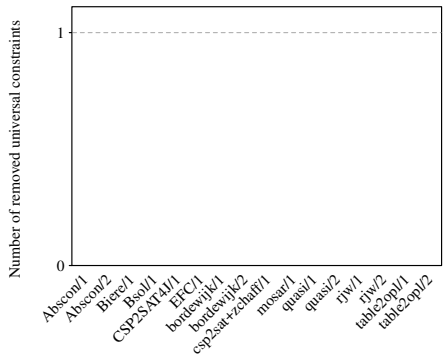

Fig. 390. Number of removed universal constraints for solved instances from class `cril`. The maximum solution time was set to 600 seconds.

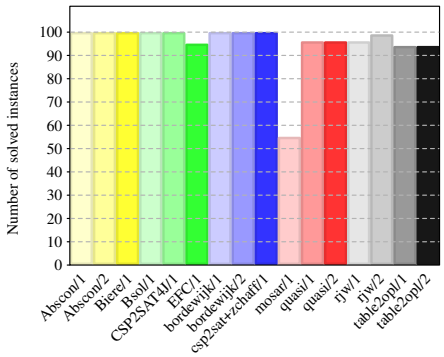

Fig. 391. Number of solved instances for class `ehi-85`. The maximum solution time was set to 600 seconds.

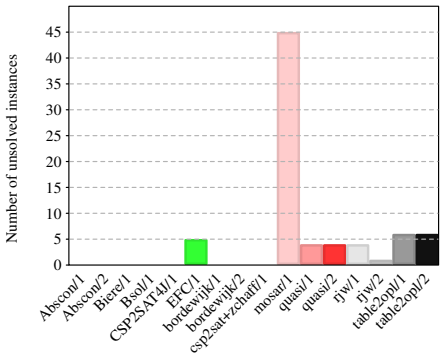

Fig. 392. Number of unsolved instances for class `ehi-85`. The maximum solution time was set to 600 seconds.

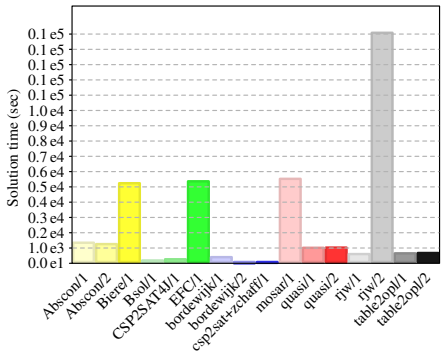

Fig. 393. Solution time in seconds for solved instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

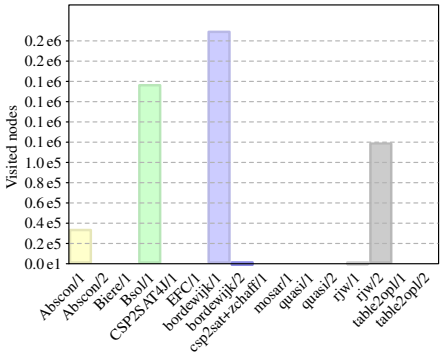

Fig. 394. Visited nodes required for solved instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

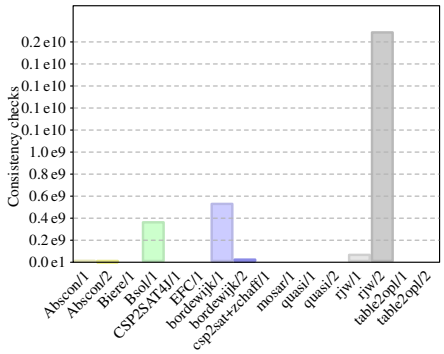

Fig. 395. Consistency checks required for solved instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

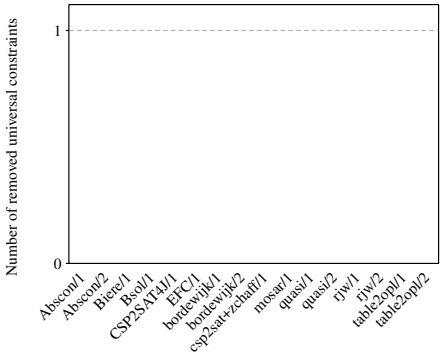

Fig. 396. Number of removed universal constraints for solved instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

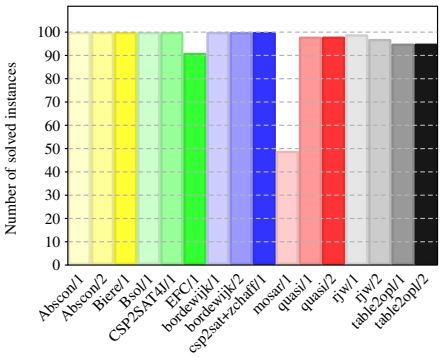

Fig. 397. Number of solved instances for class `ehi-90`. The maximum solution time was set to 600 seconds.

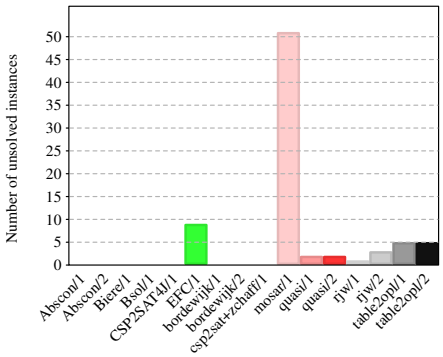

Fig. 398. Number of unsolved instances for class `ehi-90`. The maximum solution time was set to 600 seconds.

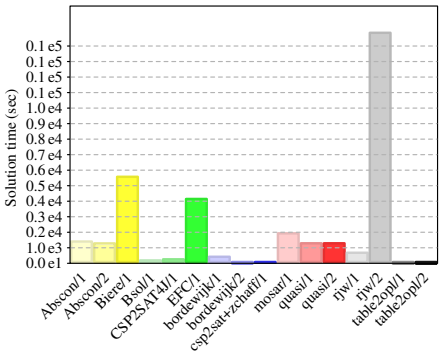

Fig. 399. Solution time in seconds for solved instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

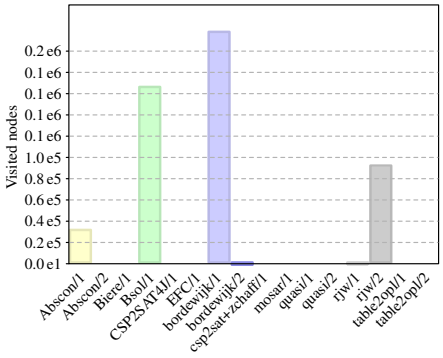

Fig. 400. Visited nodes required for solved instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

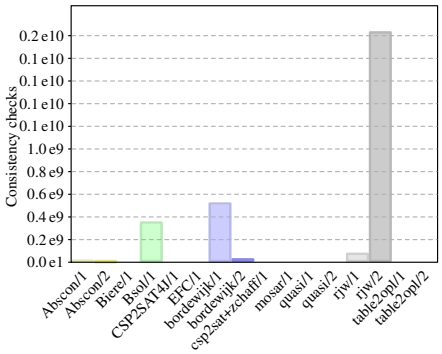

Fig. 401. Consistency checks required for solved instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

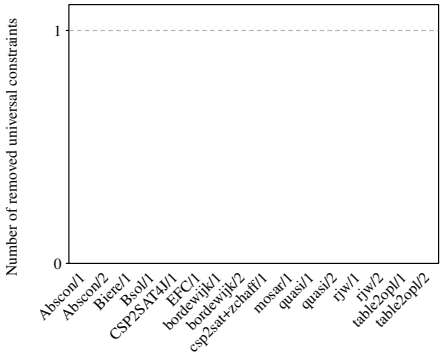

Fig. 402. Number of removed universal constraints for solved instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

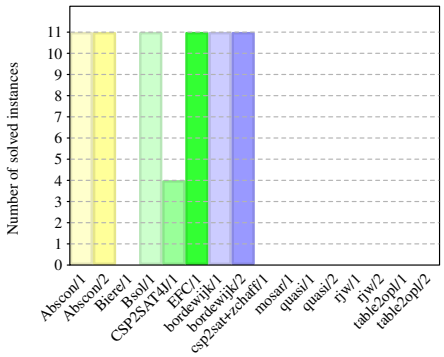

Fig. 403. Number of solved instances for class `fapp01`. The maximum solution time was set to 600 seconds.

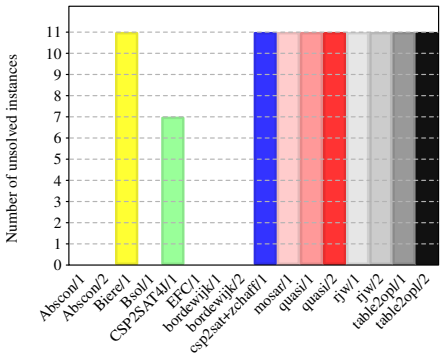

Fig. 404. Number of unsolved instances for class `fapp01`. The maximum solution time was set to 600 seconds.

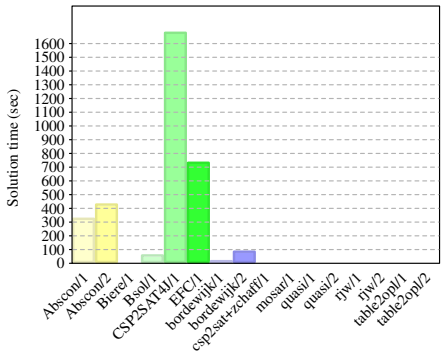

Fig. 405. Solution time in seconds for solved instances from class `fapp01`. The maximum solution time was set to 600 seconds.

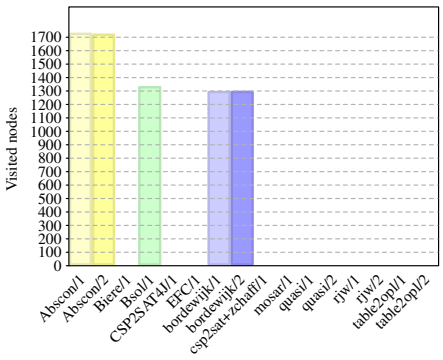

Fig. 406. Visited nodes required for solved instances from class `fapp01`. The maximum solution time was set to 600 seconds.

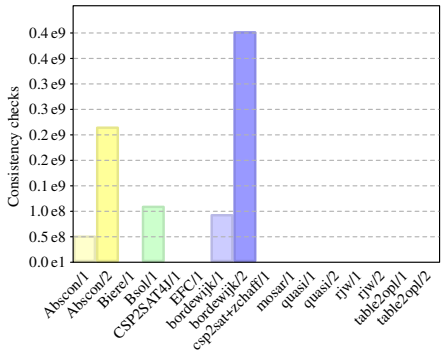

Fig. 407. Consistency checks required for solved instances from class `fapp01`. The maximum solution time was set to 600 seconds.

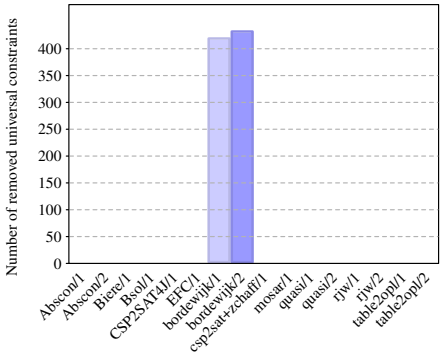

Fig. 408. Number of removed universal constraints for solved instances from class `fapp01`. The maximum solution time was set to 600 seconds.

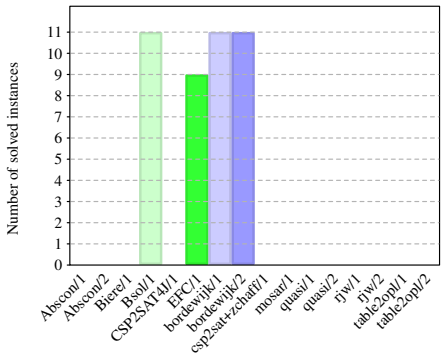

Fig. 409. Number of solved instances for class `fapp02`. The maximum solution time was set to 600 seconds.

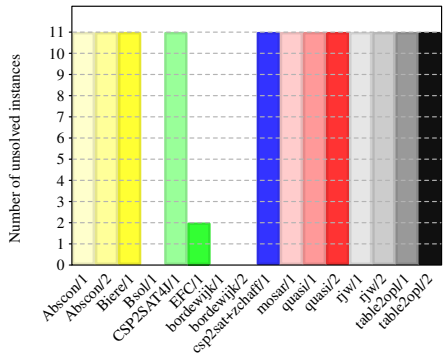

Fig. 410. Number of unsolved instances for class `fapp02`. The maximum solution time was set to 600 seconds.

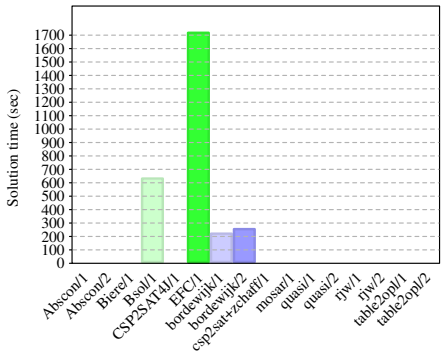

Fig. 411. Solution time in seconds for solved instances from class `fapp02`. The maximum solution time was set to 600 seconds.

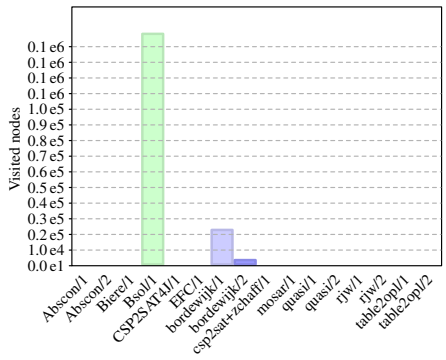

Fig. 412. Visited nodes required for solved instances from class `fapp02`. The maximum solution time was set to 600 seconds.

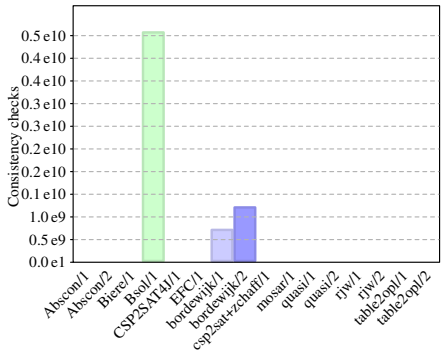

Fig. 413. Consistency checks required for solved instances from class `fapp02`. The maximum solution time was set to 600 seconds.

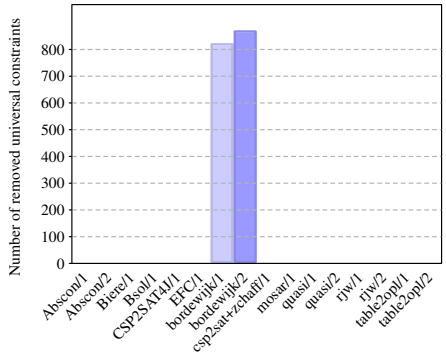

Fig. 414. Number of removed universal constraints for solved instances from class `fapp02`. The maximum solution time was set to 600 seconds.

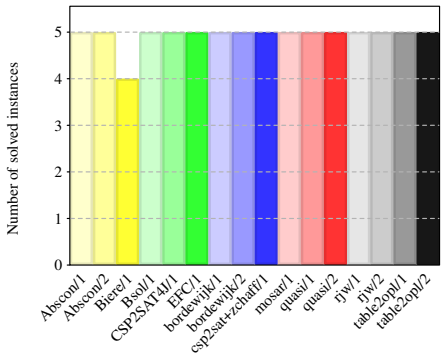

Fig. 415. Number of solved instances for class `frb30-15`. The maximum solution time was set to 600 seconds.

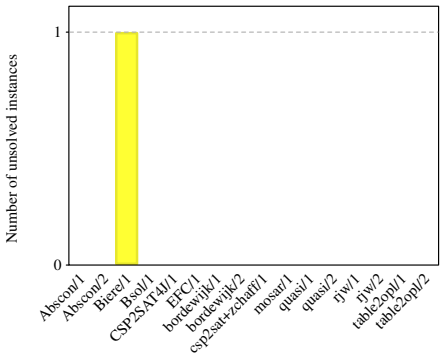

Fig. 416. Number of unsolved instances for class `frb30-15`. The maximum solution time was set to 600 seconds.

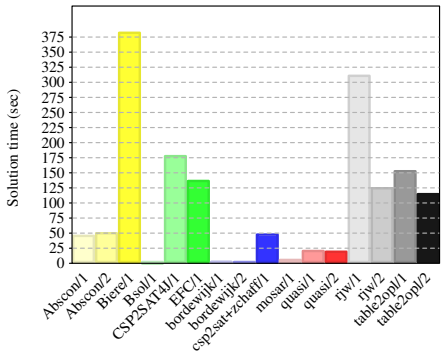

Fig. 417. Solution time in seconds for solved instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

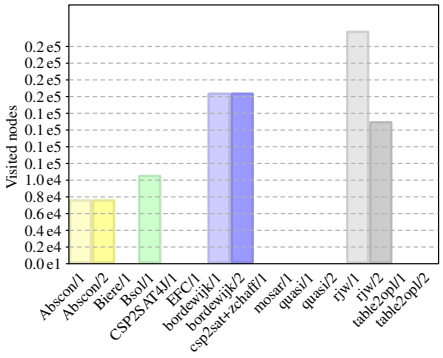

Fig. 418. Visited nodes required for solved instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

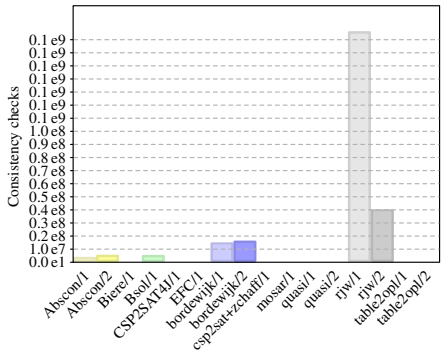

Fig. 419. Consistency checks required for solved instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

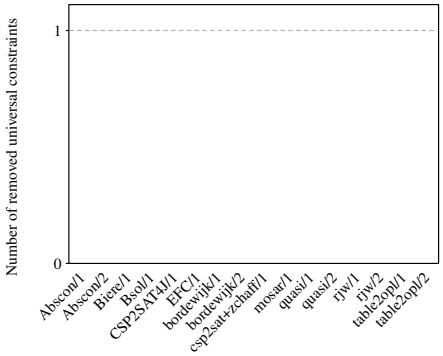

Fig. 420. Number of removed universal constraints for solved instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

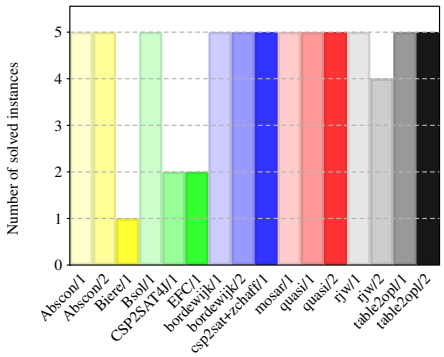

Fig. 421. Number of solved instances for class `frb35-17`. The maximum solution time was set to 600 seconds.

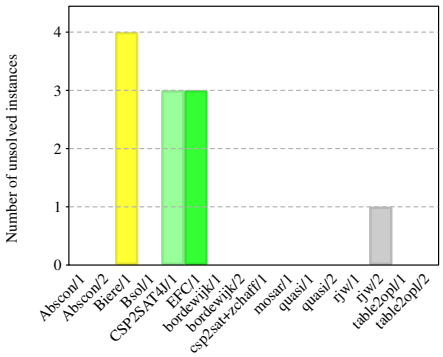

Fig. 422. Number of unsolved instances for class `frb35-17`. The maximum solution time was set to 600 seconds.

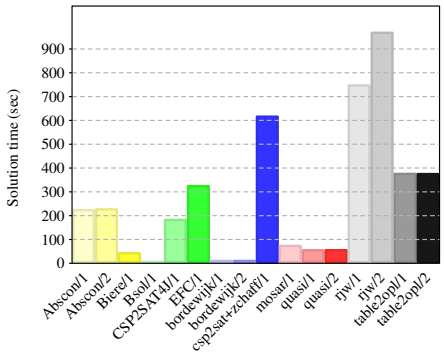

Fig. 423. Solution time in seconds for solved instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

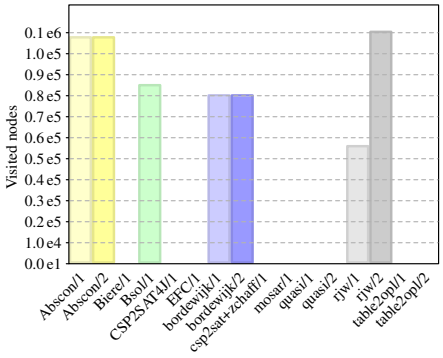

Fig. 424. Visited nodes required for solved instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

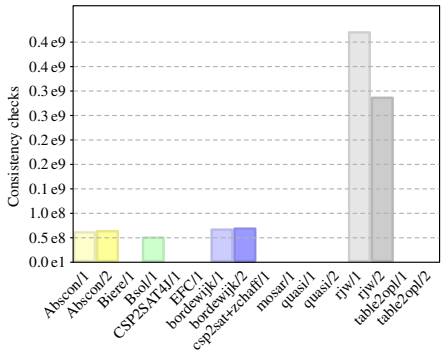

Fig. 425. Consistency checks required for solved instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

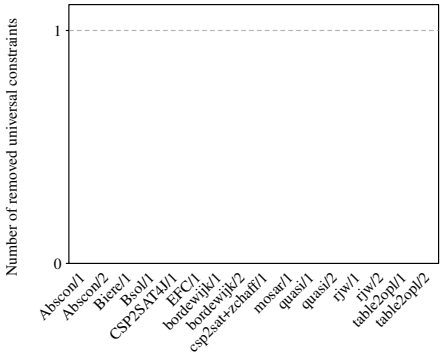

Fig. 426. Number of removed universal constraints for solved instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

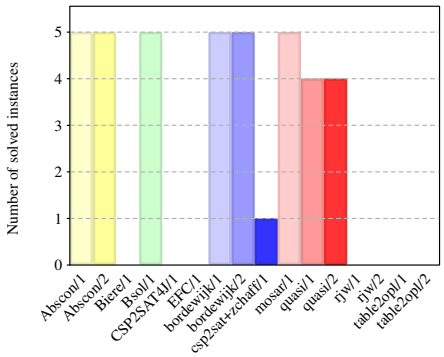

Fig. 427. Number of solved instances for class `frb40-19`. The maximum solution time was set to 600 seconds.

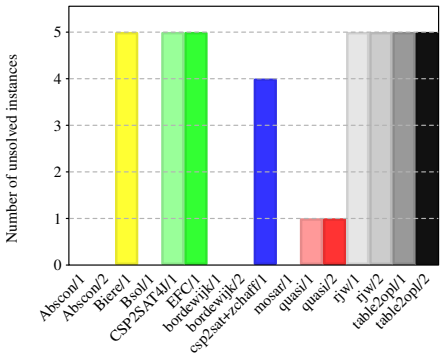

Fig. 428. Number of unsolved instances for class `frb40-19`. The maximum solution time was set to 600 seconds.

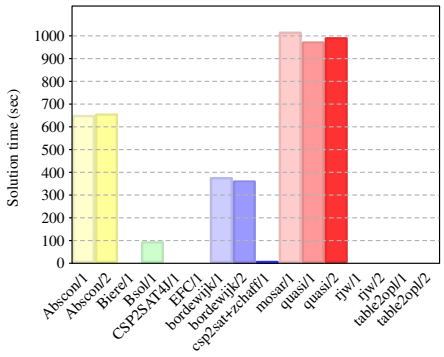

Fig. 429. Solution time in seconds for solved instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

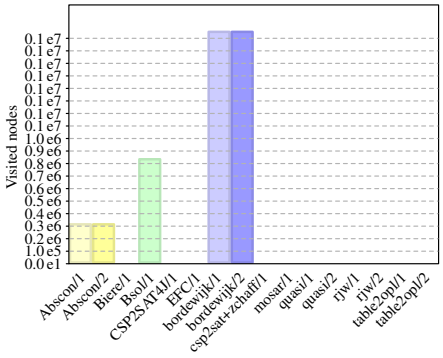

Fig. 430. Visited nodes required for solved instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

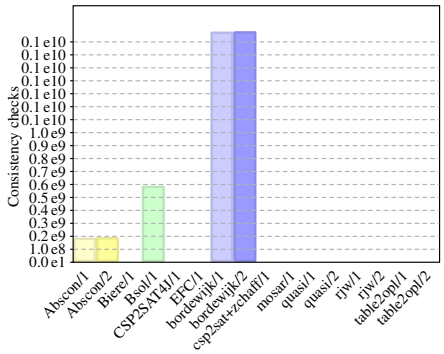

Fig. 431. Consistency checks required for solved instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

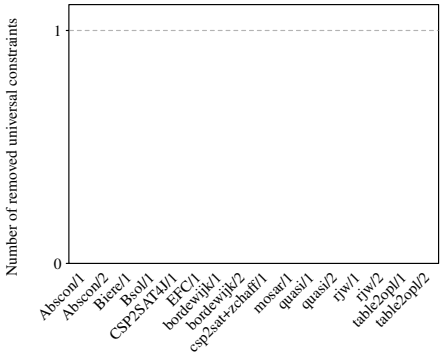

Fig. 432. Number of removed universal constraints for solved instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

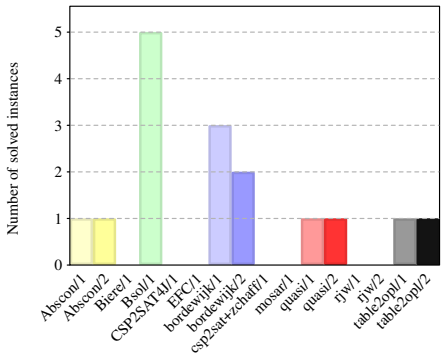

Fig. 433. Number of solved instances for class `frb45-21`. The maximum solution time was set to 600 seconds.

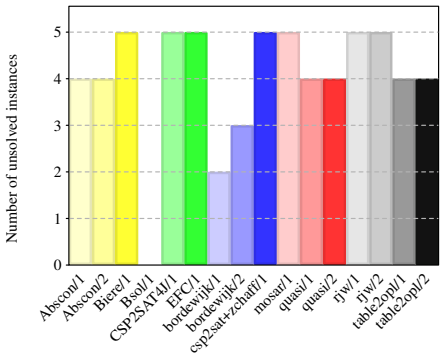

Fig. 434. Number of unsolved instances for class `frb45-21`. The maximum solution time was set to 600 seconds.

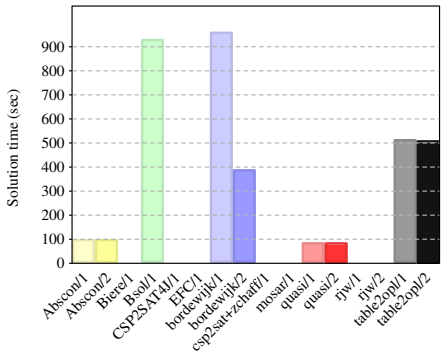

Fig. 435. Solution time in seconds for solved instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

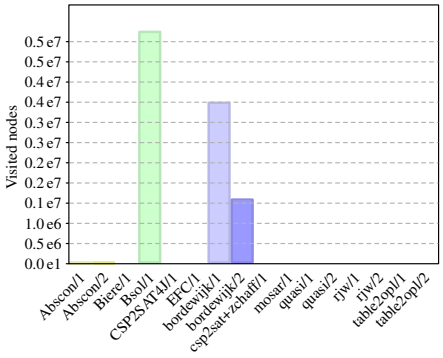

Fig. 436. Visited nodes required for solved instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

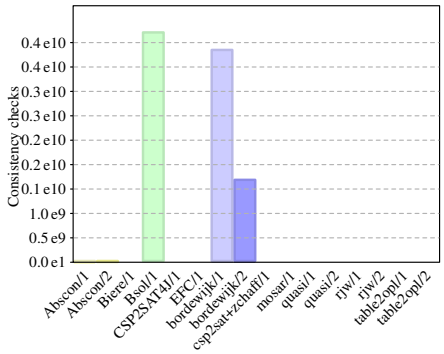

Fig. 437. Consistency checks required for solved instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

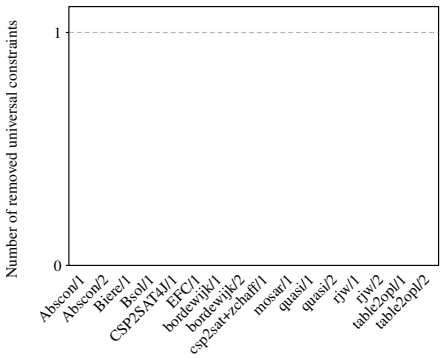

Fig. 438. Number of removed universal constraints for solved instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

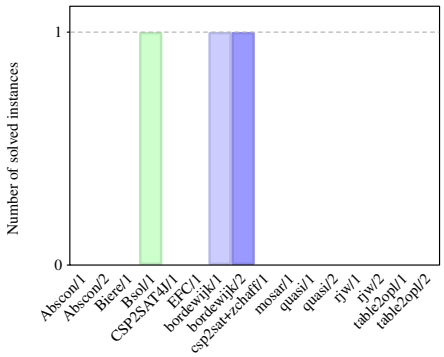

Fig. 439. Number of solved instances for class `frb50-23`. The maximum solution time was set to 600 seconds.

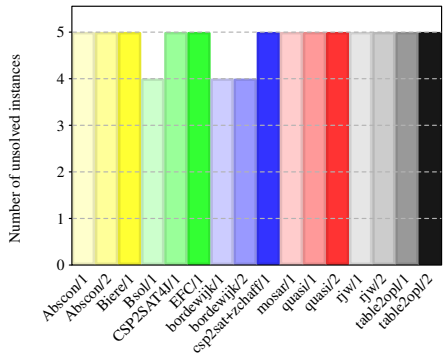

Fig. 440. Number of unsolved instances for class `frb50-23`. The maximum solution time was set to 600 seconds.

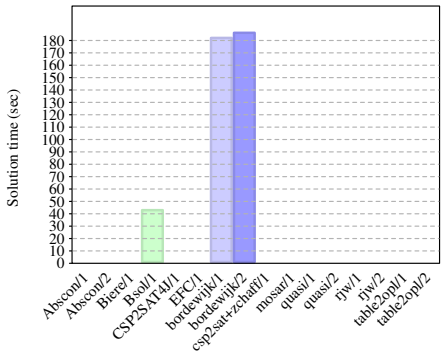

Fig. 441. Solution time in seconds for solved instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

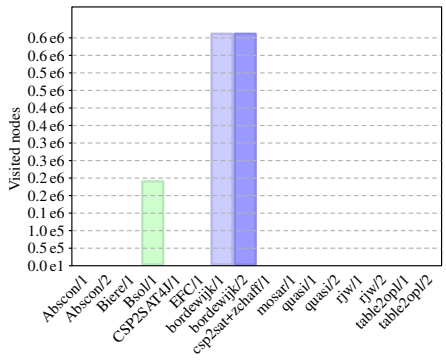

Fig. 442. Visited nodes required for solved instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

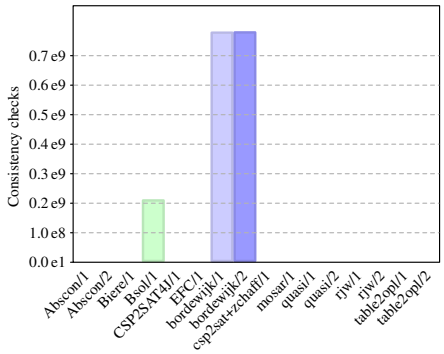

Fig. 443. Consistency checks required for solved instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

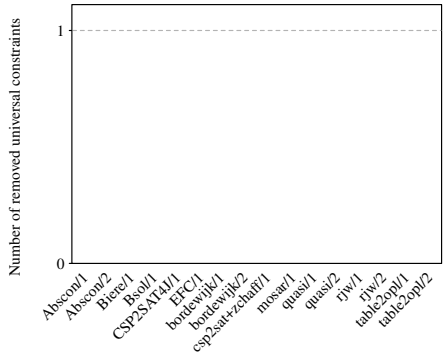

Fig. 444. Number of removed universal constraints for solved instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

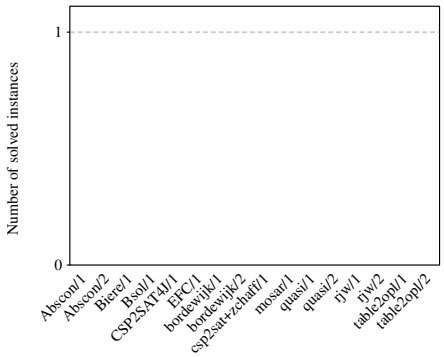

Fig. 445. Number of solved instances for class `frb53-24`. The maximum solution time was set to 600 seconds.

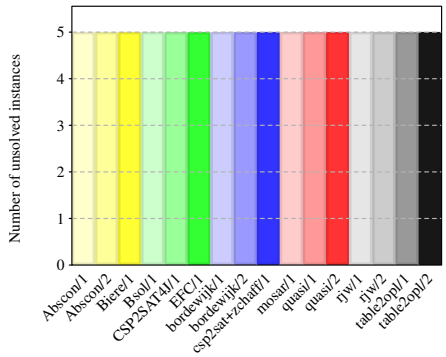

Fig. 446. Number of unsolved instances for class `frb53-24`. The maximum solution time was set to 600 seconds.

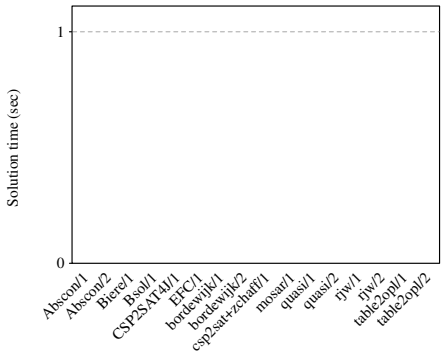

Fig. 447. Solution time in seconds for solved instances from class `frb53-24`. The maximum solution time was set to 600 seconds.

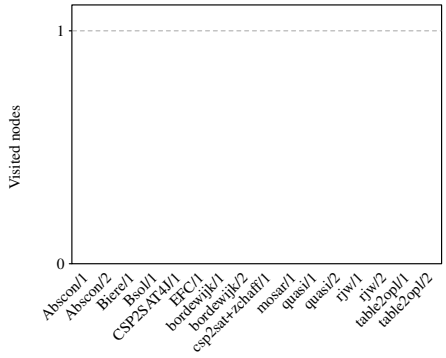

Fig. 448. Visited nodes required for solved instances from class `frb53-24`. The maximum solution time was set to 600 seconds.

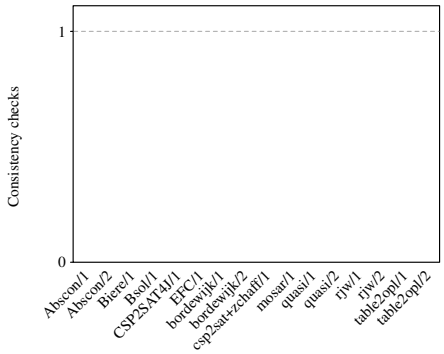

Fig. 449. Consistency checks required for solved instances from class `frb53-24`. The maximum solution time was set to 600 seconds.

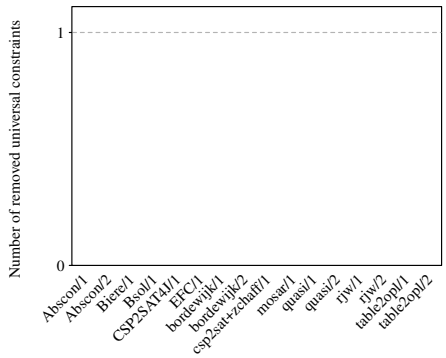

Fig. 450. Number of removed universal constraints for solved instances from class `frb53-24`. The maximum solution time was set to 600 seconds.

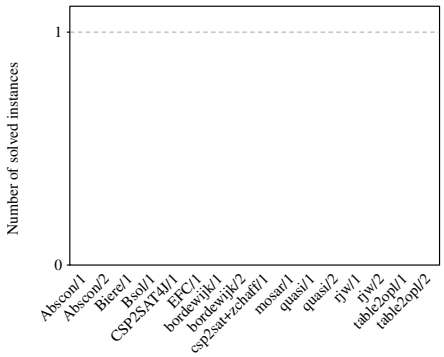

Fig. 451. Number of solved instances for class `frb56-25`. The maximum solution time was set to 600 seconds.

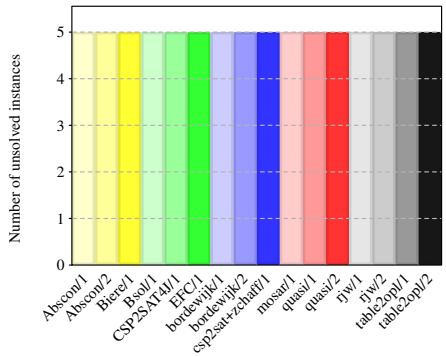

Fig. 452. Number of unsolved instances for class `frb56-25`. The maximum solution time was set to 600 seconds.

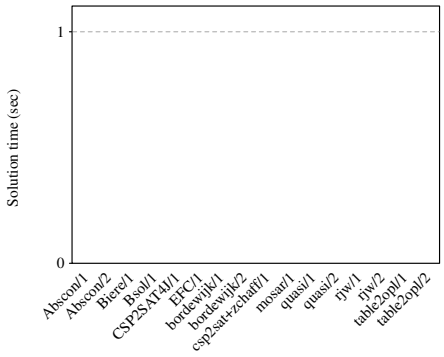

Fig. 453. Solution time in seconds for solved instances from class `frb56-25`. The maximum solution time was set to 600 seconds.

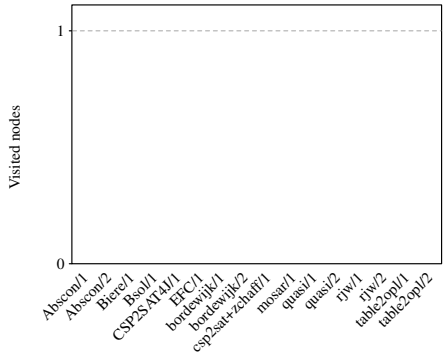

Fig. 454. Visited nodes required for solved instances from class `frb56-25`. The maximum solution time was set to 600 seconds.

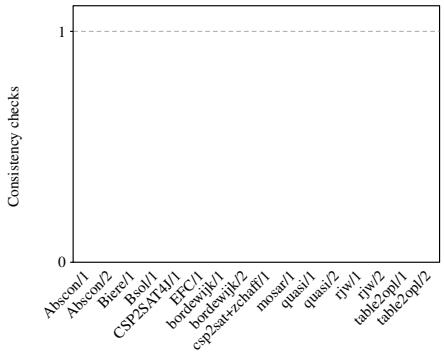

Fig. 455. Consistency checks required for solved instances from class `frb56-25`. The maximum solution time was set to 600 seconds.

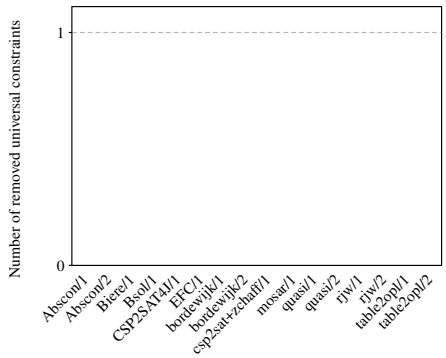

Fig. 456. Number of removed universal constraints for solved instances from class `frb56-25`. The maximum solution time was set to 600 seconds.

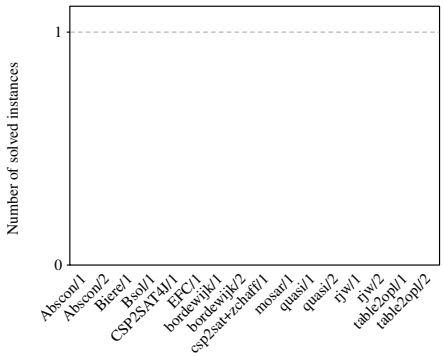

Fig. 457. Number of solved instances for class `frb59-26`. The maximum solution time was set to 600 seconds.

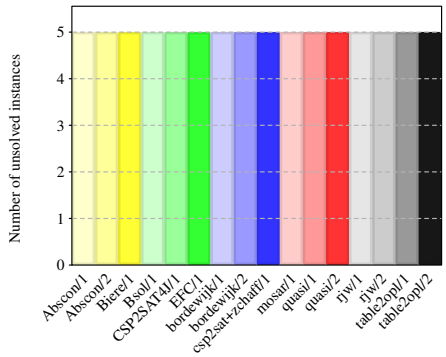

Fig. 458. Number of unsolved instances for class `frb59-26`. The maximum solution time was set to 600 seconds.

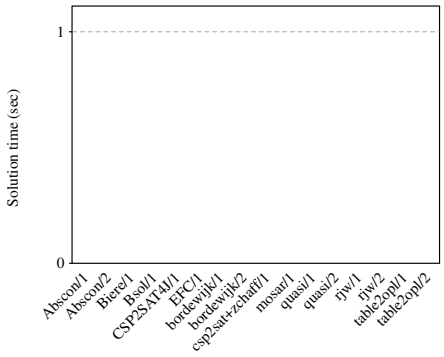

Fig. 459. Solution time in seconds for solved instances from class `frb59-26`. The maximum solution time was set to 600 seconds.

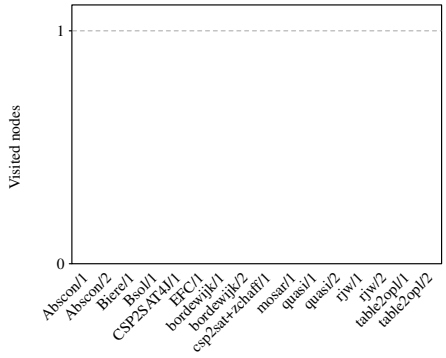

Fig. 460. Visited nodes required for solved instances from class `frb59-26`. The maximum solution time was set to 600 seconds.

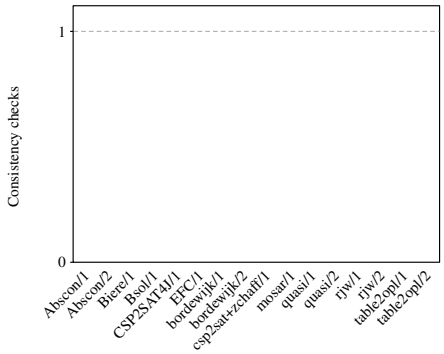

Fig. 461. Consistency checks required for solved instances from class `frb59-26`. The maximum solution time was set to 600 seconds.

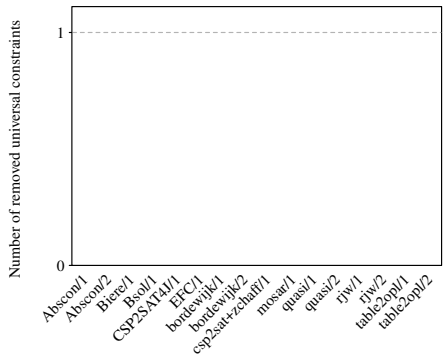

Fig. 462. Number of removed universal constraints for solved instances from class `frb59-26`. The maximum solution time was set to 600 seconds.

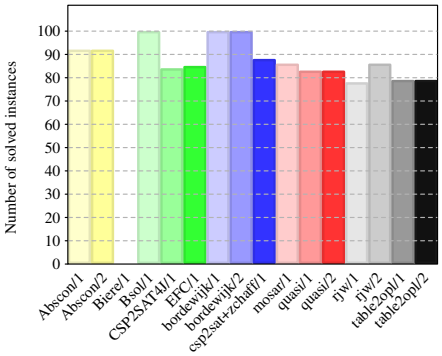

Fig. 463. Number of solved instances for class `geom`. The maximum solution time was set to 600 seconds.

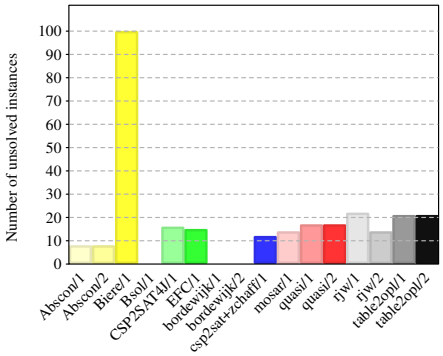

Fig. 464. Number of unsolved instances for class `geom`. The maximum solution time was set to 600 seconds.

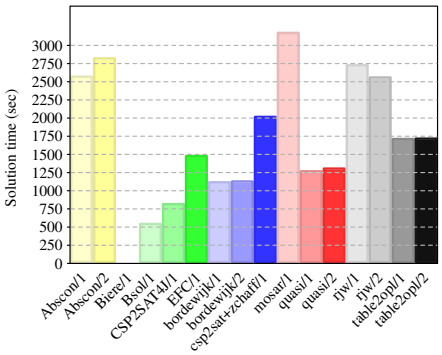

Fig. 465. Solution time in seconds for solved instances from class `geom`. The maximum solution time was set to 600 seconds.

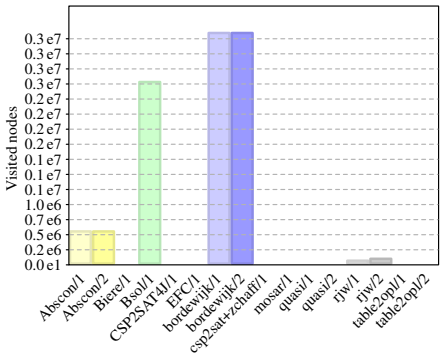

Fig. 466. Visited nodes required for solved instances from class `geom`. The maximum solution time was set to 600 seconds.

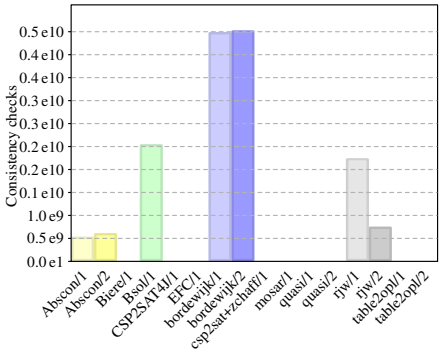

Fig. 467. Consistency checks required for solved instances from class `geom`. The maximum solution time was set to 600 seconds.

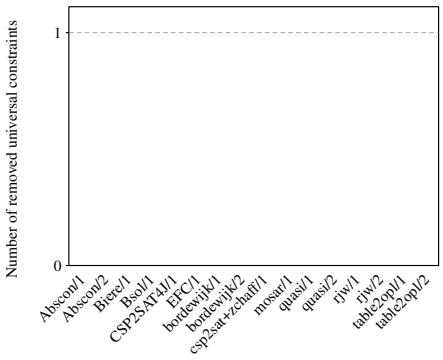

Fig. 468. Number of removed universal constraints for solved instances from class `geom`. The maximum solution time was set to 600 seconds.

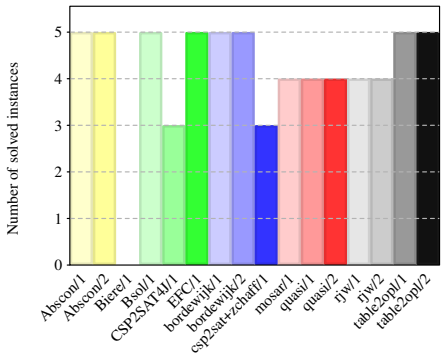

Fig. 469. Number of solved instances for class `hanoi1`. The maximum solution time was set to 600 seconds.

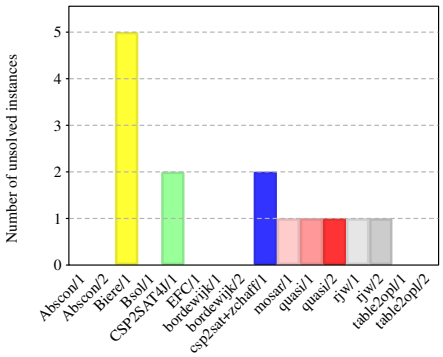

Fig. 470. Number of unsolved instances for class `hanoi1`. The maximum solution time was set to 600 seconds.

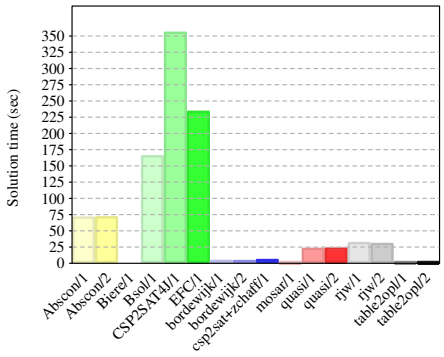

Fig. 471. Solution time in seconds for solved instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

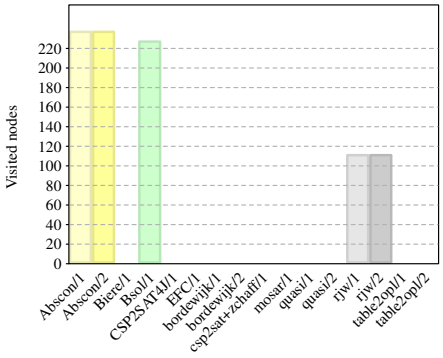

Fig. 472. Visited nodes required for solved instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

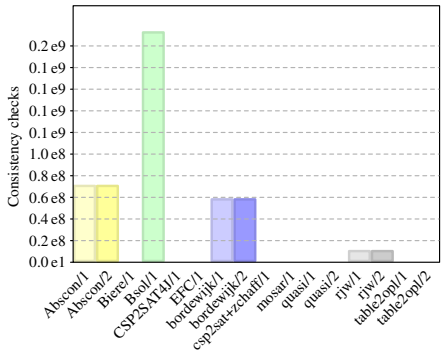

Fig. 473. Consistency checks required for solved instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

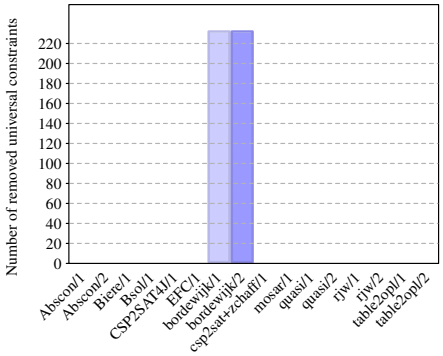

Fig. 474. Number of removed universal constraints for solved instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

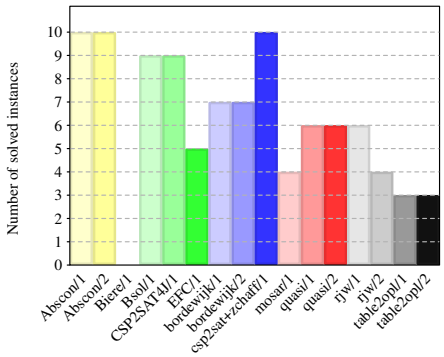

Fig. 475. Number of solved instances for class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

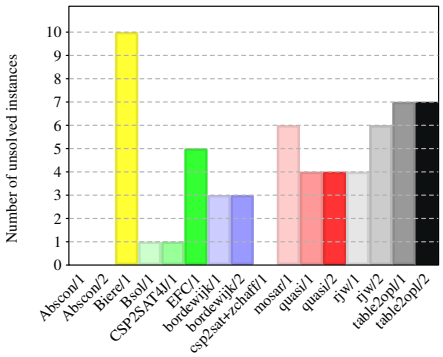

Fig. 476. Number of unsolved instances for class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

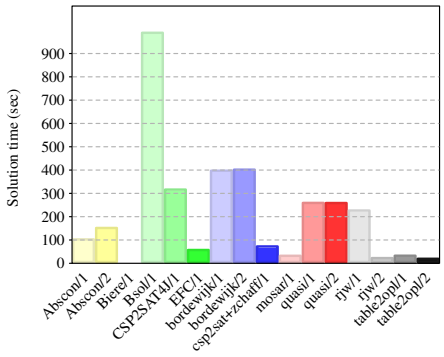

Fig. 477. Solution time in seconds for solved instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

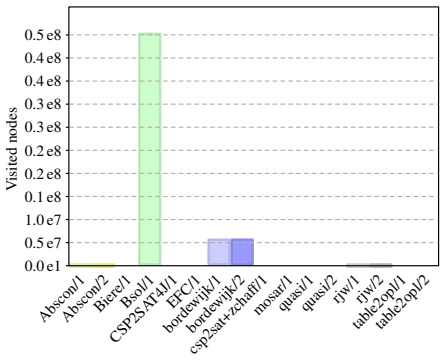

Fig. 478. Visited nodes required for solved instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

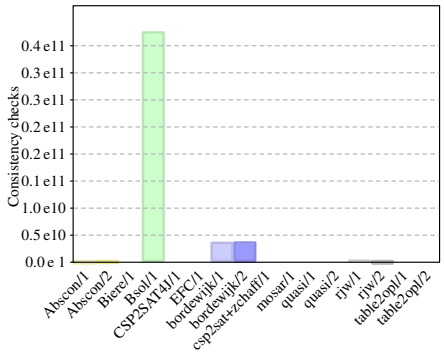

Fig. 479. Consistency checks required for solved instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

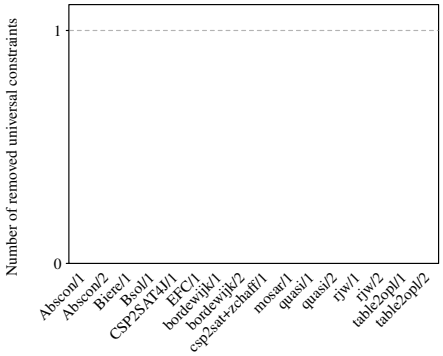

Fig. 480. Number of removed universal constraints for solved instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

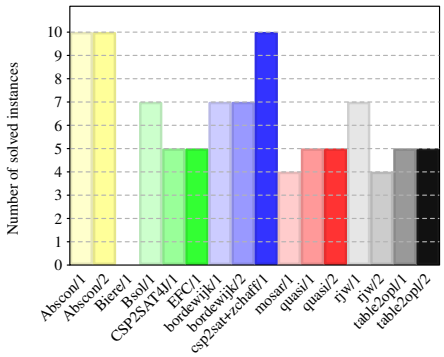

Fig. 481. Number of solved instances for class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

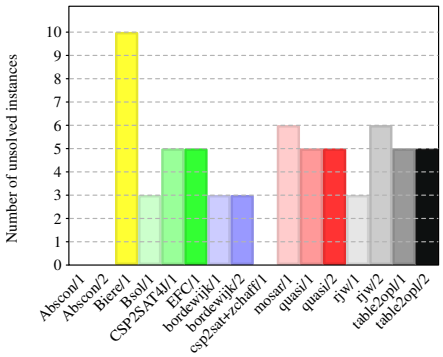

Fig. 482. Number of unsolved instances for class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

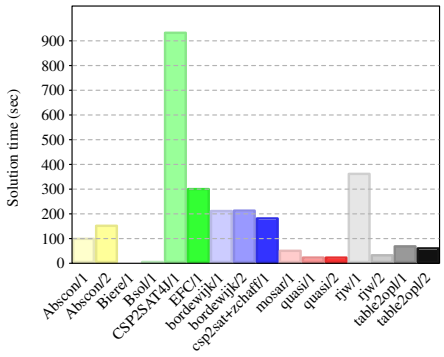

Fig. 483. Solution time in seconds for solved instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

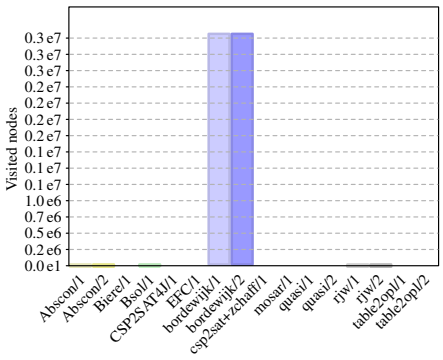

Fig. 484. Visited nodes required for solved instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

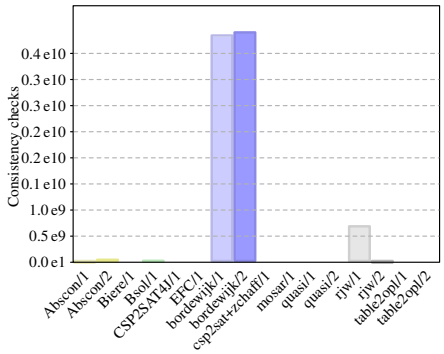

Fig. 485. Consistency checks required for solved instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

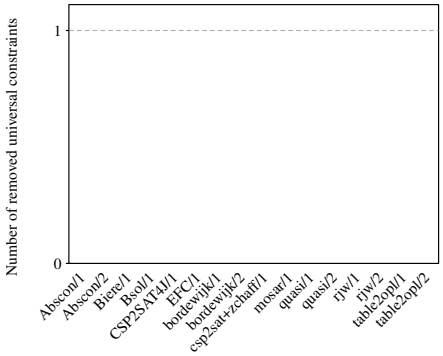

Fig. 486. Number of removed universal constraints for solved instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

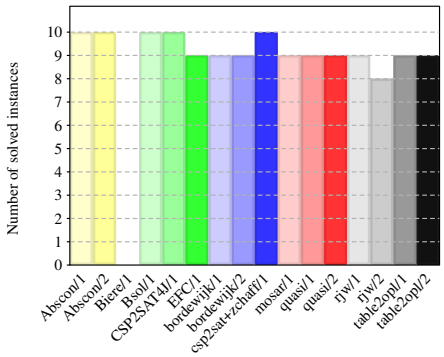

Fig. 487. Number of solved instances for class `js-enddr1`. The maximum solution time was set to 600 seconds.

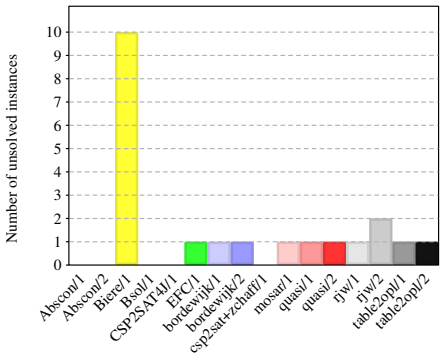

Fig. 488. Number of unsolved instances for class `js-enddr1`. The maximum solution time was set to 600 seconds.

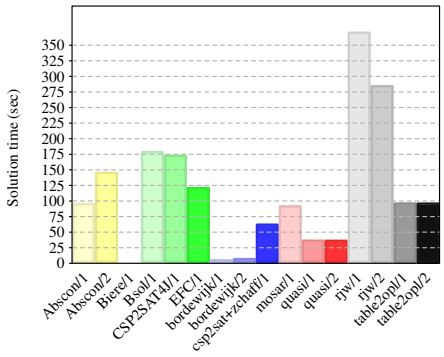

Fig. 489. Solution time in seconds for solved instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

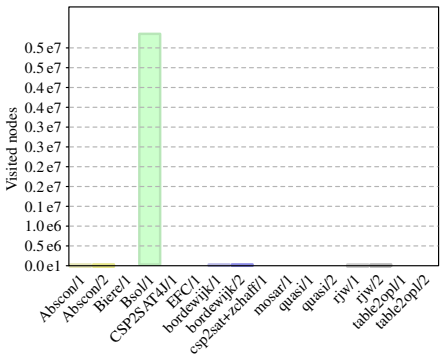

Fig. 490. Visited nodes required for solved instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

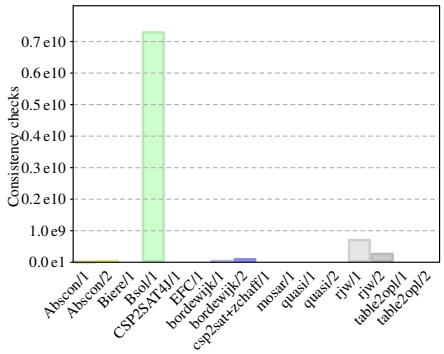

Fig. 491. Consistency checks required for solved instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

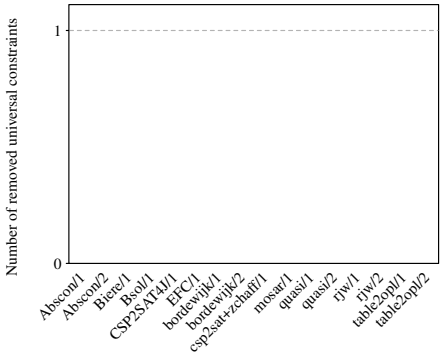

Fig. 492. Number of removed universal constraints for solved instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

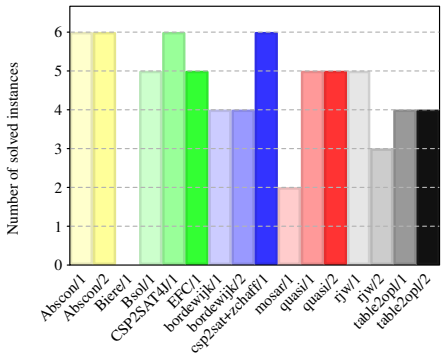

Fig. 493. Number of solved instances for class `js-enddr2`. The maximum solution time was set to 600 seconds.

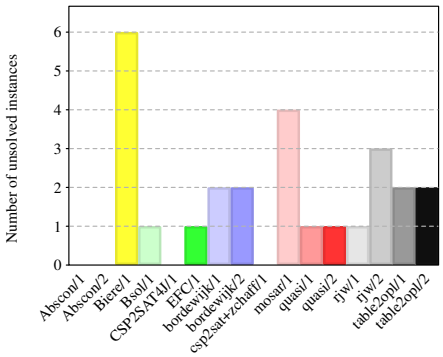

Fig. 494. Number of unsolved instances for class `js-enddr2`. The maximum solution time was set to 600 seconds.

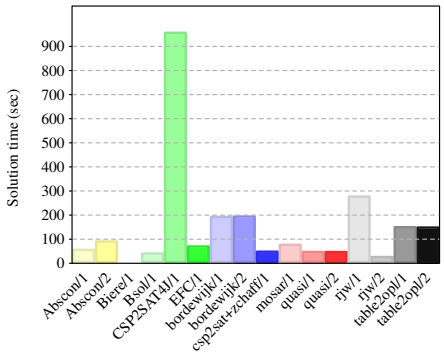

Fig. 495. Solution time in seconds for solved instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

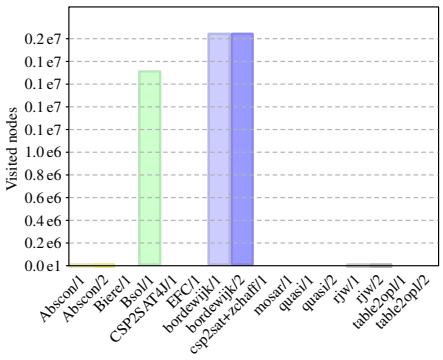

Fig. 496. Visited nodes required for solved instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

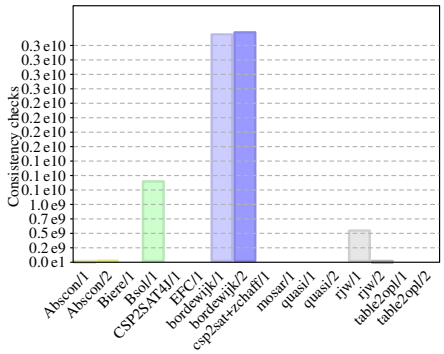

Fig. 497. Consistency checks required for solved instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

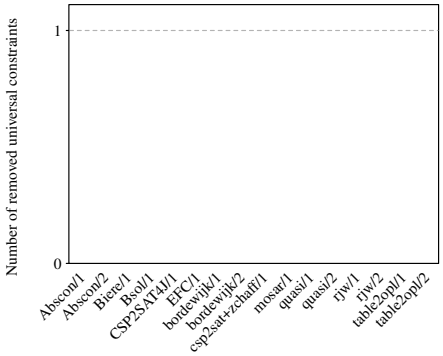

Fig. 498. Number of removed universal constraints for solved instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

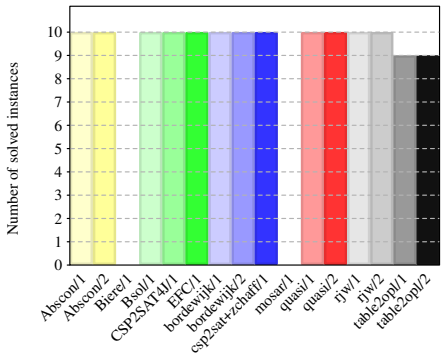

Fig. 499. Number of solved instances for class `js-ewddr2`. The maximum solution time was set to 600 seconds.

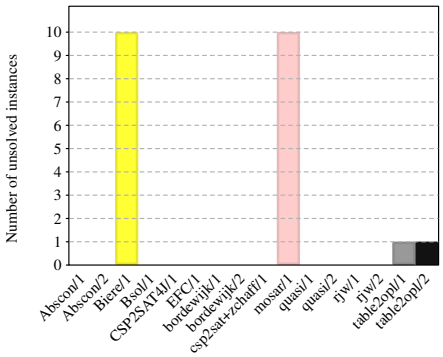

Fig. 500. Number of unsolved instances for class `js-ewddr2`. The maximum solution time was set to 600 seconds.

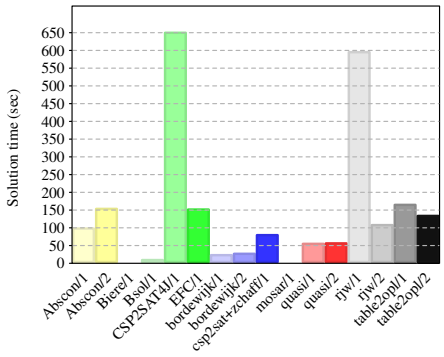

Fig. 501. Solution time in seconds for solved instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

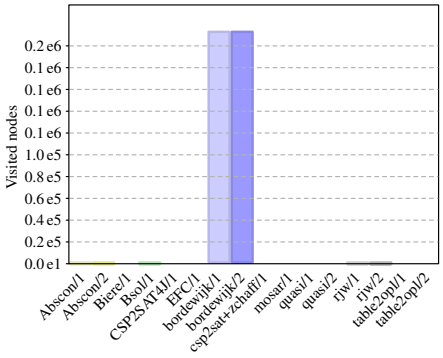

Fig. 502. Visited nodes required for solved instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

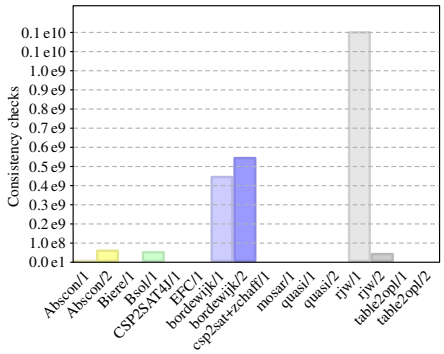

Fig. 503. Consistency checks required for solved instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

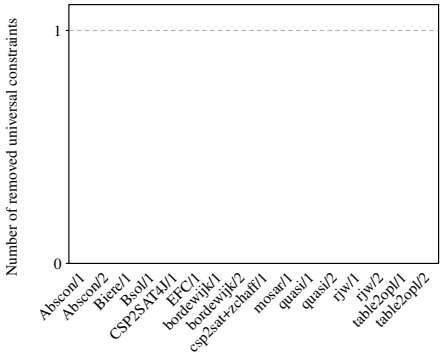

Fig. 504. Number of removed universal constraints for solved instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

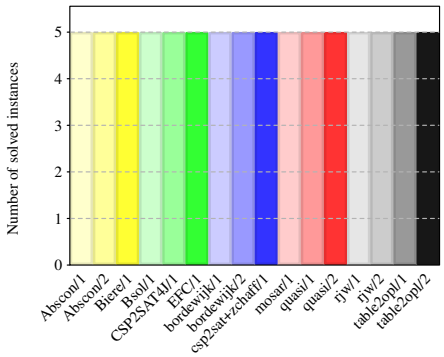

Fig. 505. Number of solved instances for class `lsq-dg1`. The maximum solution time was set to 600 seconds.

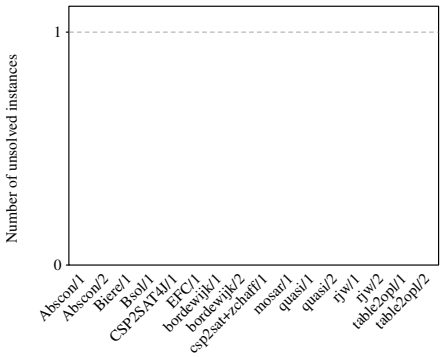

Fig. 506. Number of unsolved instances for class `lsq-dg1`. The maximum solution time was set to 600 seconds.

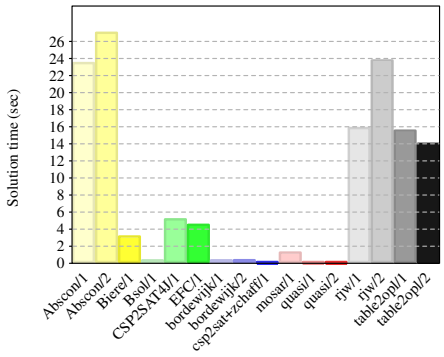

Fig. 507. Solution time in seconds for solved instances from class `lsq-dg1`. The maximum solution time was set to 600 seconds.

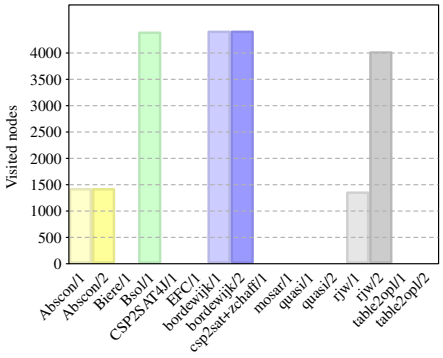

Fig. 508. Visited nodes required for solved instances from class `lsq-dg1`. The maximum solution time was set to 600 seconds.

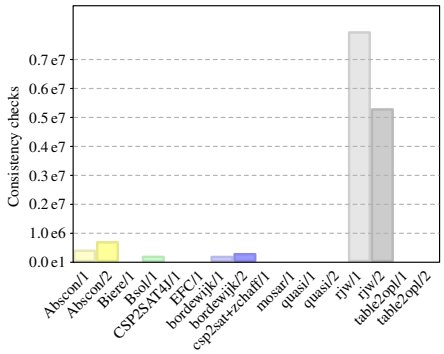

Fig. 509. Consistency checks required for solved instances from class `lsq-dg1`. The maximum solution time was set to 600 seconds.

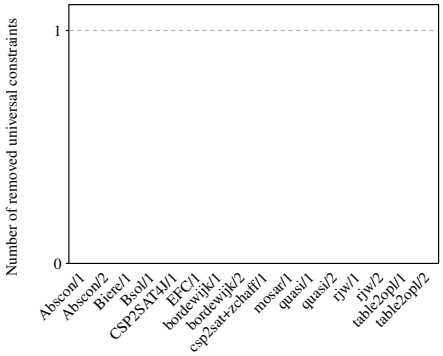

Fig. 510. Number of removed universal constraints for solved instances from class `lsq-dg1`. The maximum solution time was set to 600 seconds.

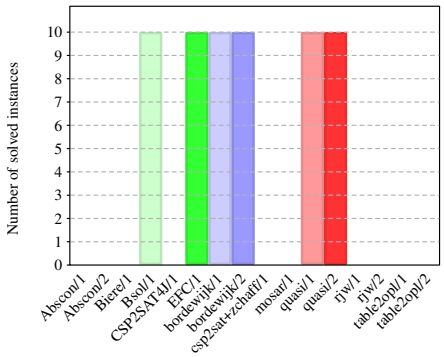

Fig. 511. Number of solved instances for class `marc`. The maximum solution time was set to 600 seconds.

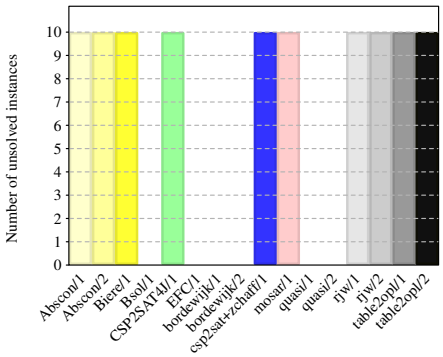

Fig. 512. Number of unsolved instances for class `marc`. The maximum solution time was set to 600 seconds.

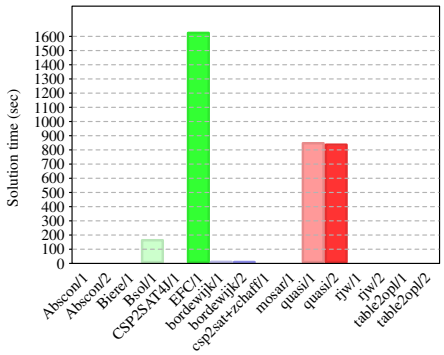

Fig. 513. Solution time in seconds for solved instances from class `marc`. The maximum solution time was set to 600 seconds.

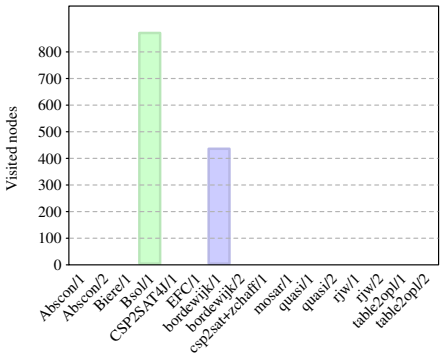

Fig. 514. Visited nodes required for solved instances from class `marc`. The maximum solution time was set to 600 seconds.

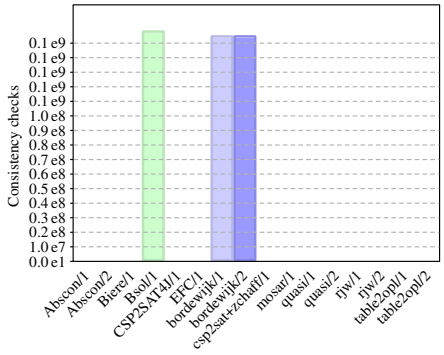

Fig. 515. Consistency checks required for solved instances from class `marc`. The maximum solution time was set to 600 seconds.

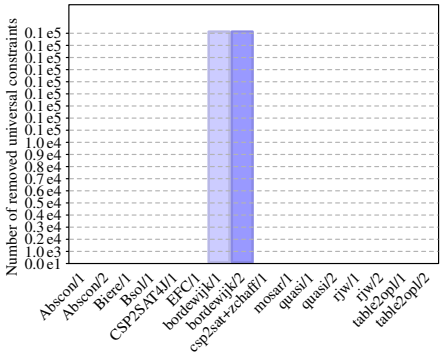

Fig. 516. Number of removed universal constraints for solved instances from class `marc`. The maximum solution time was set to 600 seconds.

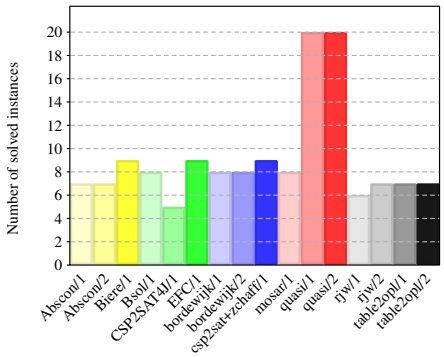

Fig. 517. Number of solved instances for class `pigeons`. The maximum solution time was set to 600 seconds.

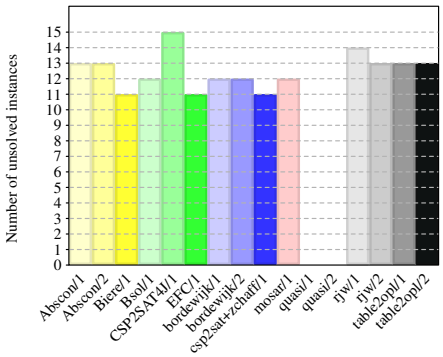

Fig. 518. Number of unsolved instances for class `pigeons`. The maximum solution time was set to 600 seconds.

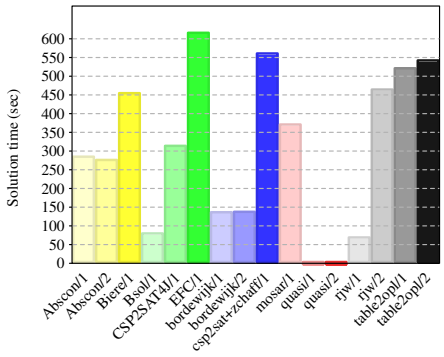

Fig. 519. Solution time in seconds for solved instances from class `pigeons`. The maximum solution time was set to 600 seconds.

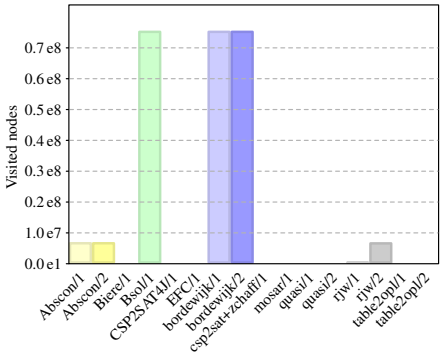

Fig. 520. Visited nodes required for solved instances from class `pigeons`. The maximum solution time was set to 600 seconds.

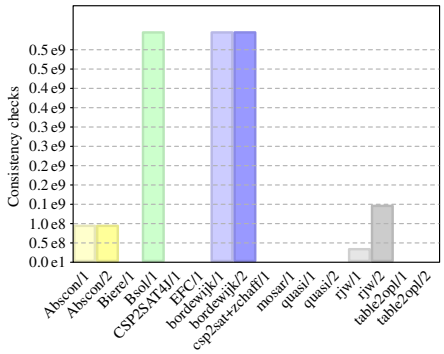

Fig. 521. Consistency checks required for solved instances from class `pigeons`. The maximum solution time was set to 600 seconds.

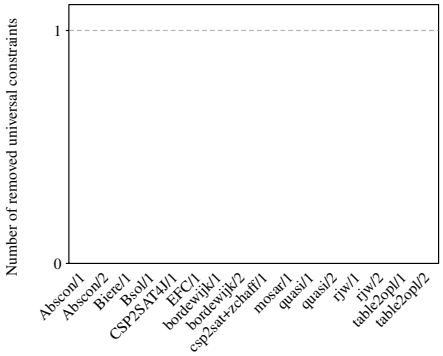

Fig. 522. Number of removed universal constraints for solved instances from class `pigeons`. The maximum solution time was set to 600 seconds.

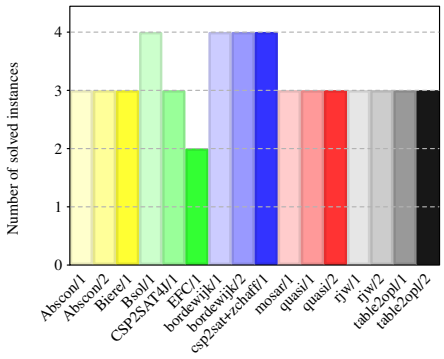

Fig. 523. Number of solved instances for class `qa1`. The maximum solution time was set to 600 seconds.

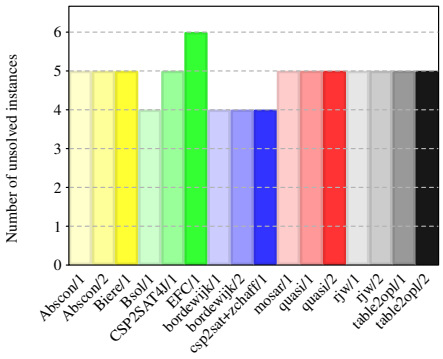

Fig. 524. Number of unsolved instances for class `qa1`. The maximum solution time was set to 600 seconds.

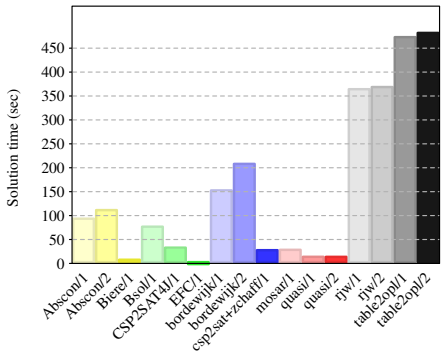

Fig. 525. Solution time in seconds for solved instances from class `qa1`. The maximum solution time was set to 600 seconds.

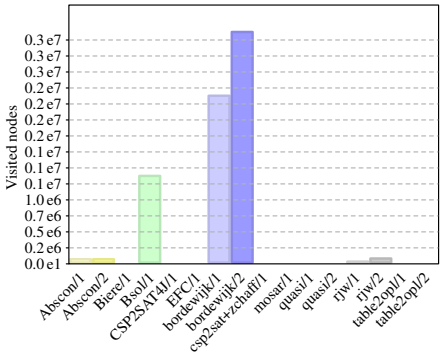

Fig. 526. Visited nodes required for solved instances from class `qa1`. The maximum solution time was set to 600 seconds.

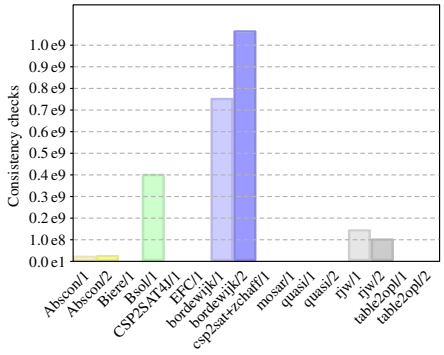

Fig. 527. Consistency checks required for solved instances from class `qa1`. The maximum solution time was set to 600 seconds.

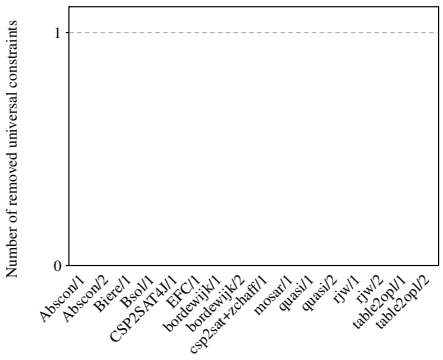

Fig. 528. Number of removed universal constraints for solved instances from class `qa1`. The maximum solution time was set to 600 seconds.

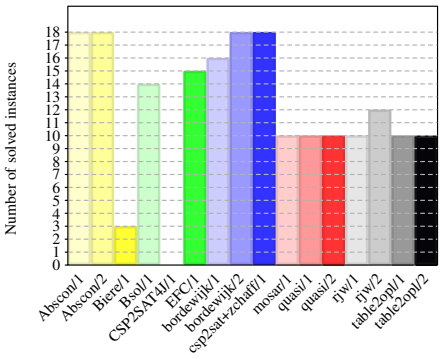

Fig. 529. Number of solved instances for class `qk1`. The maximum solution time was set to 600 seconds.

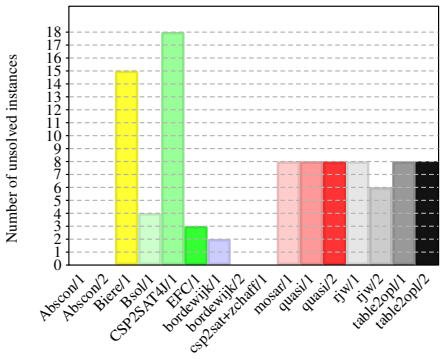

Fig. 530. Number of unsolved instances for class `qk1`. The maximum solution time was set to 600 seconds.

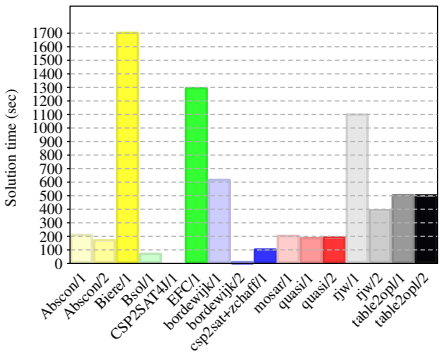

Fig. 531. Solution time in seconds for solved instances from class `qk1`. The maximum solution time was set to 600 seconds.

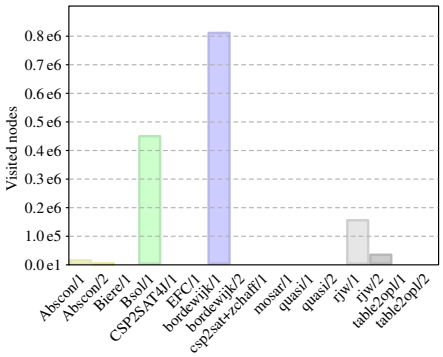

Fig. 532. Visited nodes required for solved instances from class `qk1`. The maximum solution time was set to 600 seconds.

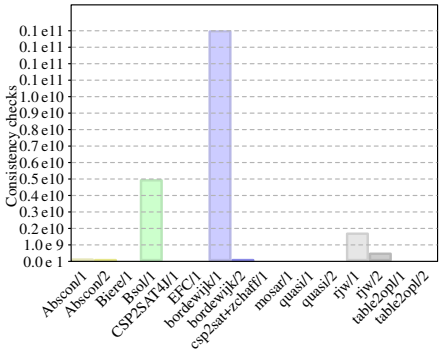

Fig. 533. Consistency checks required for solved instances from class `qk1`. The maximum solution time was set to 600 seconds.

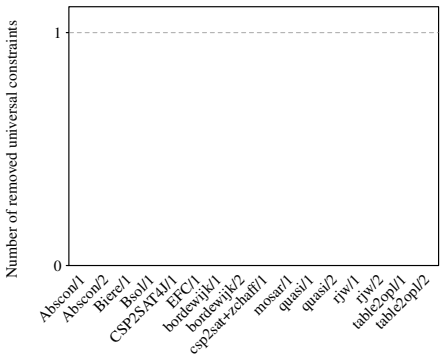

Fig. 534. Number of removed universal constraints for solved instances from class `qk1`. The maximum solution time was set to 600 seconds.

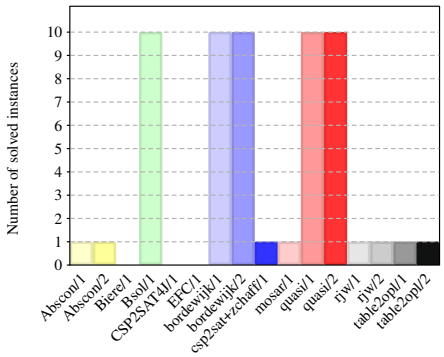

Fig. 535. Number of solved instances for class `random-23-23-253`. The maximum solution time was set to 600 seconds.

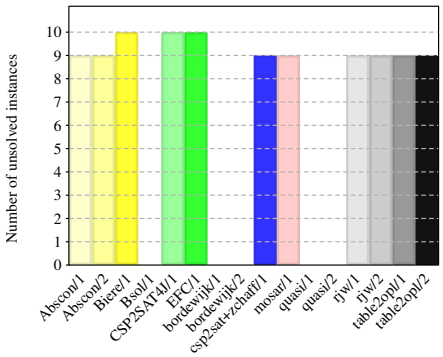

Fig. 536. Number of unsolved instances for class `random-23-23-253`. The maximum solution time was set to 600 seconds.

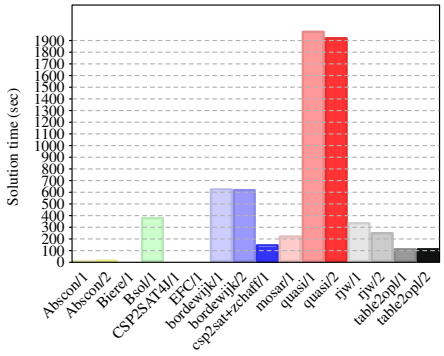

Fig. 537. Solution time in seconds for solved instances from class `random-23-23-253`. The maximum solution time was set to 600 seconds.

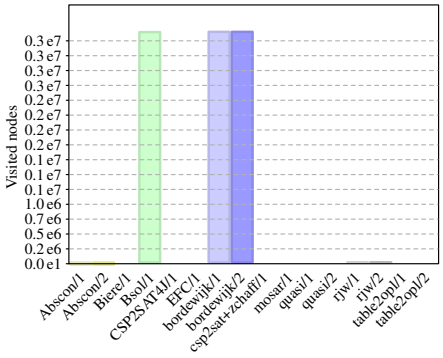

Fig. 538. Visited nodes required for solved instances from class `random-23-23-253`. The maximum solution time was set to 600 seconds.

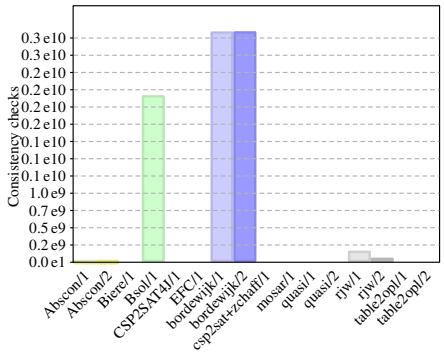

Fig. 539. Consistency checks required for solved instances from class `random-23-23-253`. The maximum solution time was set to 600 seconds.

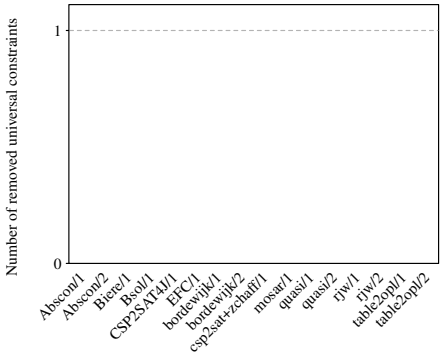

Fig. 540. Number of removed universal constraints for solved instances from class `random-23-23-253`. The maximum solution time was set to 600 seconds.

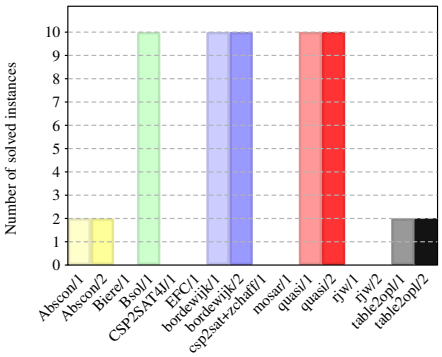

Fig. 541. Number of solved instances for class `random-24-24-276`. The maximum solution time was set to 600 seconds.

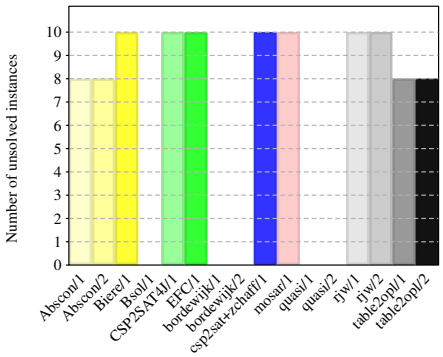

Fig. 542. Number of unsolved instances for class `random-24-24-276`. The maximum solution time was set to 600 seconds.

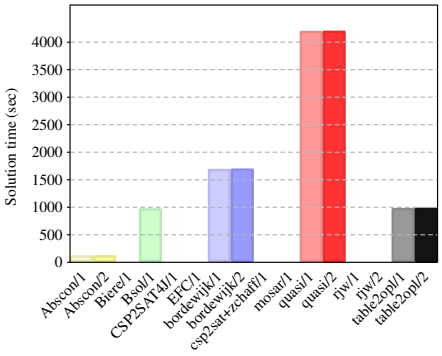

Fig. 543. Solution time in seconds for solved instances from class `random-24-24-276`. The maximum solution time was set to 600 seconds.

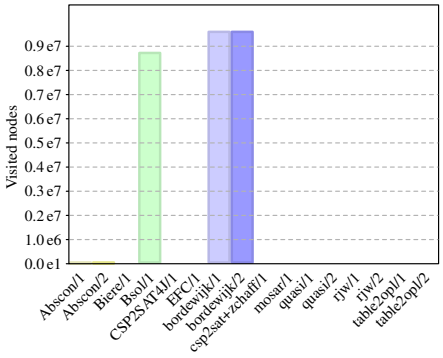

Fig. 544. Visited nodes required for solved instances from class `random-24-24-276`. The maximum solution time was set to 600 seconds.

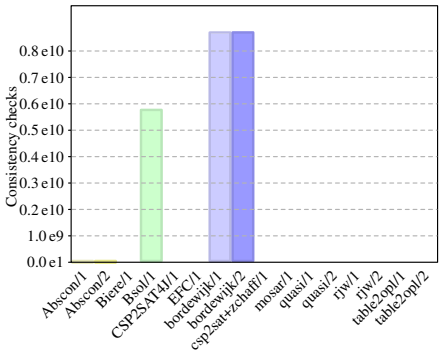

Fig. 545. Consistency checks required for solved instances from class `random-24-24-276`. The maximum solution time was set to 600 seconds.

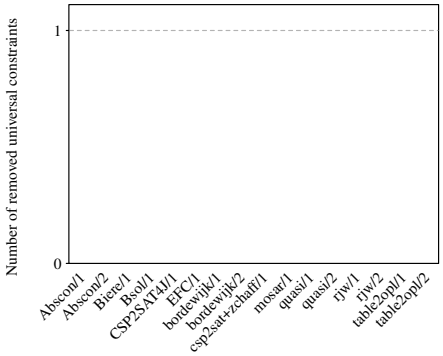

Fig. 546. Number of removed universal constraints for solved instances from class `random-24-24-276`. The maximum solution time was set to 600 seconds.

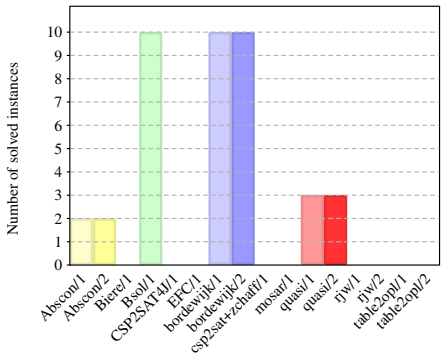

Fig. 547. Number of solved instances for class `random-25-25-300`. The maximum solution time was set to 600 seconds.

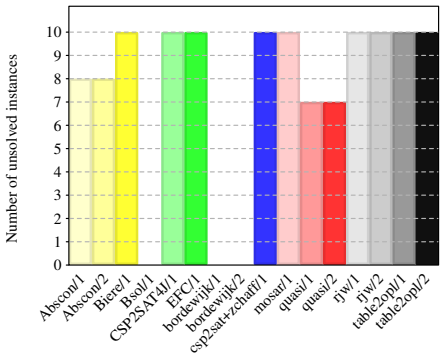

Fig. 548. Number of unsolved instances for class `random-25-25-300`. The maximum solution time was set to 600 seconds.

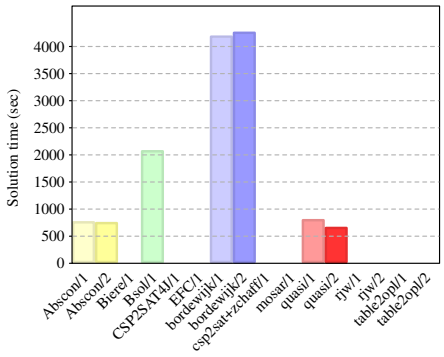

Fig. 549. Solution time in seconds for solved instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

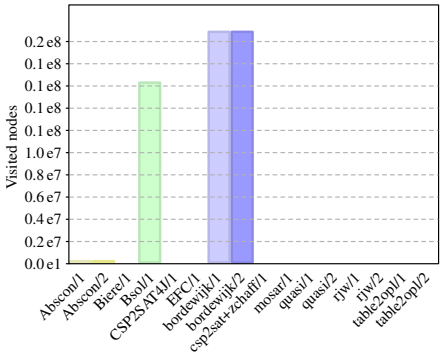

Fig. 550. Visited nodes required for solved instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

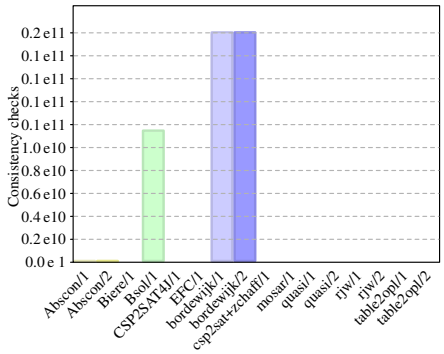

Fig. 551. Consistency checks required for solved instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

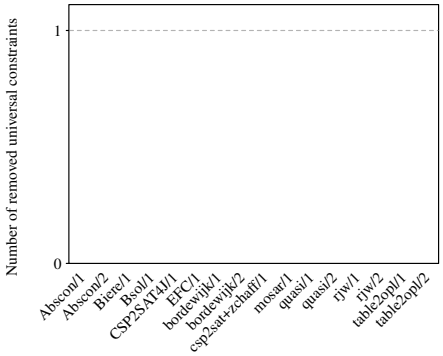

Fig. 552. Number of removed universal constraints for solved instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

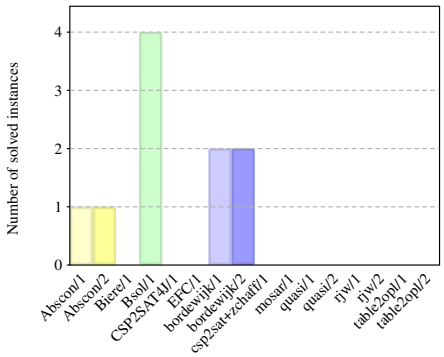

Fig. 553. Number of solved instances for class `random-26-26-325`. The maximum solution time was set to 600 seconds.

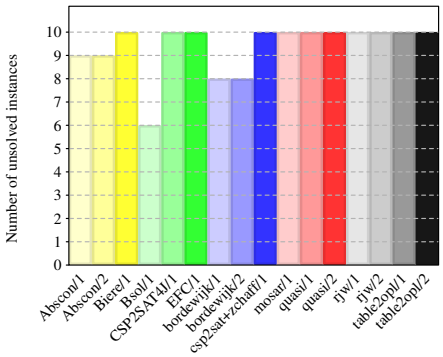

Fig. 554. Number of unsolved instances for class `random-26-26-325`. The maximum solution time was set to 600 seconds.

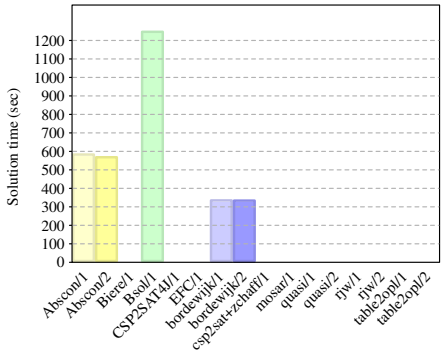

Fig. 555. Solution time in seconds for solved instances from class `random-26-26-325`. The maximum solution time was set to 600 seconds.

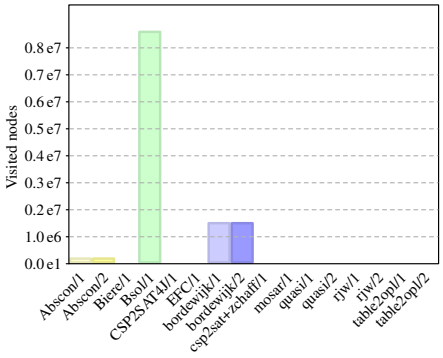

Fig. 556. Visited nodes required for solved instances from class `random-26-26-325`. The maximum solution time was set to 600 seconds.

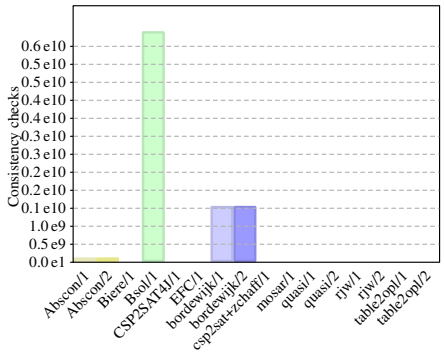

Fig. 557. Consistency checks required for solved instances from class `random-26-26-325`. The maximum solution time was set to 600 seconds.

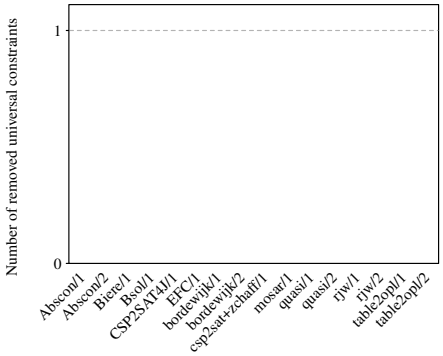

Fig. 558. Number of removed universal constraints for solved instances from class `random-26-26-325`. The maximum solution time was set to 600 seconds.

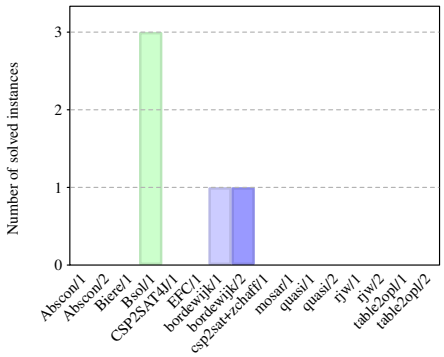

Fig. 559. Number of solved instances for class `random-27-27-351`. The maximum solution time was set to 600 seconds.

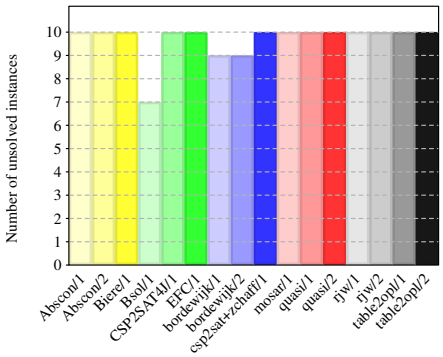

Fig. 560. Number of unsolved instances for class `random-27-27-351`. The maximum solution time was set to 600 seconds.

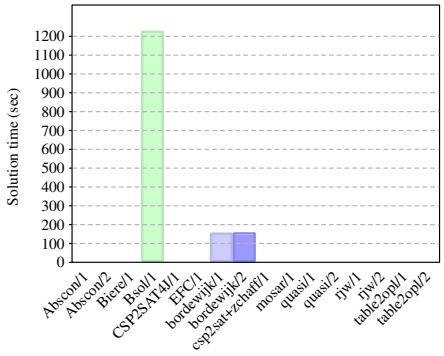

Fig. 561. Solution time in seconds for solved instances from class `random-27-27-351`. The maximum solution time was set to 600 seconds.

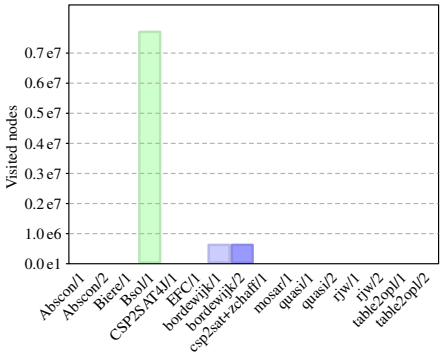

Fig. 562. Visited nodes required for solved instances from class `random-27-27-351`. The maximum solution time was set to 600 seconds.

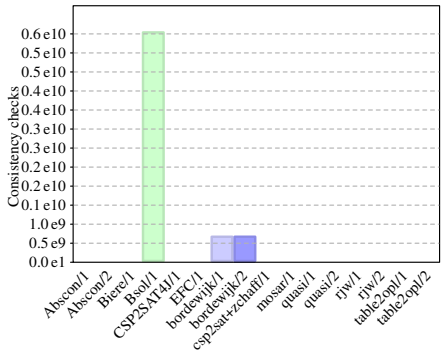

Fig. 563. Consistency checks required for solved instances from class `random-27-27-351`. The maximum solution time was set to 600 seconds.

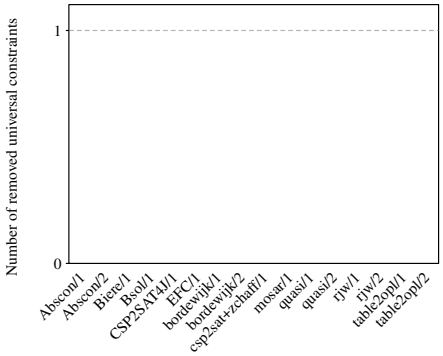

Fig. 564. Number of removed universal constraints for solved instances from class `random-27-27-351`. The maximum solution time was set to 600 seconds.

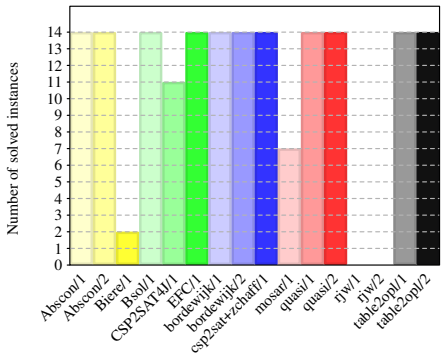

Fig. 565. Number of solved instances for class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

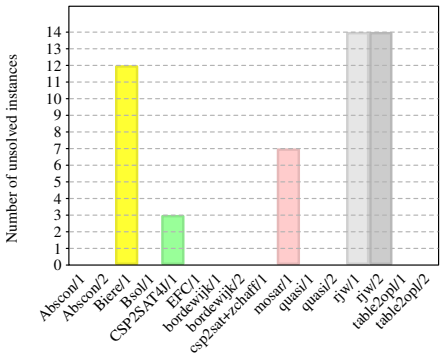

Fig. 566. Number of unsolved instances for class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

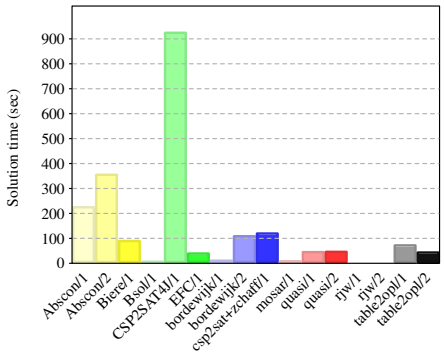

Fig. 567. Solution time in seconds for solved instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

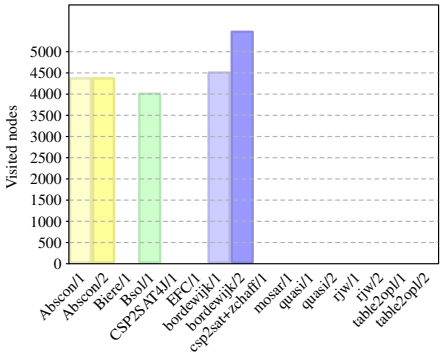

Fig. 568. Visited nodes required for solved instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

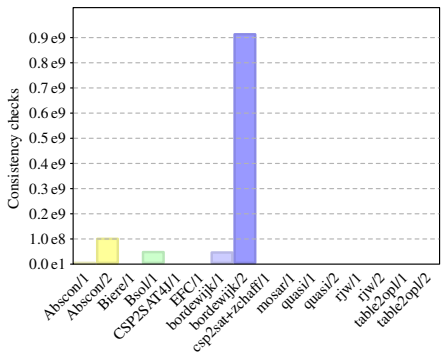

Fig. 569. Consistency checks required for solved instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

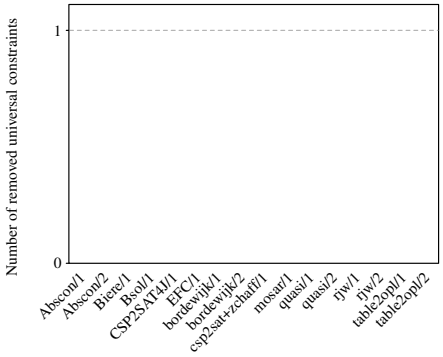

Fig. 570. Number of removed universal constraints for solved instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

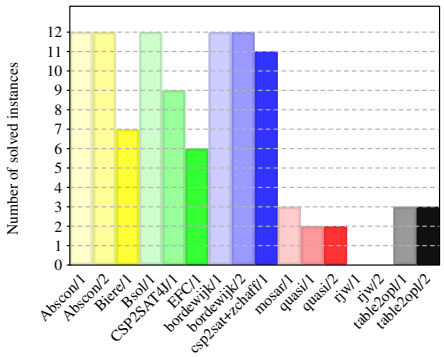

Fig. 571. Number of solved instances for class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

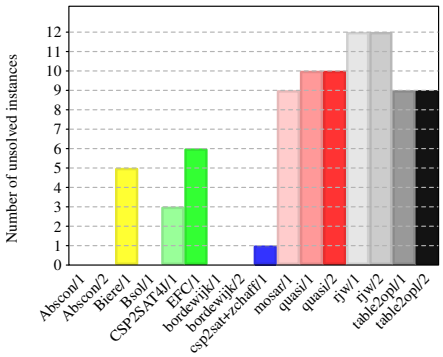

Fig. 572. Number of unsolved instances for class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

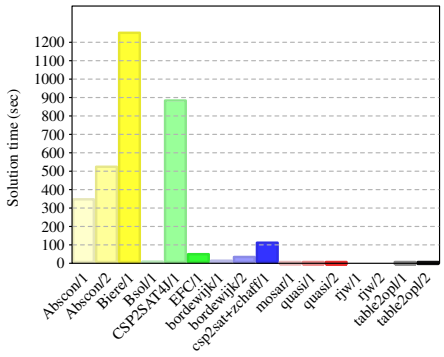

Fig. 573. Solution time in seconds for solved instances from class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

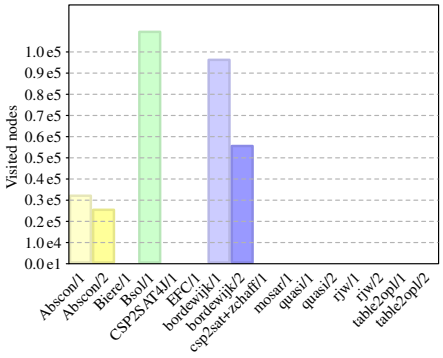

Fig. 574. Visited nodes required for solved instances from class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

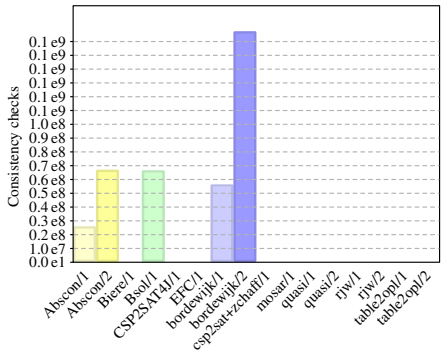

Fig. 575. Consistency checks required for solved instances from class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

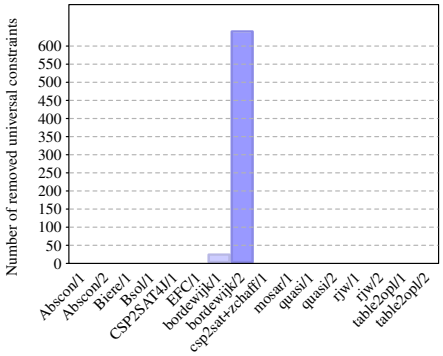

Fig. 576. Number of removed universal constraints for solved instances from class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

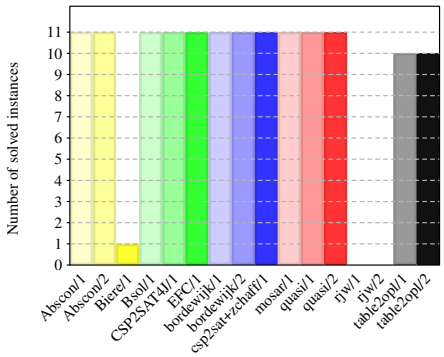

Fig. 577. Number of solved instances for class `rlfapScens`. The maximum solution time was set to 600 seconds.

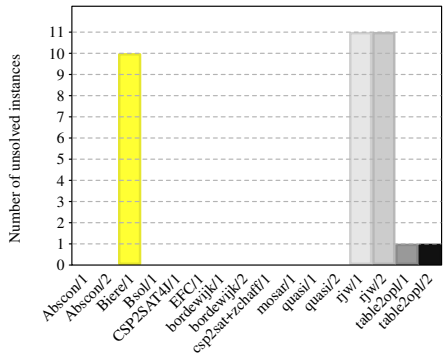

Fig. 578. Number of unsolved instances for class `rlfapScens`. The maximum solution time was set to 600 seconds.

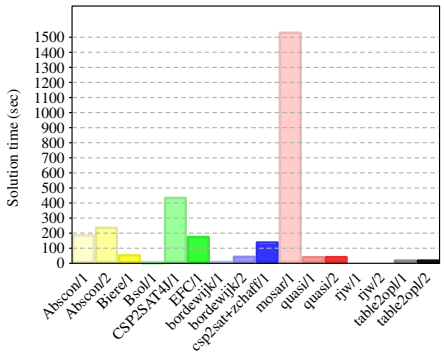

Fig. 579. Solution time in seconds for solved instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

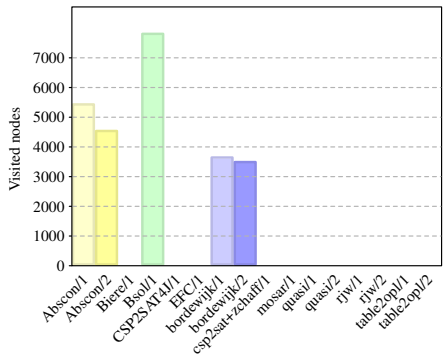

Fig. 580. Visited nodes required for solved instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

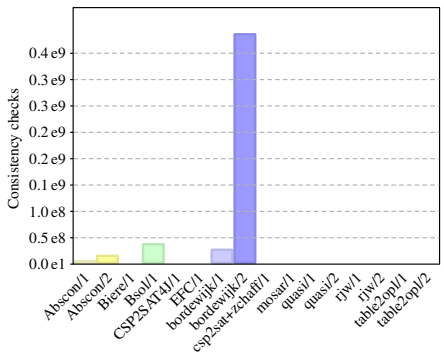

Fig. 581. Consistency checks required for solved instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

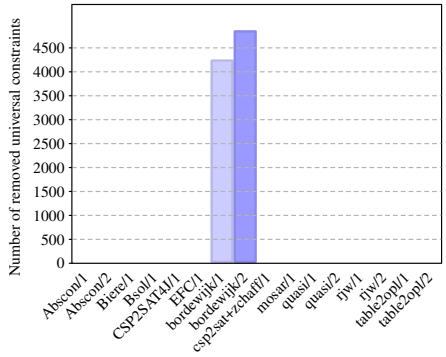

Fig. 582. Number of removed universal constraints for solved instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

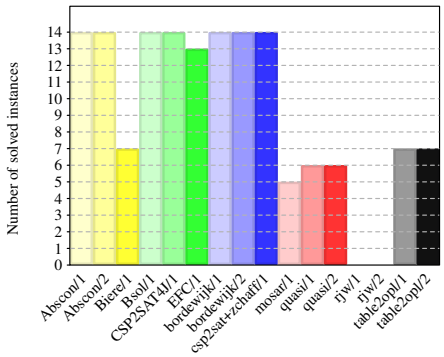

Fig. 583. Number of solved instances for class `rlfapModScens`. The maximum solution time was set to 600 seconds.

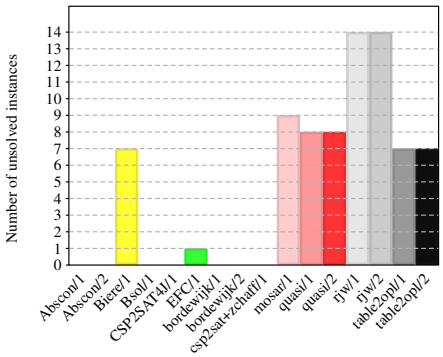

Fig. 584. Number of unsolved instances for class `rlfapModScens`. The maximum solution time was set to 600 seconds.

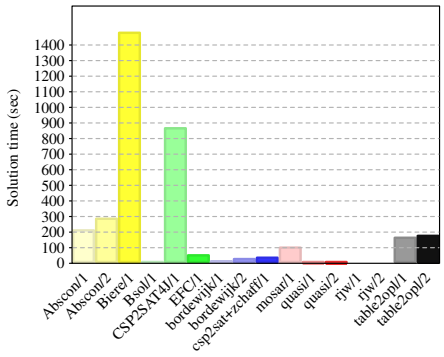

Fig. 585. Solution time in seconds for solved instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

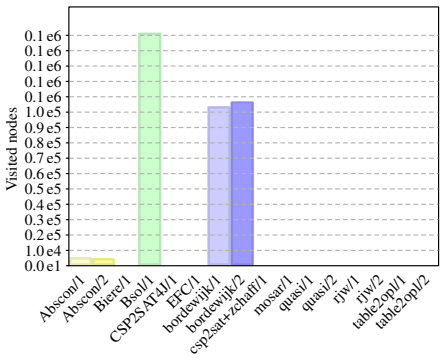

Fig. 586. Visited nodes required for solved instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

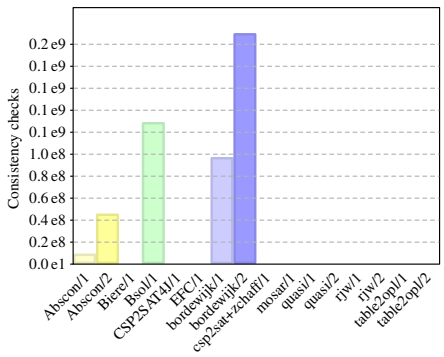

Fig. 587. Consistency checks required for solved instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

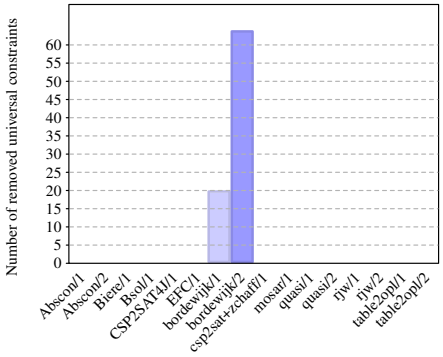

Fig. 588. Number of removed universal constraints for solved instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

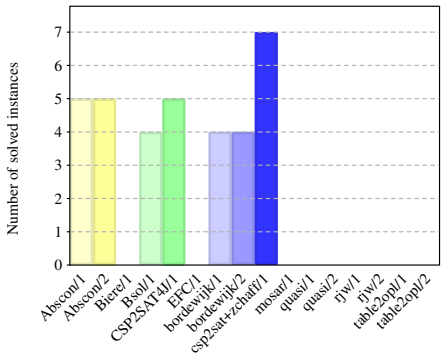

Fig. 589. Number of solved instances for class `rlfapScens11`. The maximum solution time was set to 600 seconds.

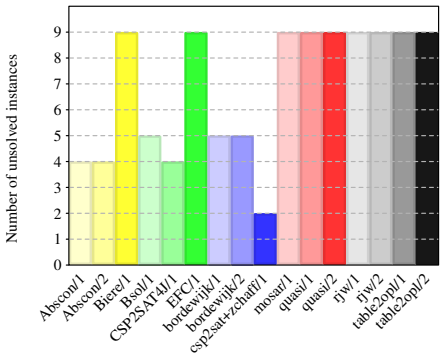

Fig. 590. Number of unsolved instances for class `rlfapScens11`. The maximum solution time was set to 600 seconds.

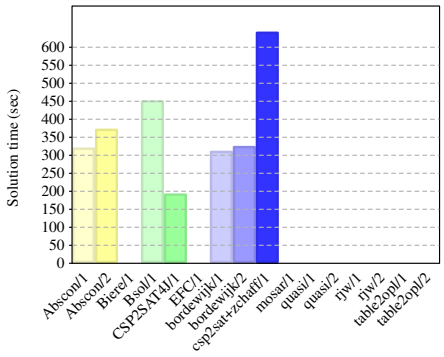

Fig. 591. Solution time in seconds for solved instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.

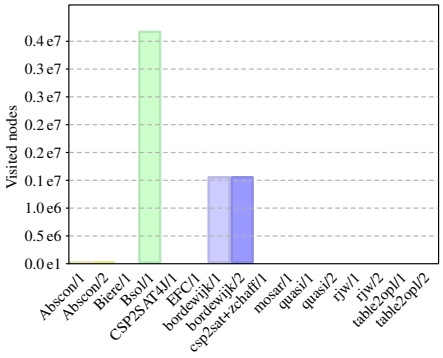

Fig. 592. Visited nodes required for solved instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.

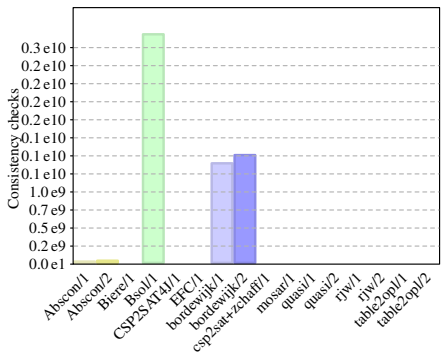

Fig. 593. Consistency checks required for solved instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.

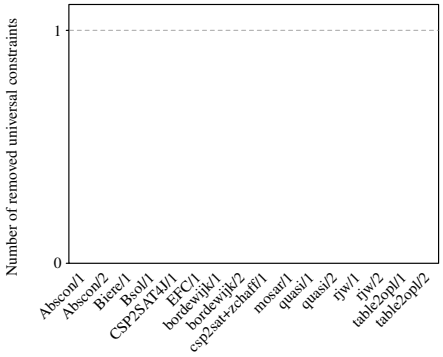

Fig. 594. Number of removed universal constraints for solved instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.

5 Graphs by Problem Class

This section consists of a listing of figures with results organised by problem class. Table 575 indicates where to find the figures for a given problem class. .

Class	Link	Class	Link
nb-Golomb	Figures 595–597		
nb-TSP-20-easy	Figures 598–600	nb-TSP-25-easy	Figures 601–603
nb-TSP-20-hard	Figures 604–606	nb-TSP-25-hard	Figures 607–609
nb-allSeries1	Figures 610–612	nb-cc1	Figures 613–615
nb-cril	Figures 616–618	nb-gr1	Figures 619–621
nb-ramsey4	Figures 625–627	nb-random-3-20-20-60-632-forced	Figures 628–630
nb-random-3-24-24-76-632-forced	Figures 631–633	nb-renault	Figures 634–636
nb-schurr	Figures 637–639	BH-4-4	Figures 640–642
QCP-10	Figures 643–645	QCP-15	Figures 646–648
QCP-20	Figures 649–651	QCP-25	Figures 652–654
QCP-10-easy	Figures 655–657	QCP-15-easy	Figures 658–660
QCP-20-easy	Figures 661–663	QCP-10-hard	Figures 664–666
QCP-15-hard	Figures 667–669	QCP-20-hard	Figures 670–672
QCPp-10	Figures 673–675	QCPp-15	Figures 676–678
QCPp-20	Figures 679–681	QCPp-10-easy	Figures 682–684
QCPp-15-easy	Figures 685–687	QCPp-20-easy	Figures 688–690
QCPp-10-hard	Figures 691–693	QCPp-15-hard	Figures 694–696
QCPp-20-hard	Figures 697–699	QWH-10-easy	Figures 700–702
QWH-15-easy	Figures 703–705	QWH-20-easy	Figures 706–708
QWH-25-easy	Figures 709–711	QWH-10-hard	Figures 712–714
QWH-15-hard	Figures 715–717	QWH-20-hard	Figures 718–720
QWHp-10-easy	Figures 721–723	QWHp-15-easy	Figures 724–726
QWHp-10-hard	Figures 727–729	QWHp-15-hard	Figures 730–732
bqwh15-106	Figures 733–735	bqwh18-141	Figures 736–738
composed-25-1-2	Figures 739–741	composed-25-1-25	Figures 742–744
composed-25-1-40	Figures 745–747	composed-25-1-80	Figures 748–750
composed-25-10-20	Figures 751–753	composed-75-1-2	Figures 754–756
composed-75-1-25	Figures 757–759	composed-75-1-40	Figures 760–762
composed-75-1-80	Figures 763–765	cril	Figures 766–768
ehi-85	Figures 769–771	ehi-90	Figures 772–774
fapp01	Figures 775–777	fapp02	Figures 778–780
frb30-15	Figures 781–783	frb35-17	Figures 784–786
frb40-19	Figures 787–789	frb45-21	Figures 790–792
geom	Figures 796–798	hanoi1	Figures 799–801
js-e0ddr1	Figures 802–804	js-e0ddr2	Figures 805–807
js-enddr1	Figures 808–810	js-enddr2	Figures 811–813
js-ewddr2	Figures 814–816	lsq-dg1	Figures 817–819
marc	Figures 820–822	pigeons	Figures 823–825
qa1	Figures 826–828	qk1	Figures 829–831
random-23-23-253	Figures 832–834	random-24-24-276	Figures 835–837
random-25-25-300	Figures 838–840	random-26-26-325	Figures 841–843
random-27-27-351	Figures 844–846	rlfapGraphs	Figures 847–849
rlfapModGraphs	Figures 850–852	rlfapScens	Figures 853–855
rlfapModScens	Figures 856–858	rlfapScens11	Figures 859–861

Table 575. Figure numbers per problem class.

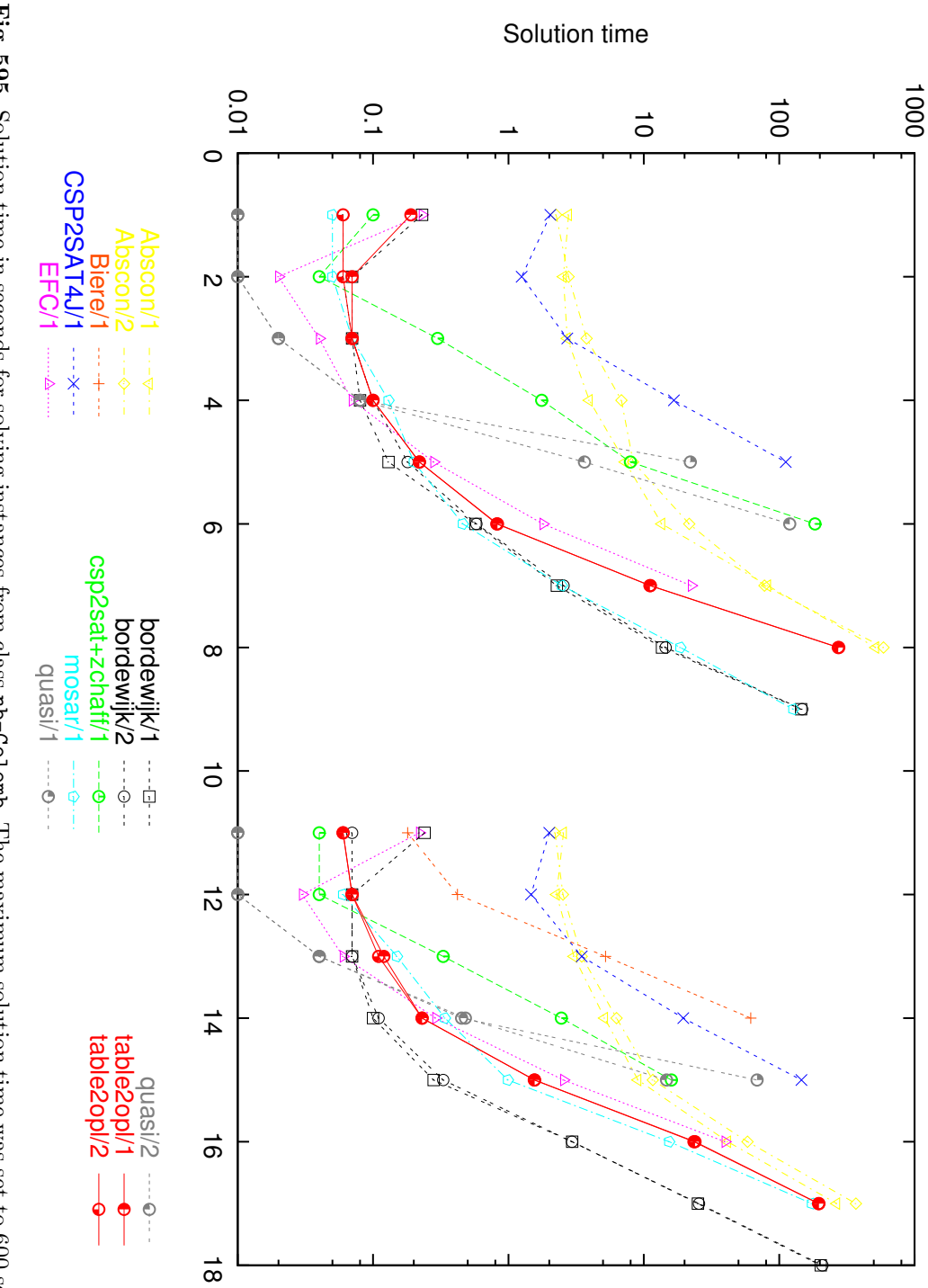

Fig. 595. Solution time in seconds for solving instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

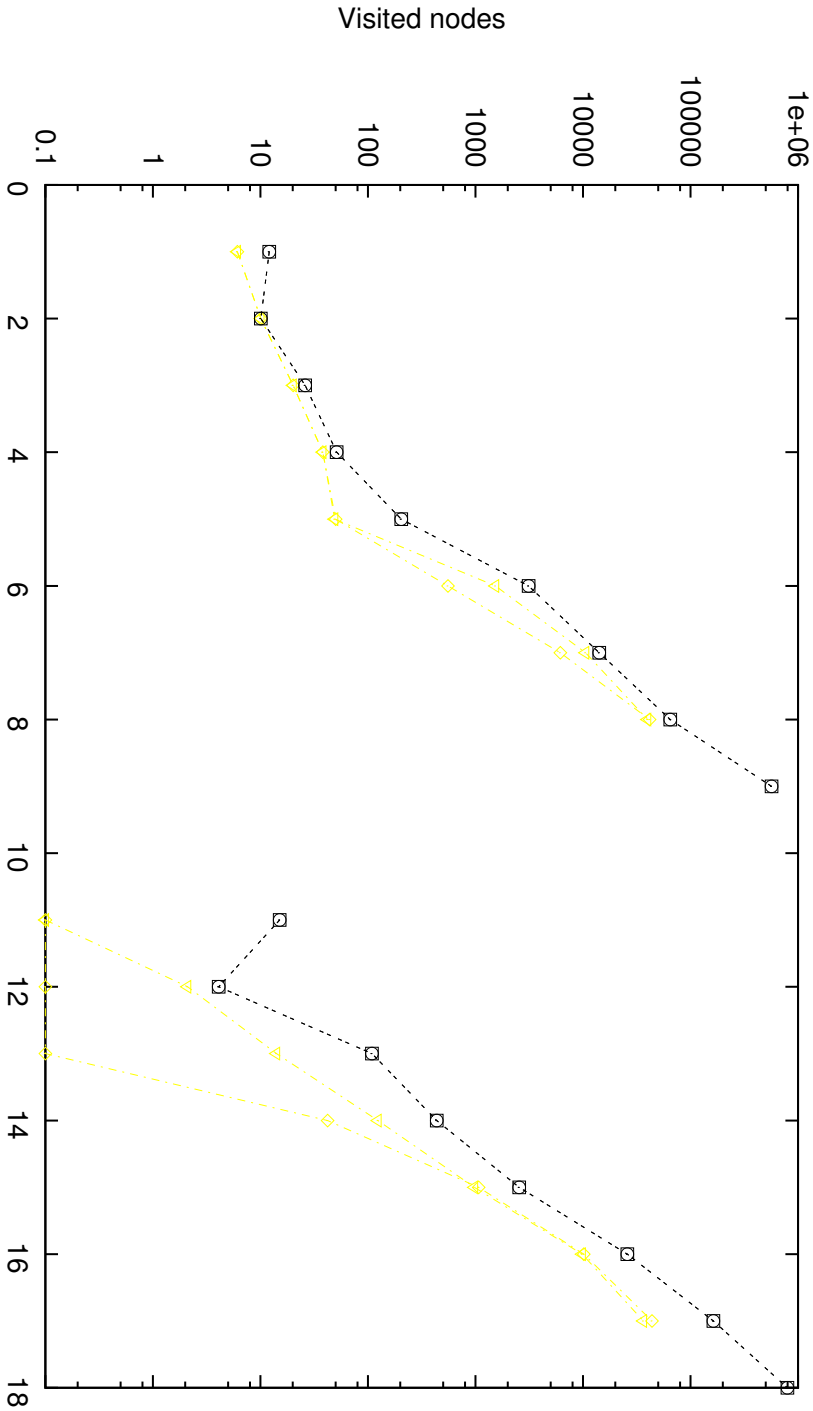

Fig. 596. Visited nodes required for solving instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

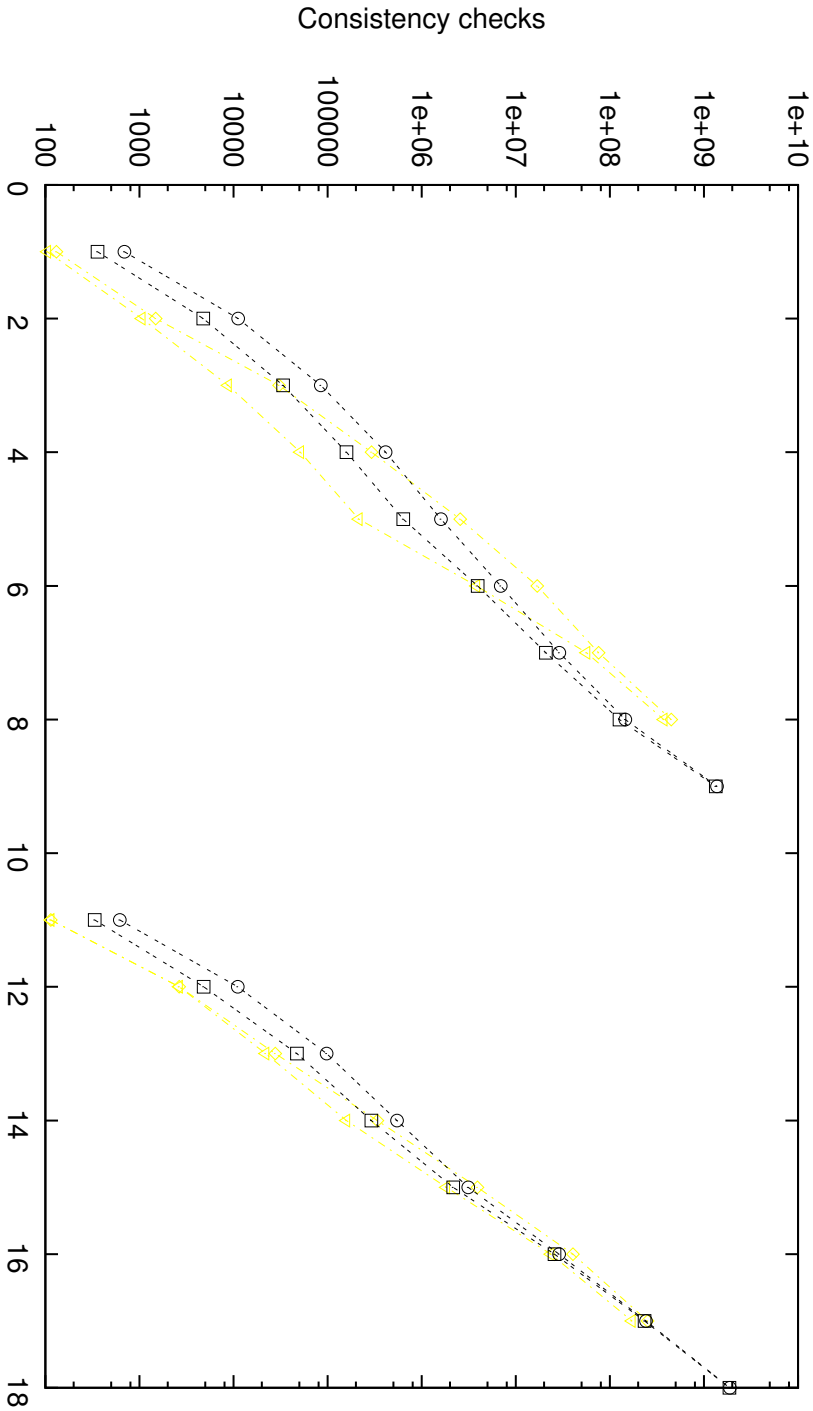

Fig. 597. Consistency checks required for solving instances from class `nb-Golomb`. The maximum solution time was set to 600 seconds.

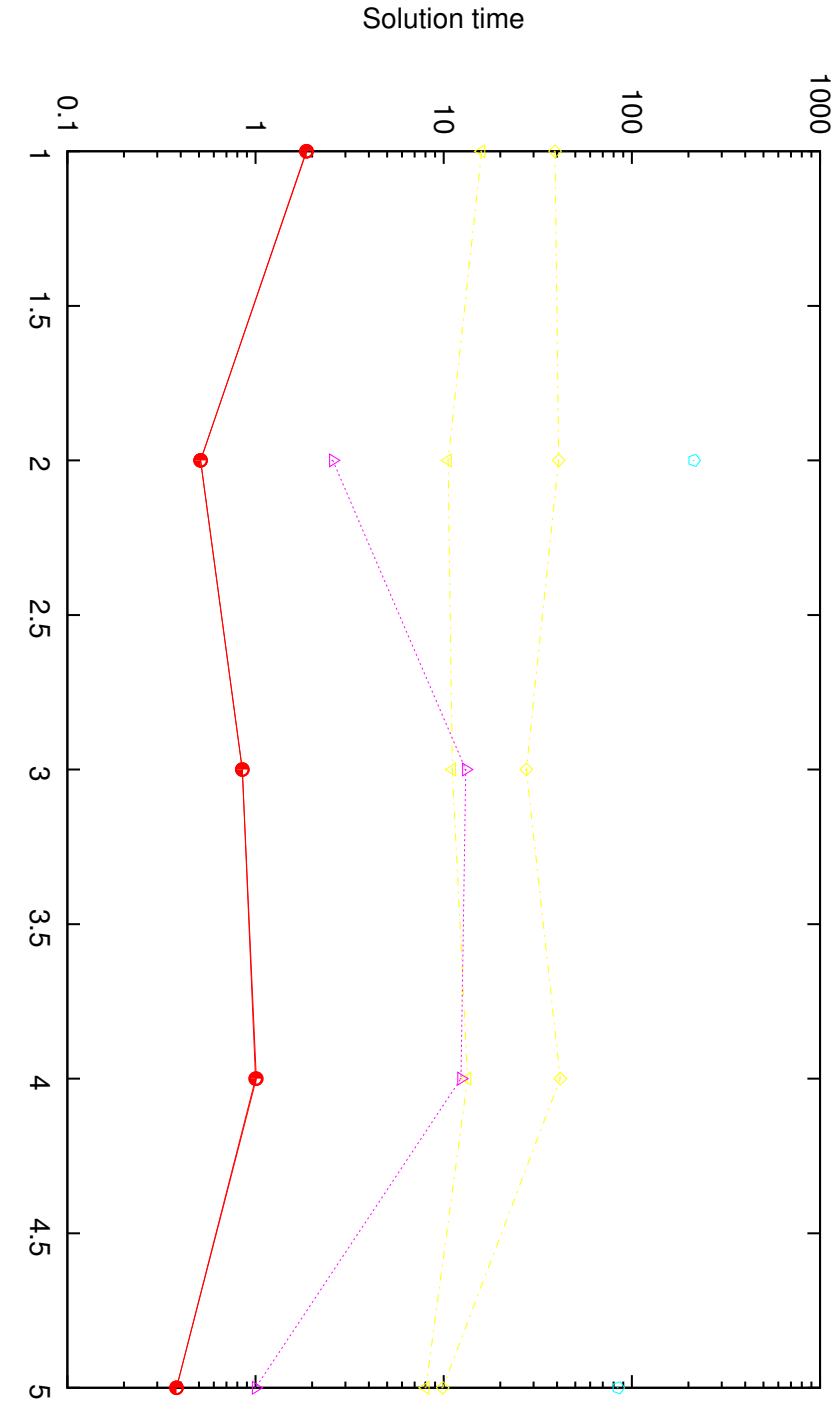

Fig. 598. Solution time in seconds for solving instances from class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

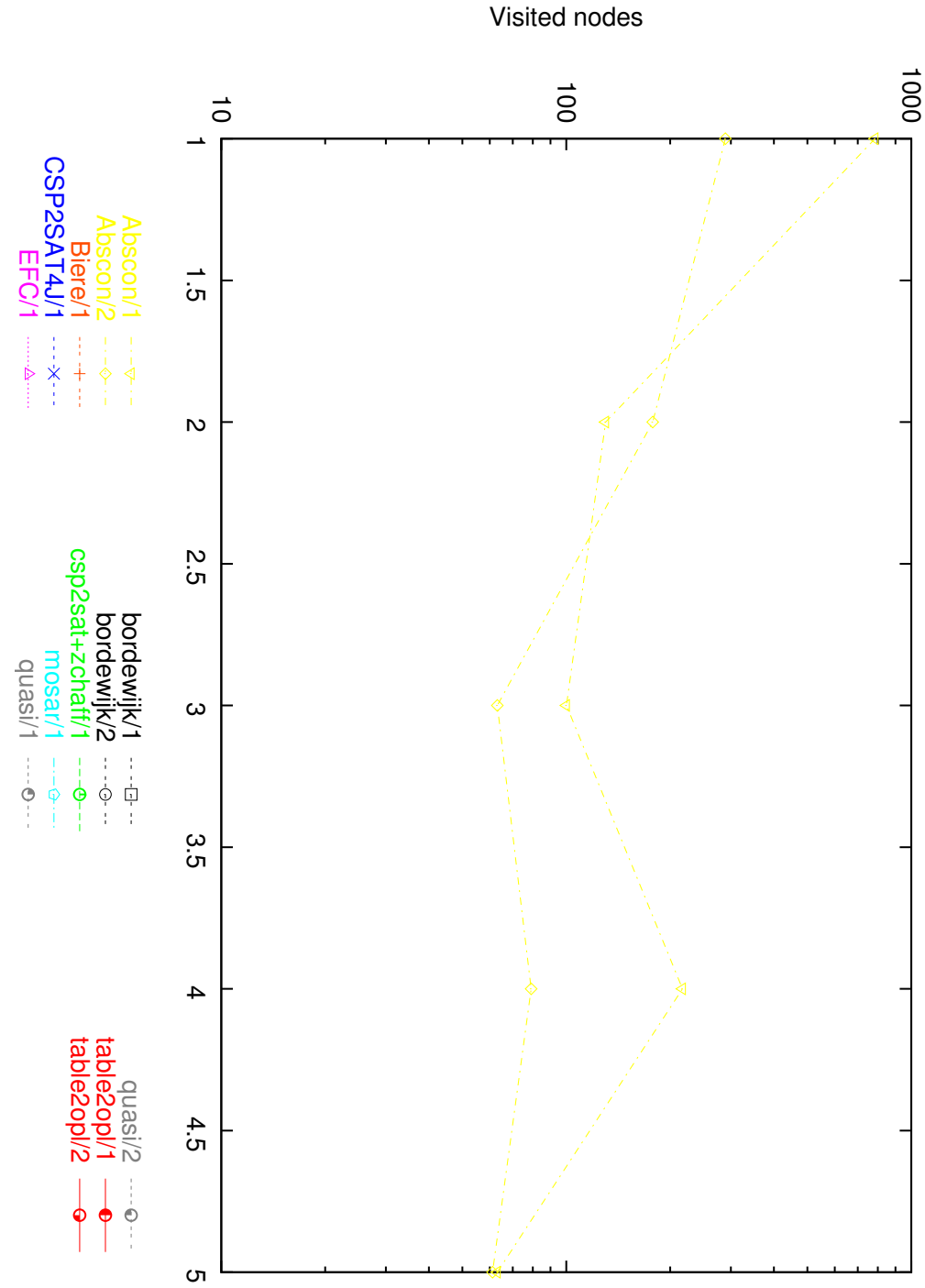

Fig. 599. Visited nodes required for solving instances from class nb-TSP-20-easy. The maximum solution time was set to 600 seconds.

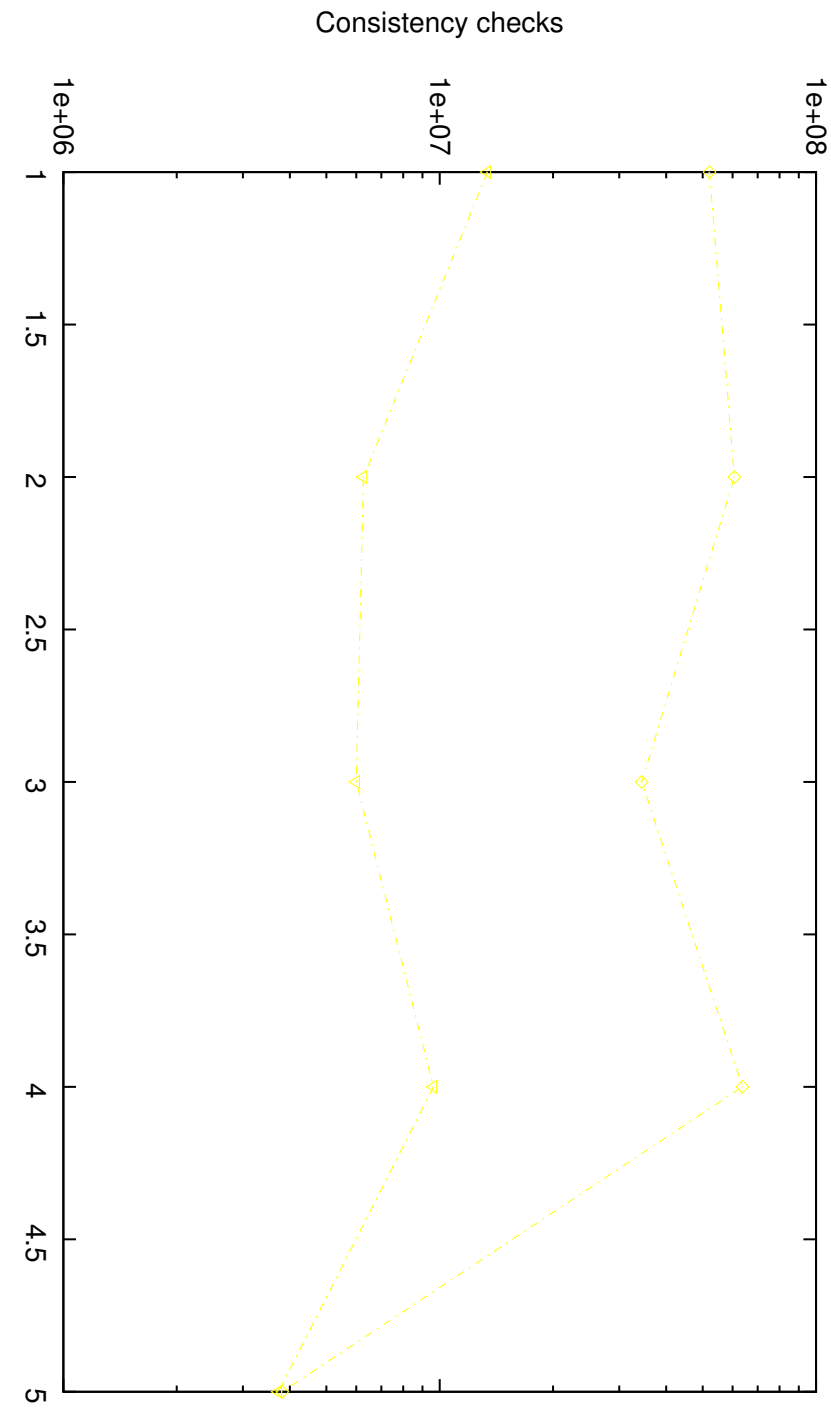

Fig. 600. Consistency checks required for solving instances from class `nb-TSP-20-easy`. The maximum solution time was set to 600 seconds.

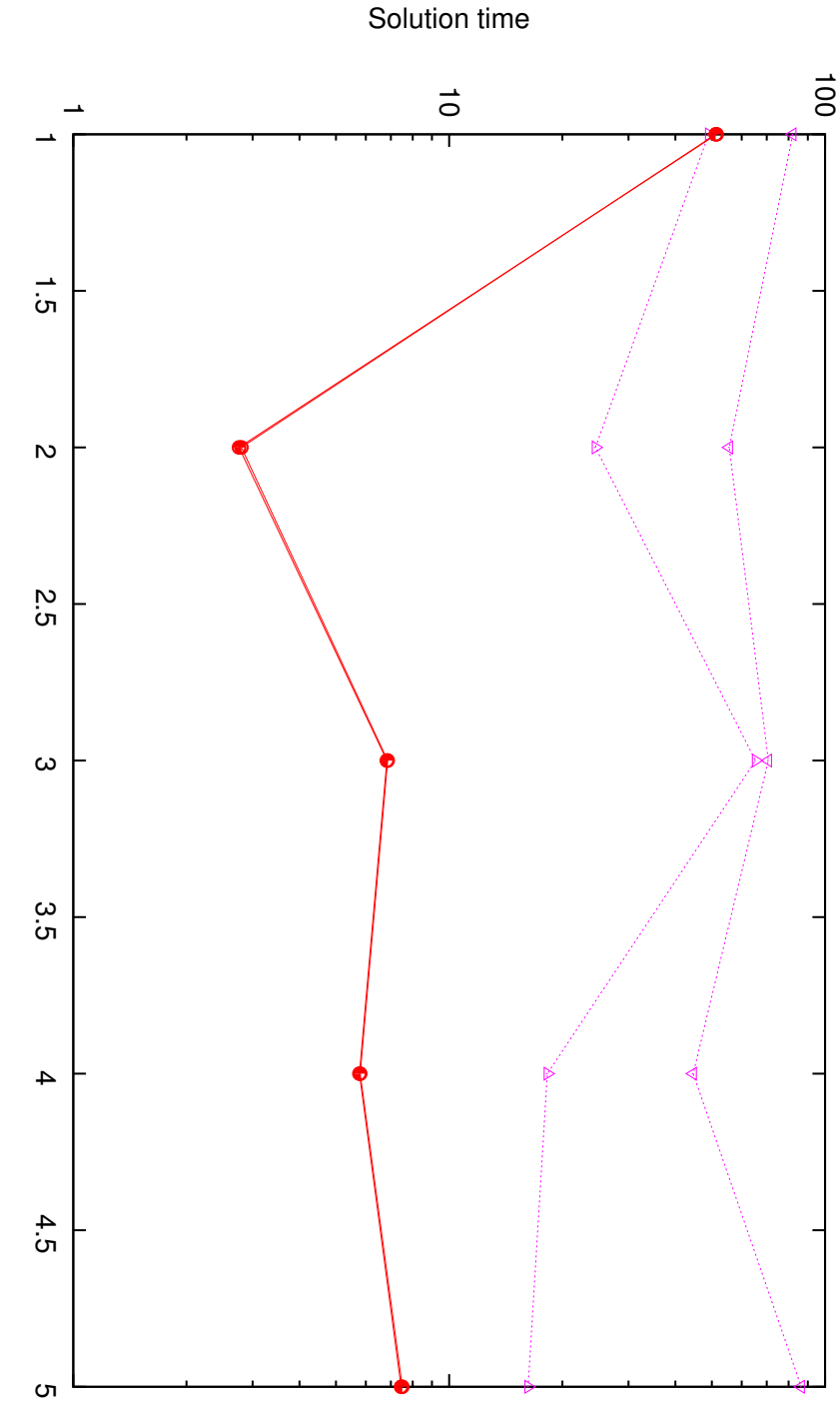

Fig. 601. Solution time in seconds for solving instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

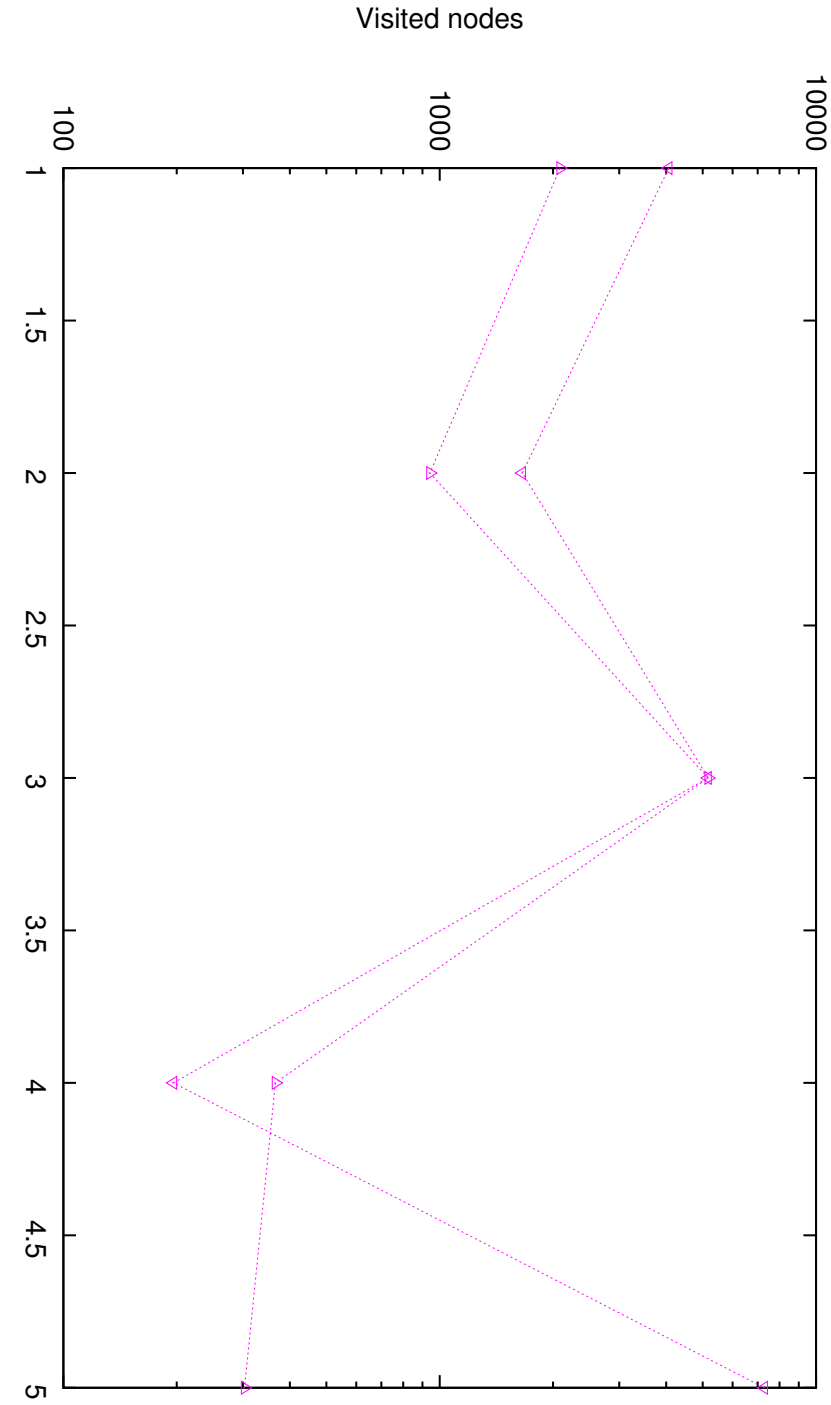

Fig. 602. Visited nodes required for solving instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

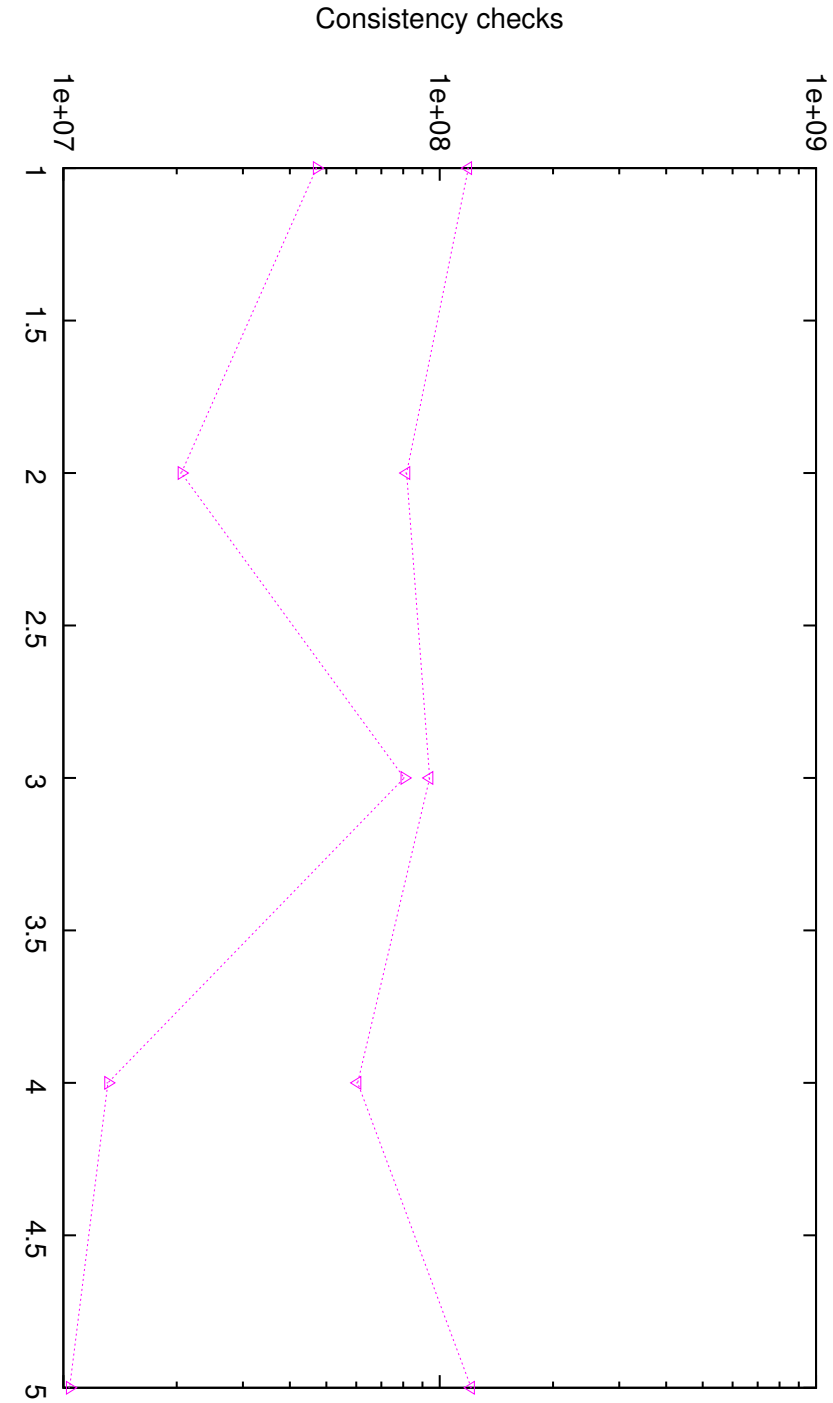

Fig. 603. Consistency checks required for solving instances from class `nb-TSP-25-easy`. The maximum solution time was set to 600 seconds.

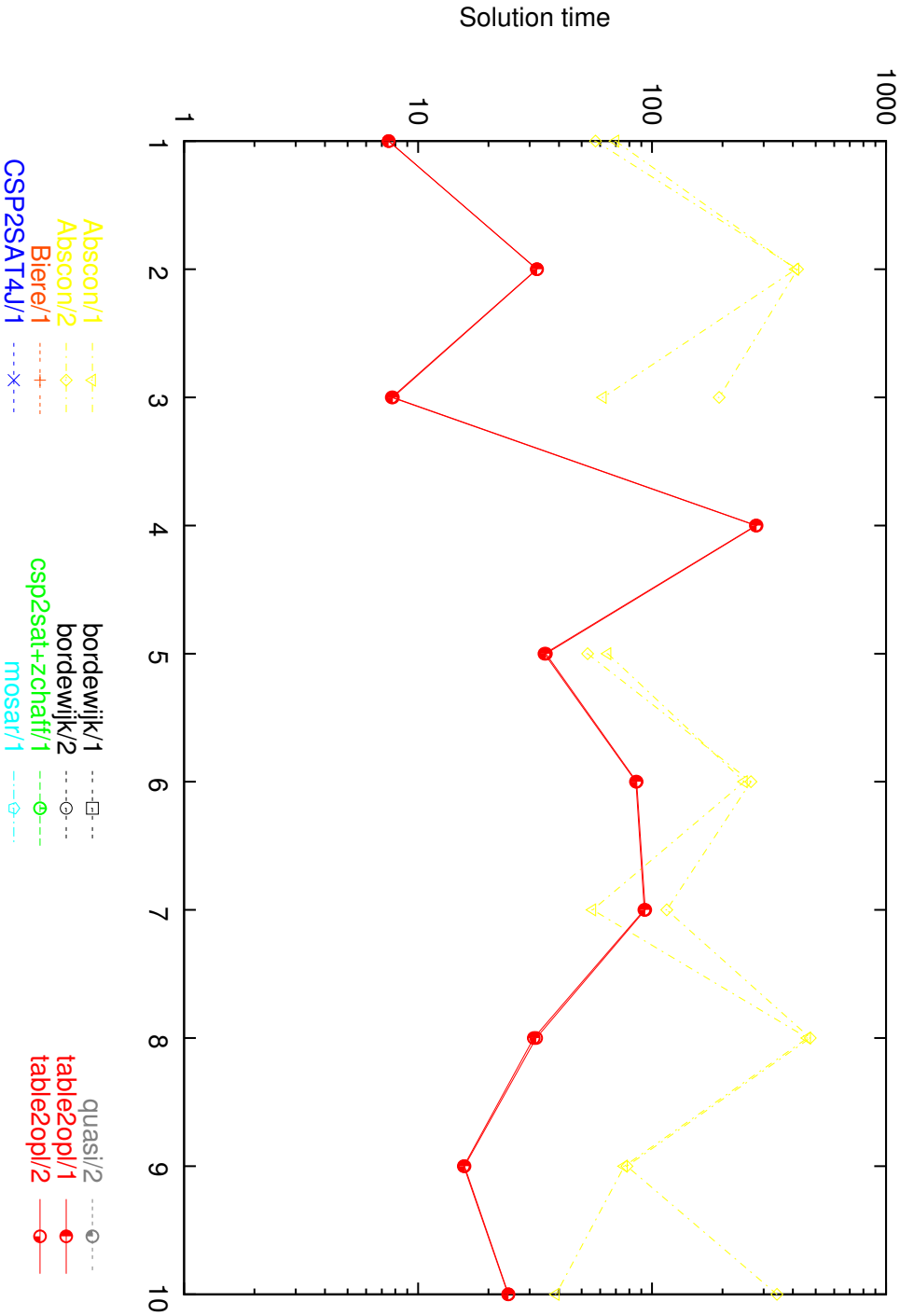

Fig. 604. Solution time in seconds for solving instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

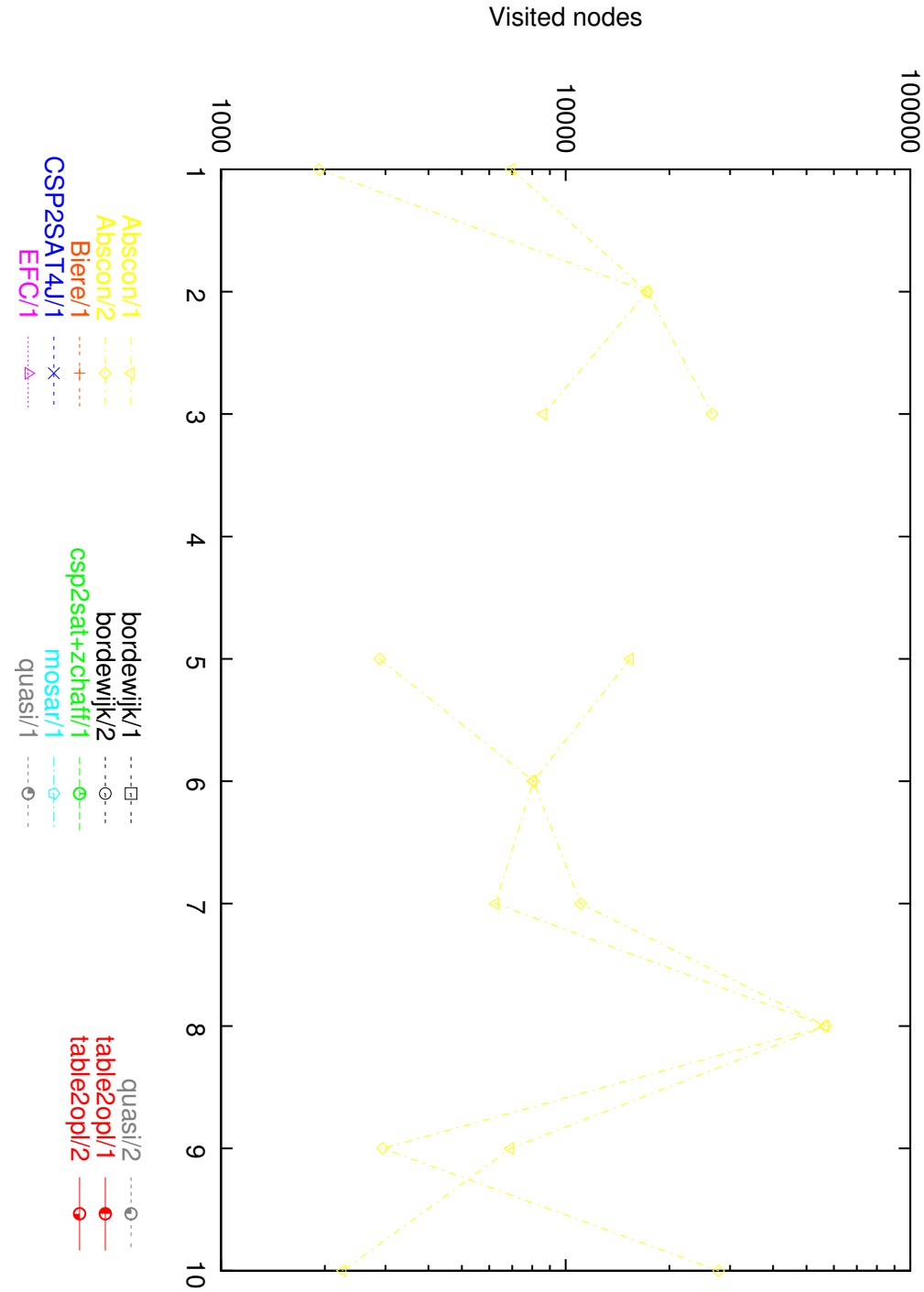

Fig. 605. Visited nodes required for solving instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

Fig. 606. Consistency checks required for solving instances from class `nb-TSP-20-hard`. The maximum solution time was set to 600 seconds.

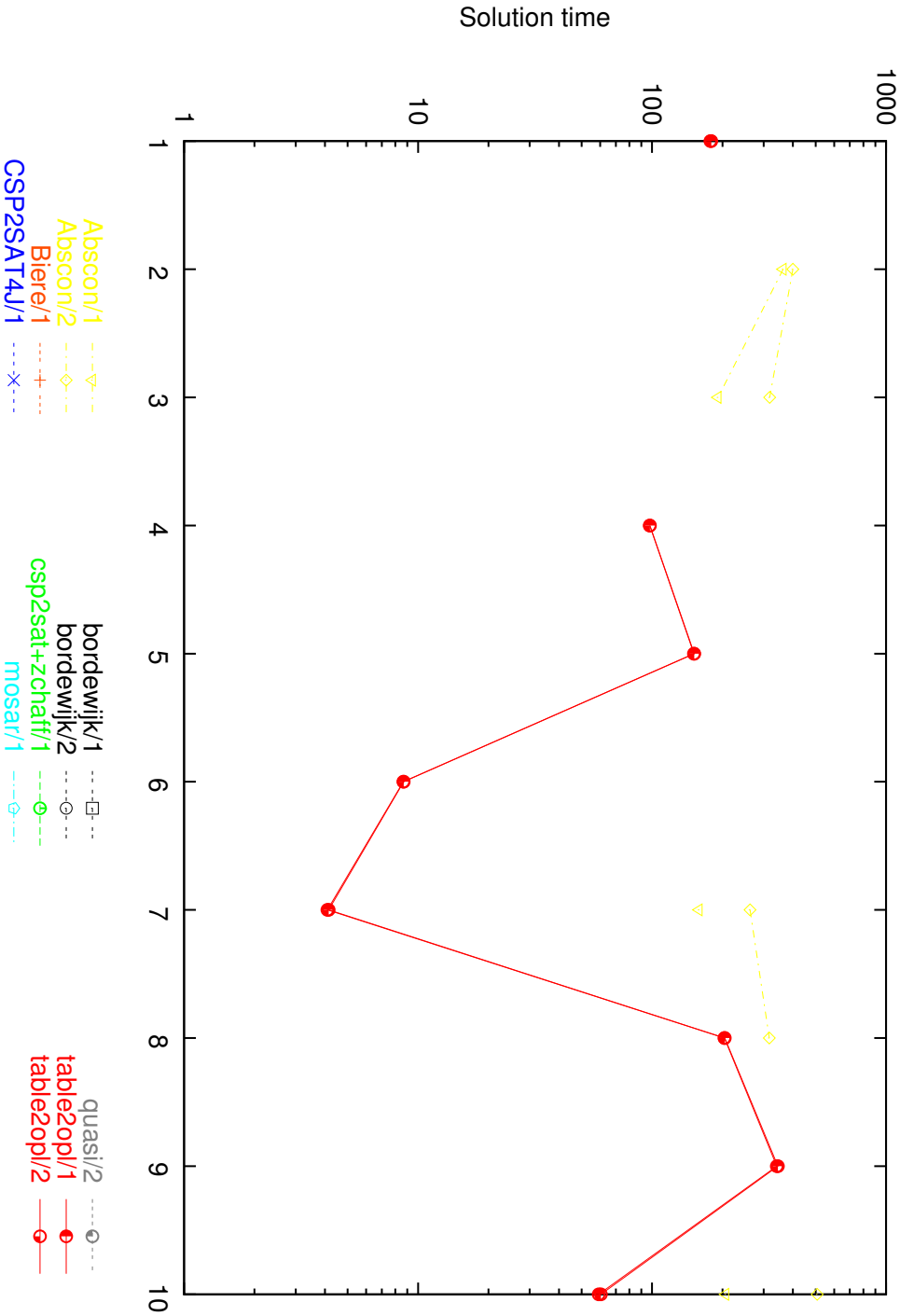

Fig. 607. Solution time in seconds for solving instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

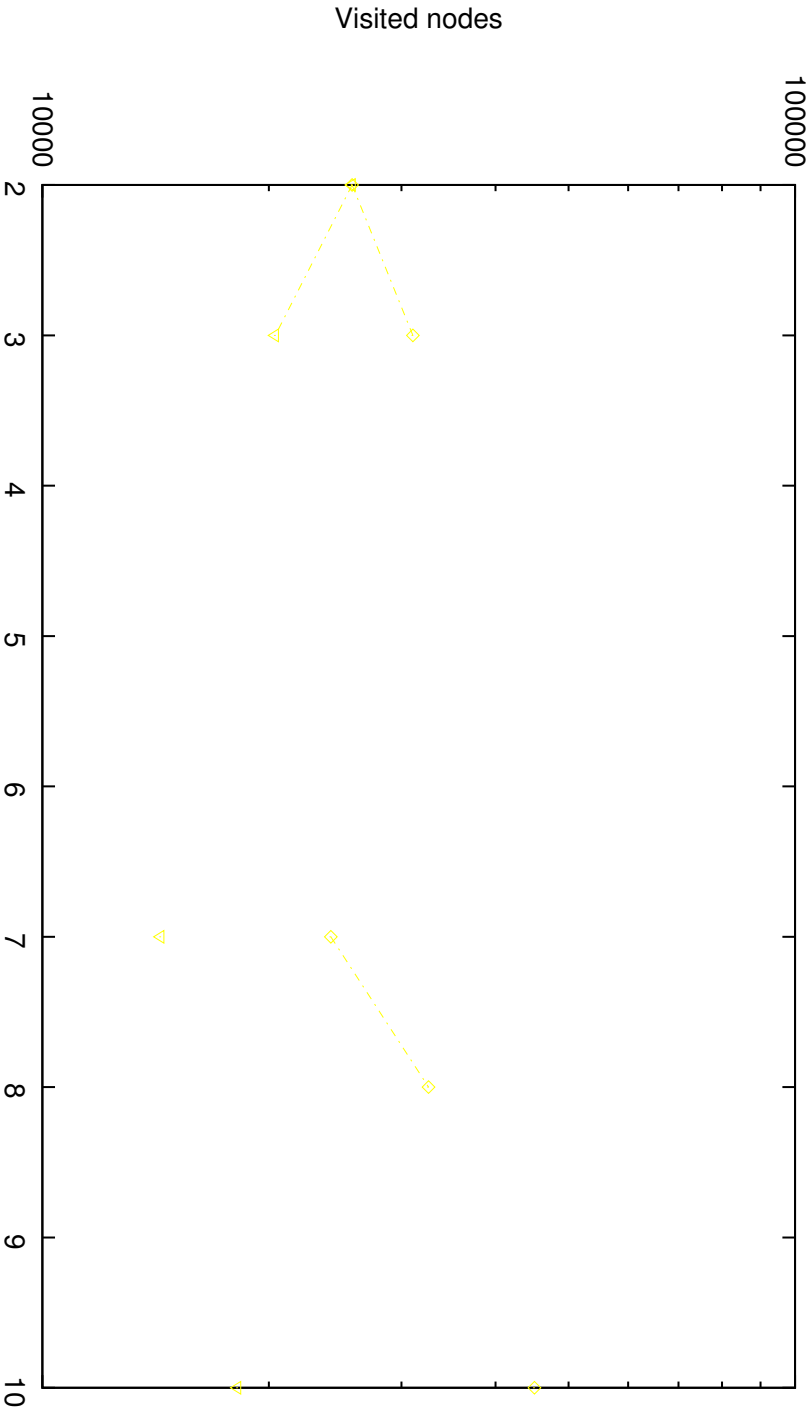

Fig. 608. Visited nodes required for solving instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

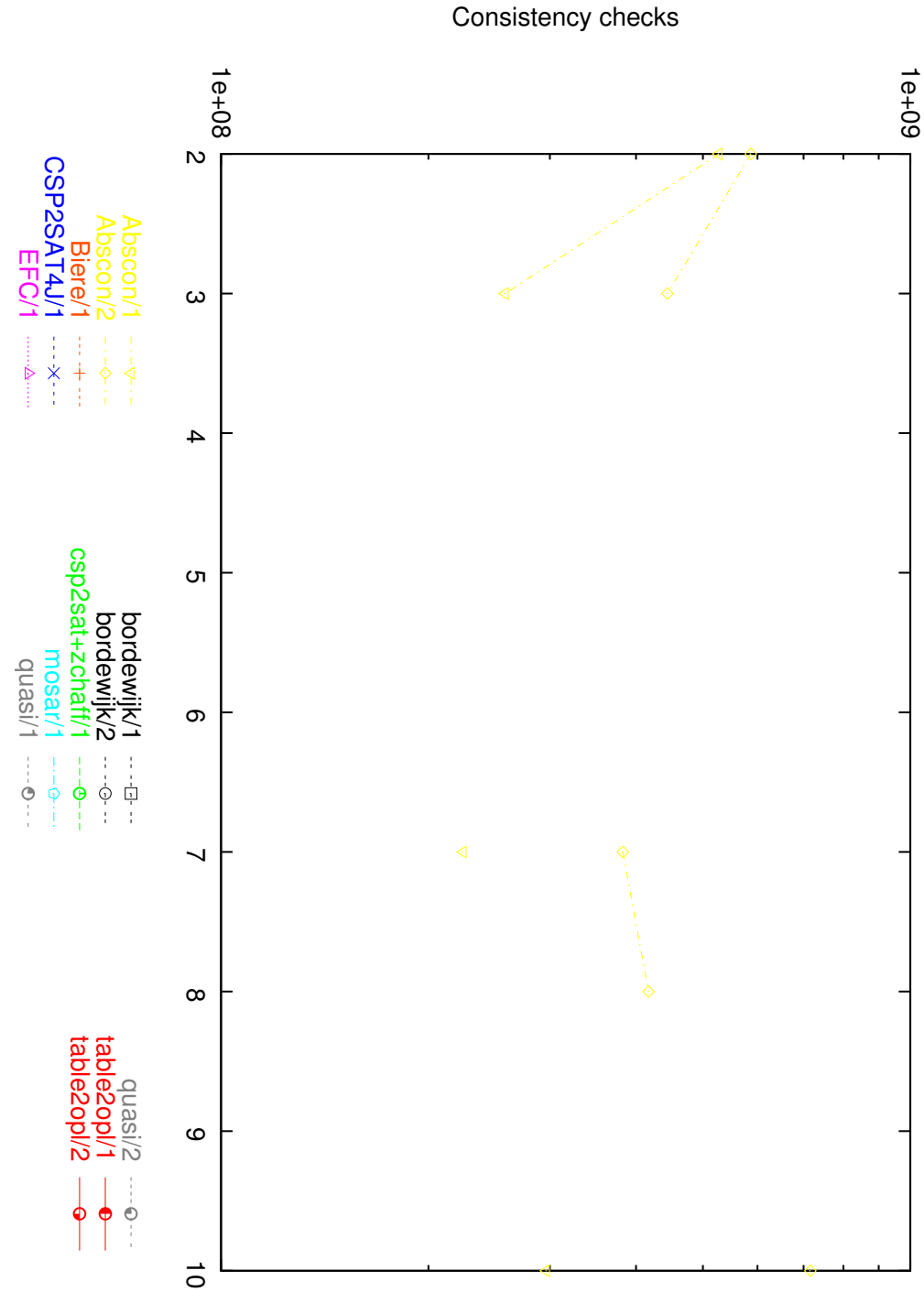

Fig. 609. Consistency checks required for solving instances from class `nb-TSP-25-hard`. The maximum solution time was set to 600 seconds.

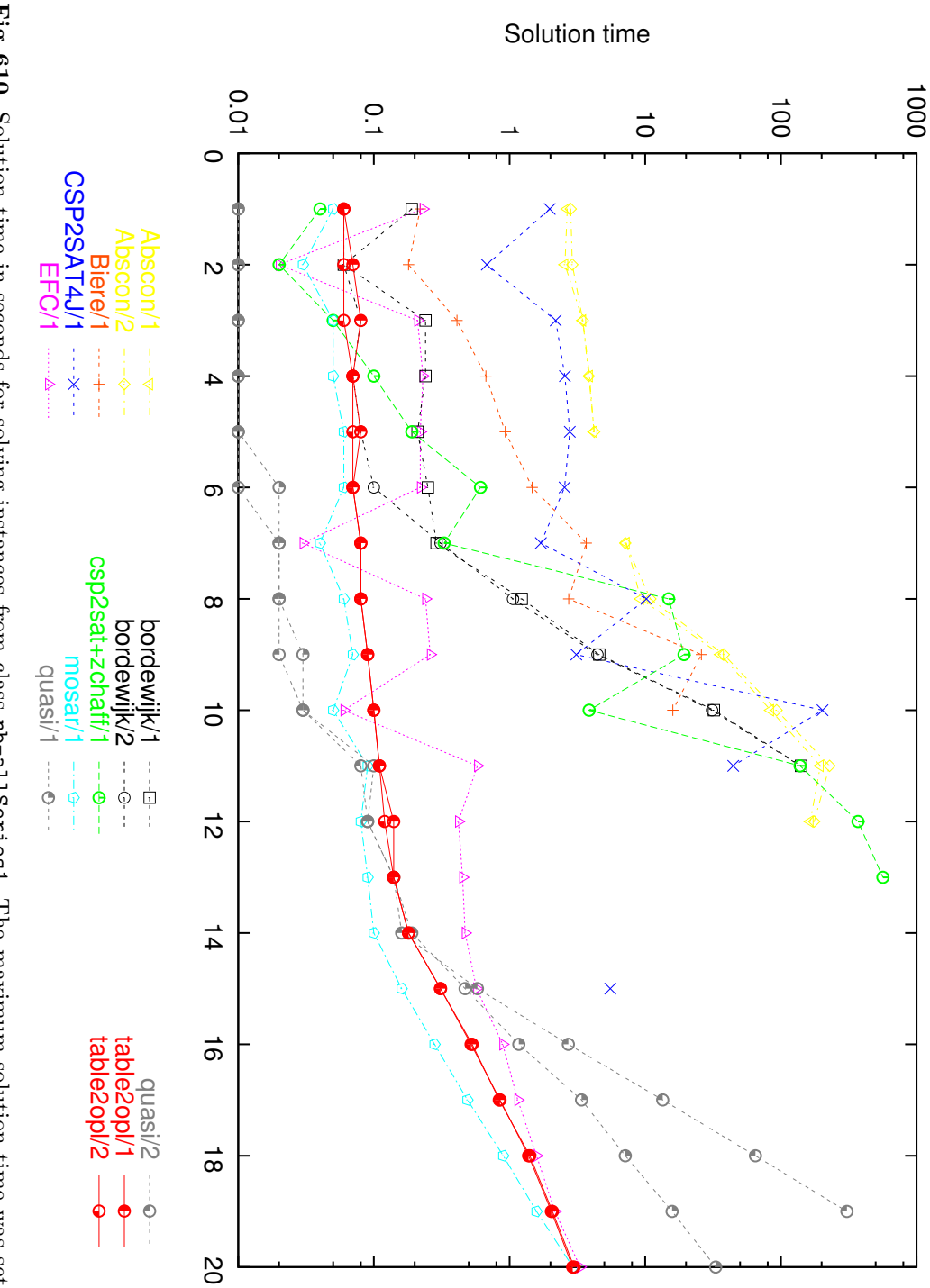

Fig. 610. Solution time in seconds for solving instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

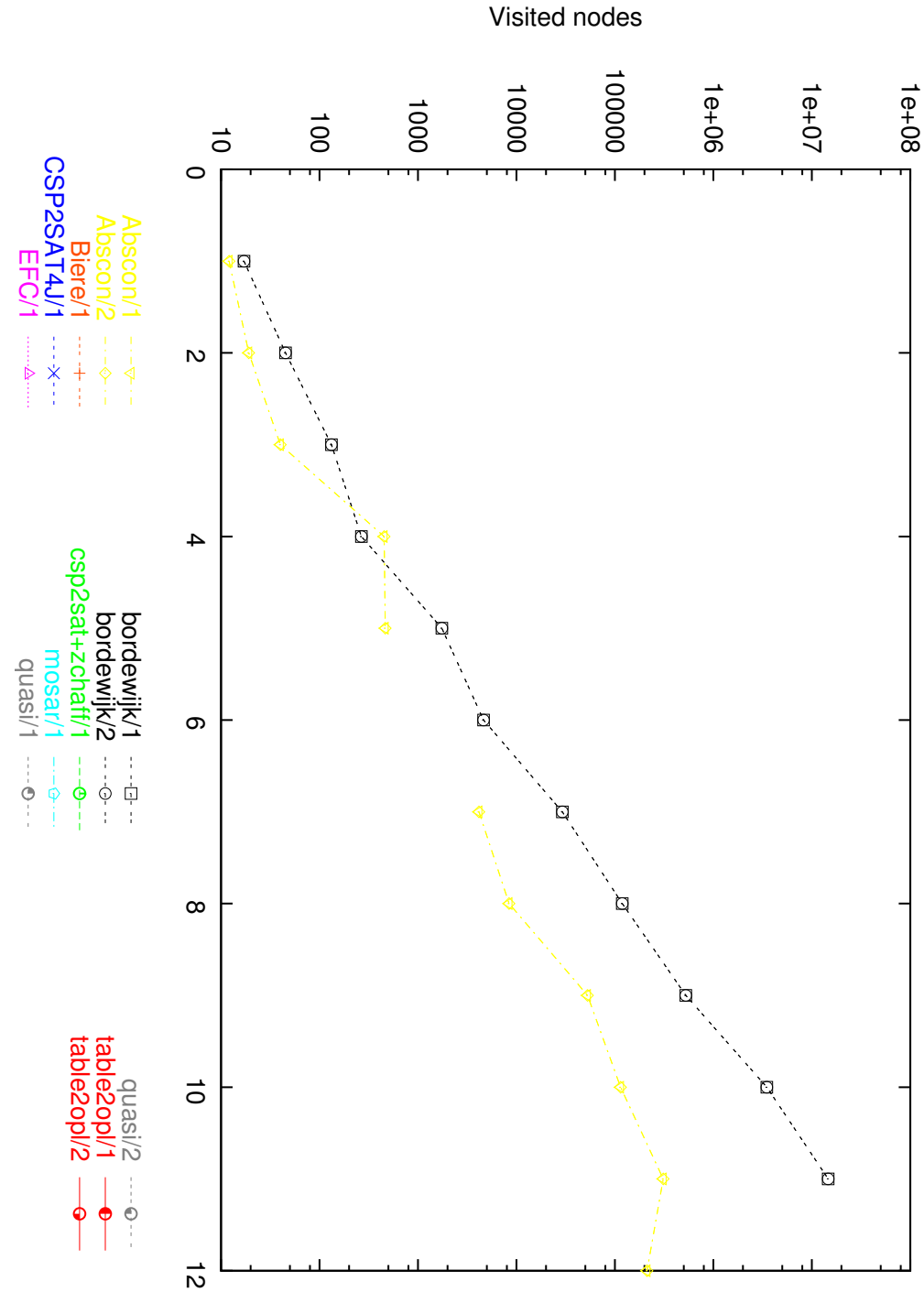

Fig. 611. Visited nodes required for solving instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

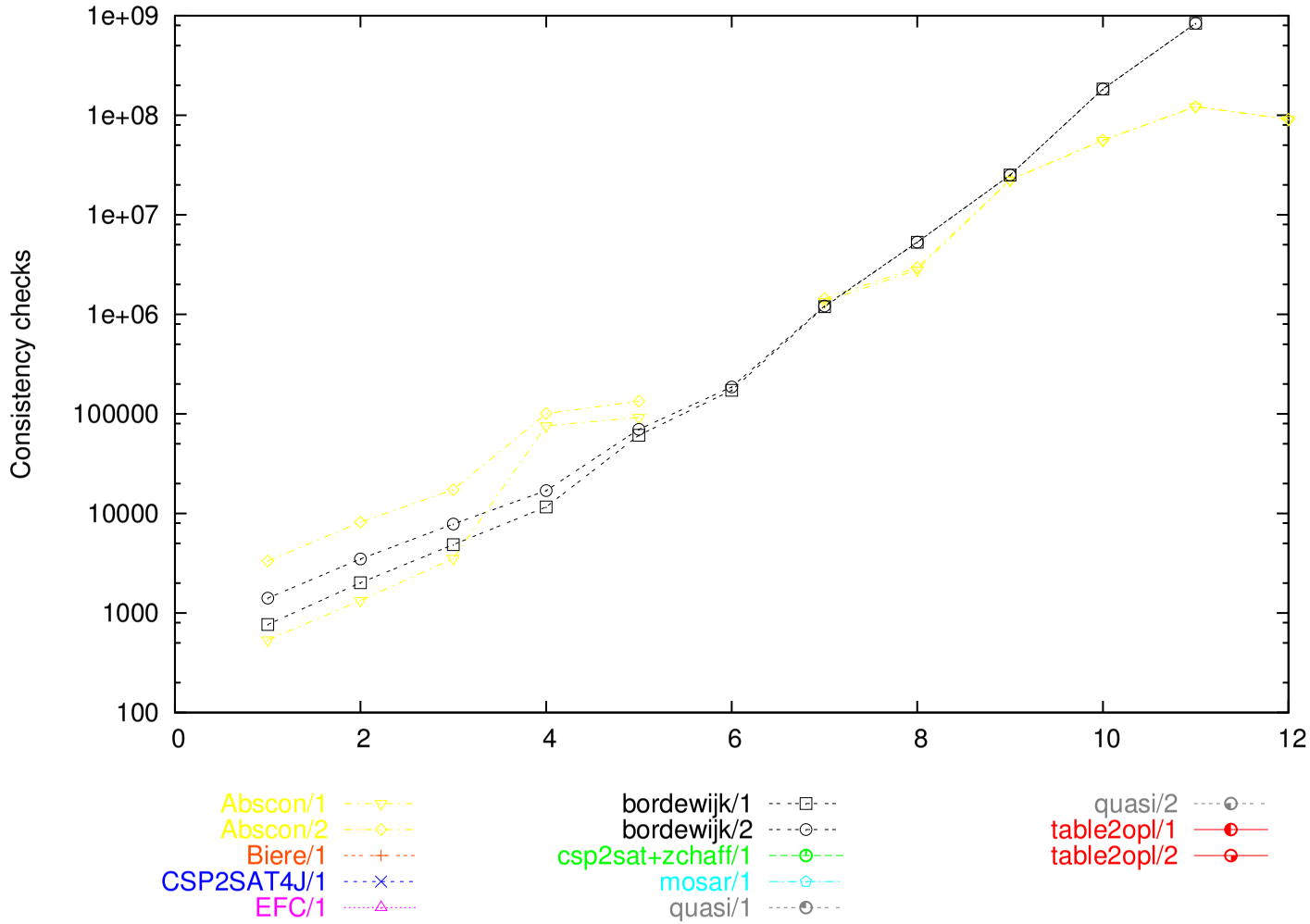

Fig. 612. Consistency checks required for solving instances from class `nb-allSeries1`. The maximum solution time was set to 600 seconds.

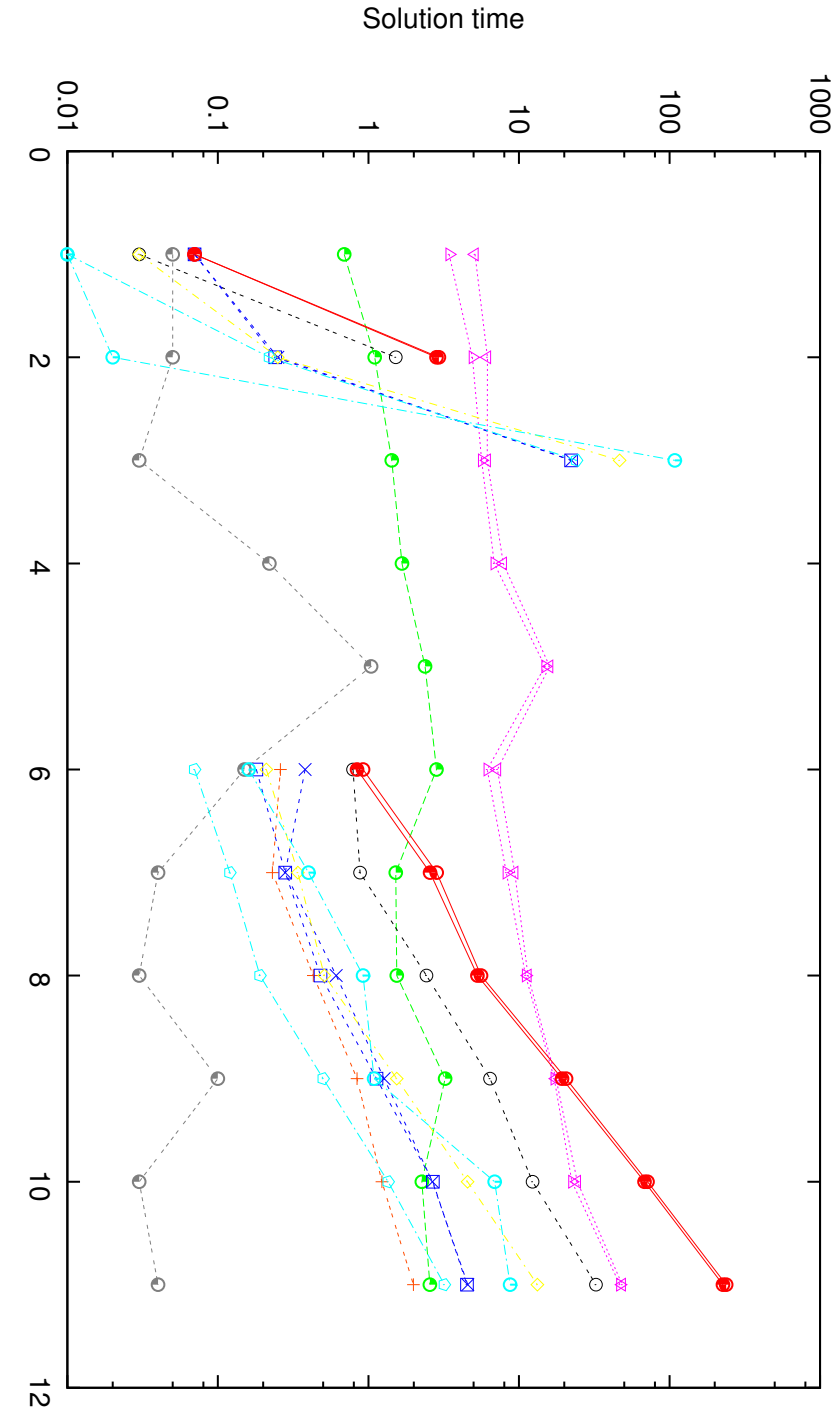

Fig. 613. Solution time in seconds for solving instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

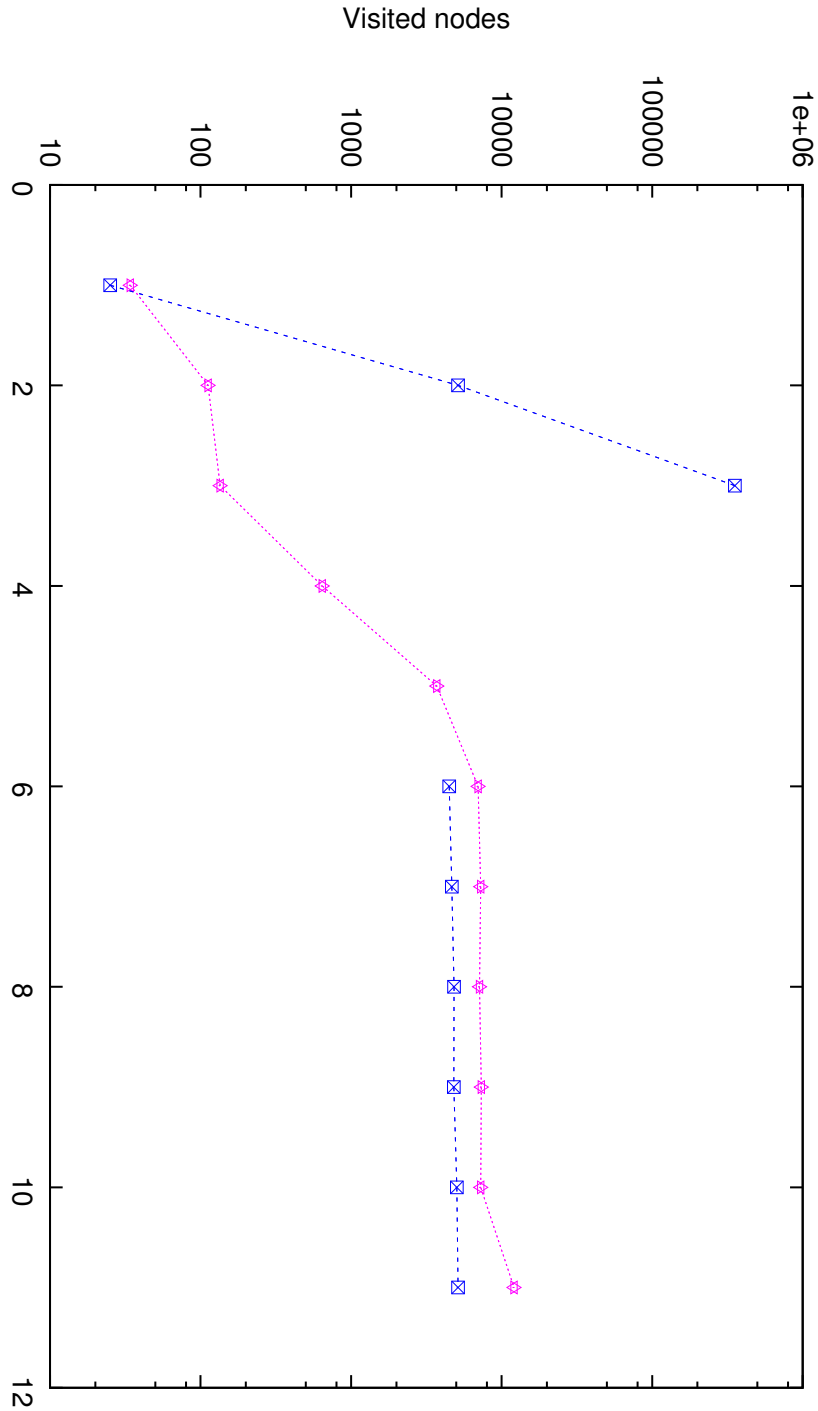

Fig. 614. Visited nodes required for solving instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

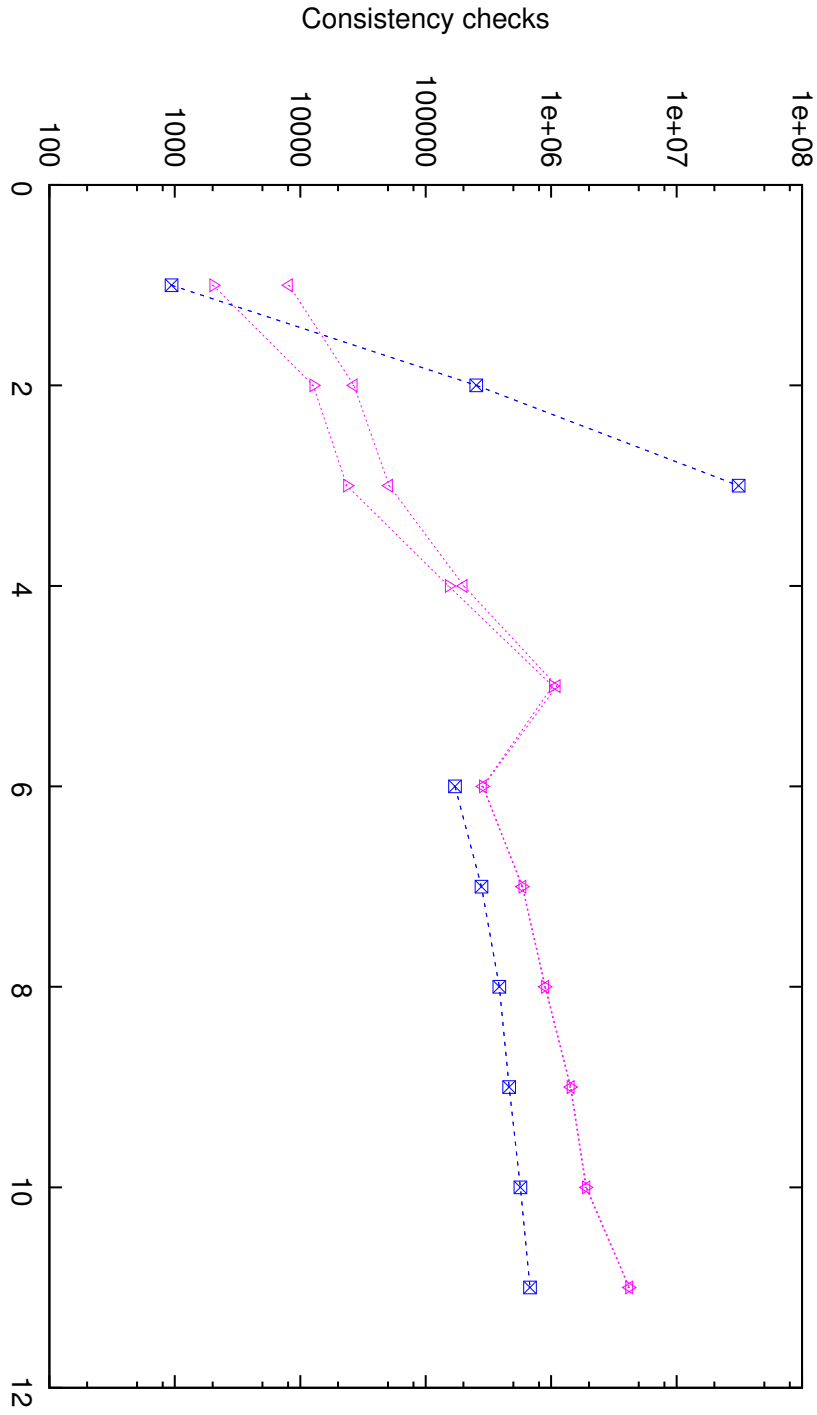

Fig. 615. Consistency checks required for solving instances from class `nb-cc1`. The maximum solution time was set to 600 seconds.

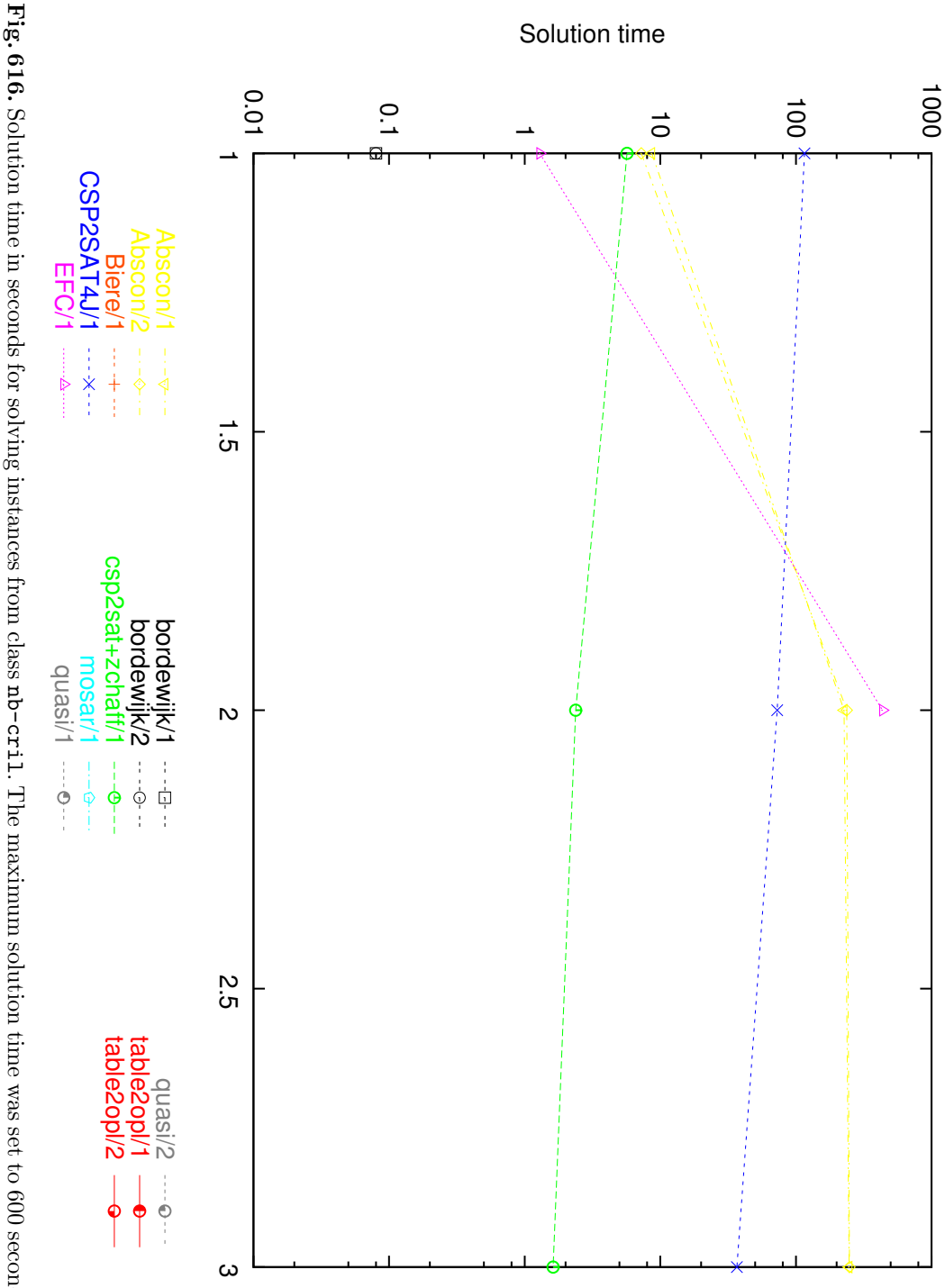

Fig. 616. Solution time in seconds for solving instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

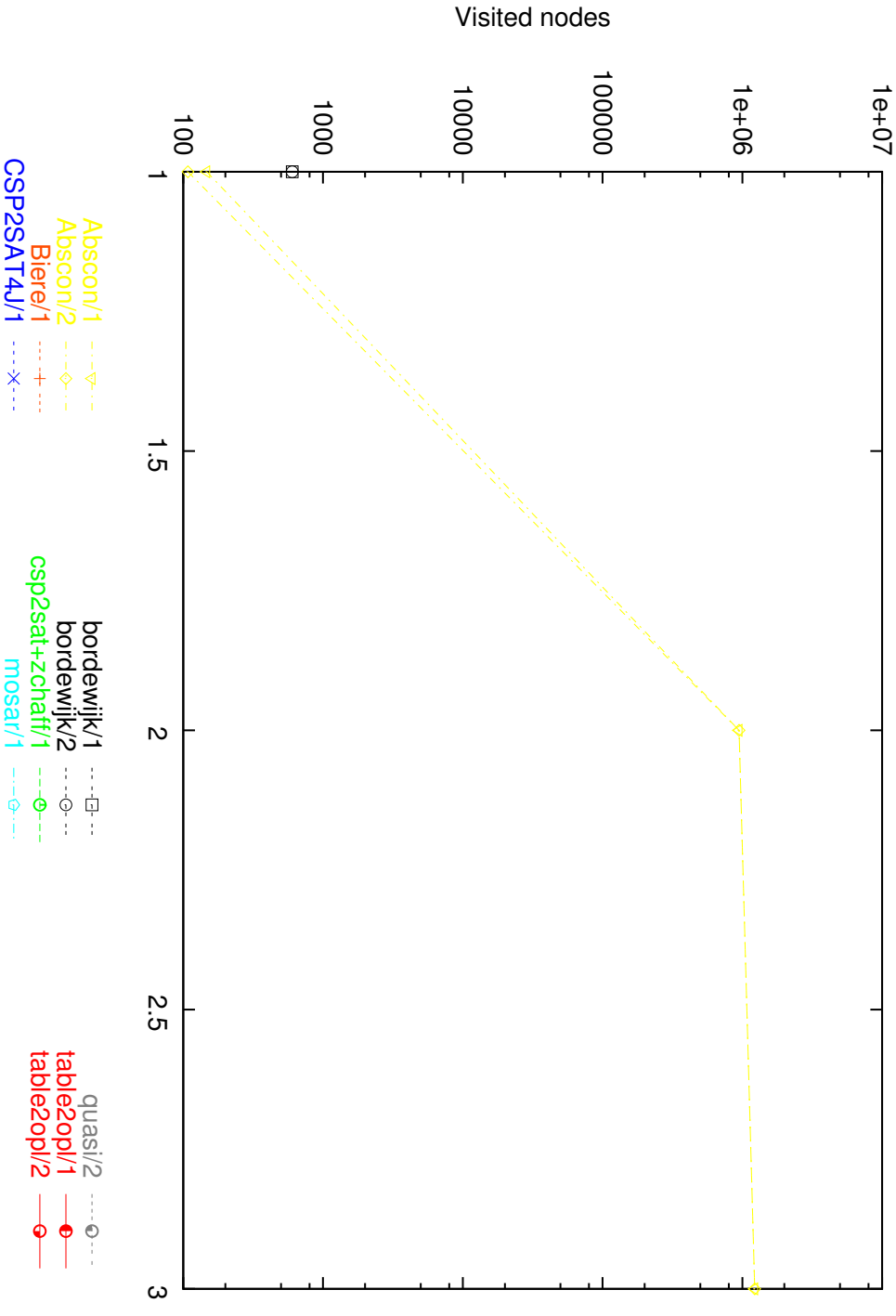

Fig. 617. Visited nodes required for solving instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

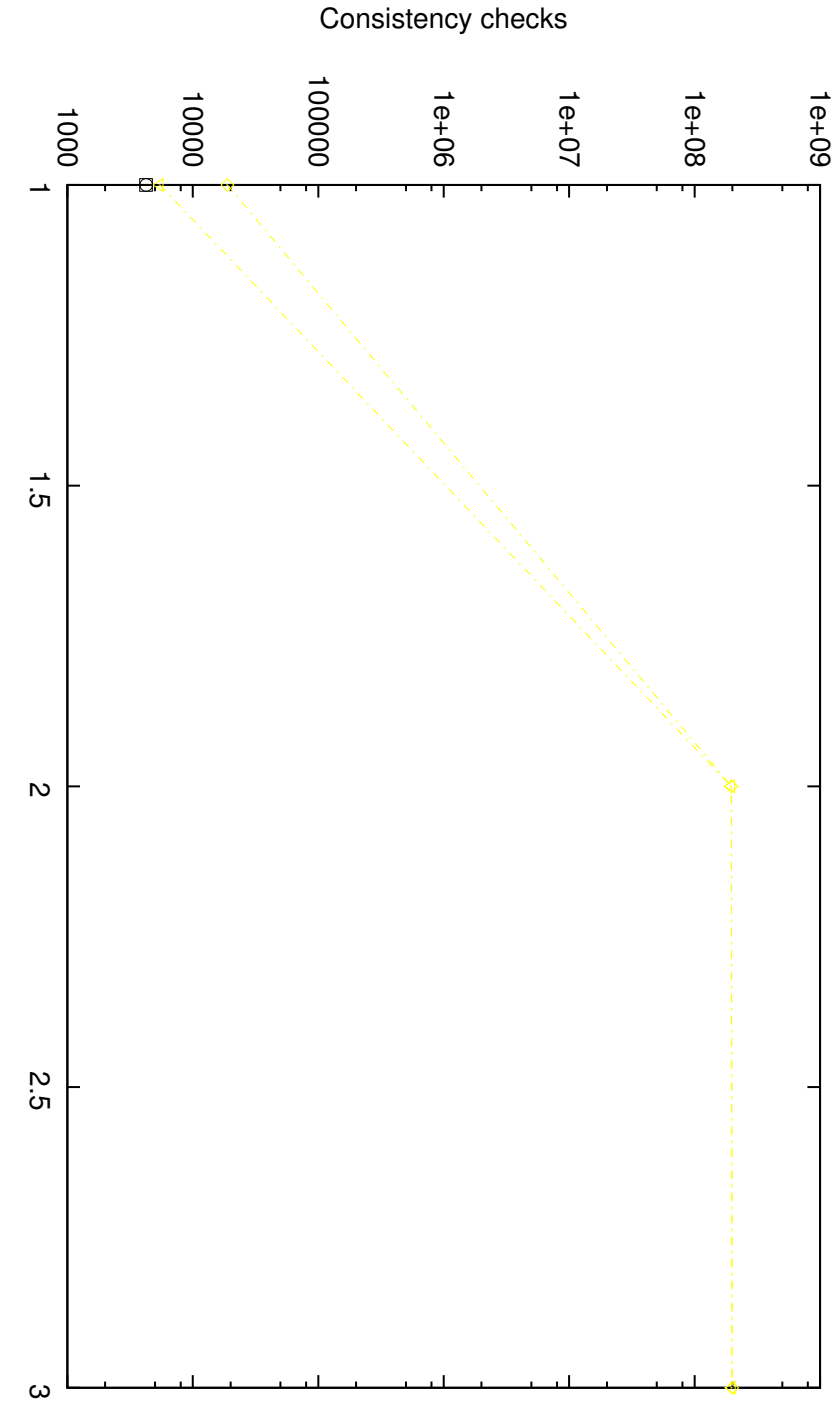

Fig. 618. Consistency checks required for solving instances from class `nb-cril`. The maximum solution time was set to 600 seconds.

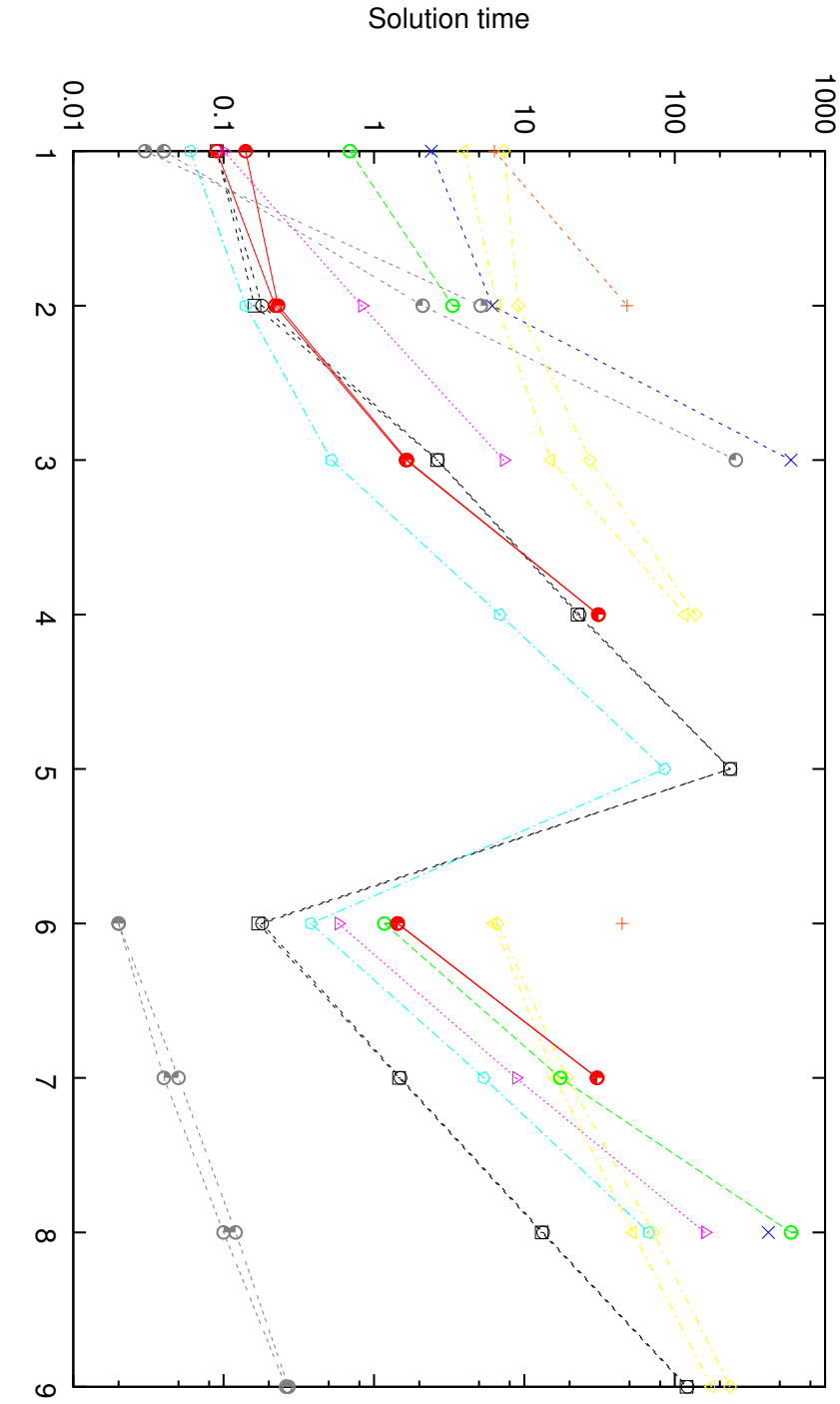

Fig. 619. Solution time in seconds for solving instances from class `nb-gr1`. The maximum solution time was set to 600 seconds.

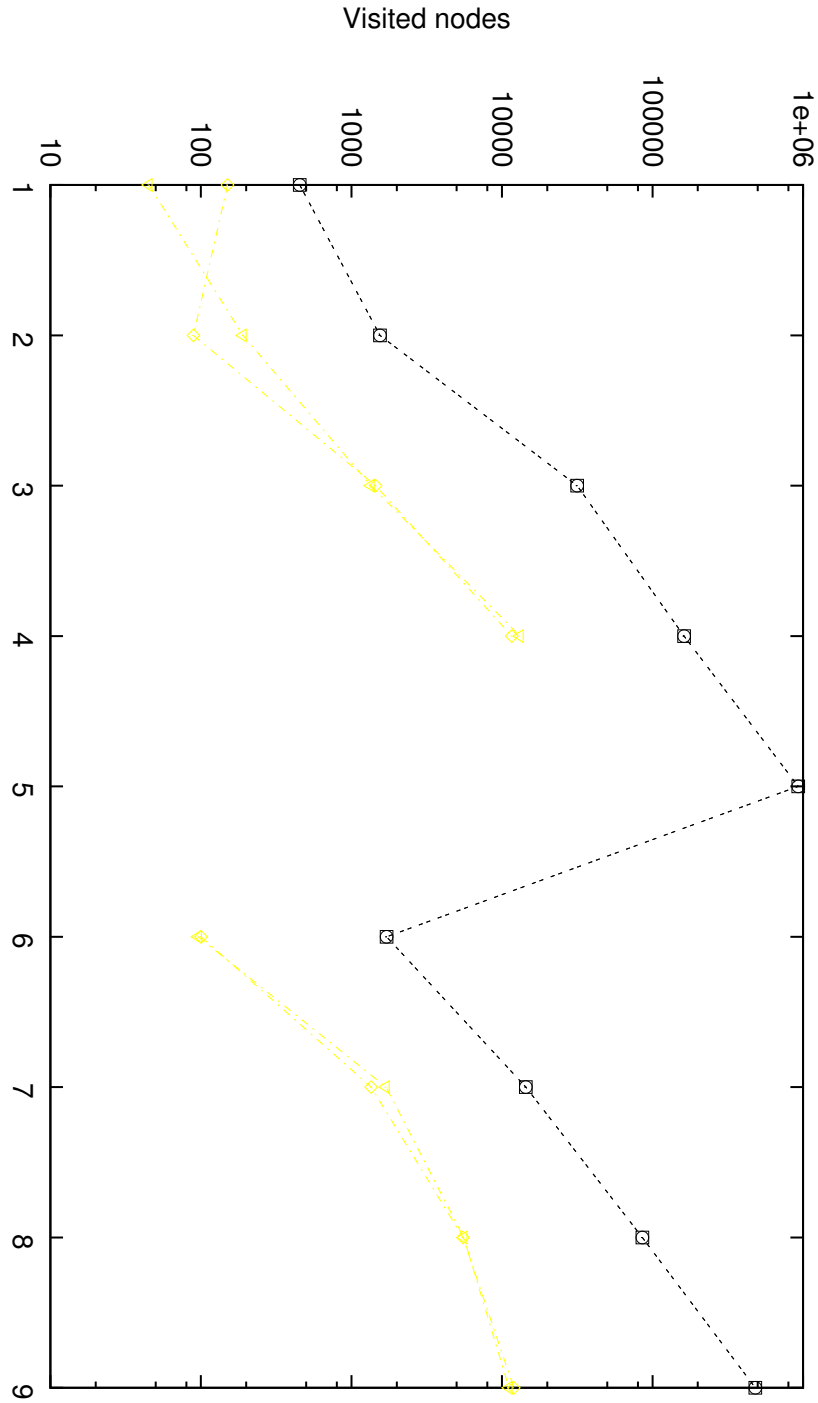

Fig. 620. Visited nodes required for solving instances from class nb-gr1. The maximum solution time was set to 600 seconds.

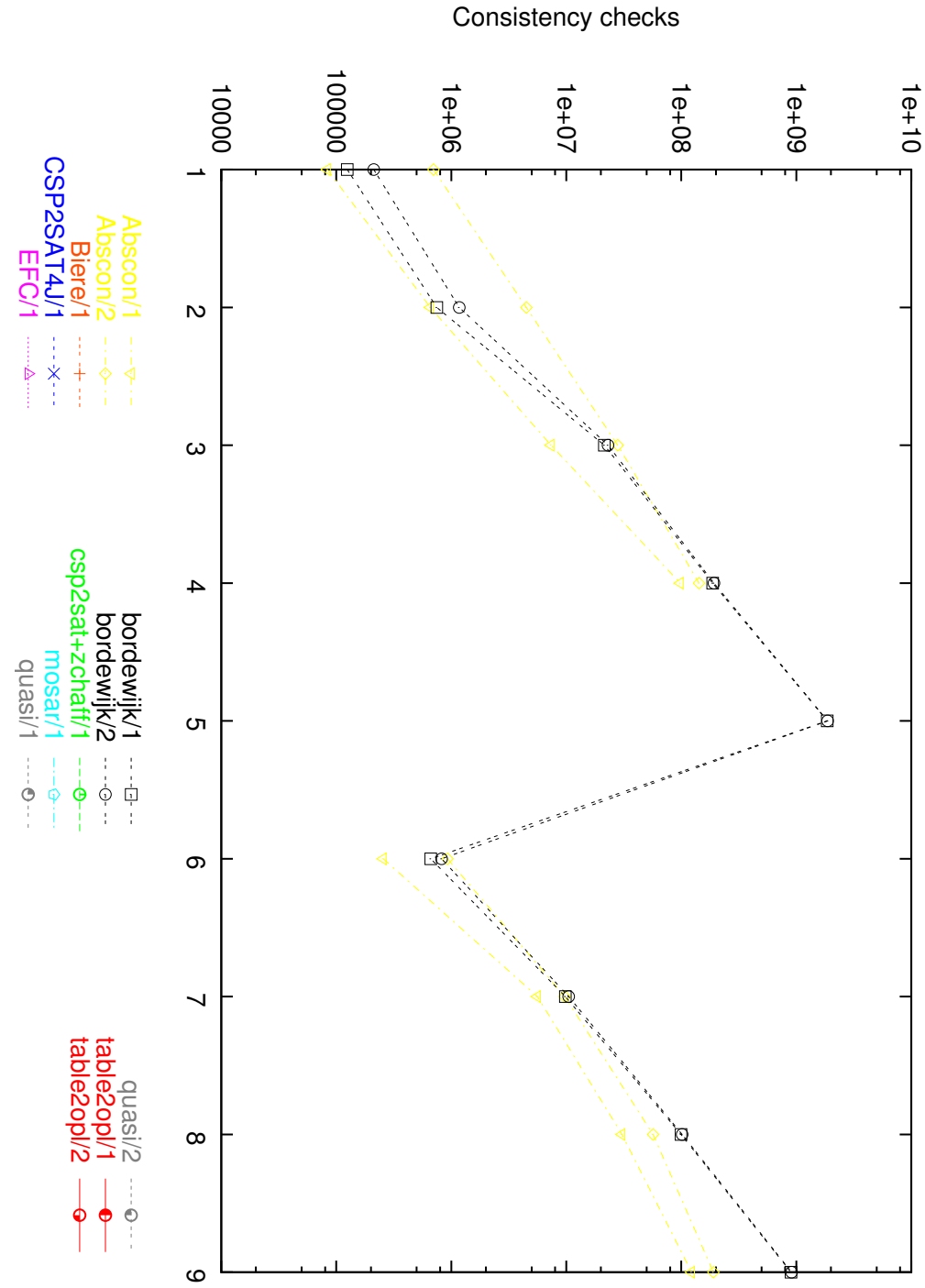

Fig. 621. Consistency checks required for solving instances from class `nb-gr1`. The maximum solution time was set to 600 seconds.

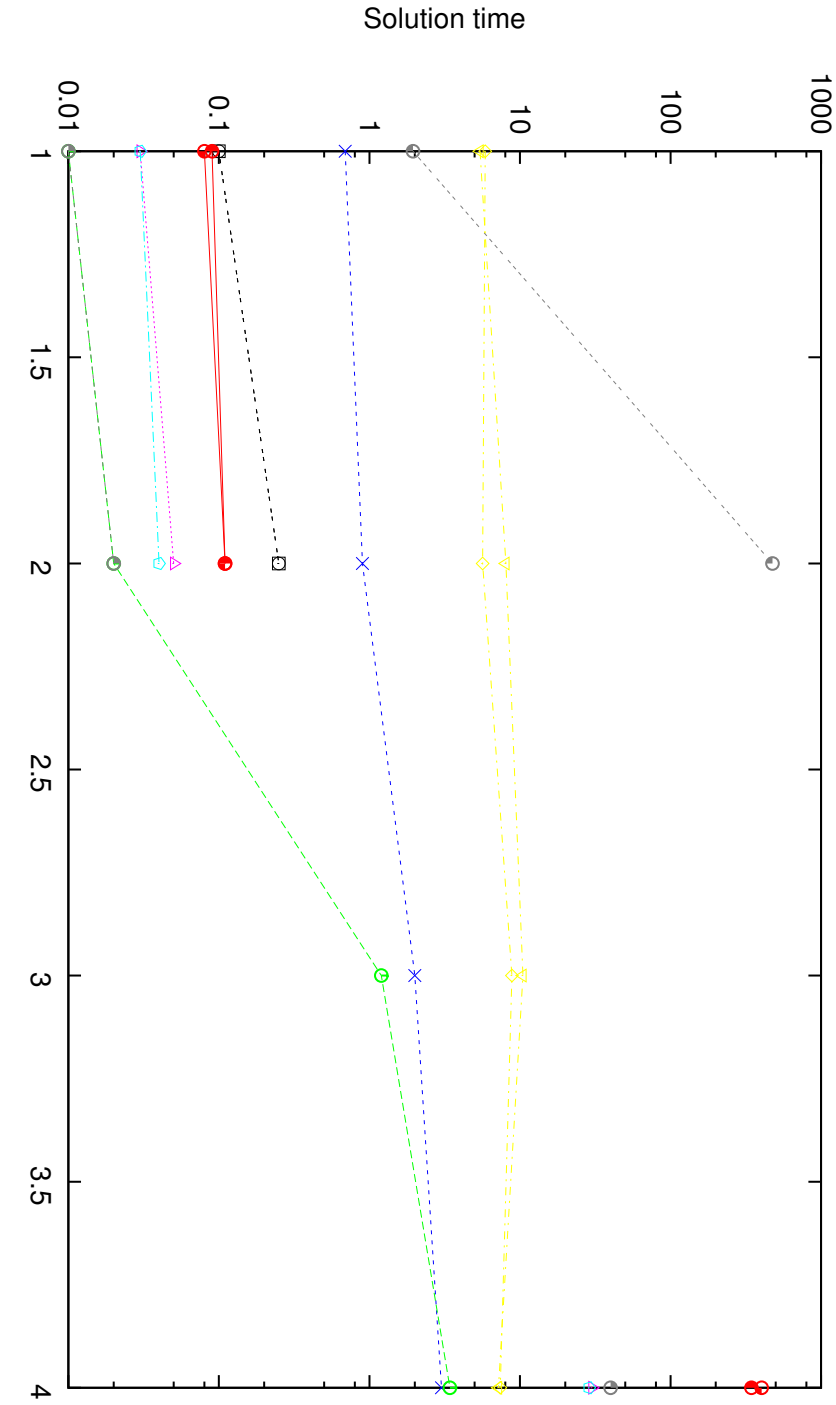

Fig. 622. Solution time in seconds for solving instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

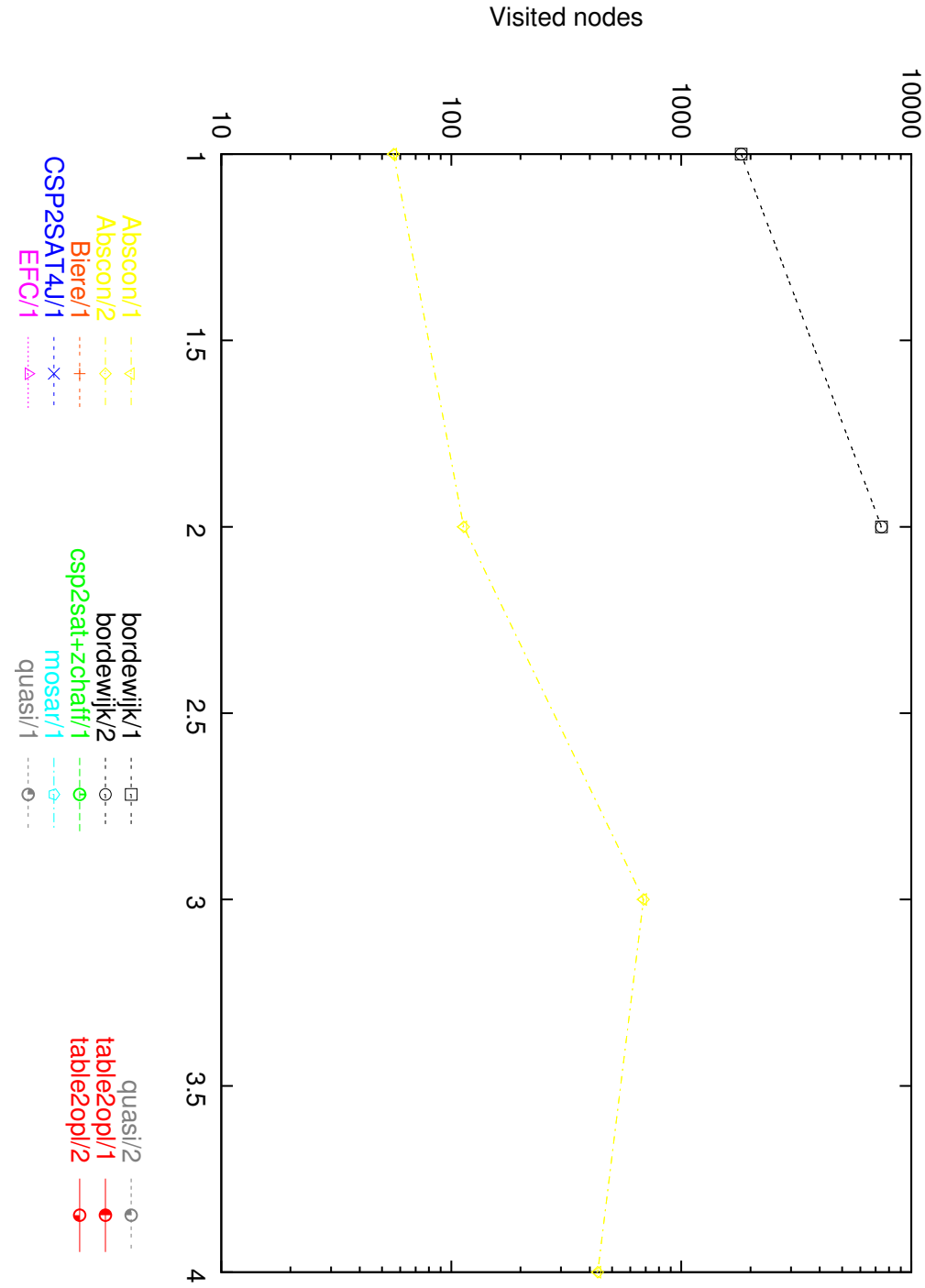

Fig. 623. Visited nodes required for solving instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

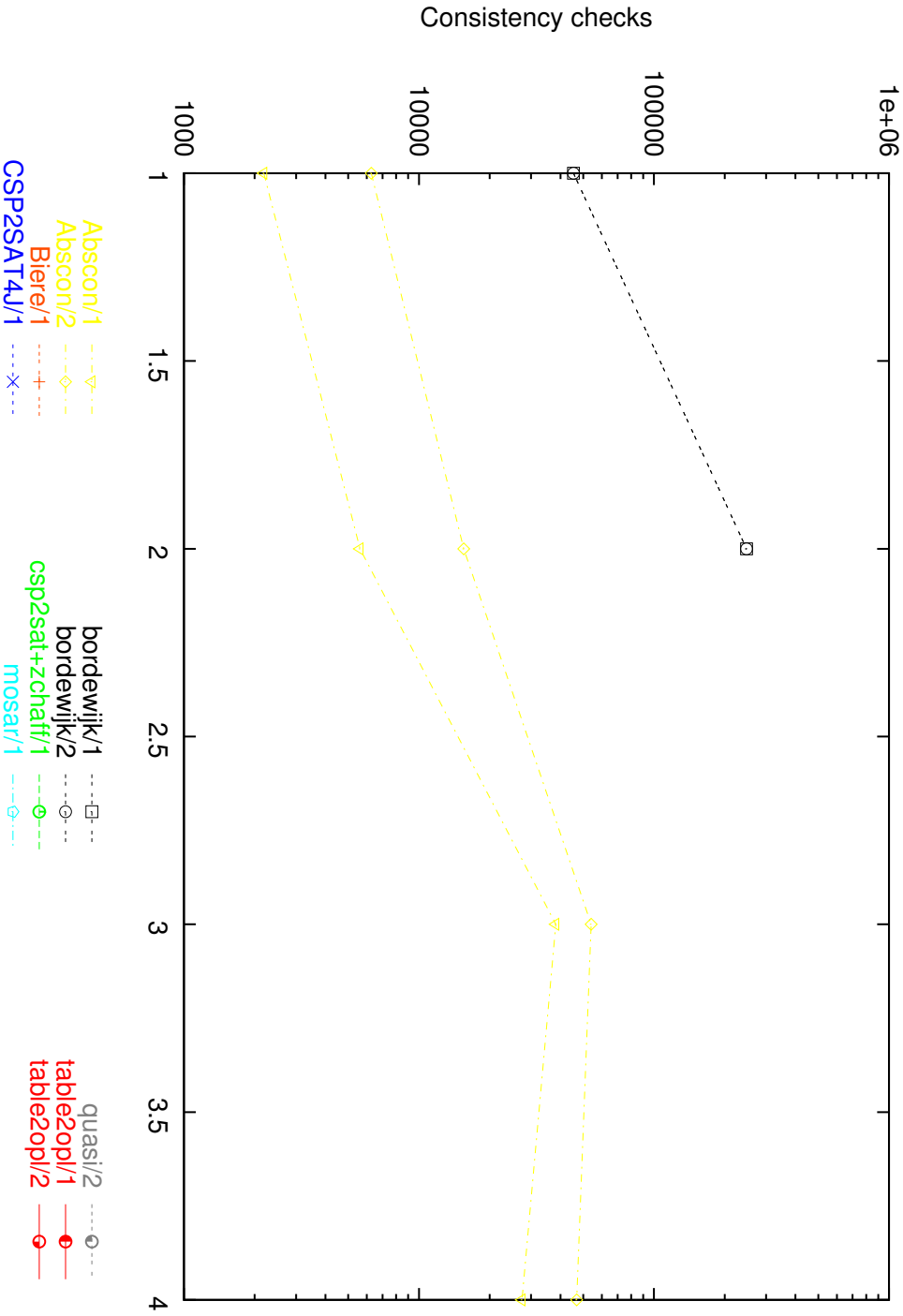

Fig. 624. Consistency checks required for solving instances from class `nb-ramsey3`. The maximum solution time was set to 600 seconds.

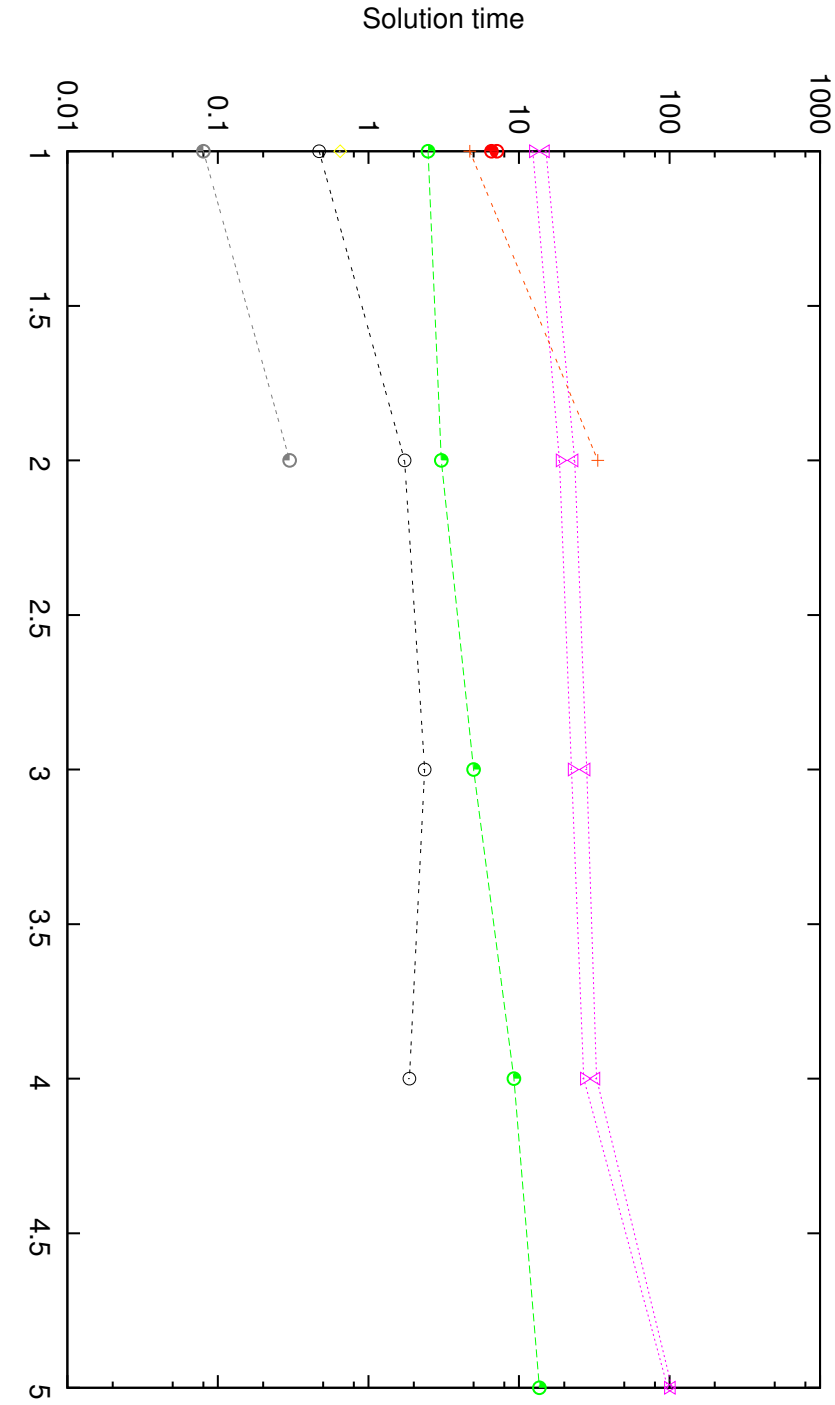

Fig. 625. Solution time in seconds for solving instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

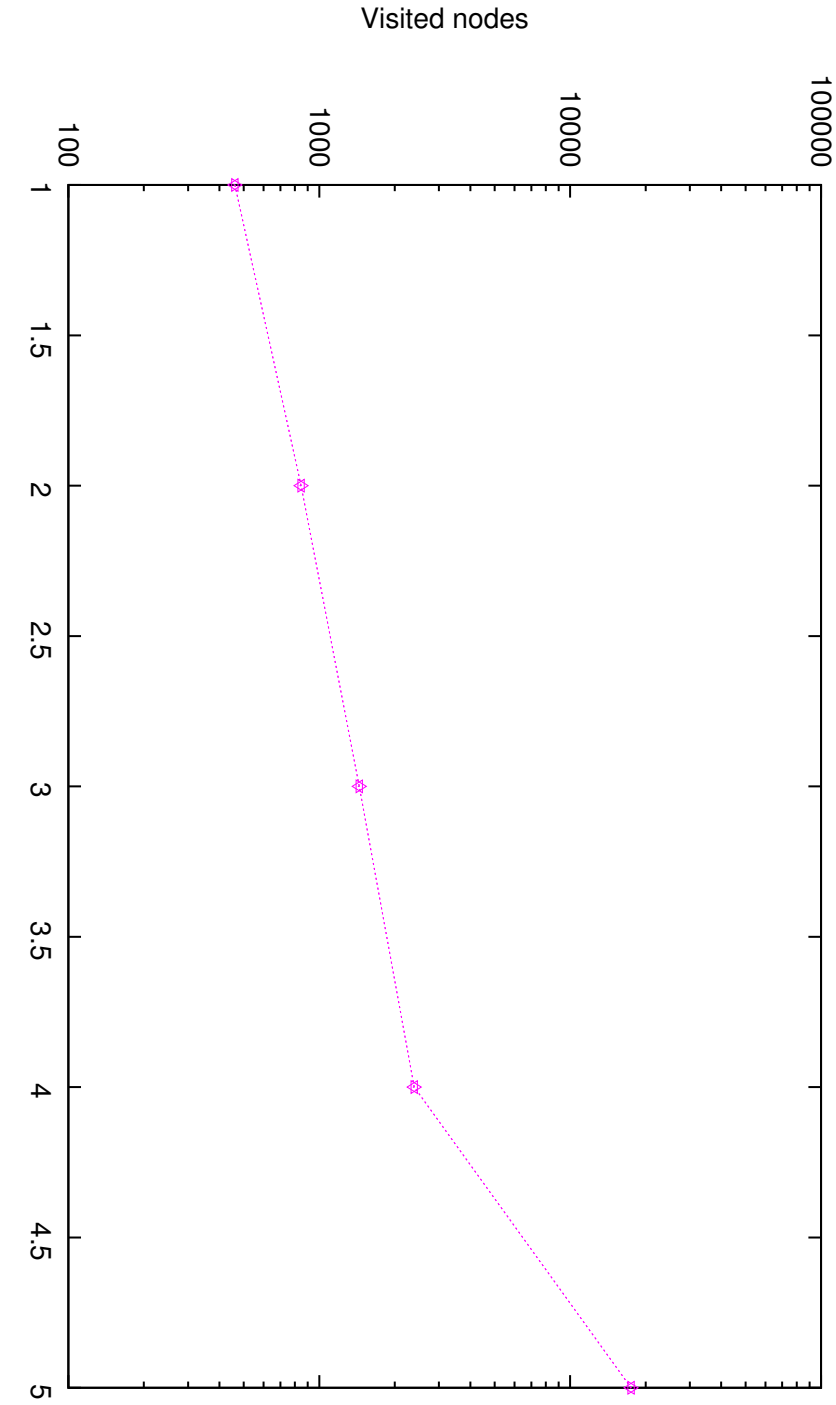

Fig. 626. Visited nodes required for solving instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

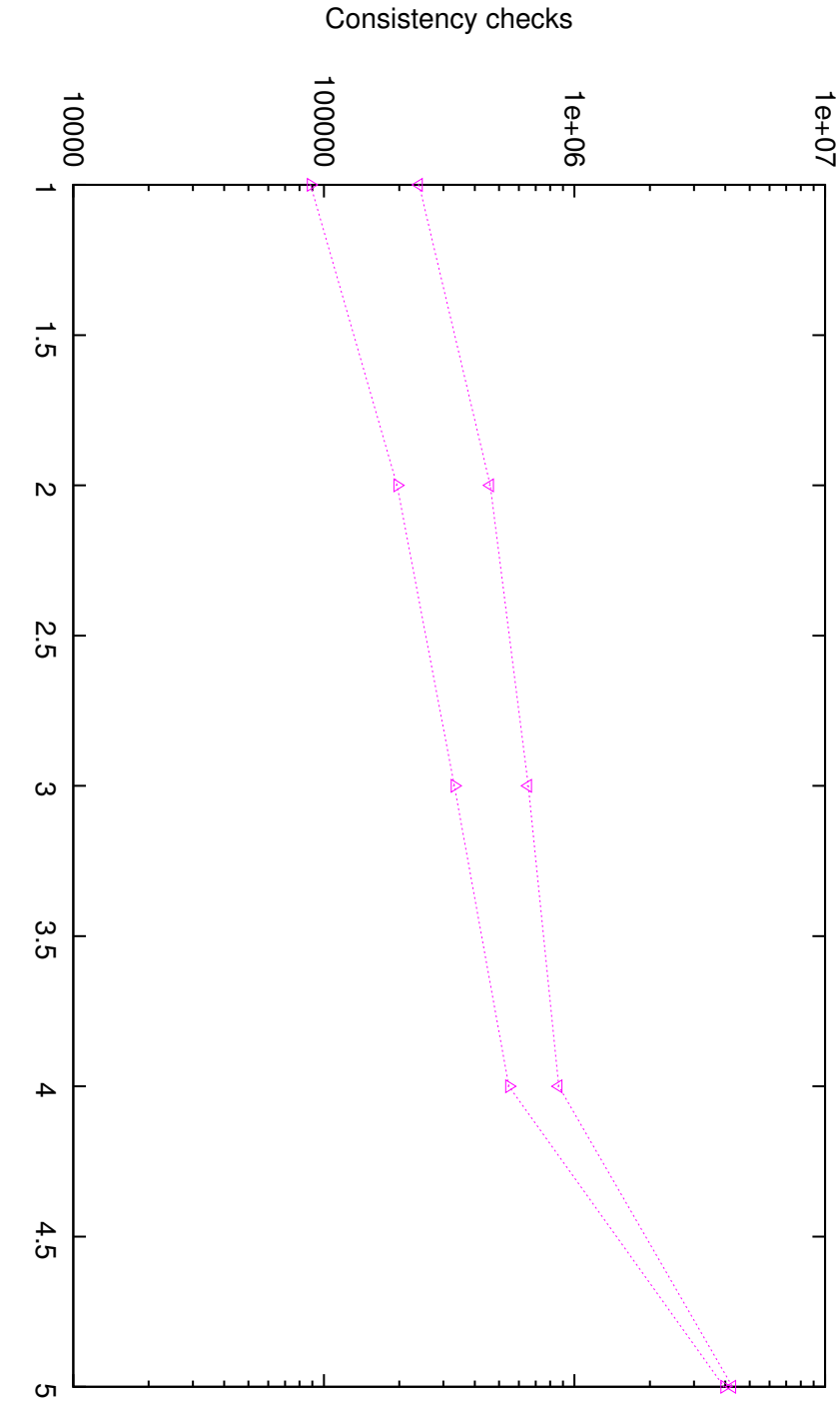

Fig. 627. Consistency checks required for solving instances from class `nb-ramsey4`. The maximum solution time was set to 600 seconds.

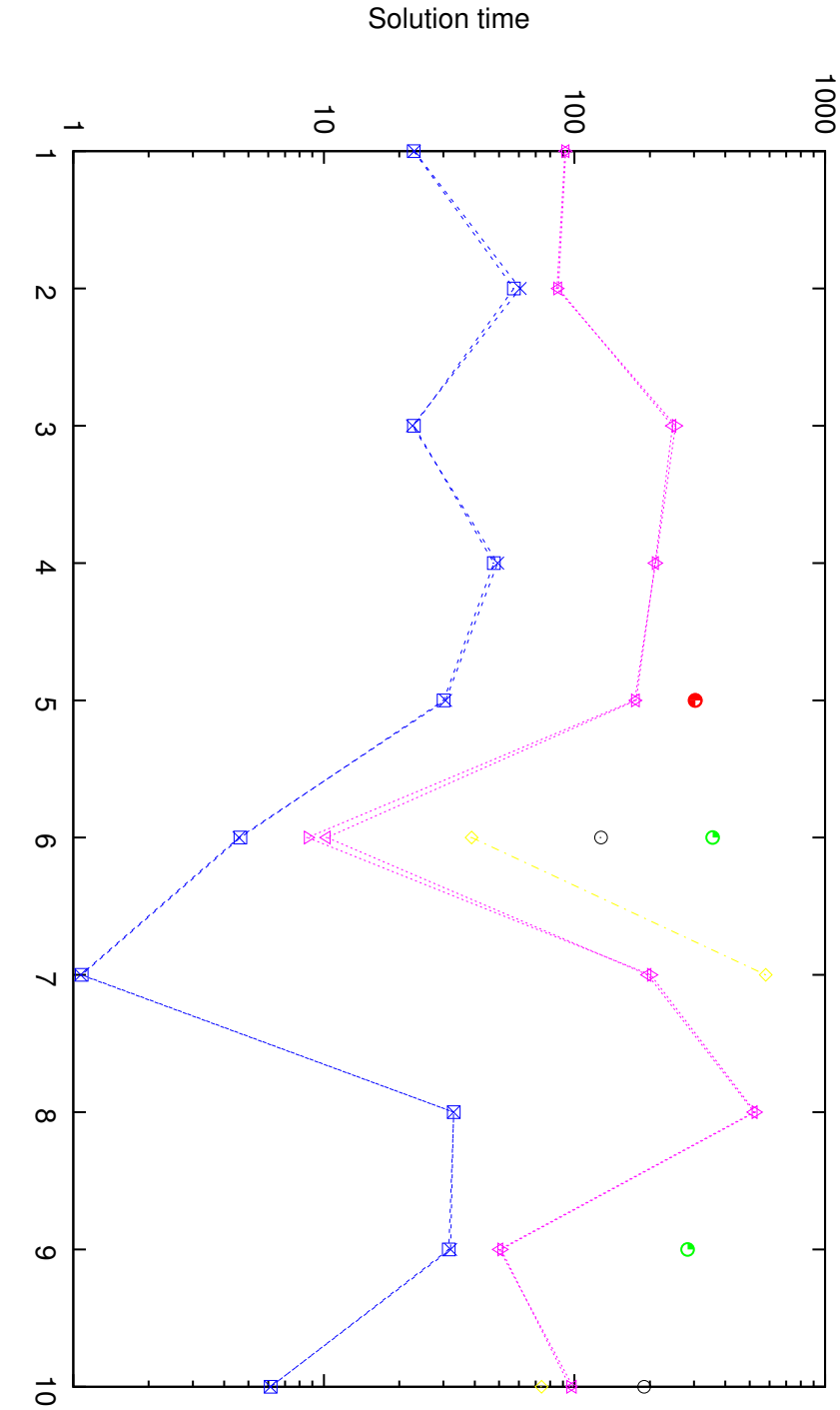

Fig. 628. Solution time in seconds for solving instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

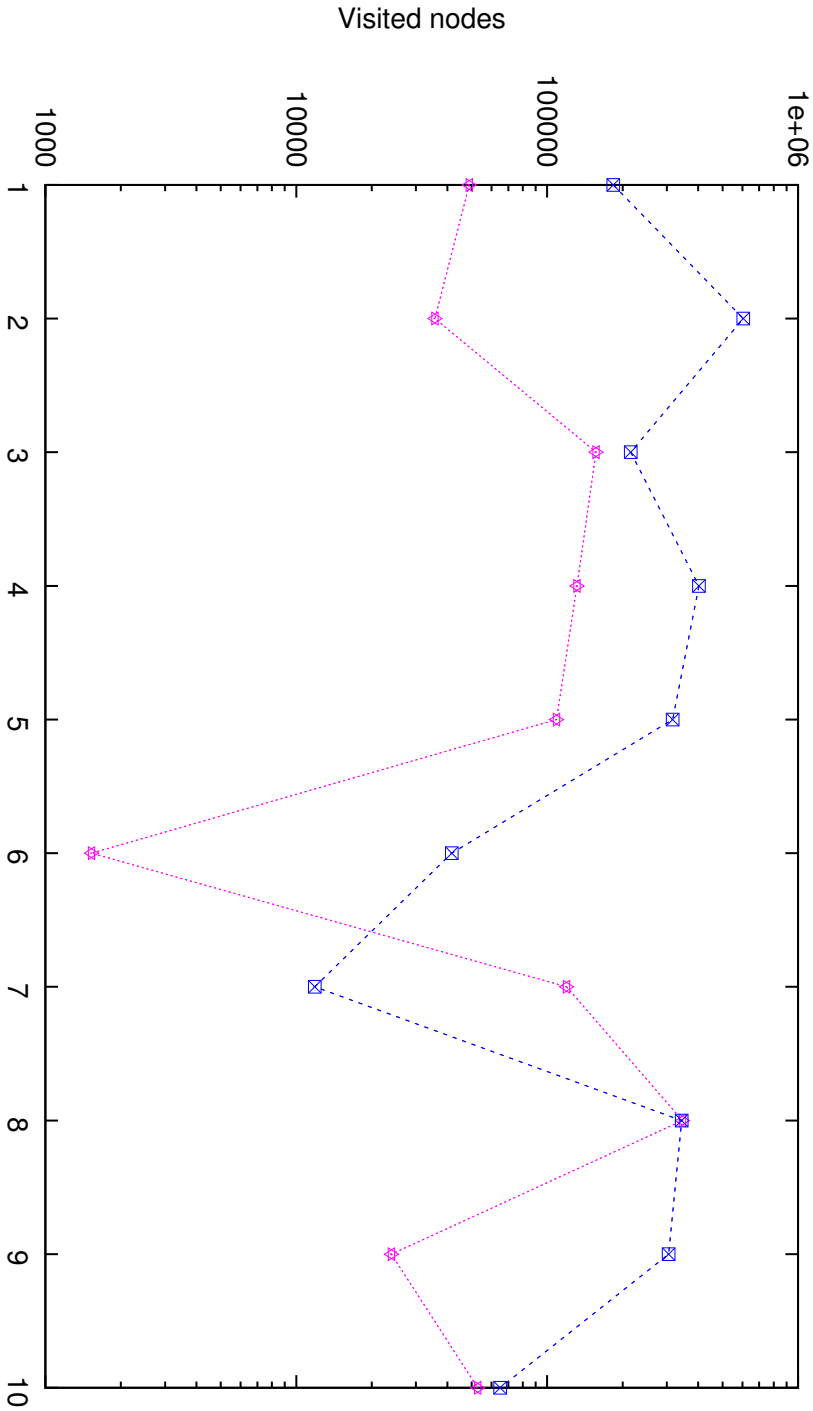

Fig. 629. Visited nodes required for solving instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

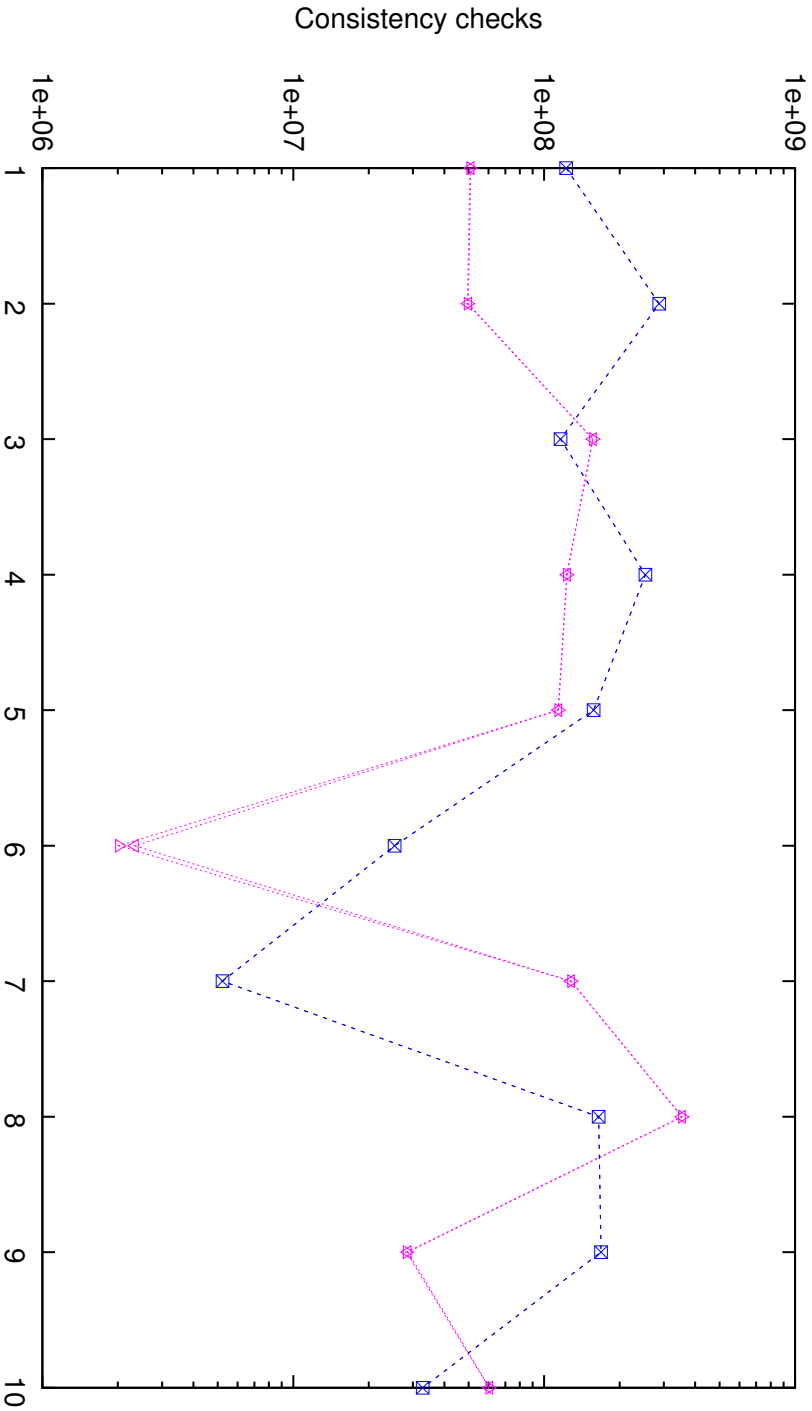

Fig. 630. Consistency checks required for solving instances from class `nb-random-3-20-20-60-632-forced`. The maximum solution time was set to 600 seconds.

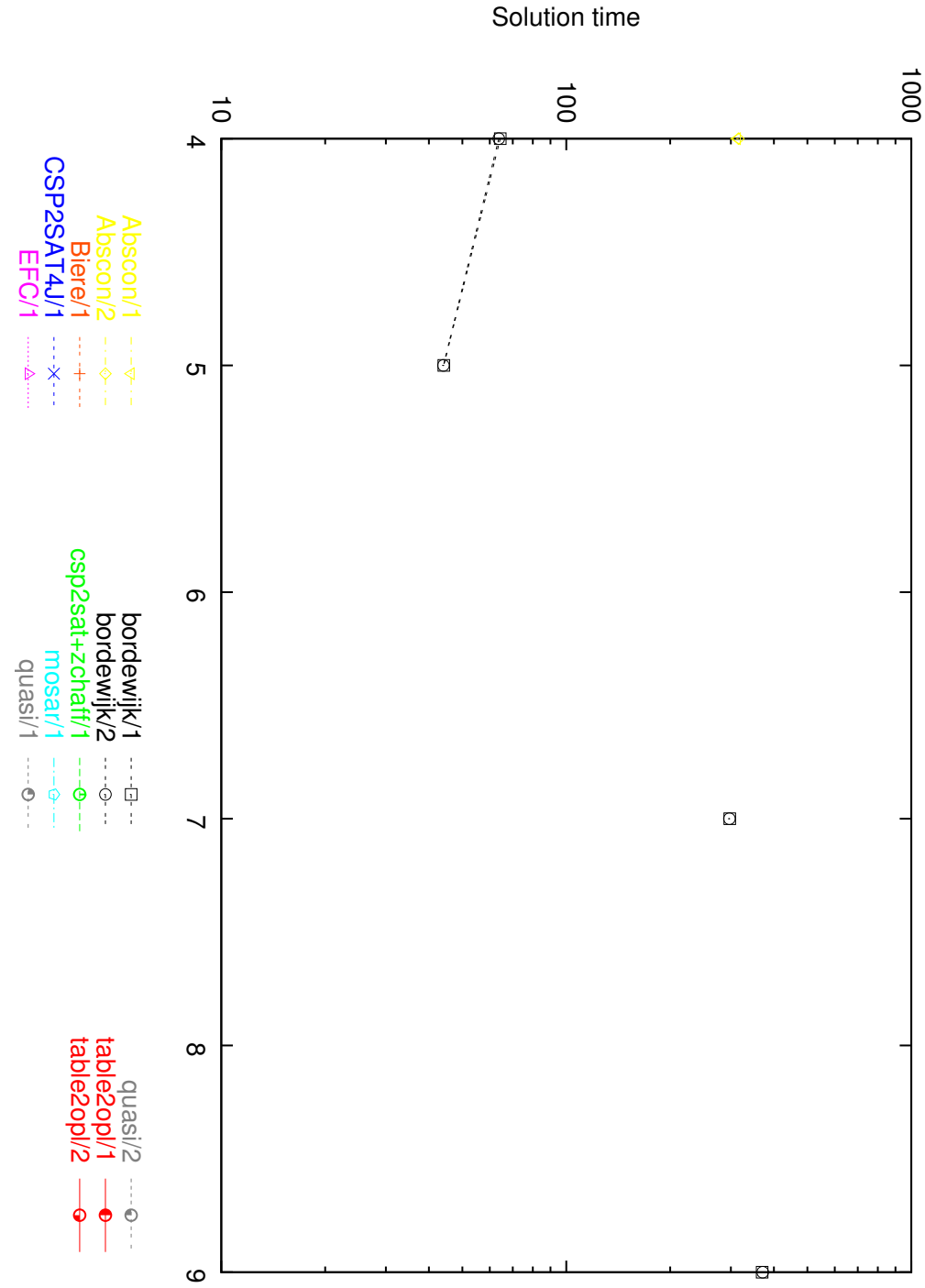

Fig. 631. Solution time in seconds for solving instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

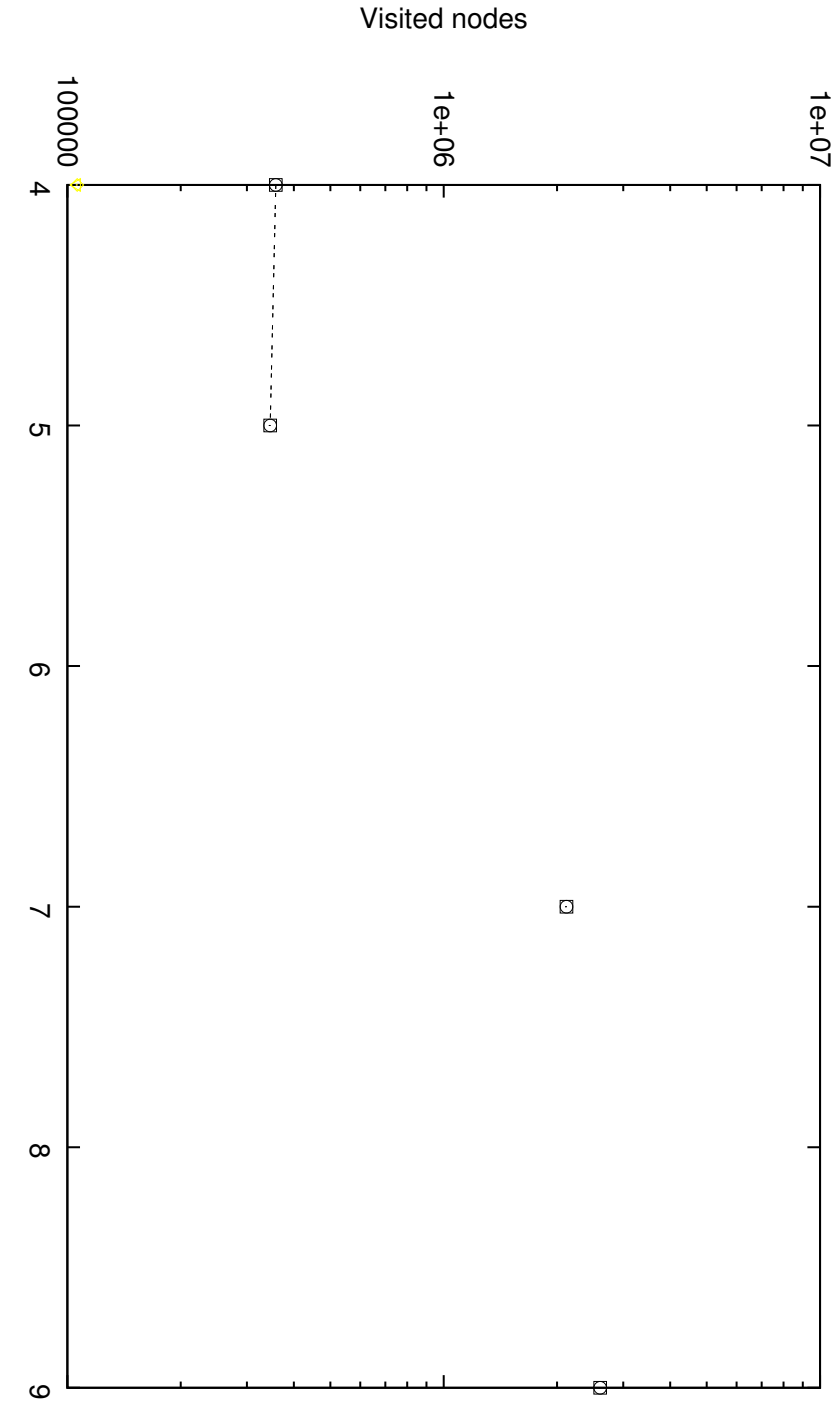

Fig. 632. Visited nodes required for solving instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

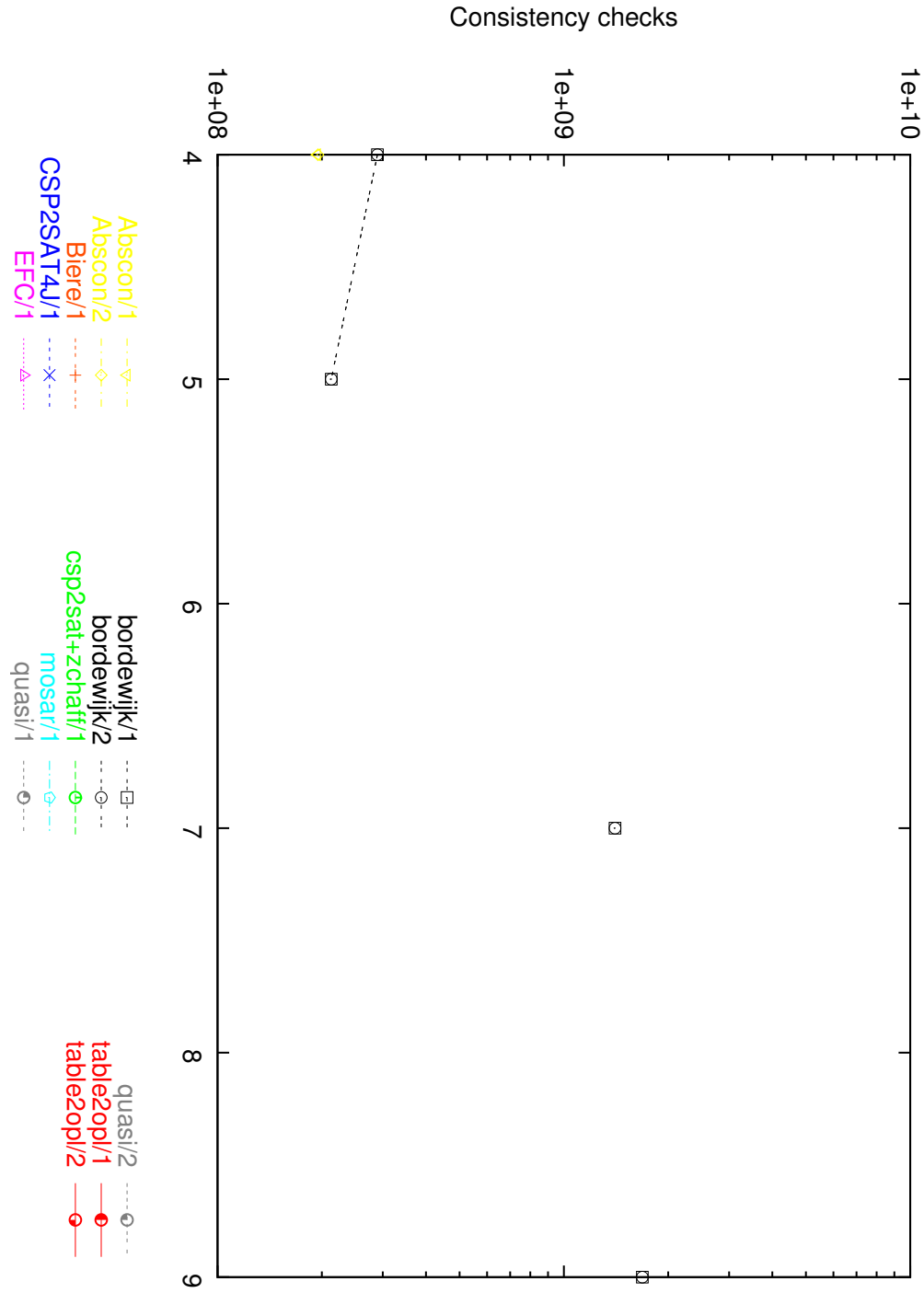

Fig. 633. Consistency checks required for solving instances from class `nb-random-3-24-24-76-632-forced`. The maximum solution time was set to 600 seconds.

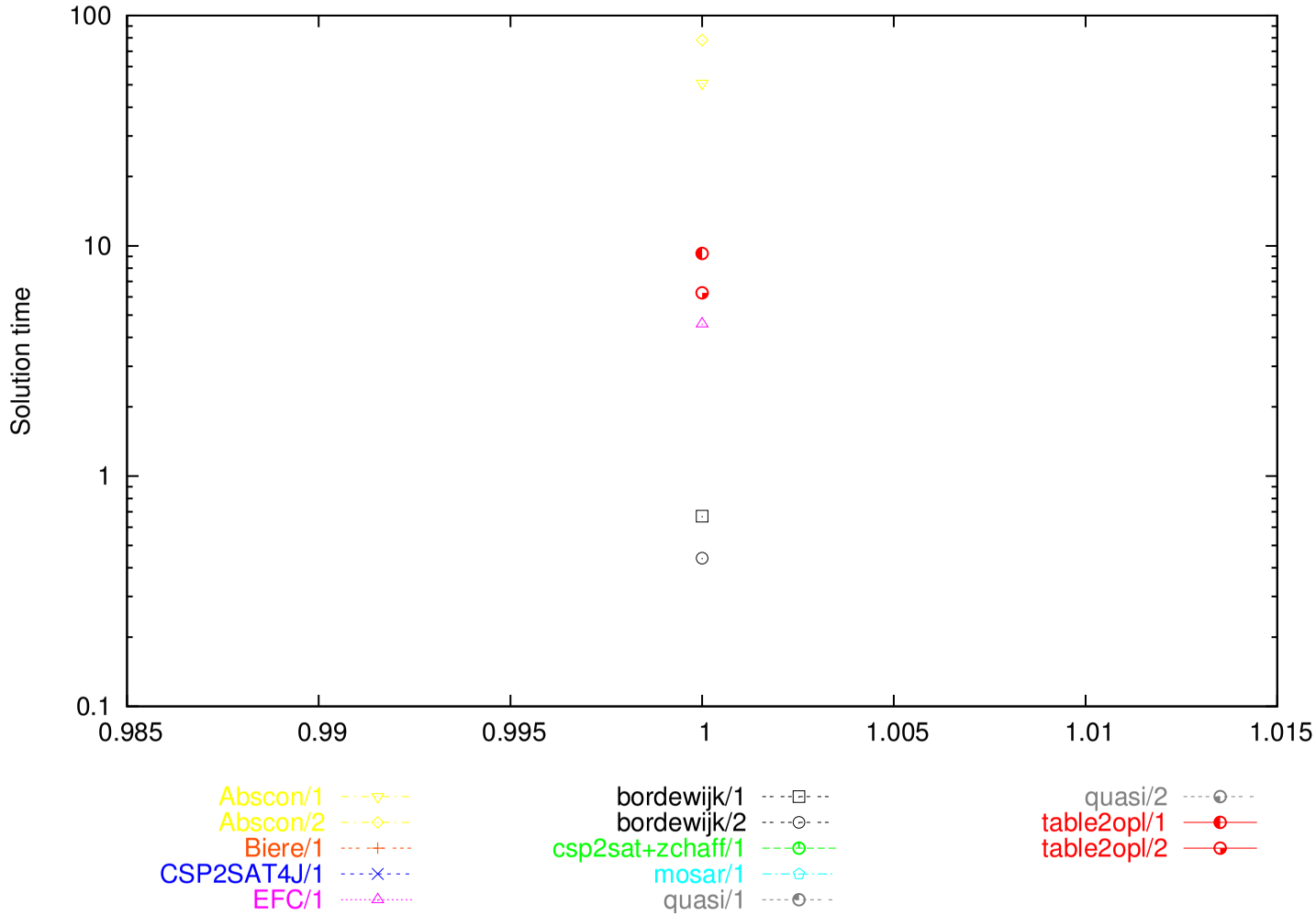

Fig. 634. Solution time in seconds for solving instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

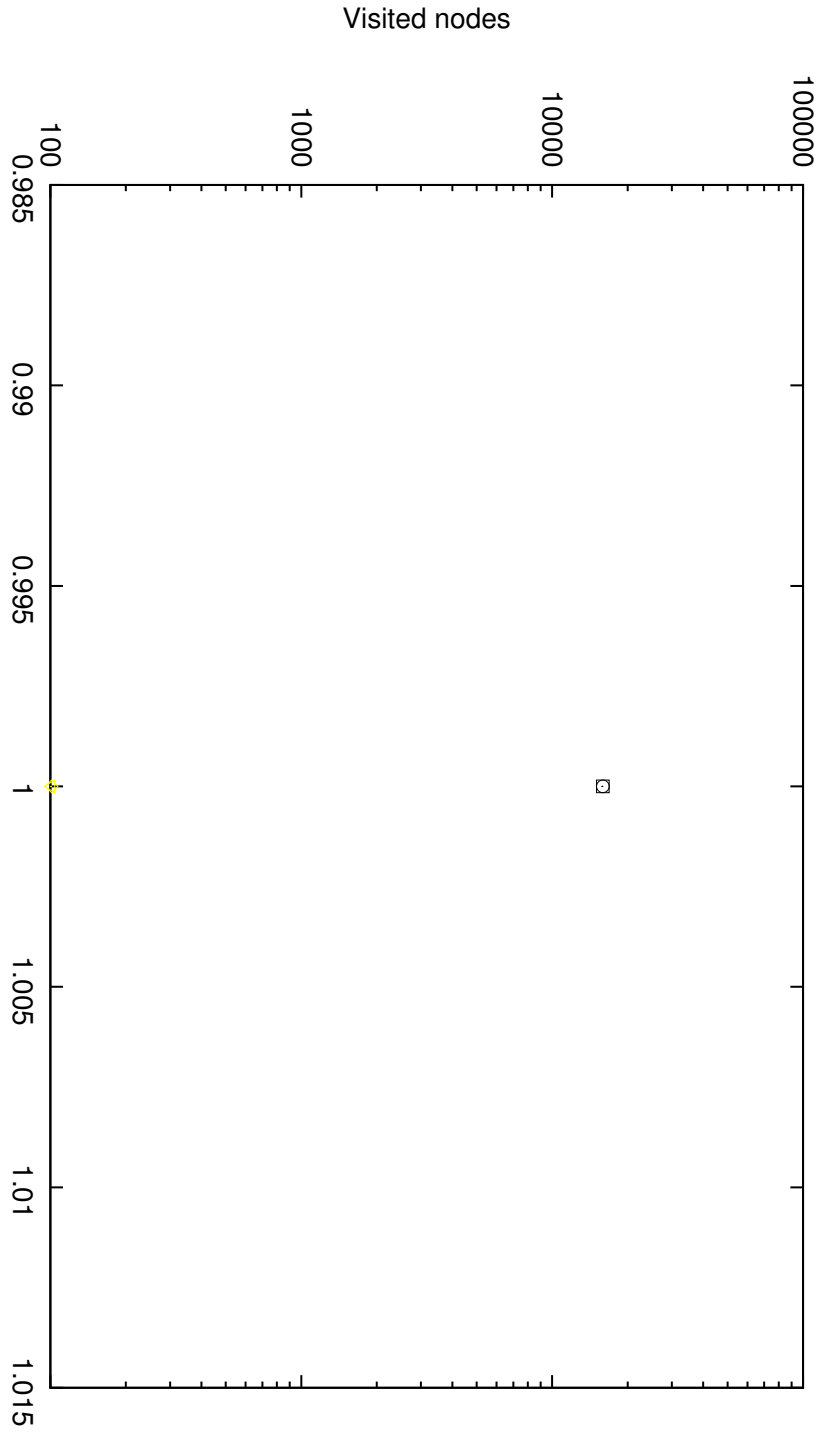

Fig. 635. Visited nodes required for solving instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

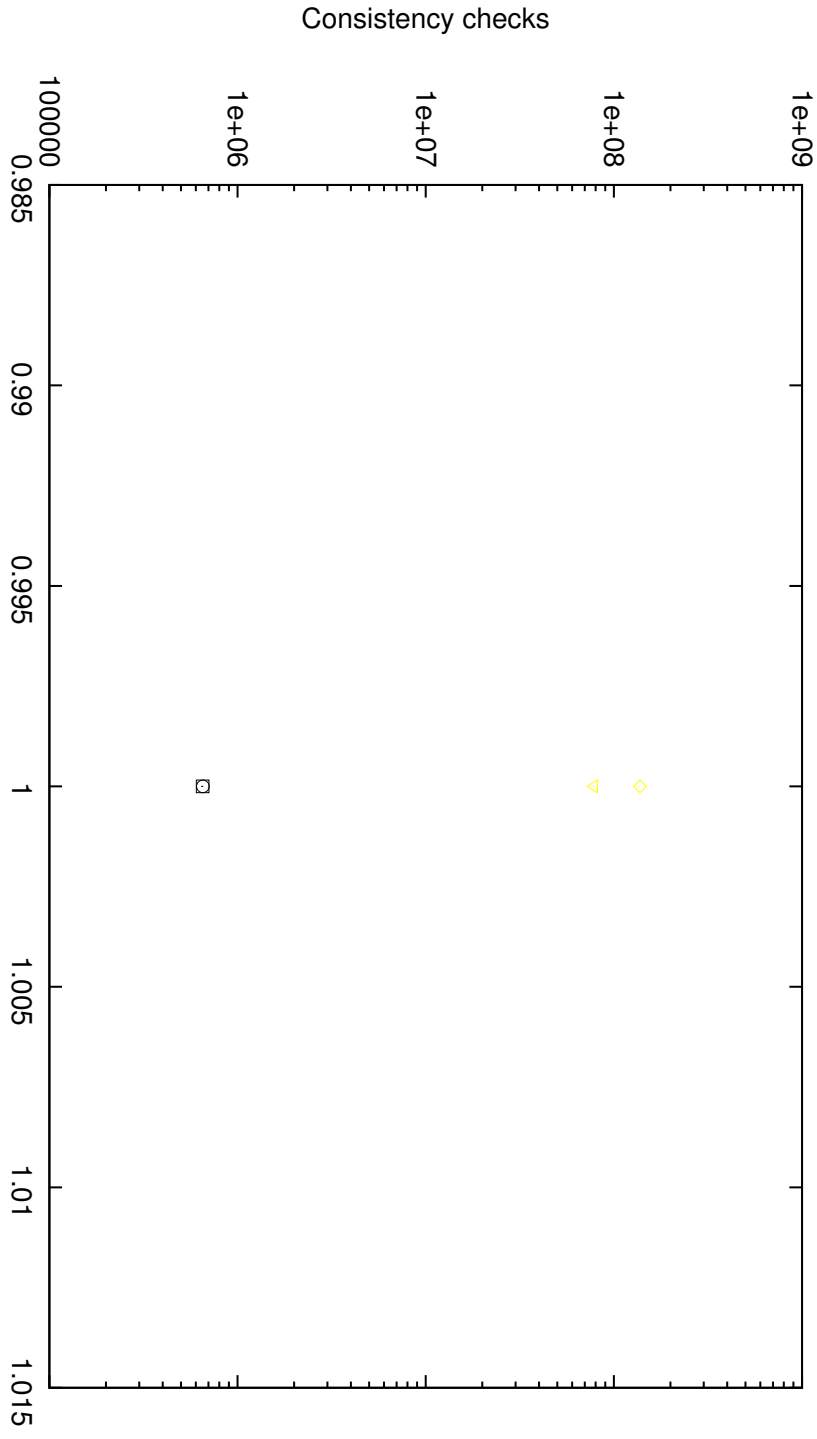

Fig. 636. Consistency checks required for solving instances from class `nb-renault`. The maximum solution time was set to 600 seconds.

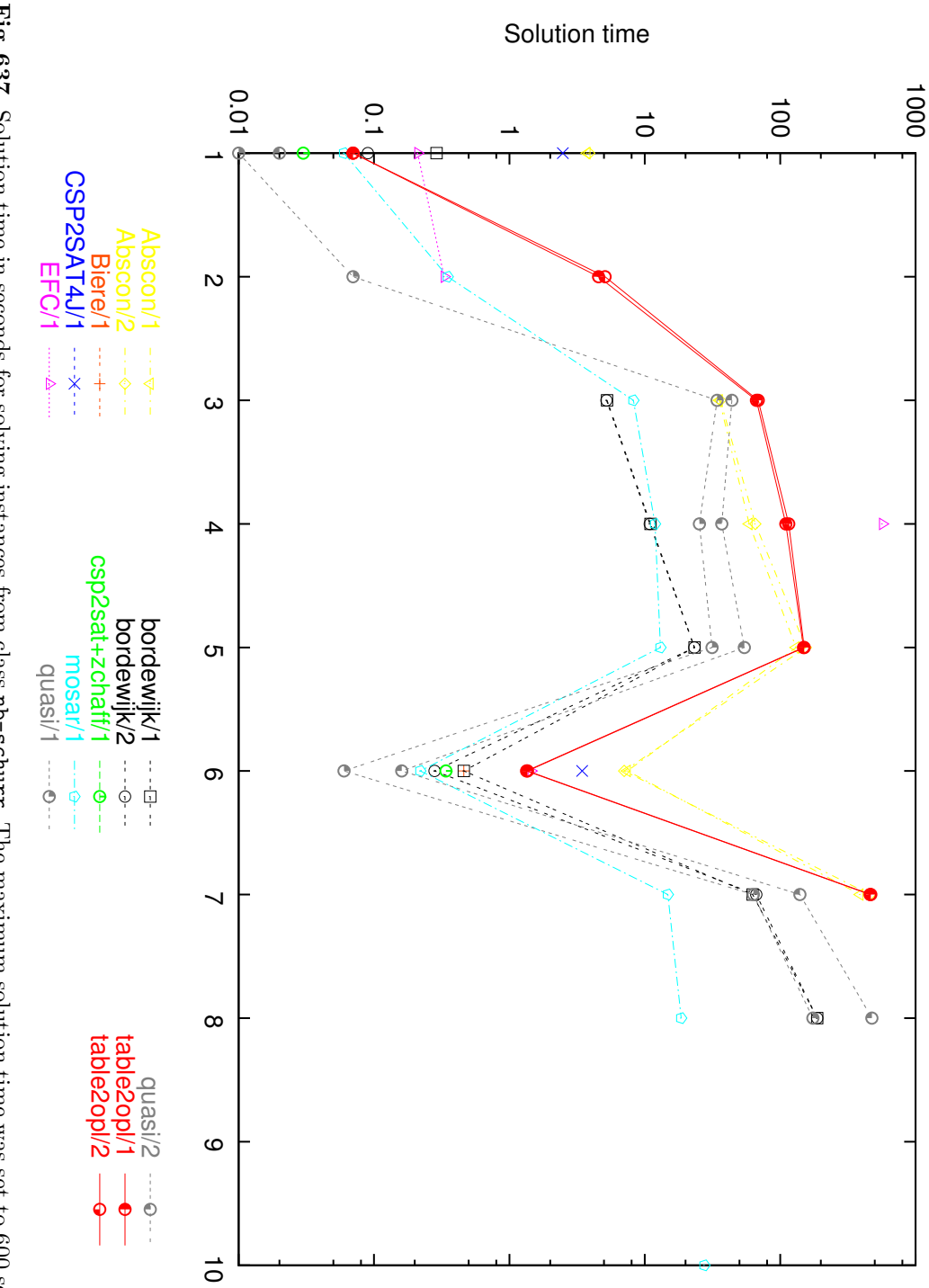

Fig. 637. Solution time in seconds for solving instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

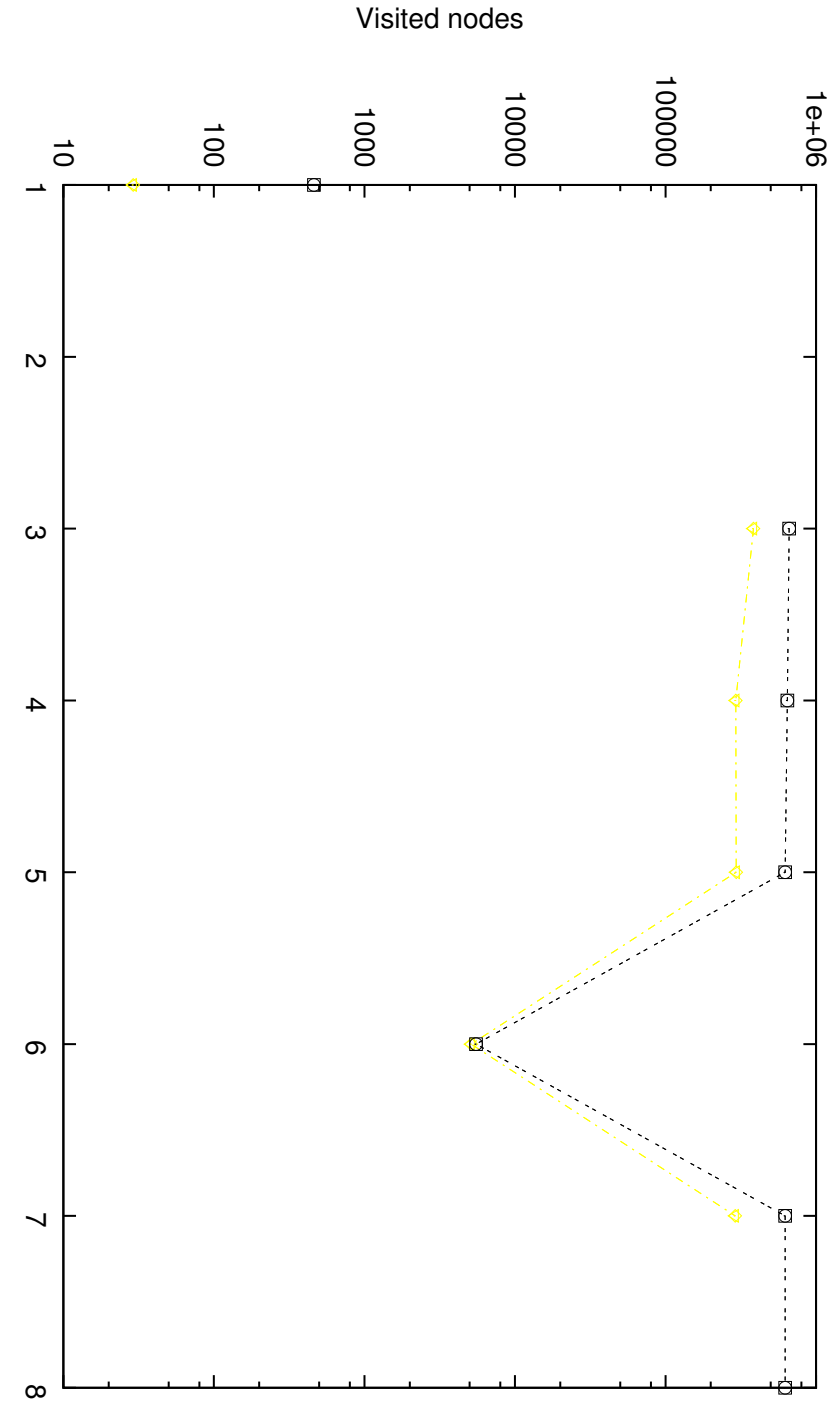

Fig. 638. Visited nodes required for solving instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

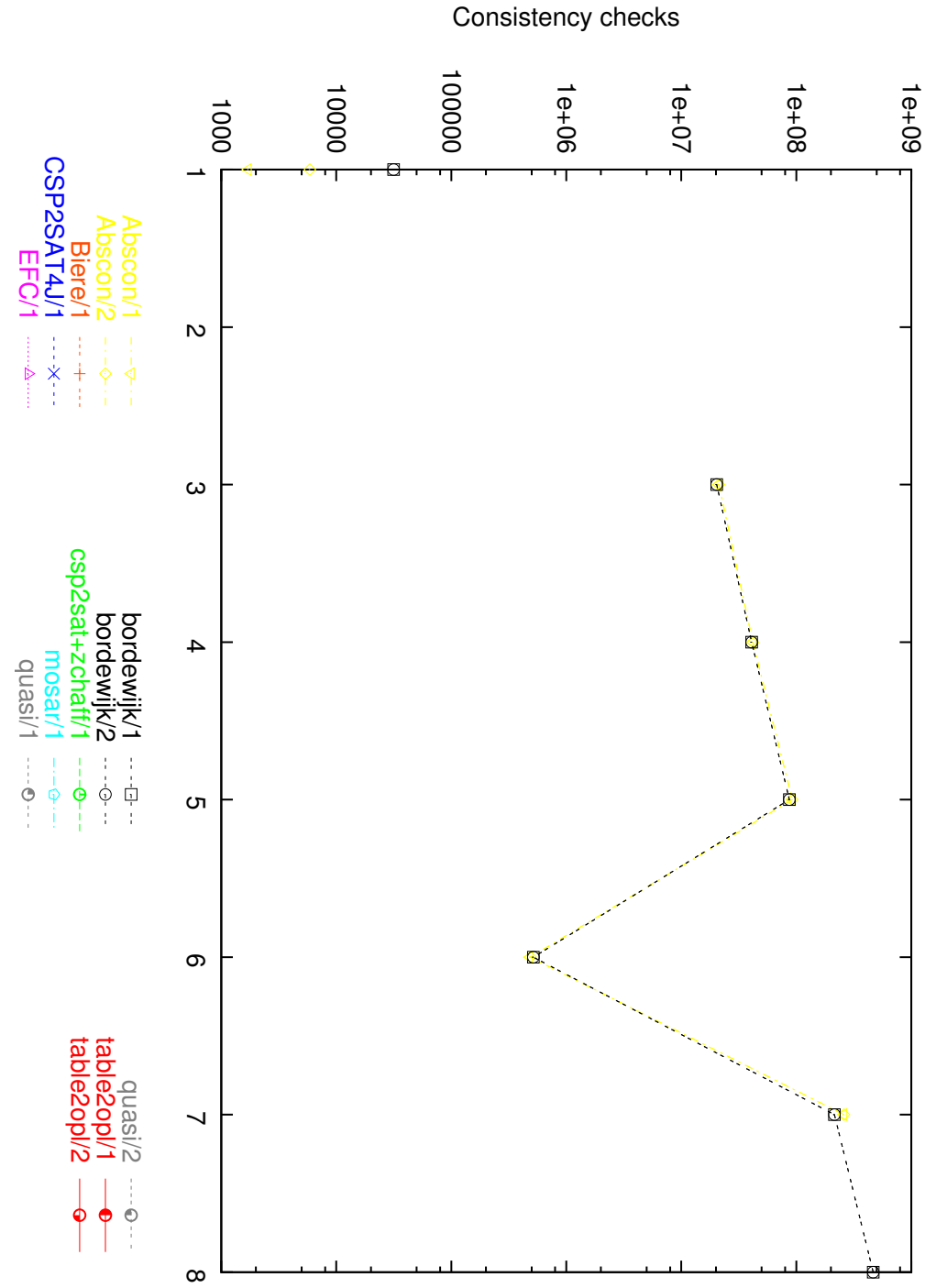

Fig. 639. Consistency checks required for solving instances from class `nb-schurr`. The maximum solution time was set to 600 seconds.

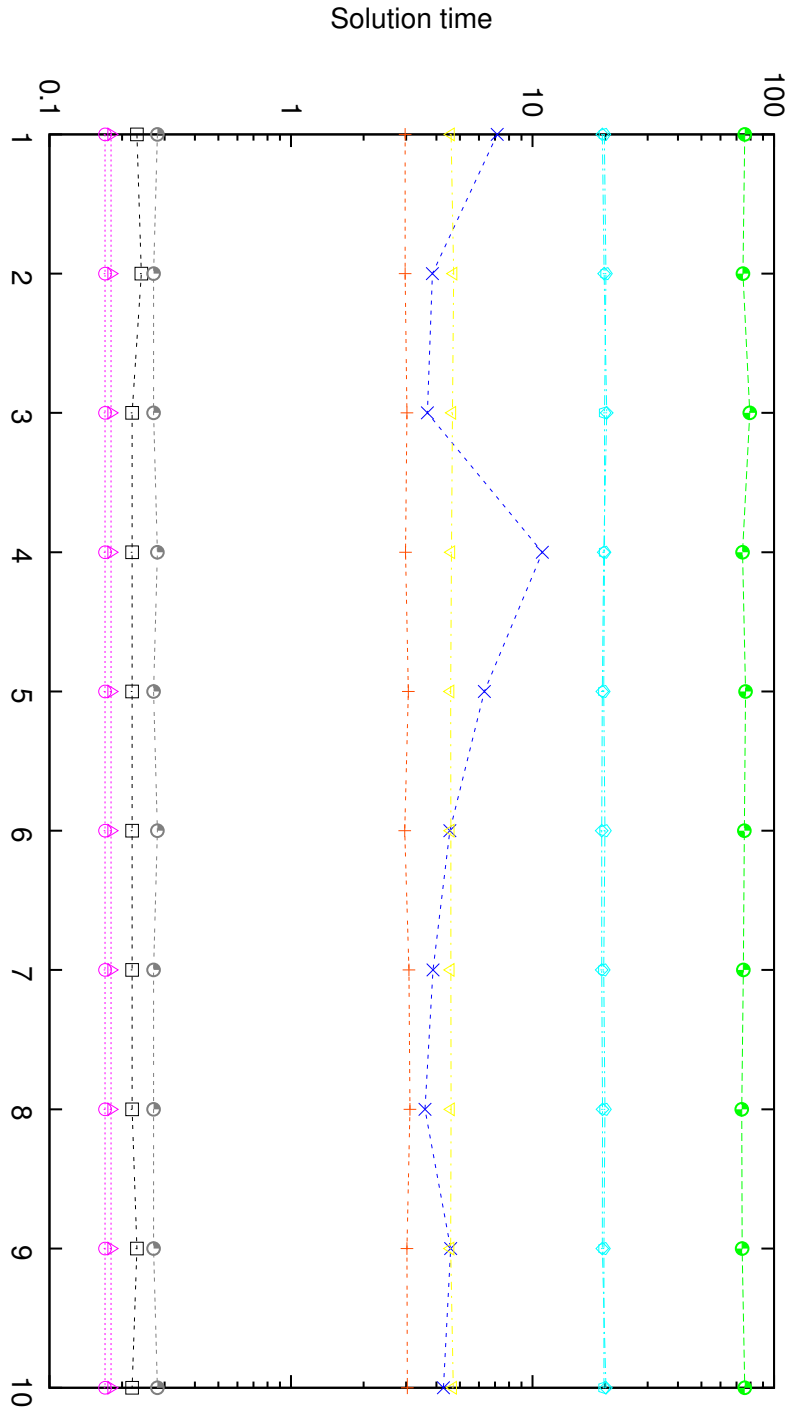

Fig. 640. Solution time in seconds for solving instances from class BH-4-4. The maximum solution time was set to 600 seconds.

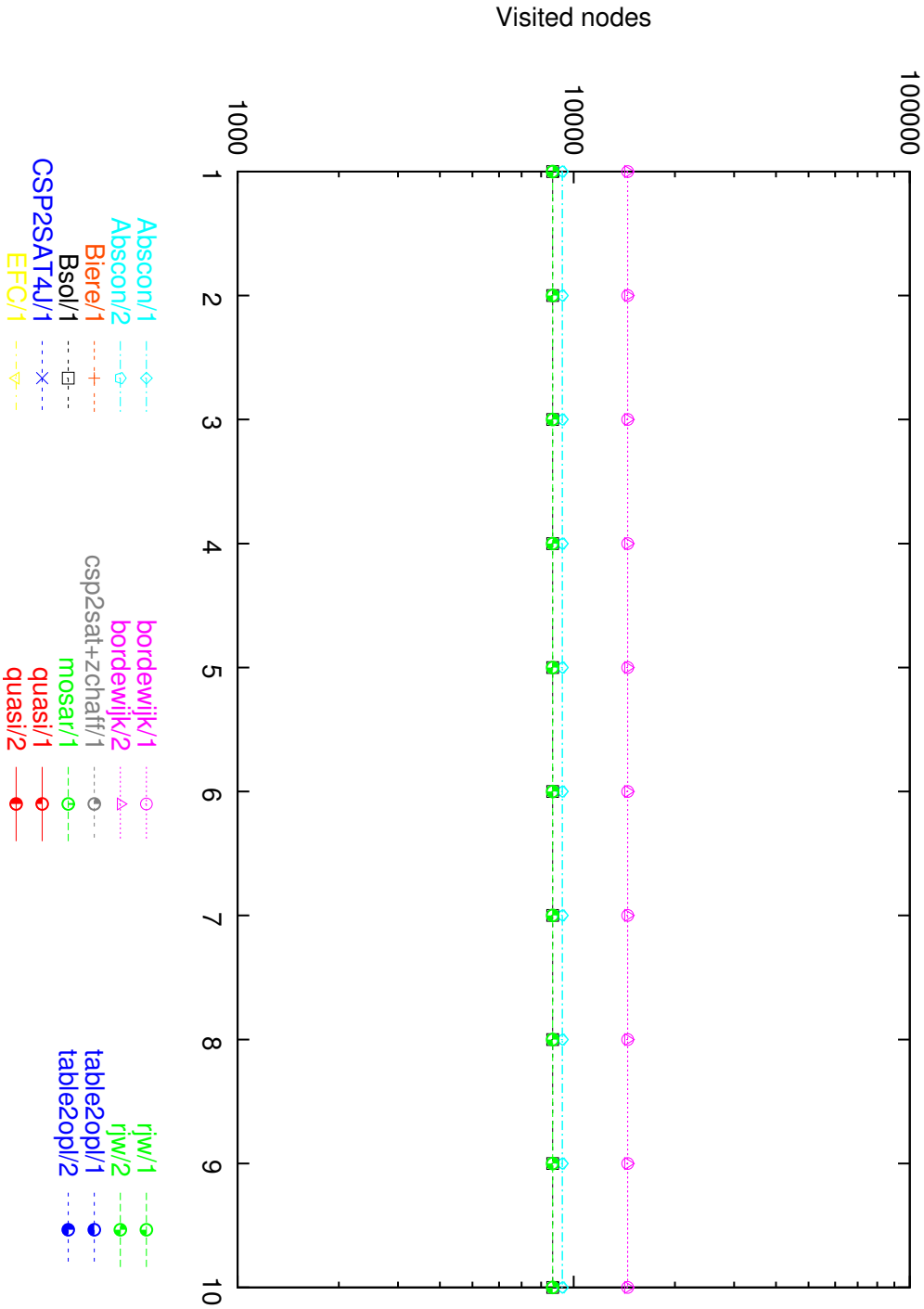

Fig. 641. Visited nodes required for solving instances from class BH-4-4. The maximum solution time was set to 600 seconds.

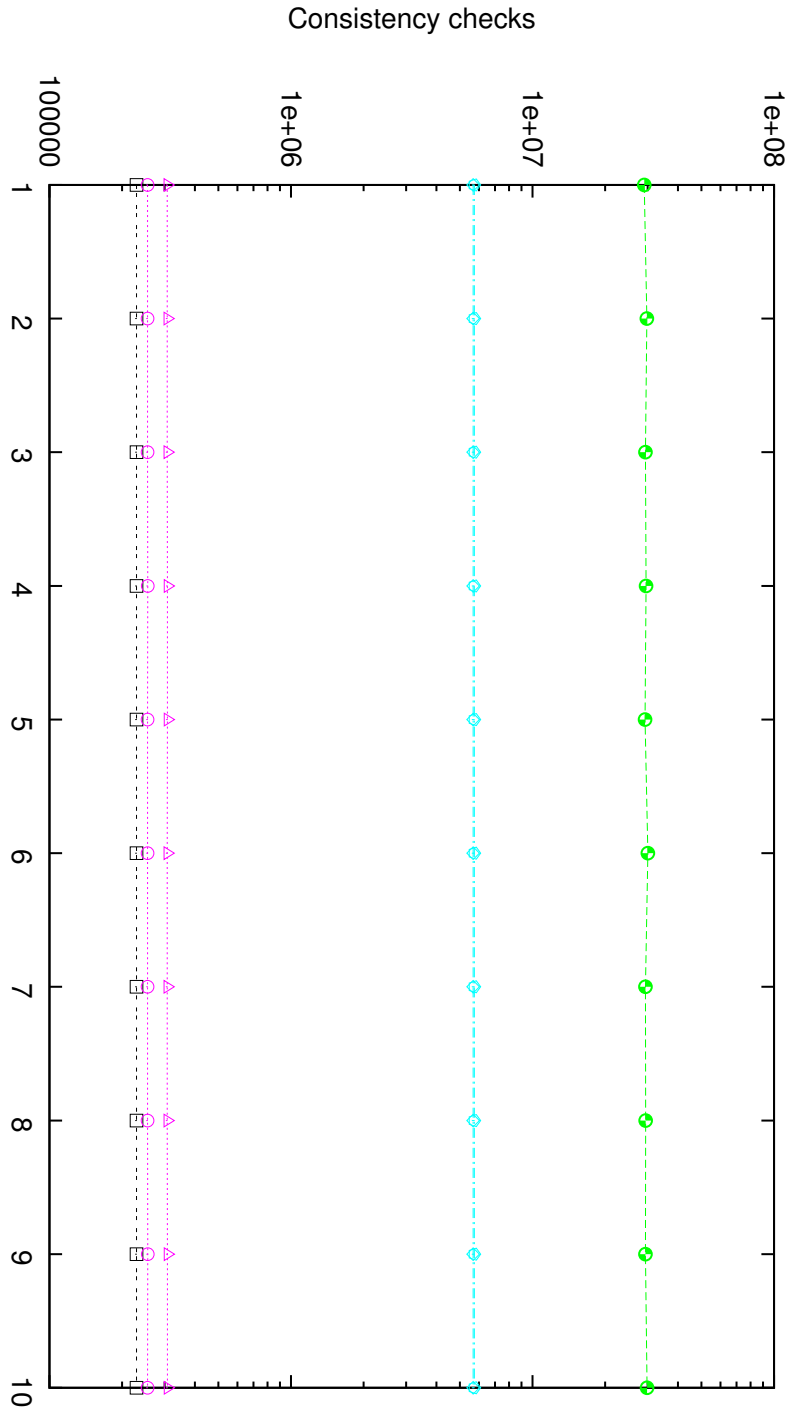

Fig. 642. Consistency checks required for solving instances from class BH-4-4. The maximum solution time was set to 600 seconds.

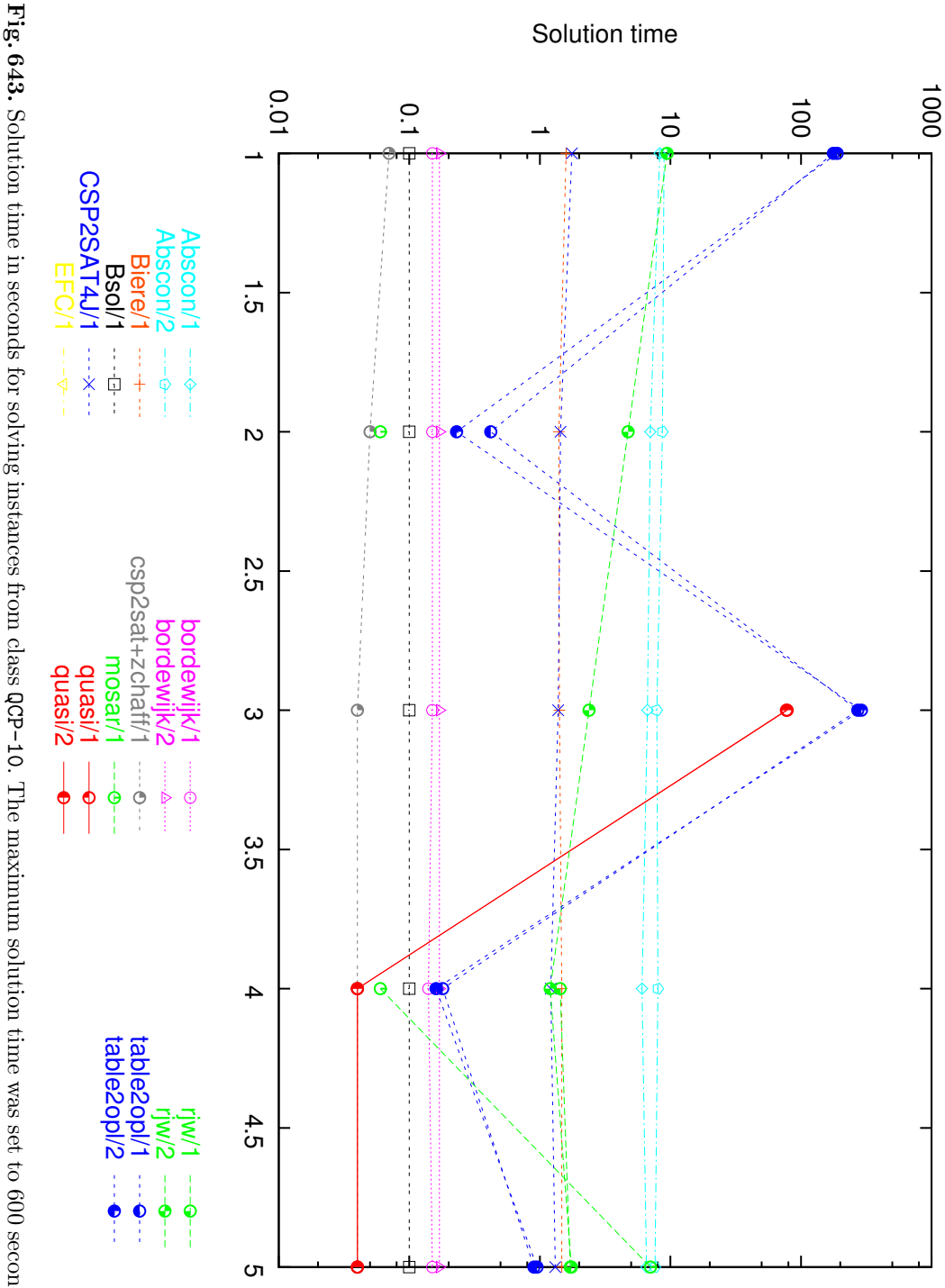

Fig. 643. Solution time in seconds for solving instances from class QCP-10. The maximum solution time was set to 600 seconds.

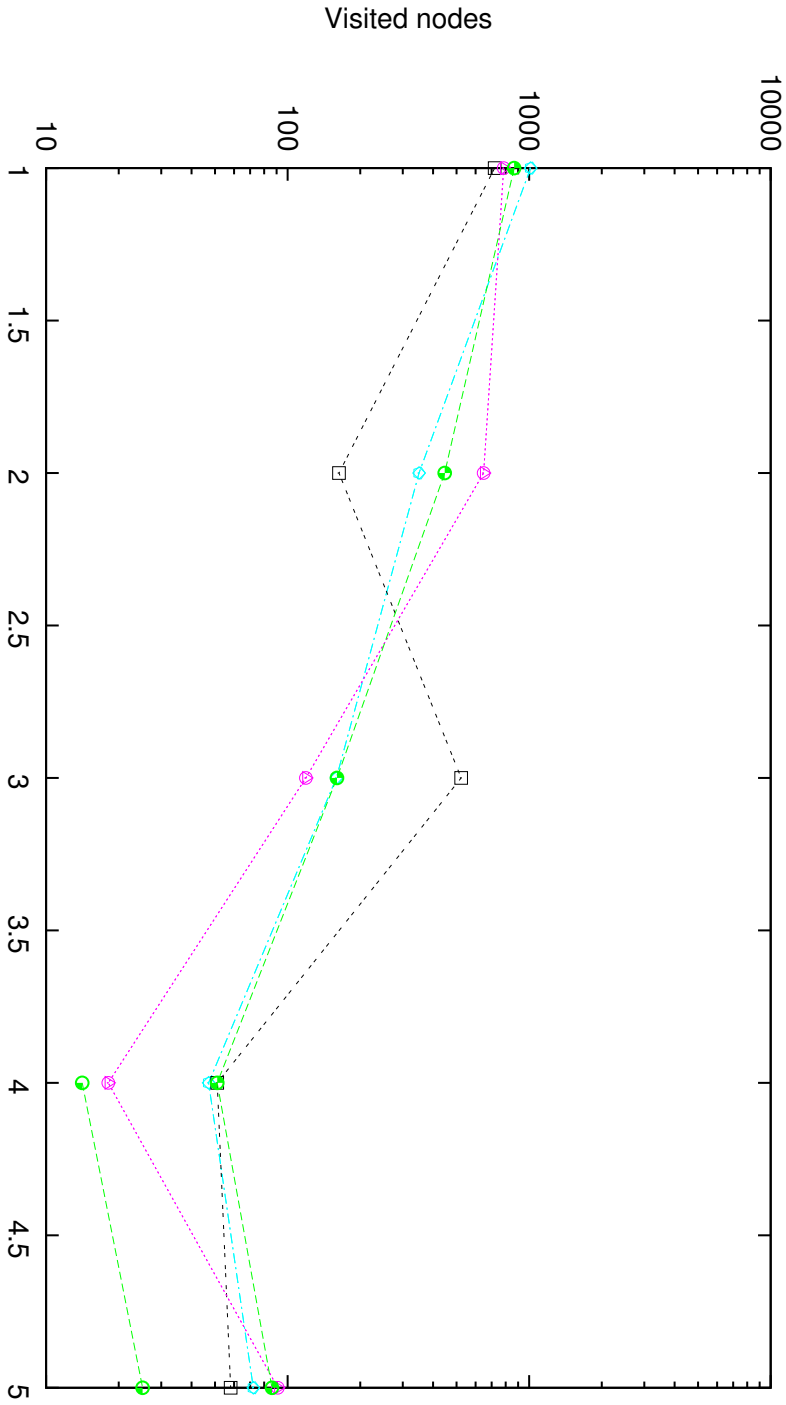

Fig. 644. Visited nodes required for solving instances from class QCP-10. The maximum solution time was set to 600 seconds.

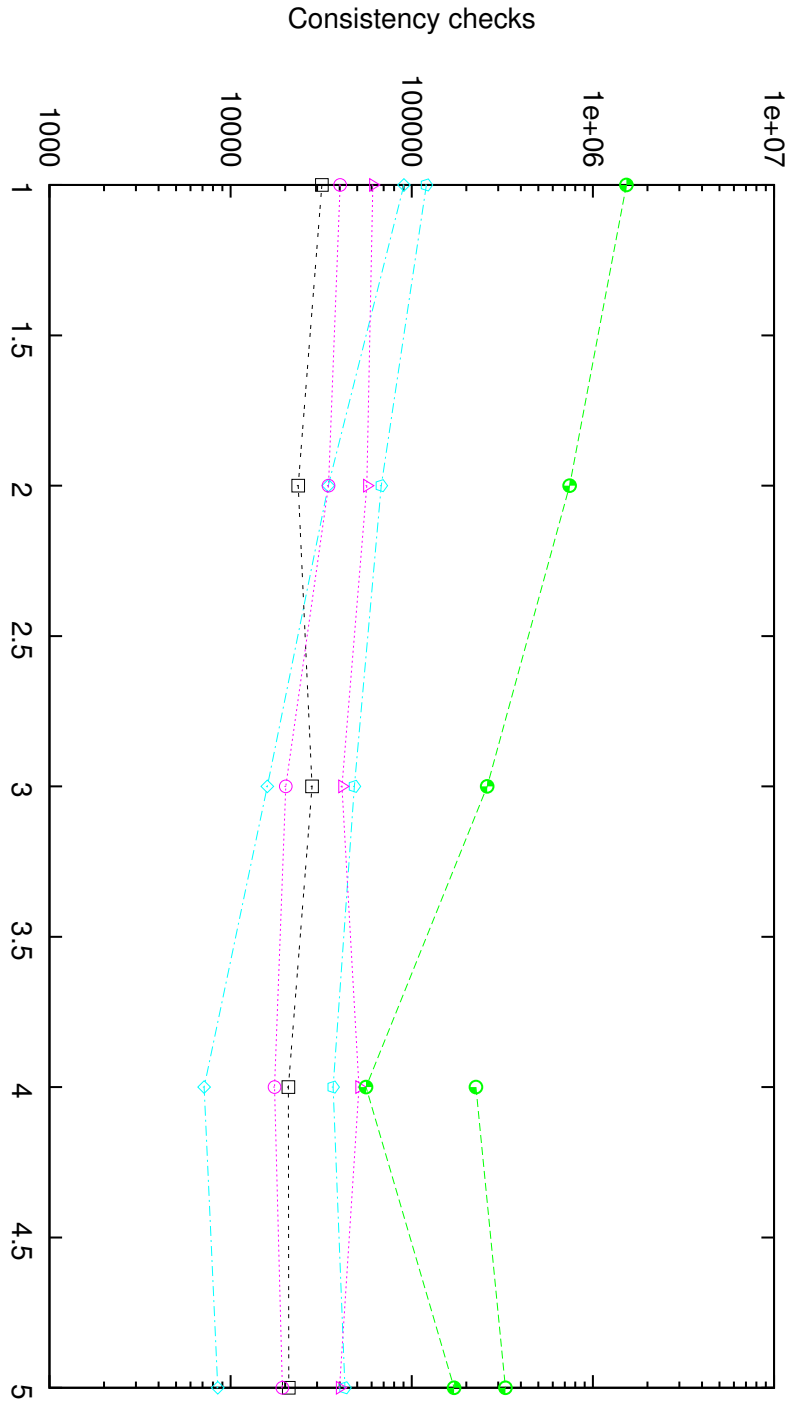

Fig. 645. Consistency checks required for solving instances from class QCP-10. The maximum solution time was set to 600 seconds.

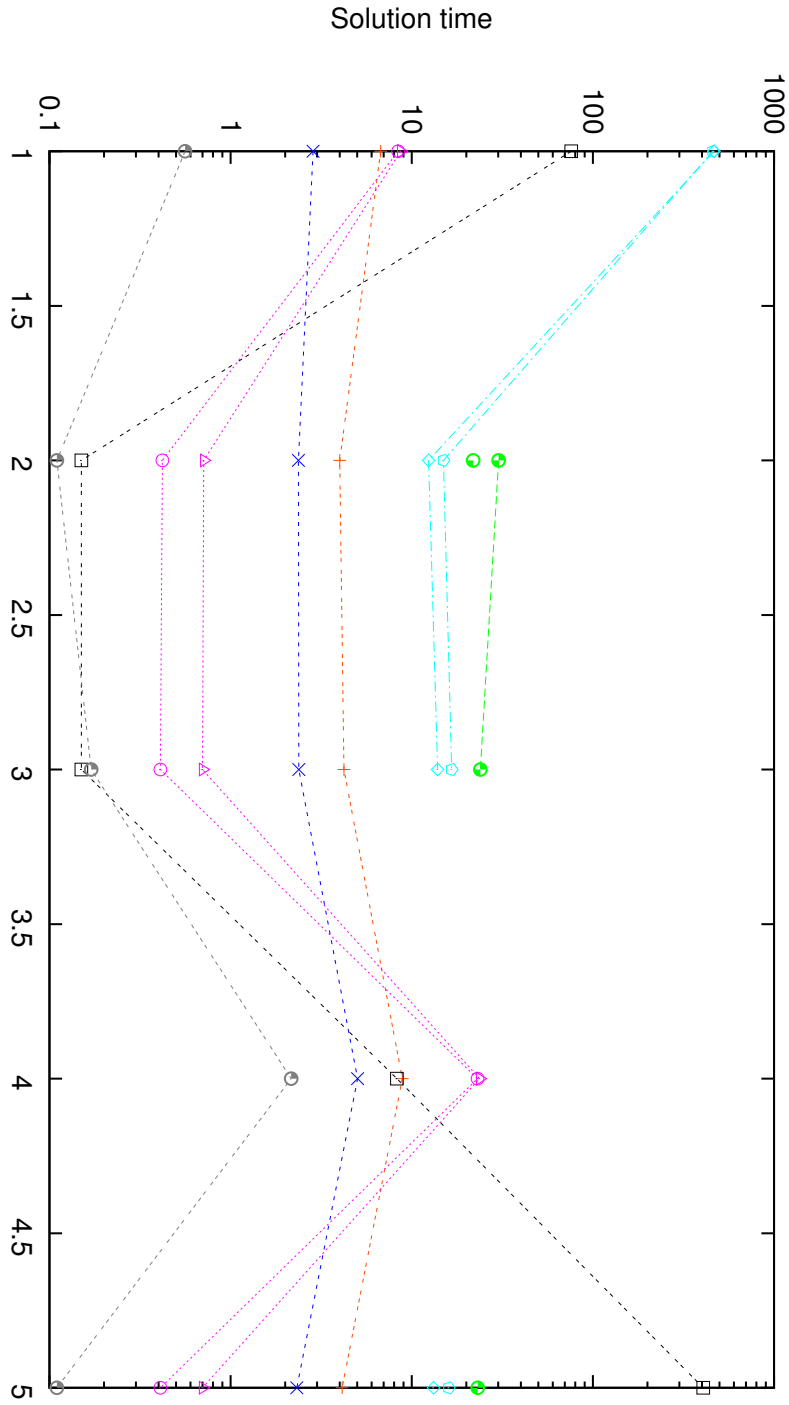

Fig. 646. Solution time in seconds for solving instances from class QCP-15. The maximum solution time was set to 600 seconds.

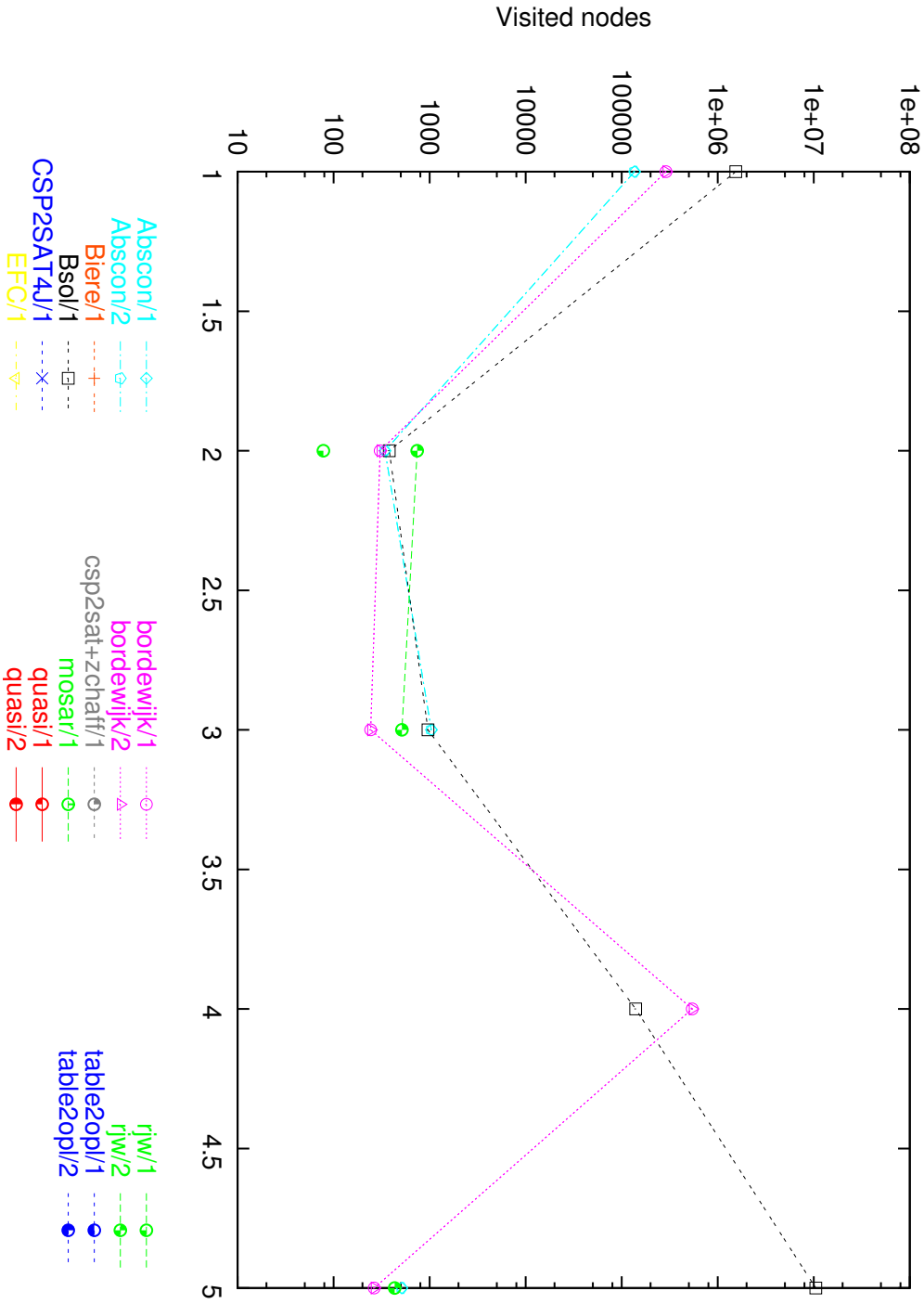

Fig. 647. Visited nodes required for solving instances from class QCP-15. The maximum solution time was set to 600 seconds.

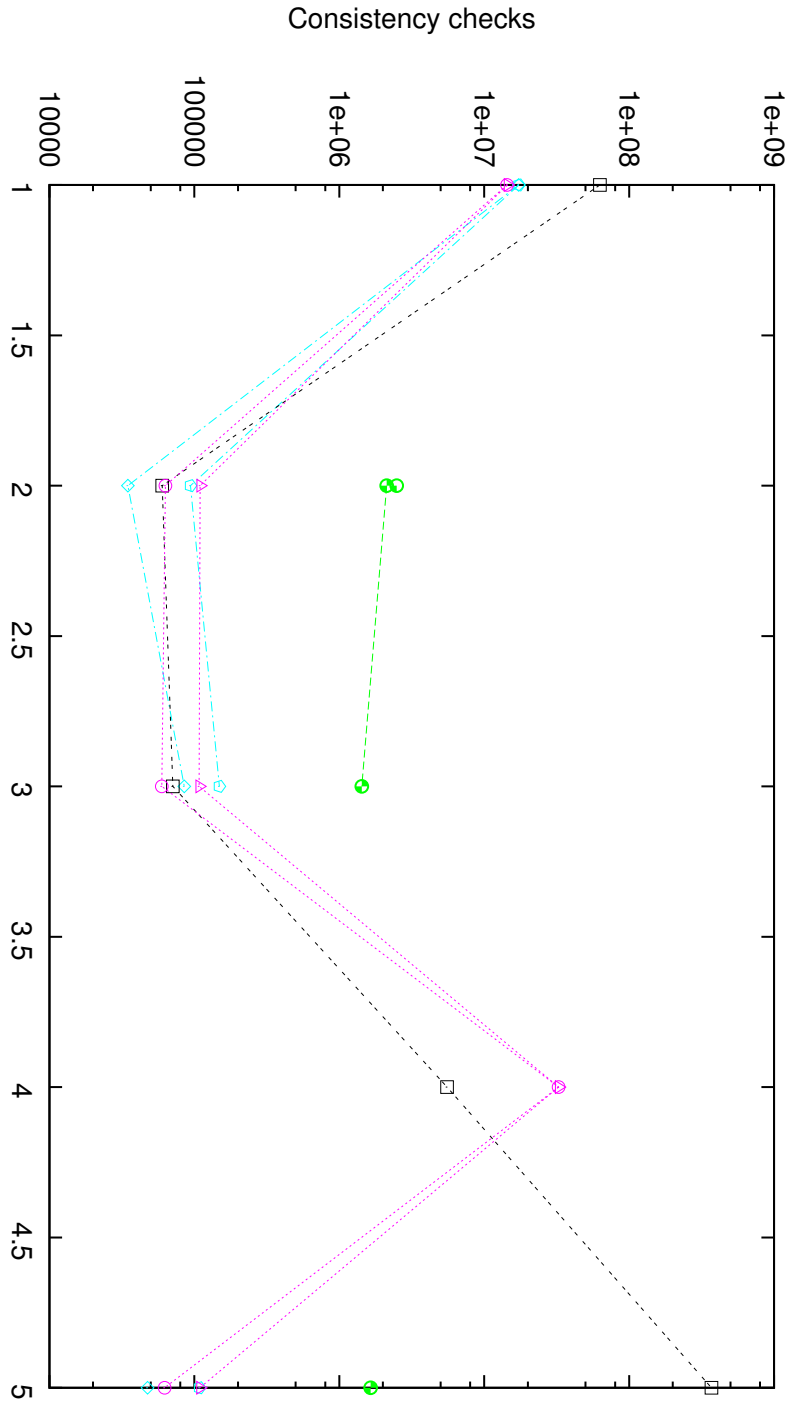

Fig. 648. Consistency checks required for solving instances from class `QCP-15`. The maximum solution time was set to 600 seconds.

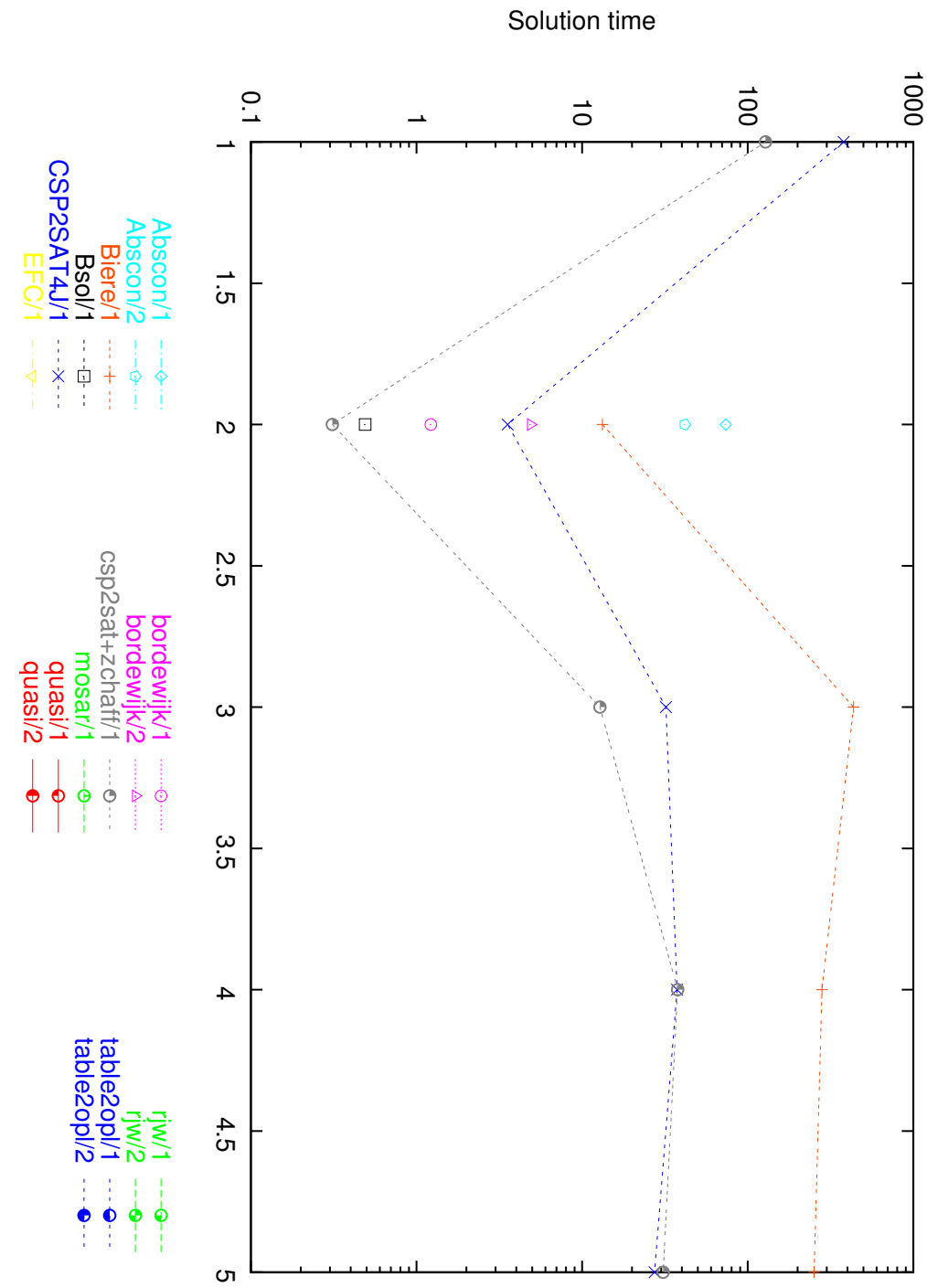

Fig. 649. Solution time in seconds for solving instances from class QCP-20. The maximum solution time was set to 600 seconds.

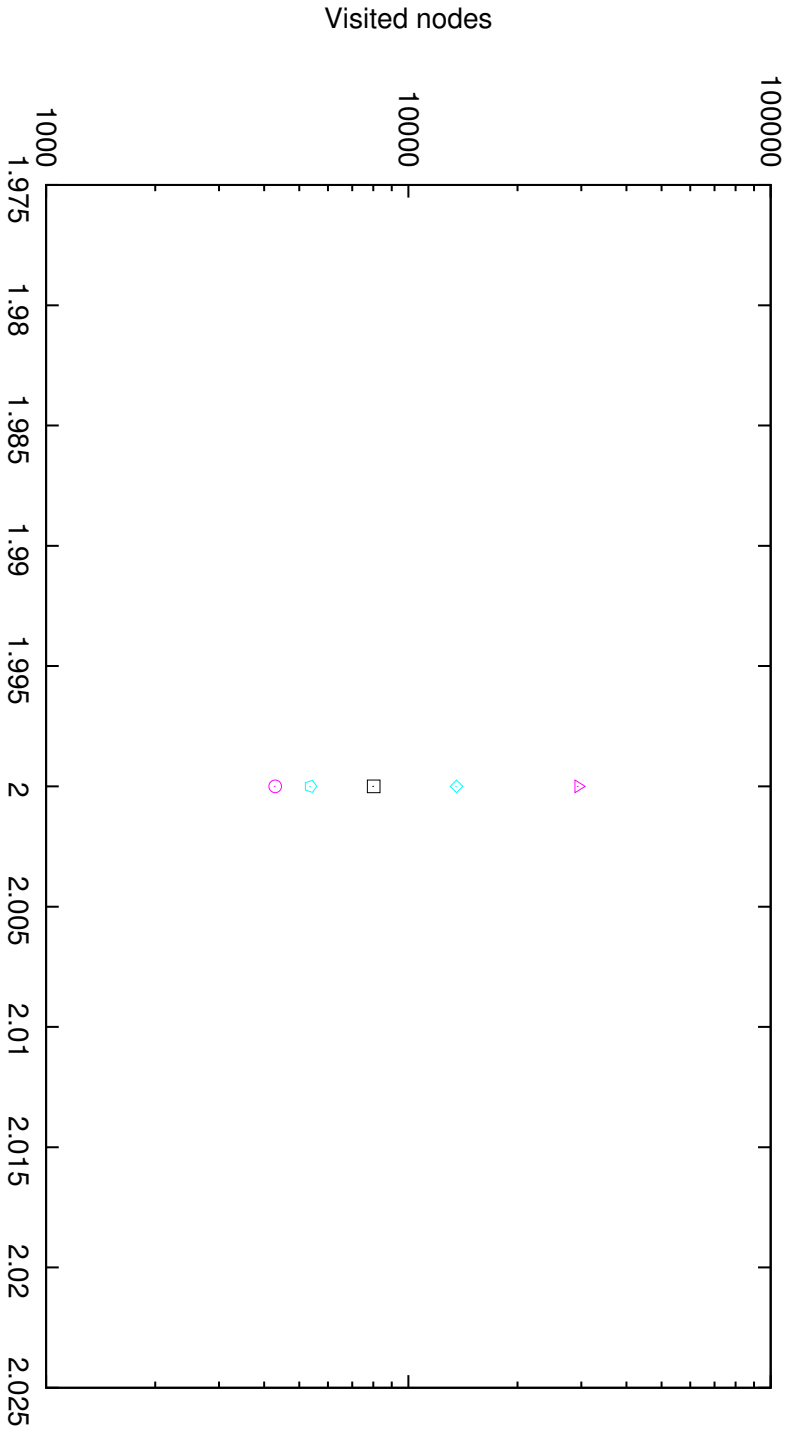

Fig. 650. Visited nodes required for solving instances from class QCP-20. The maximum solution time was set to 600 seconds.

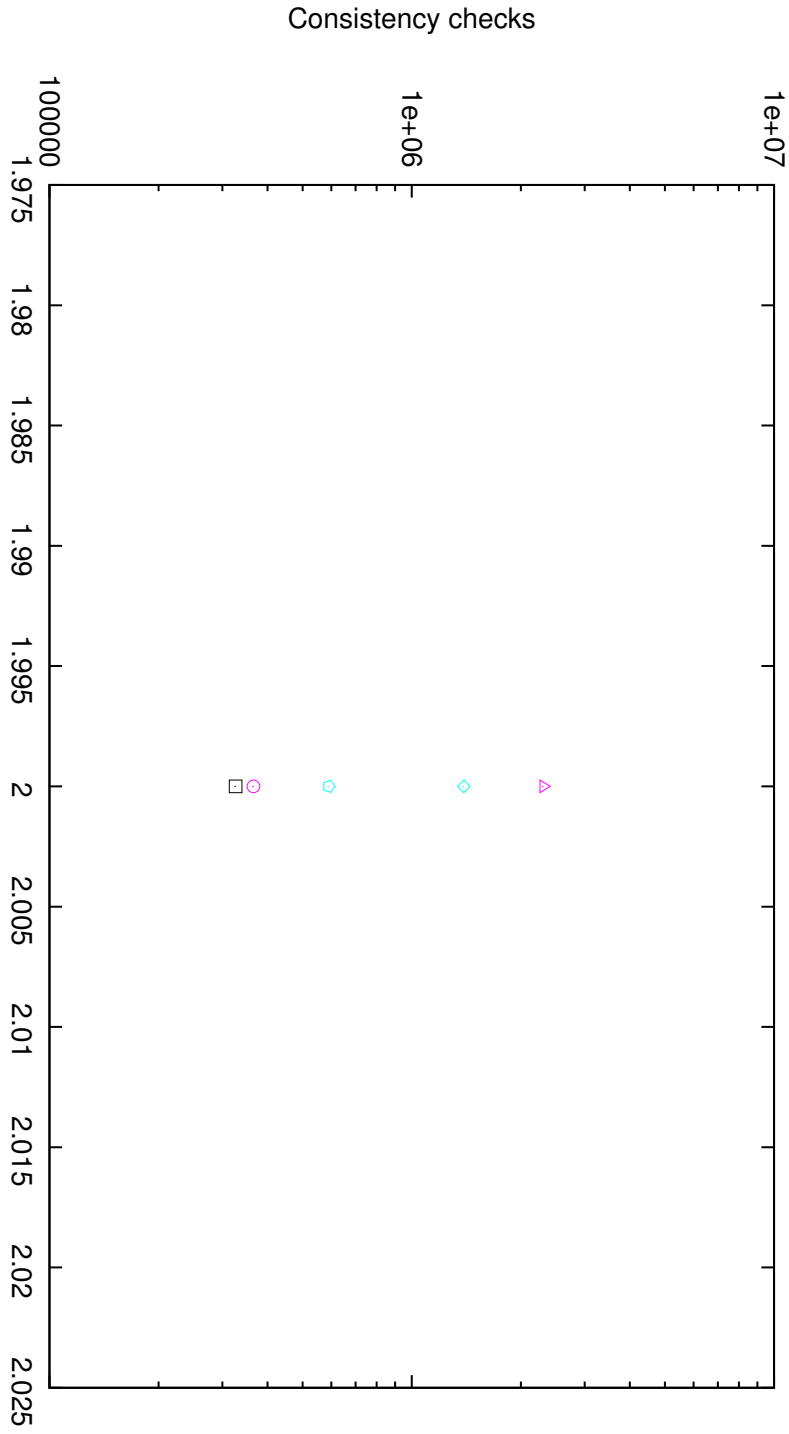

Fig. 651. Consistency checks required for solving instances from class QCP-20. The maximum solution time was set to 600 seconds.

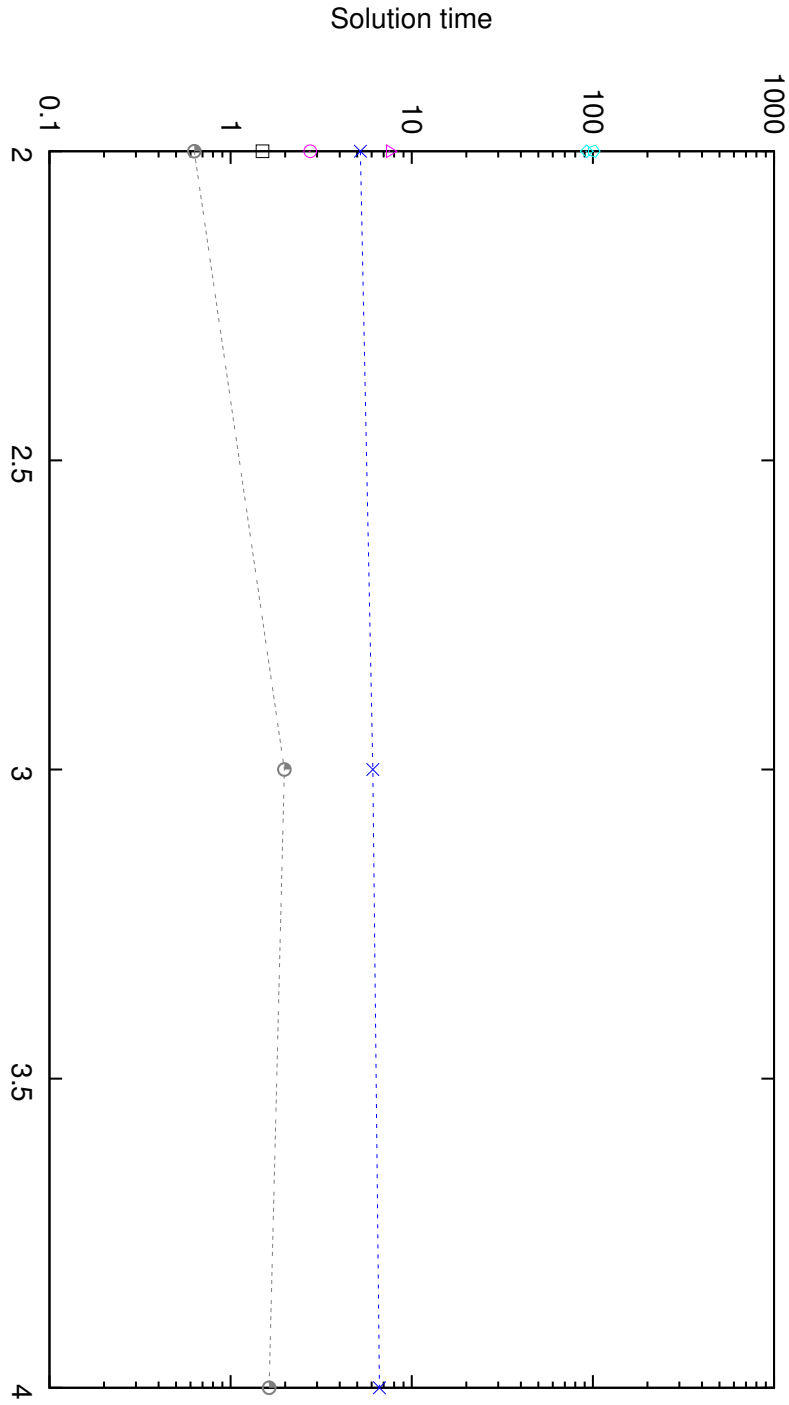

Fig. 652. Solution time in seconds for solving instances from class QCP-25. The maximum solution time was set to 600 seconds.

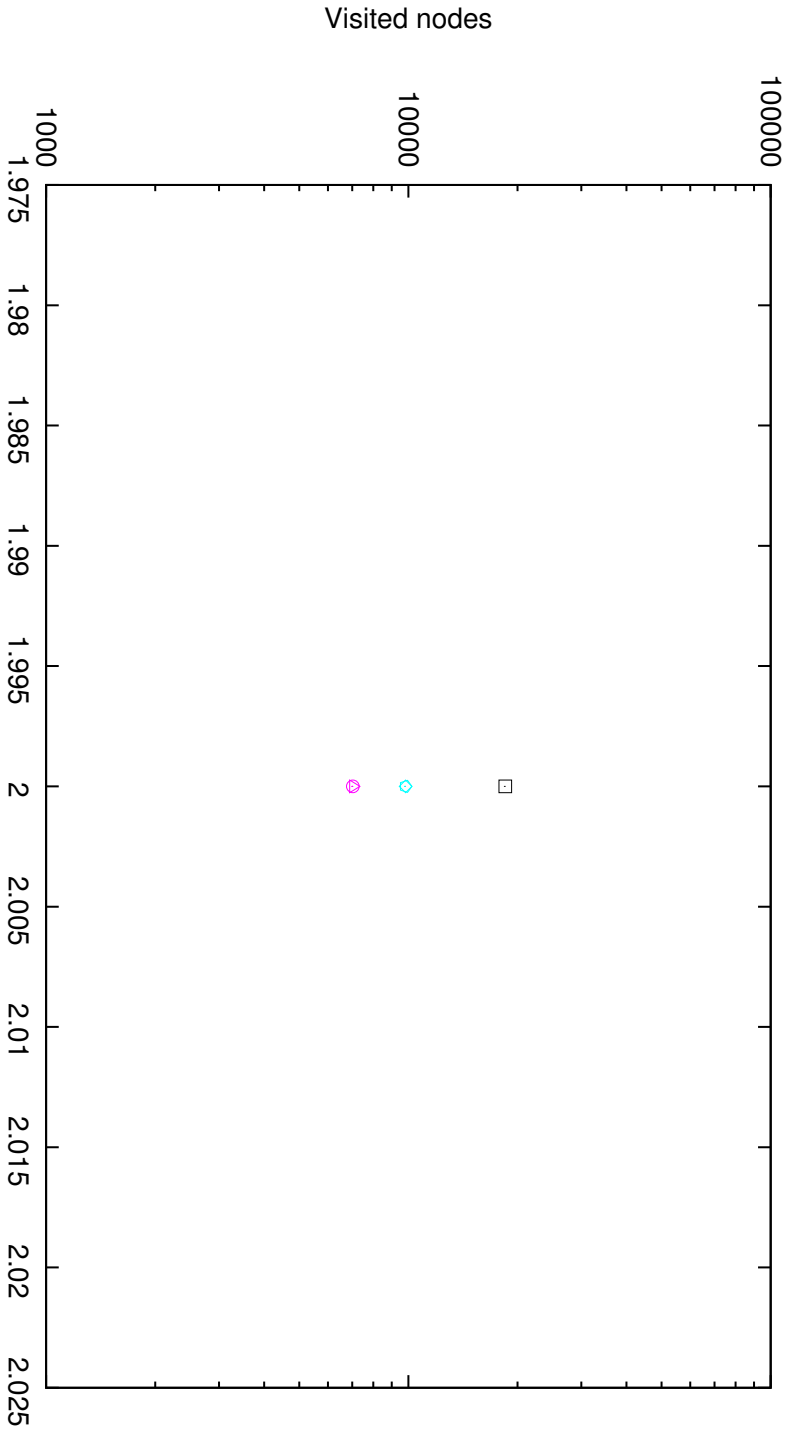

Fig. 653. Visited nodes required for solving instances from class QCP-25. The maximum solution time was set to 600 seconds.

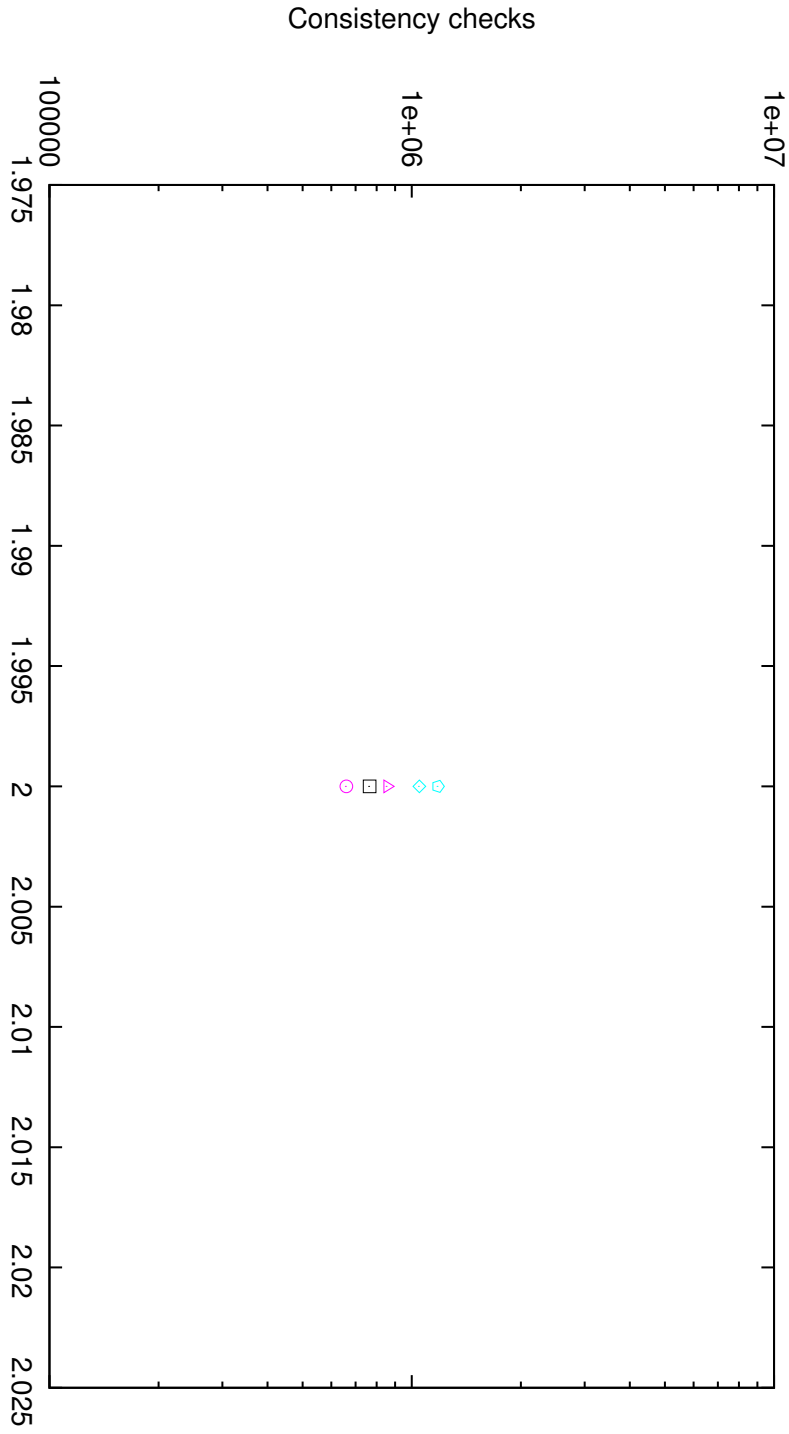

Fig. 654. Consistency checks required for solving instances from class QCP-25. The maximum solution time was set to 600 seconds.

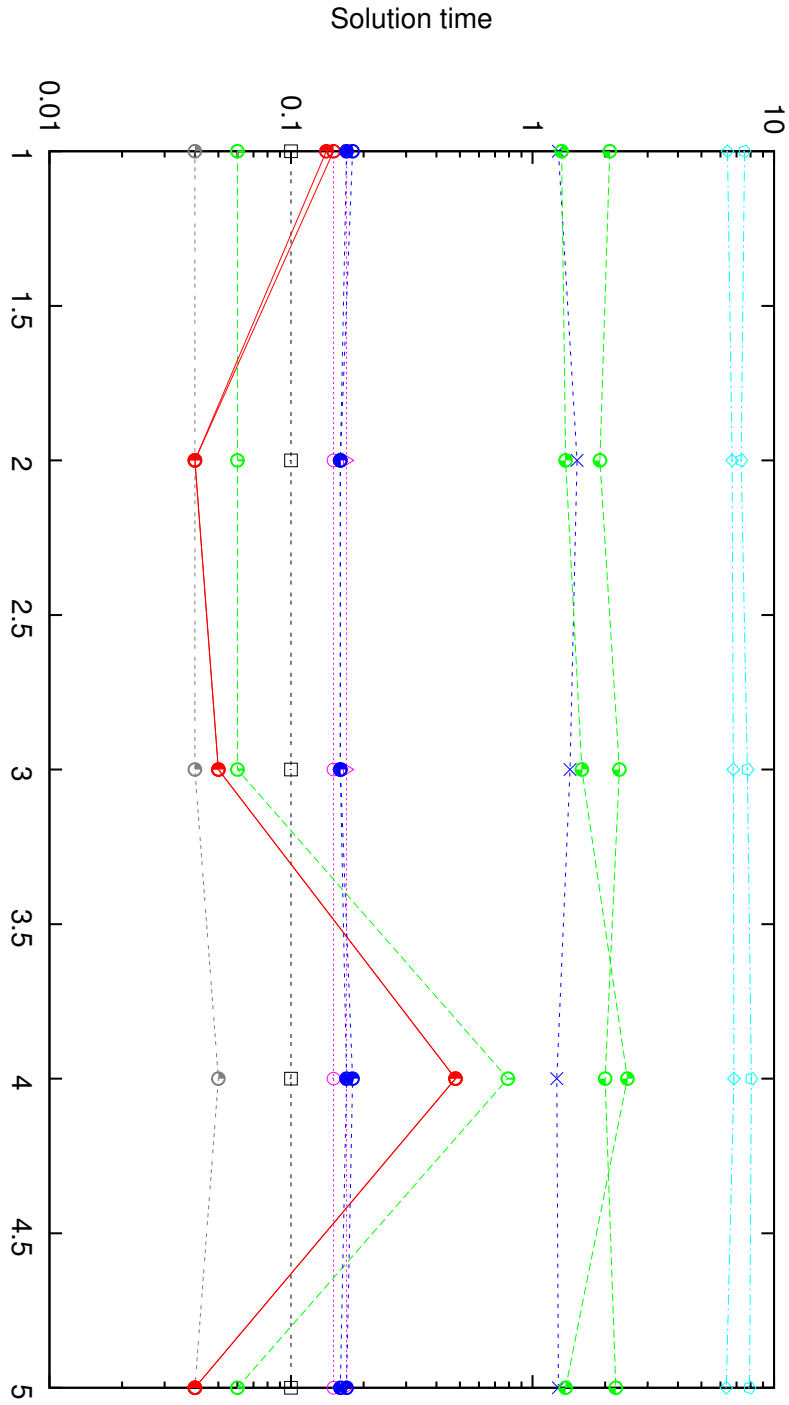

Fig. 655. Solution time in seconds for solving instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

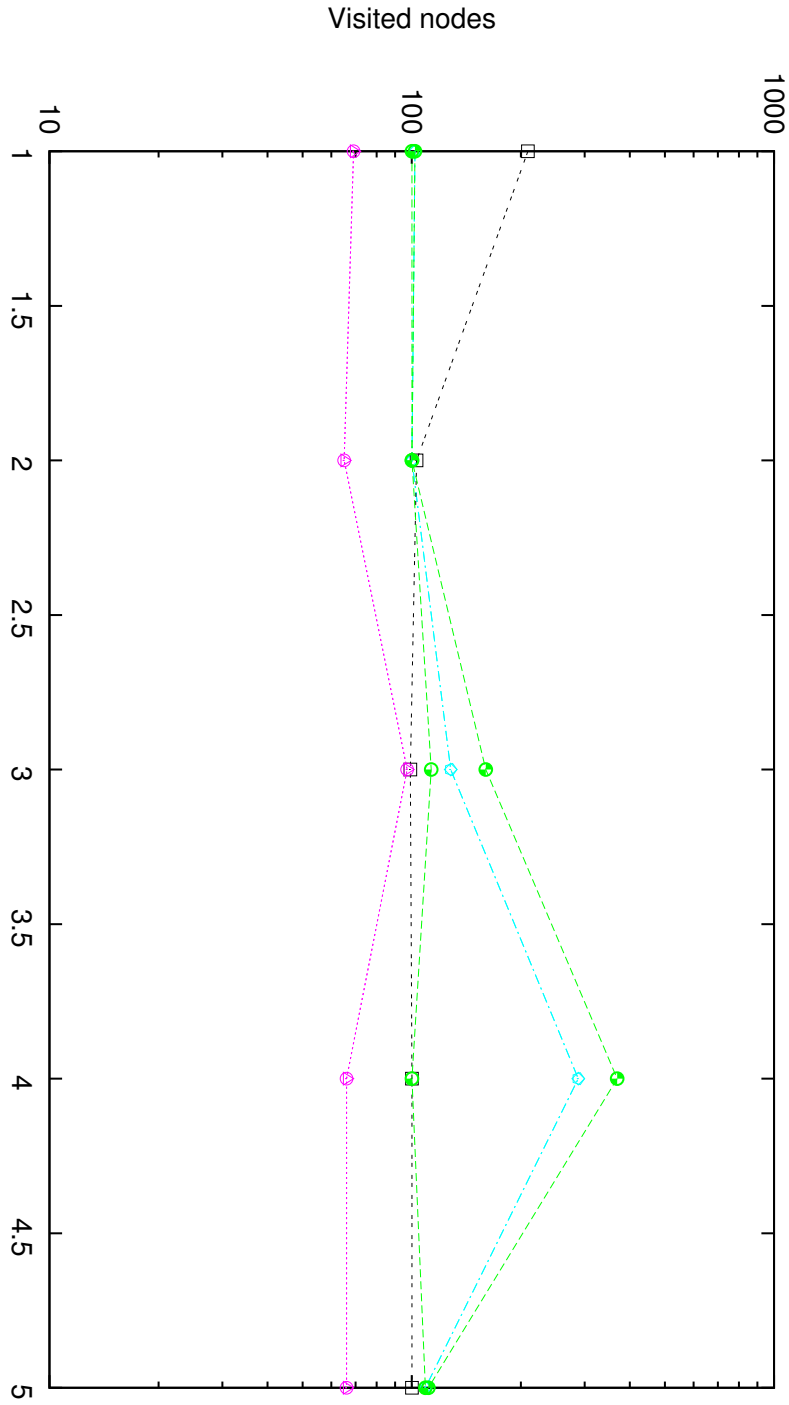

Fig. 656. Visited nodes required for solving instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

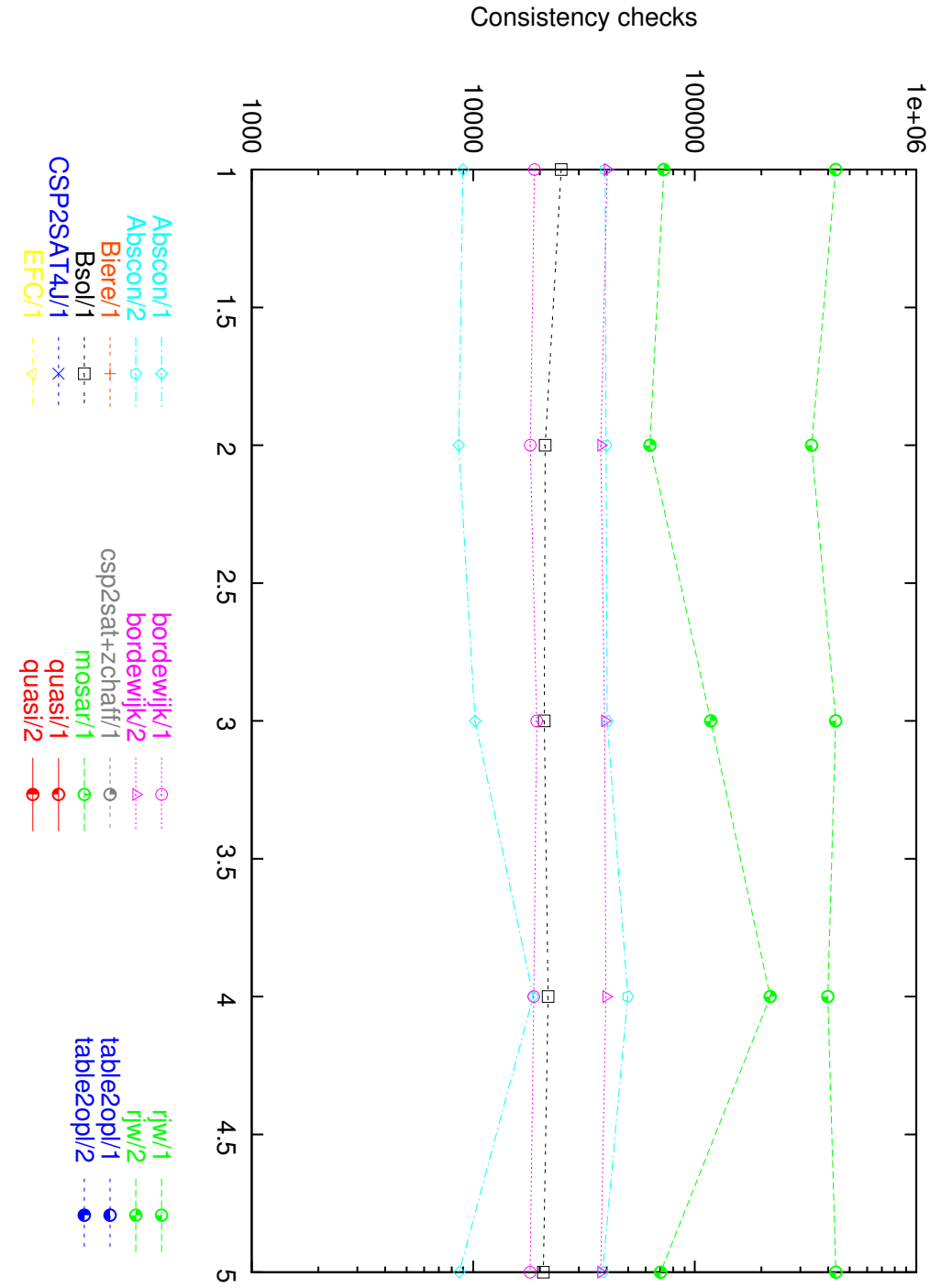

Fig. 657. Consistency checks required for solving instances from class `QCP-10-easy`. The maximum solution time was set to 600 seconds.

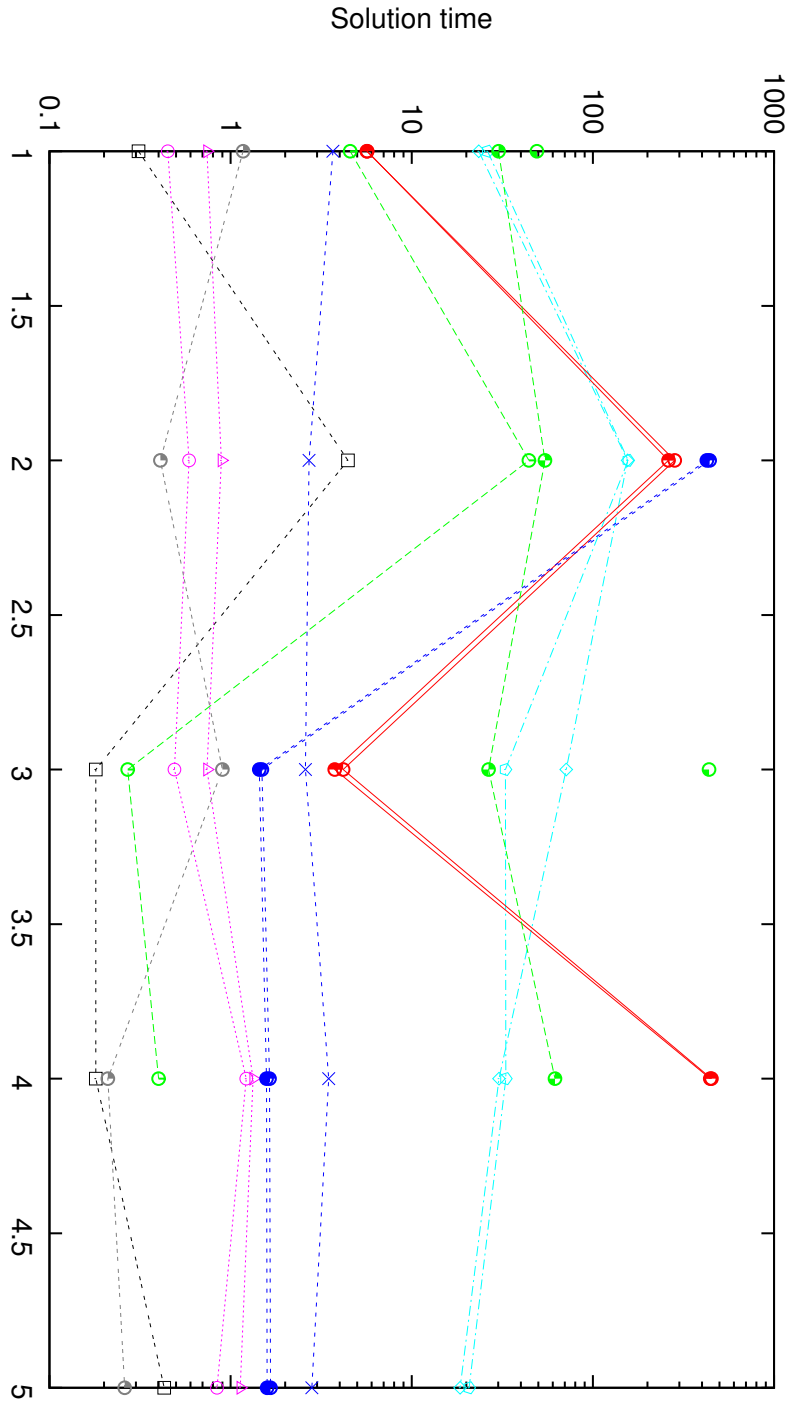

Fig. 658. Solution time in seconds for solving instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

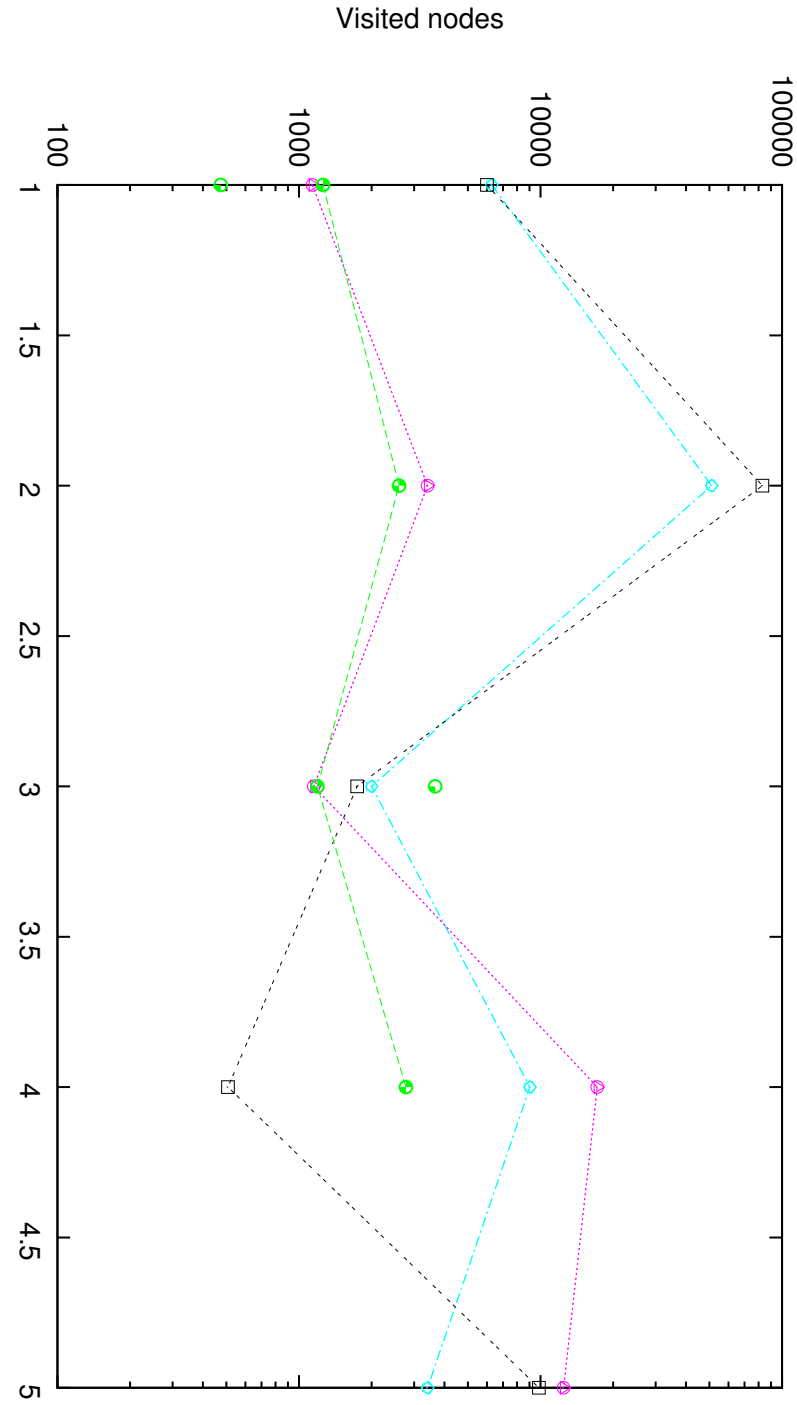

Fig. 659. Visited nodes required for solving instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

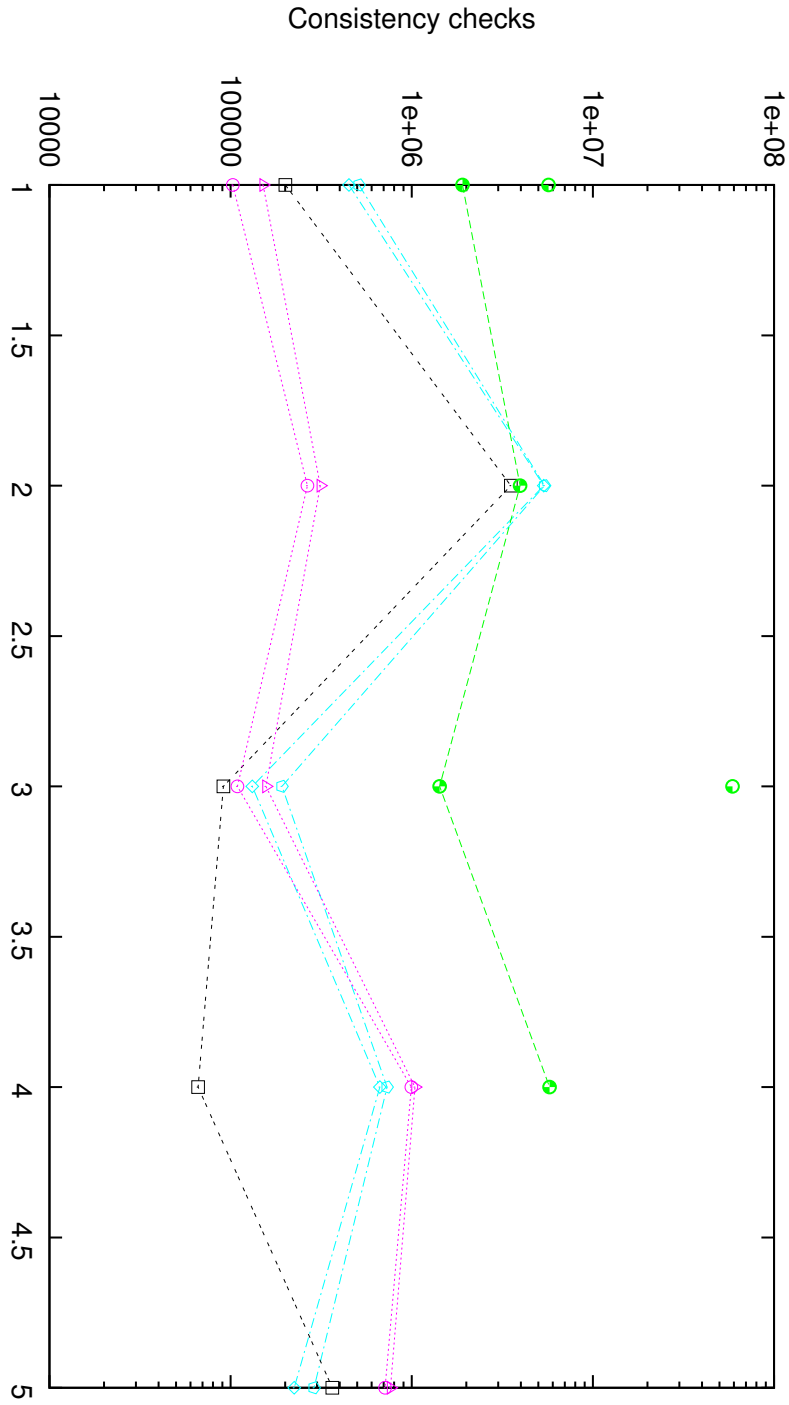

Fig. 660. Consistency checks required for solving instances from class `QCP-15-easy`. The maximum solution time was set to 600 seconds.

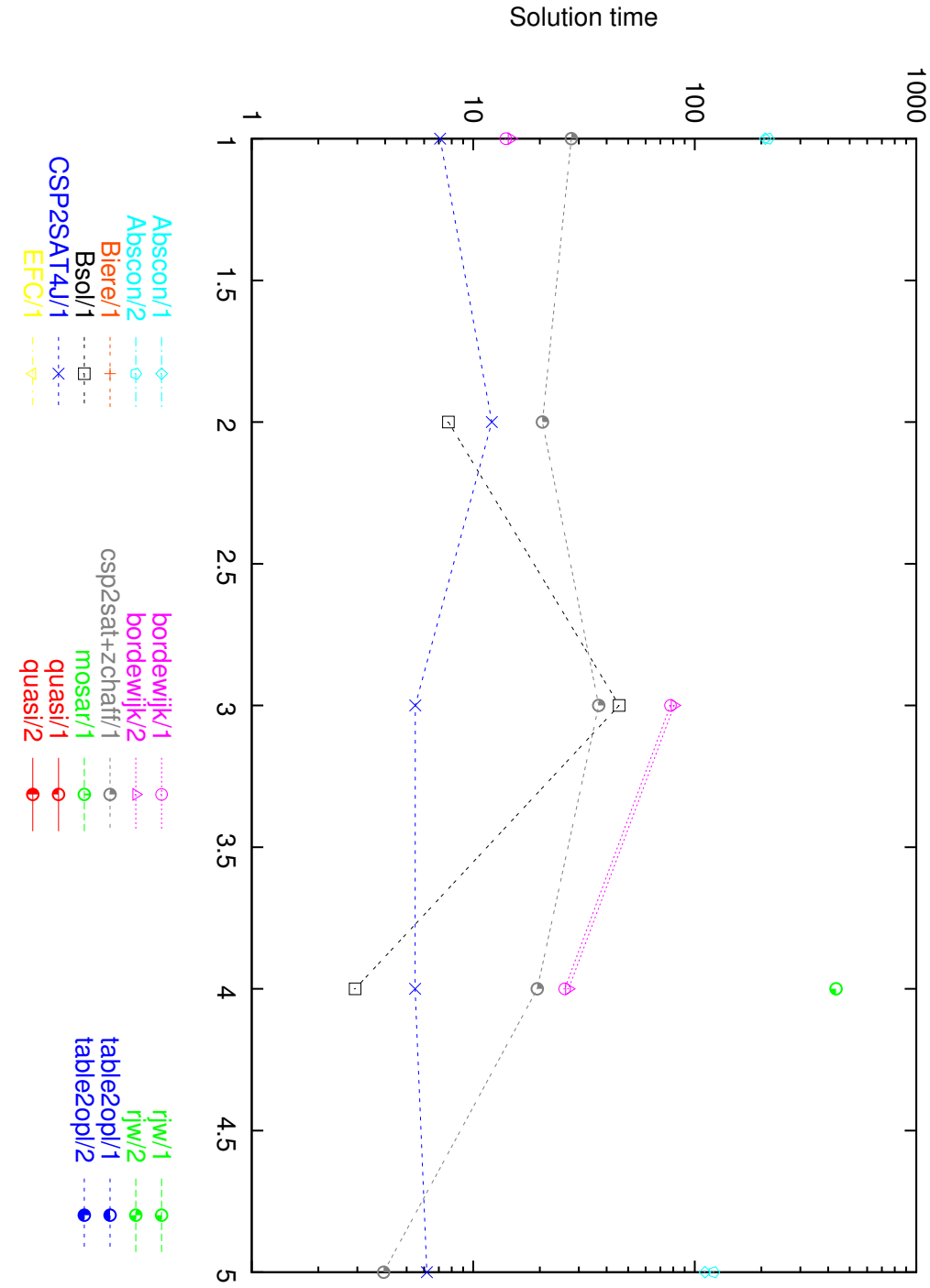

Fig. 661. Solution time in seconds for solving instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

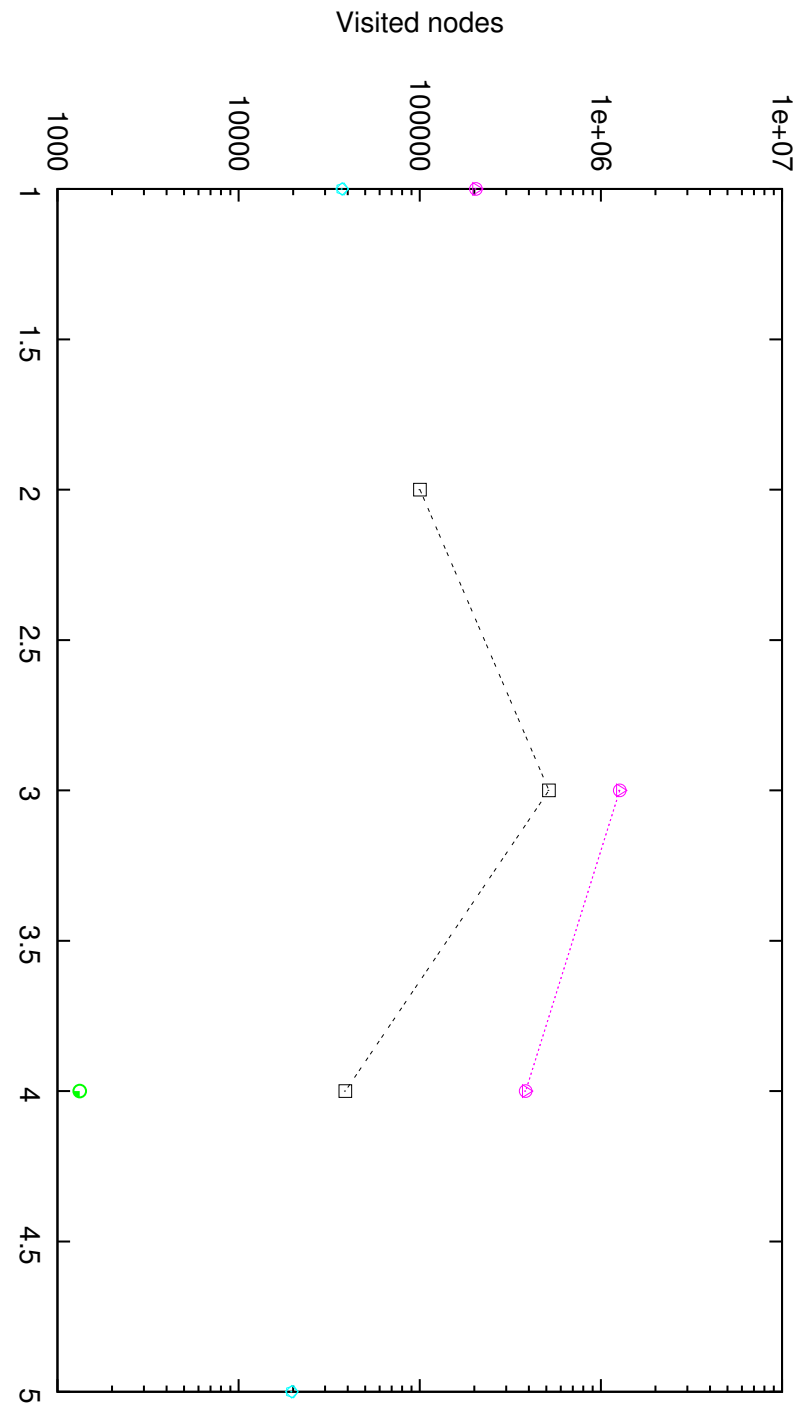

Fig. 662. Visited nodes required for solving instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

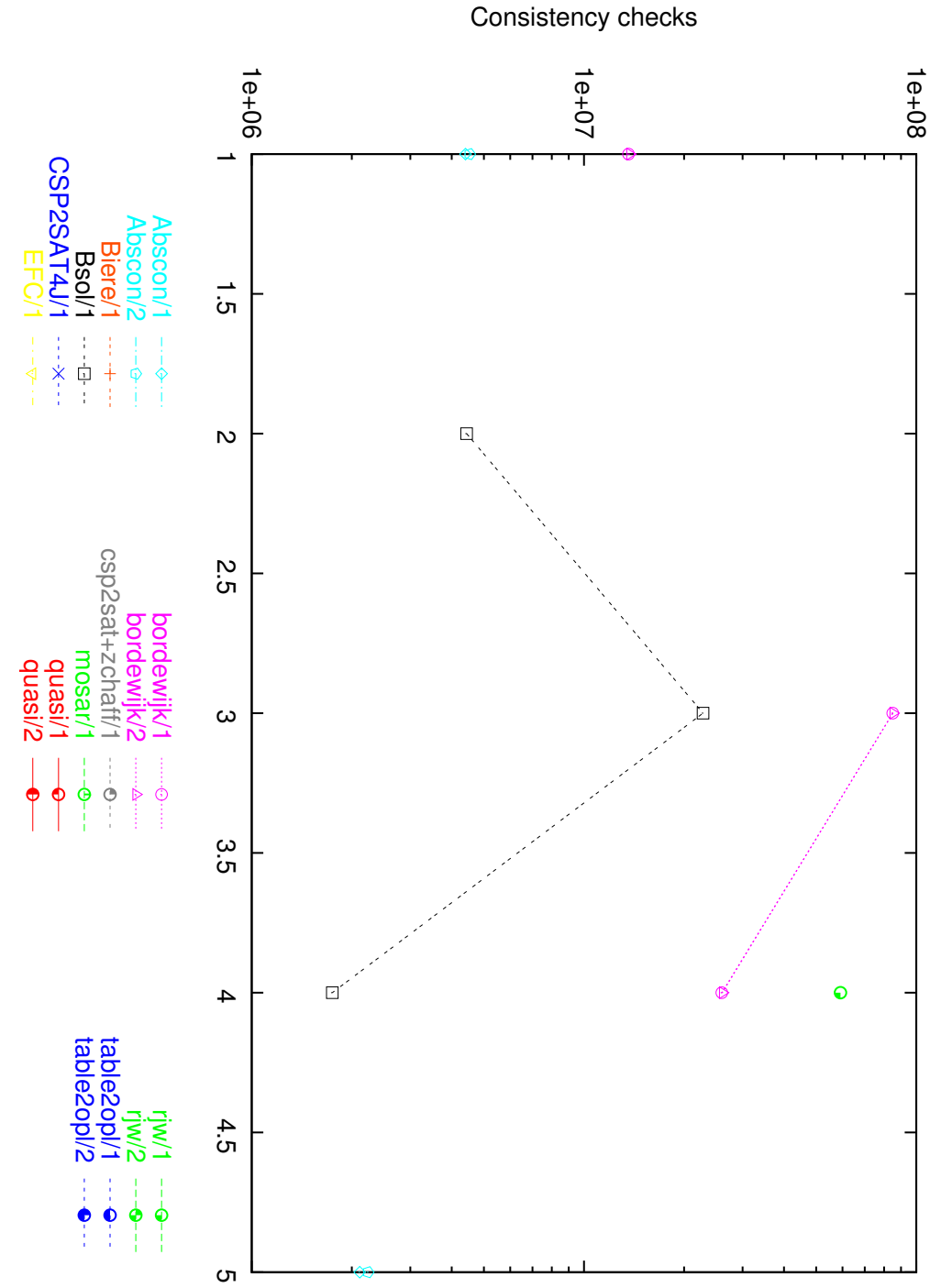

Fig. 663. Consistency checks required for solving instances from class `QCP-20-easy`. The maximum solution time was set to 600 seconds.

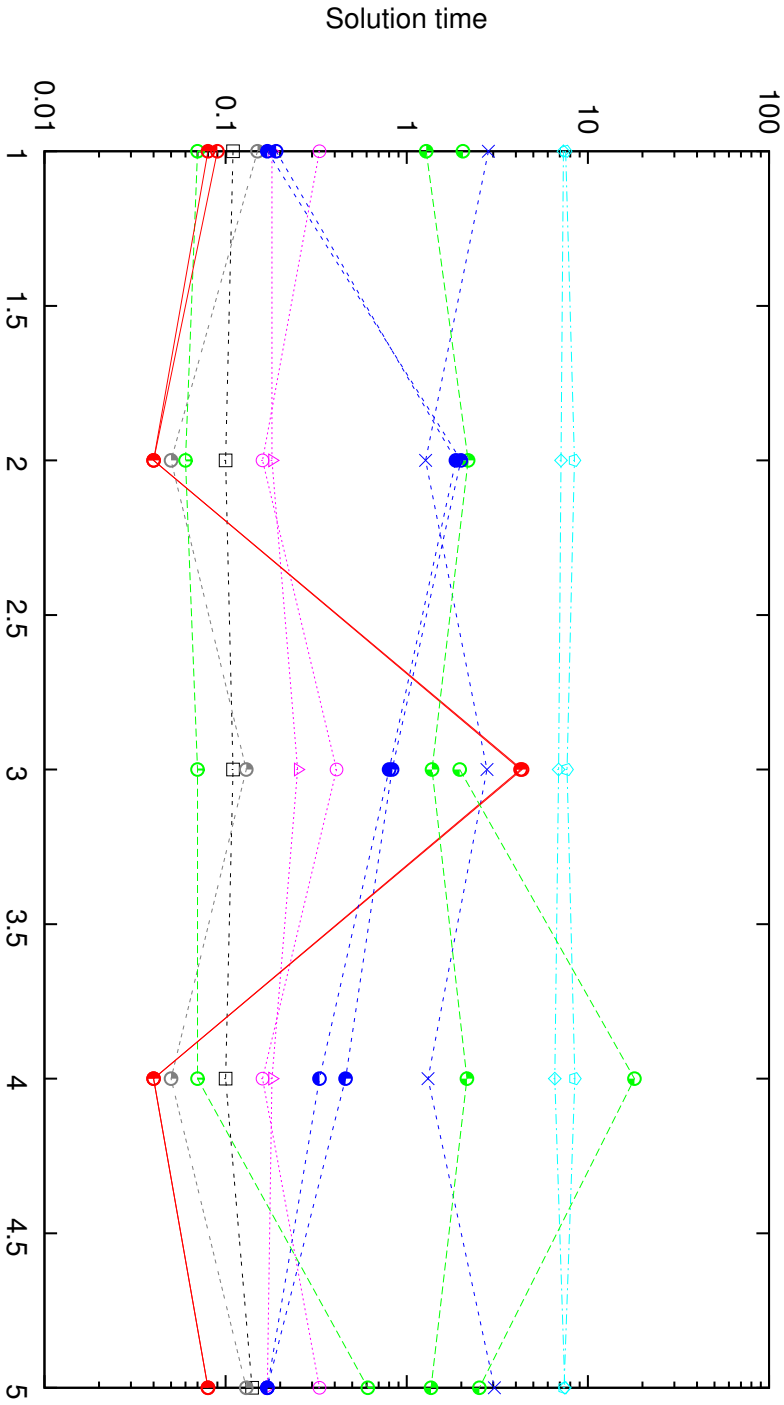

Fig. 664. Solution time in seconds for solving instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

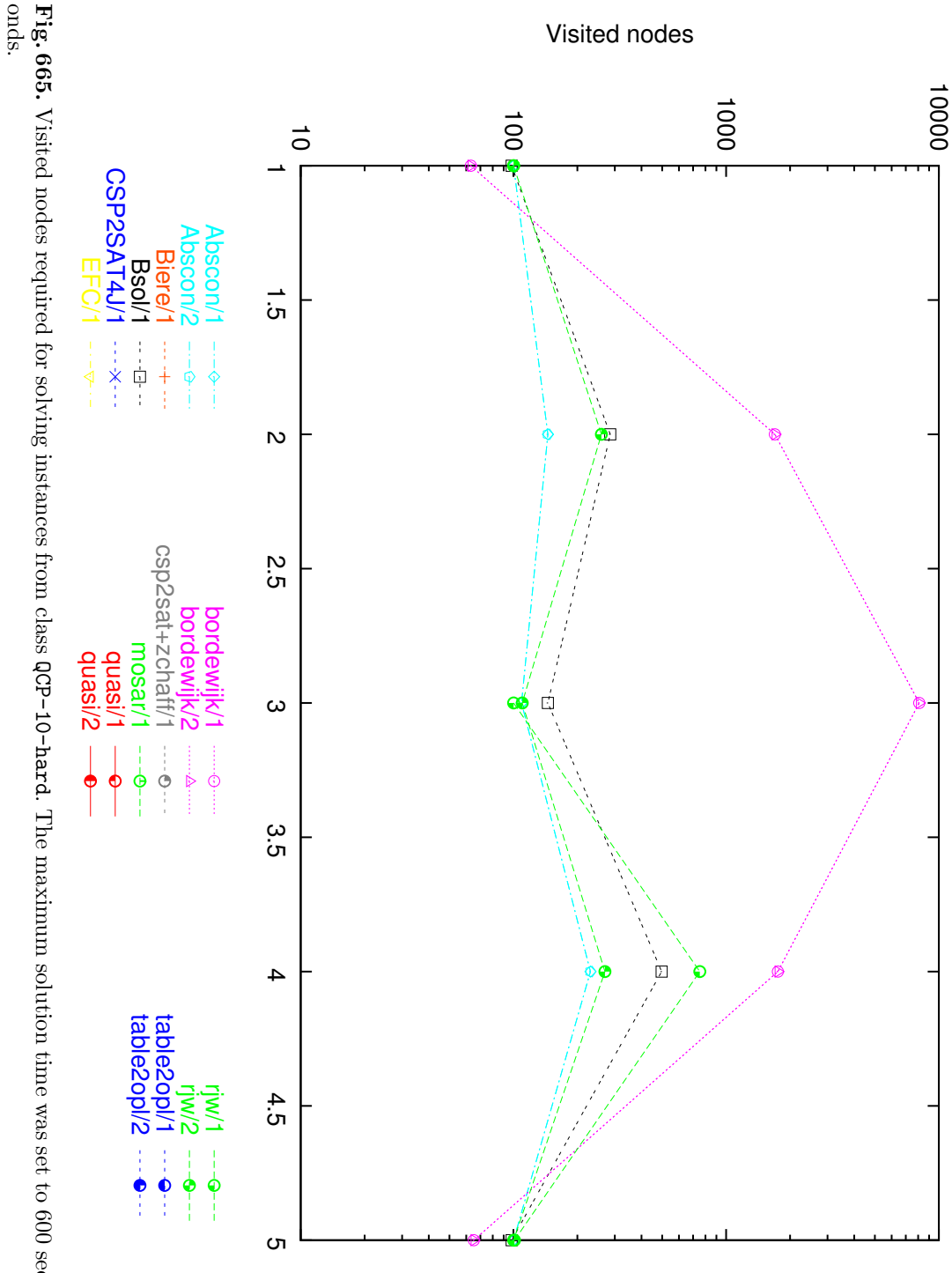

Fig. 665. Visited nodes required for solving instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

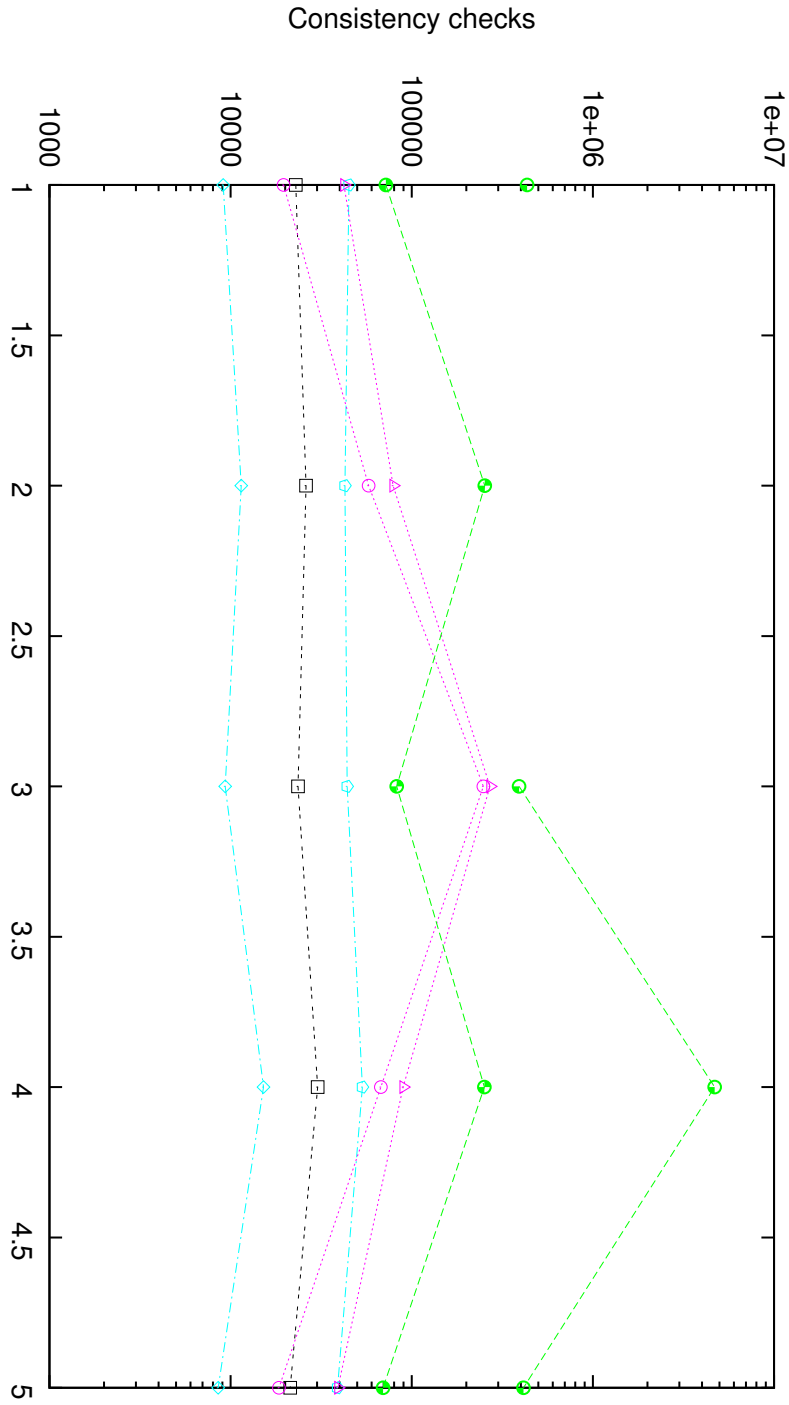

Fig. 666. Consistency checks required for solving instances from class `QCP-10-hard`. The maximum solution time was set to 600 seconds.

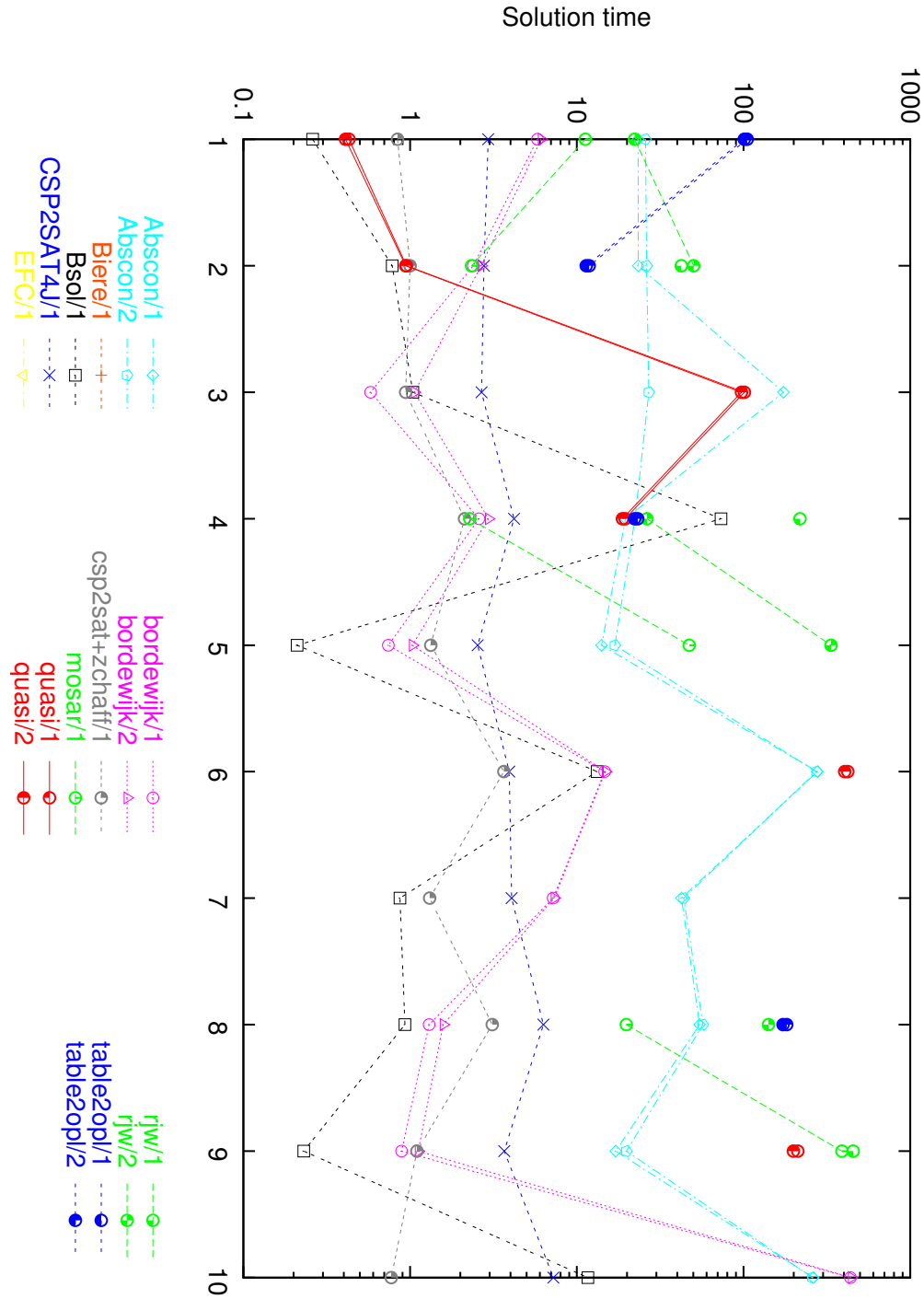

Fig. 667. Solution time in seconds for solving instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

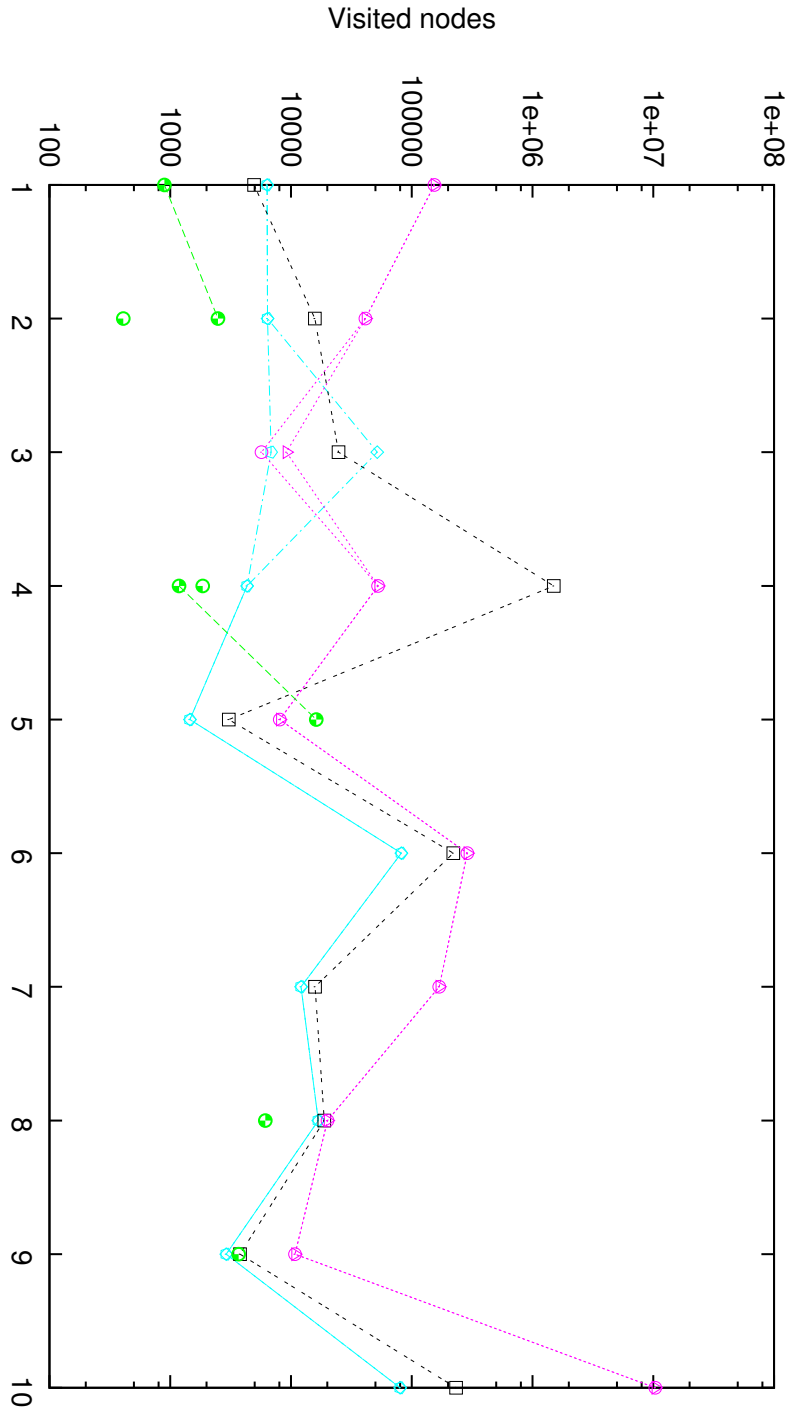

Fig. 668. Visited nodes required for solving instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

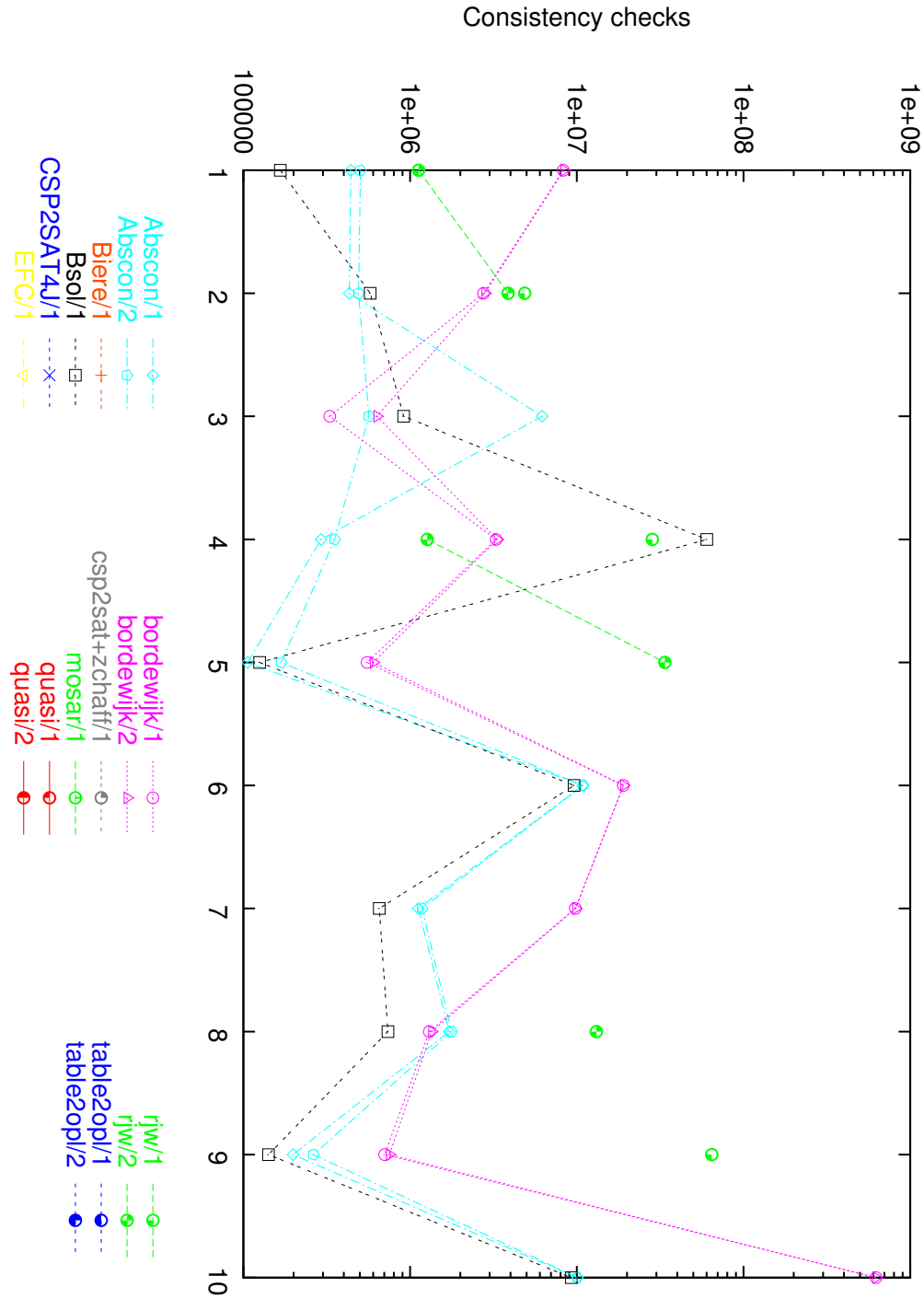

Fig. 669. Consistency checks required for solving instances from class `QCP-15-hard`. The maximum solution time was set to 600 seconds.

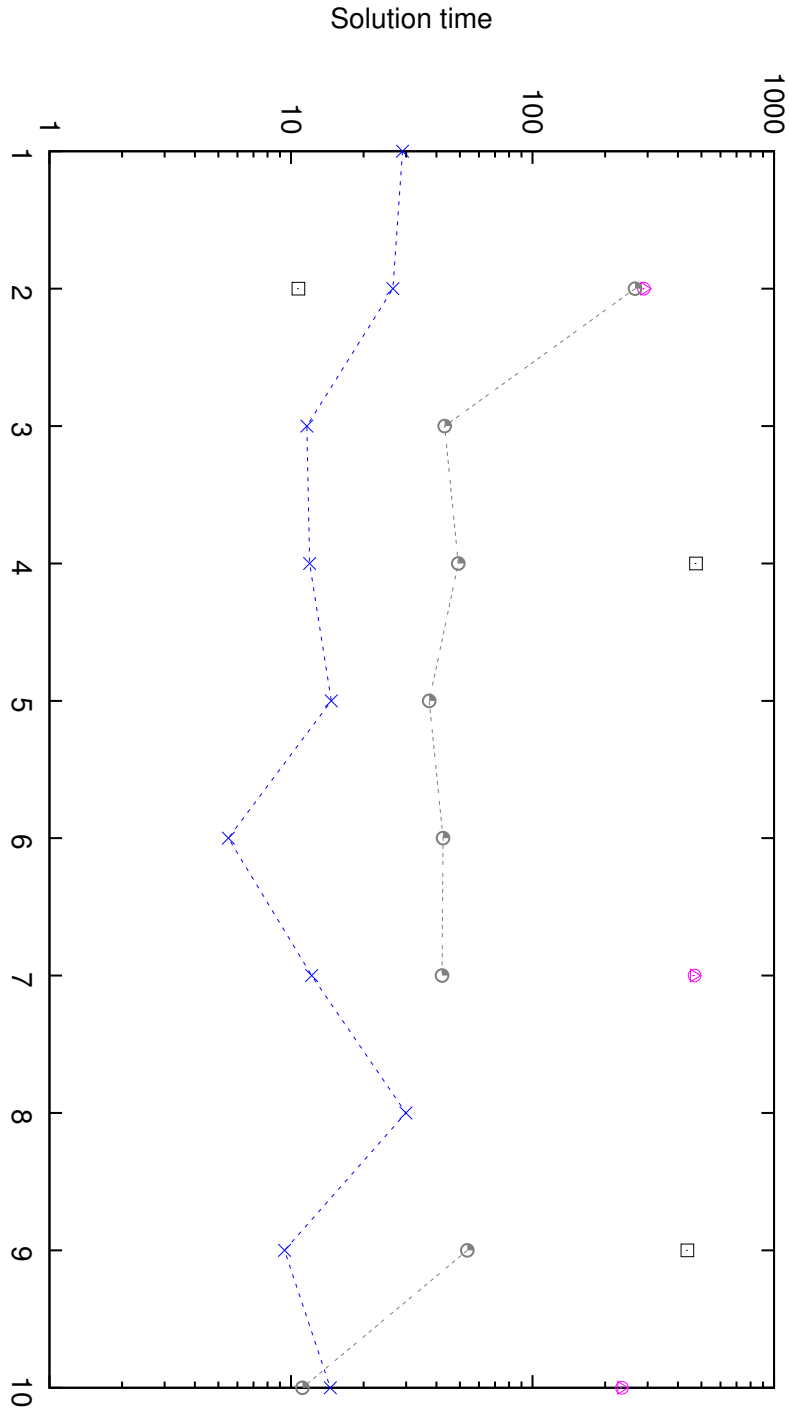

Fig. 670. Solution time in seconds for solving instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

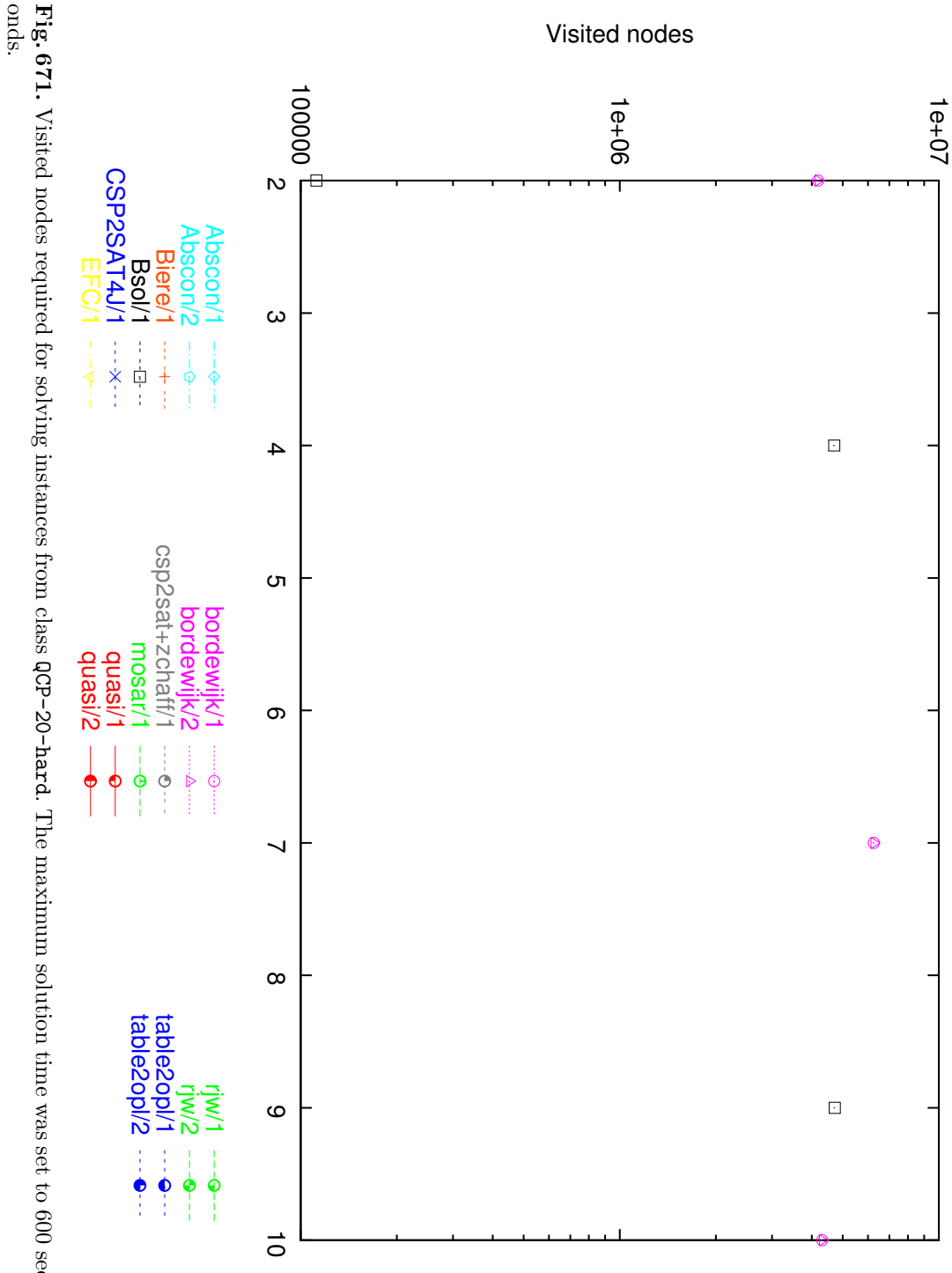

Fig. 671. Visited nodes required for solving instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

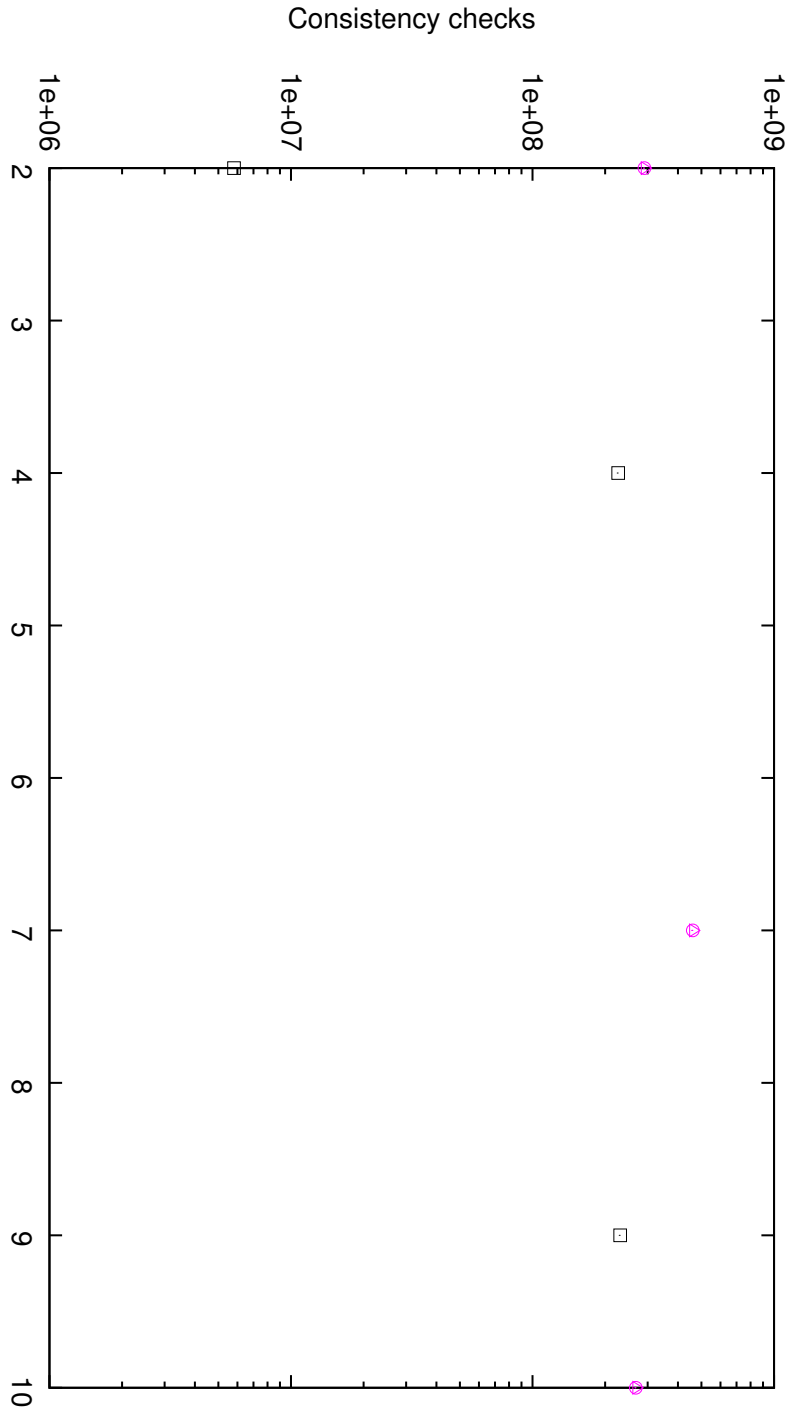

Fig. 672. Consistency checks required for solving instances from class `QCP-20-hard`. The maximum solution time was set to 600 seconds.

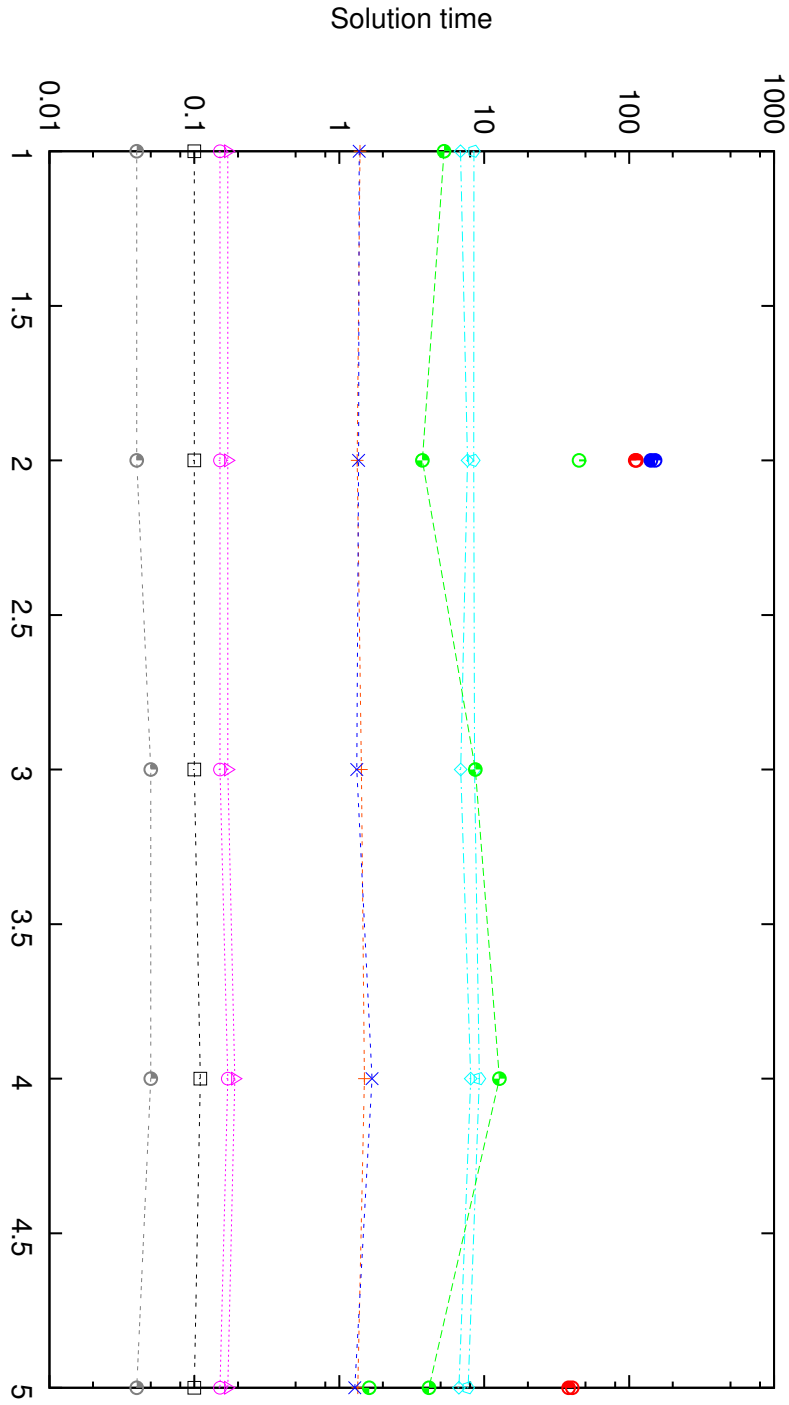

Fig. 673. Solution time in seconds for solving instances from class `QCPp-10`. The maximum solution time was set to 600 seconds.

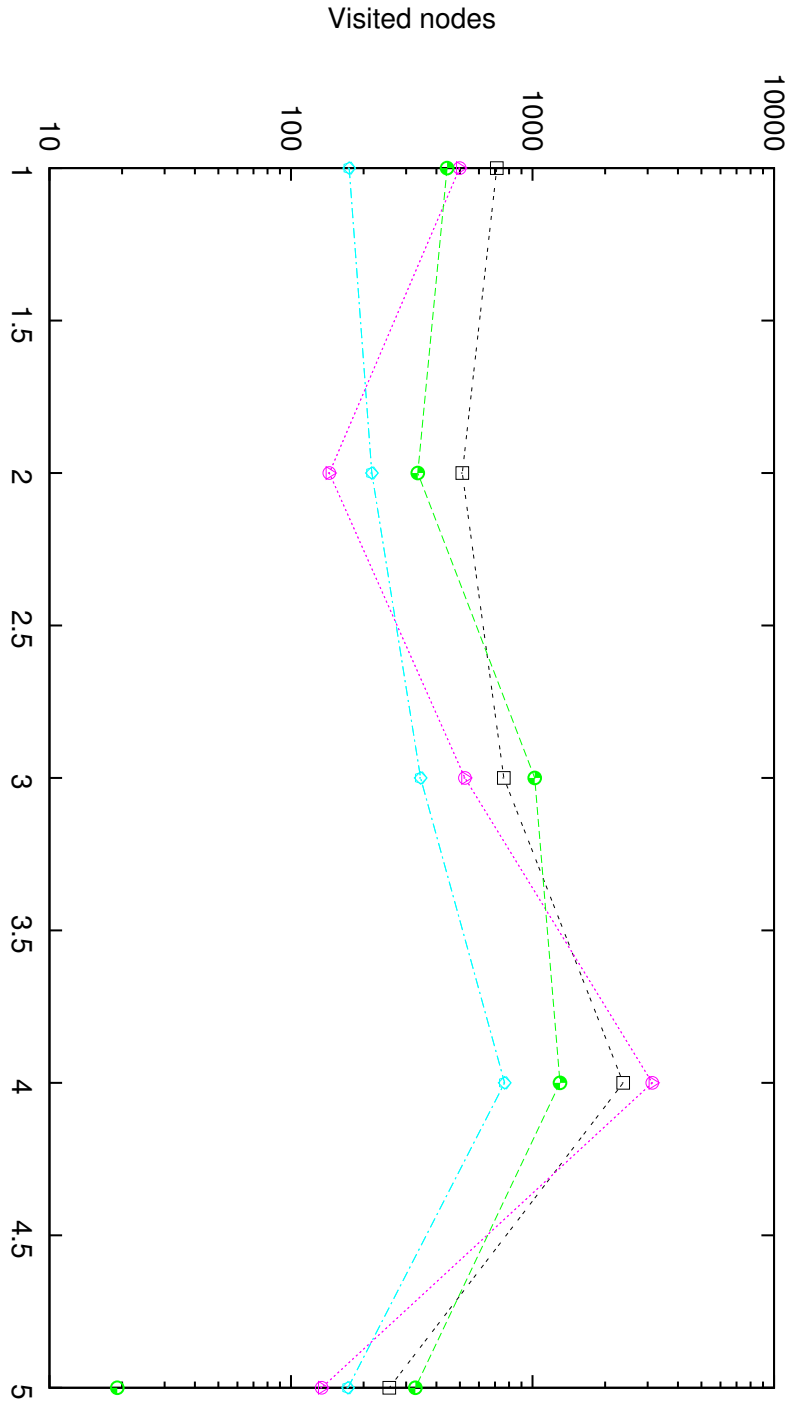

Fig. 674. Visited nodes required for solving instances from class QCPp-10. The maximum solution time was set to 600 seconds.

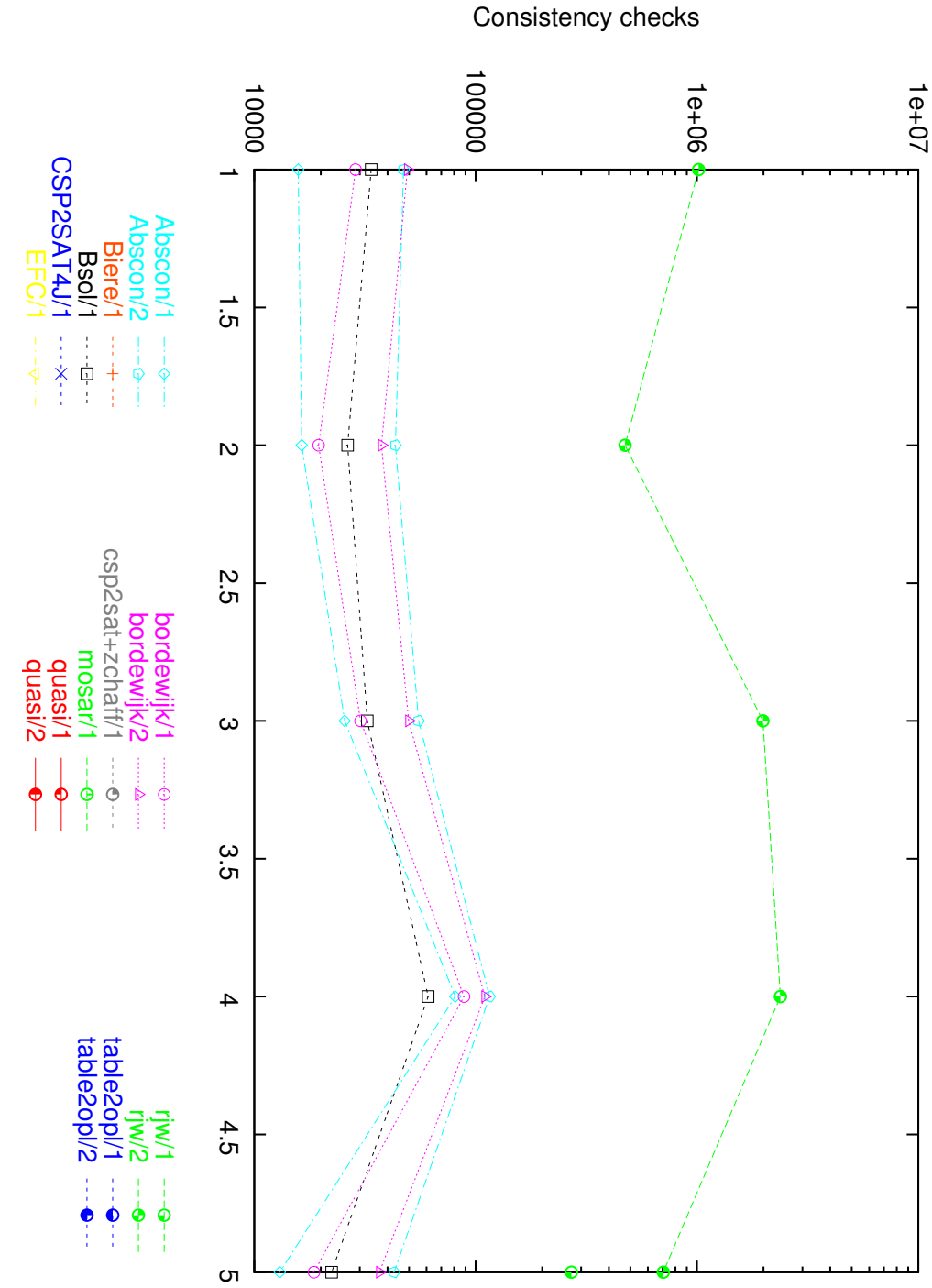

Fig. 675. Consistency checks required for solving instances from class QCPp-10. The maximum solution time was set to 600 seconds.

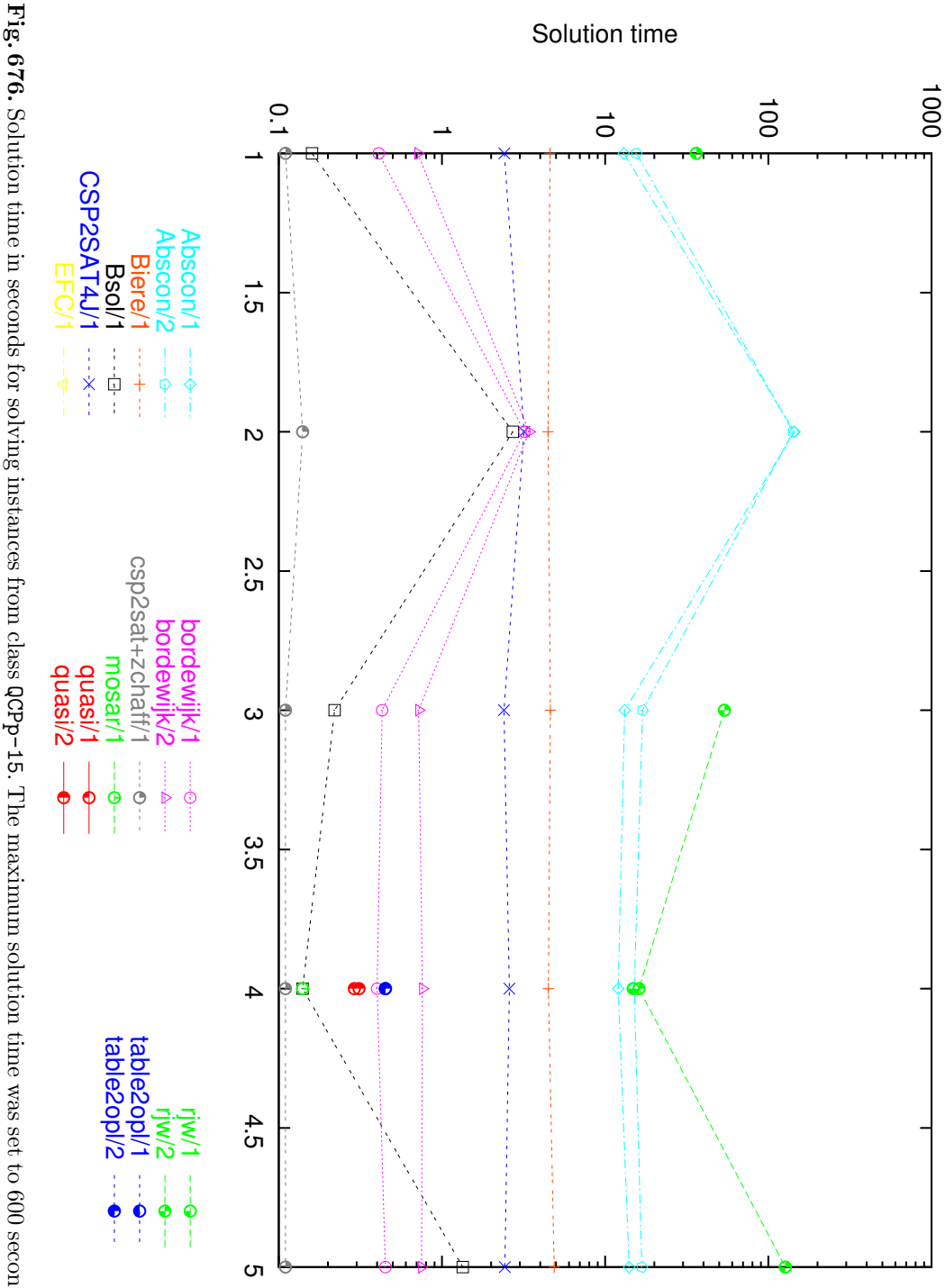

Fig. 676. Solution time in seconds for solving instances from class `QCPp-15`. The maximum solution time was set to 600 seconds.

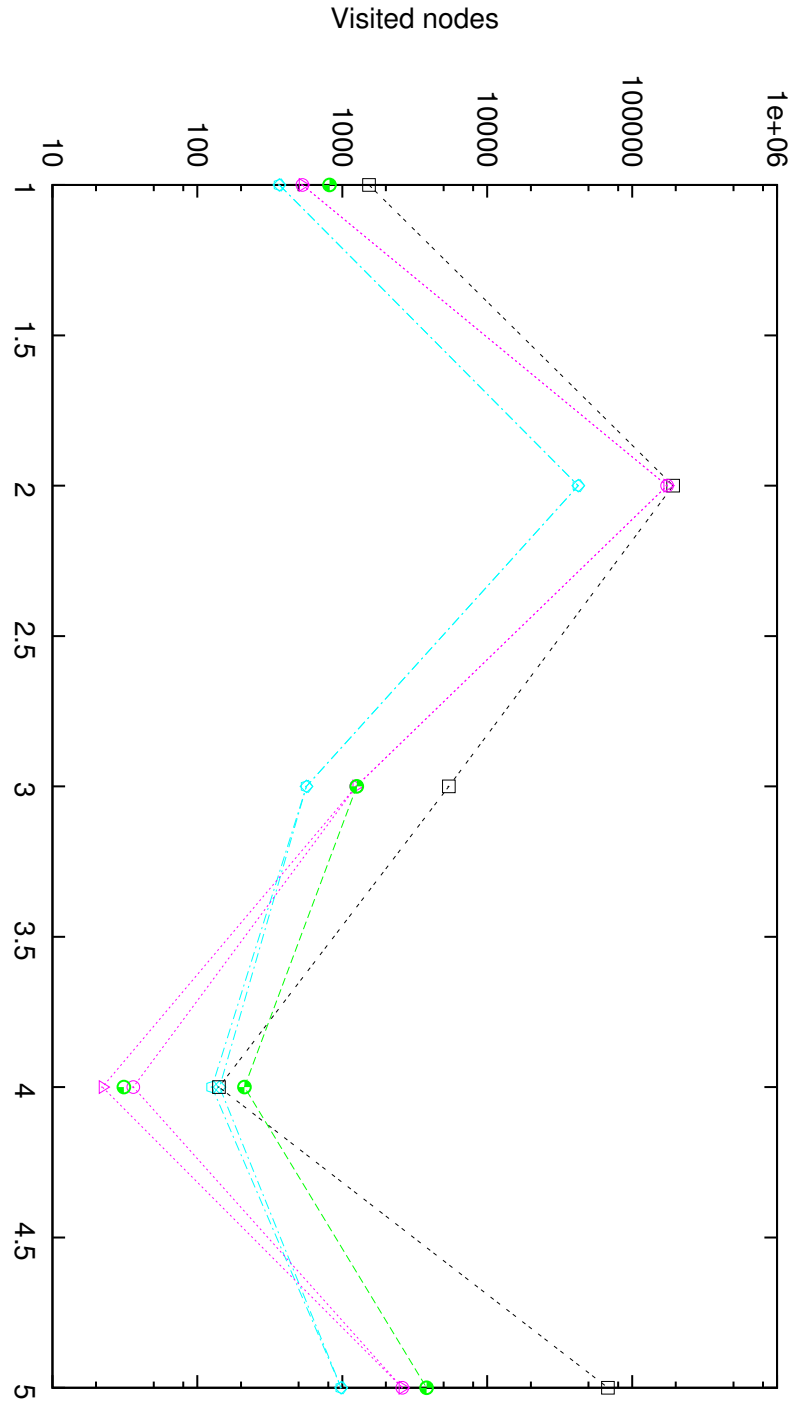

Fig. 677. Visited nodes required for solving instances from class QCPp-15. The maximum solution time was set to 600 seconds.

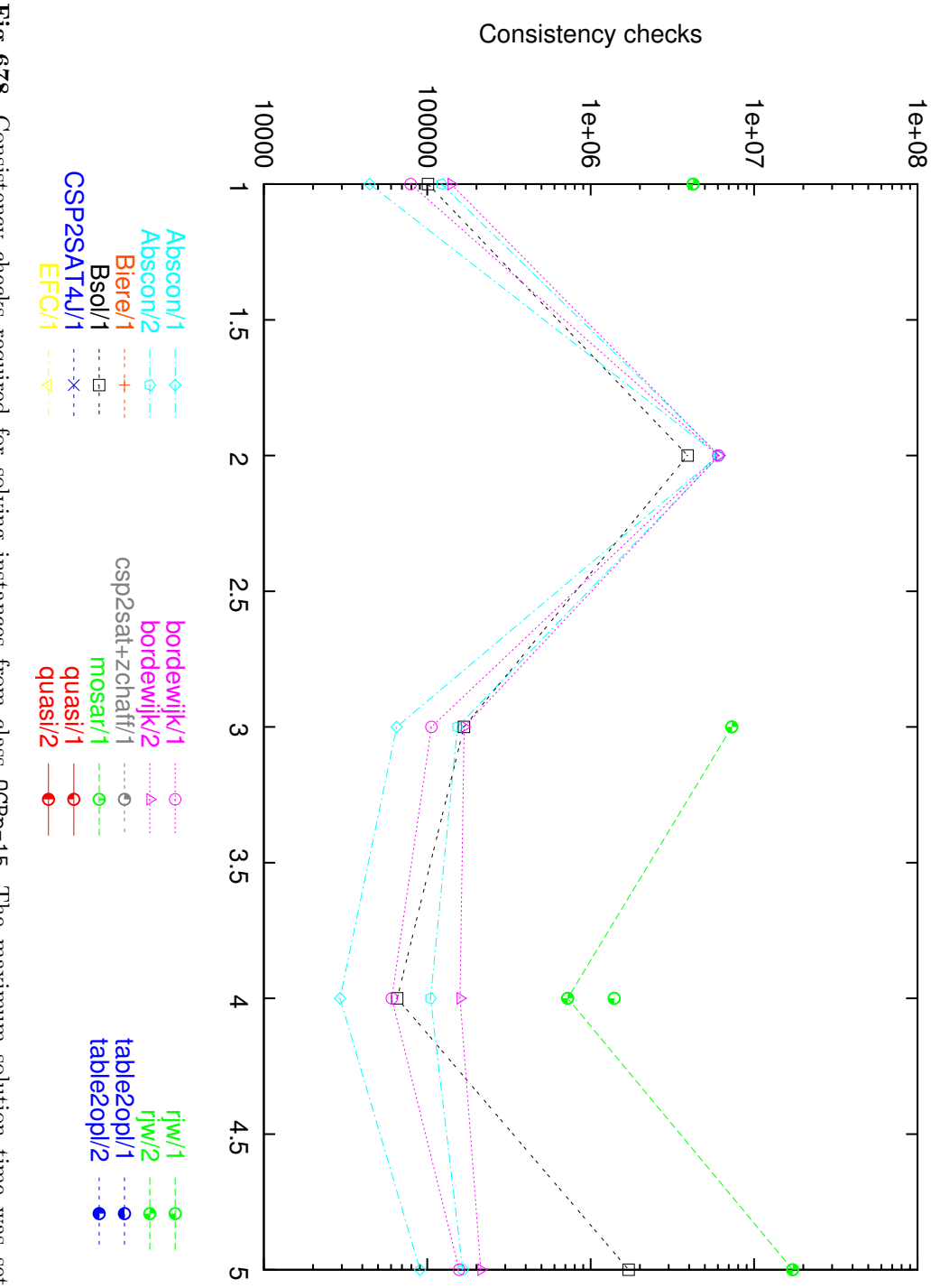

Fig. 678. Consistency checks required for solving instances from class QCPp-15. The maximum solution time was set to 600 seconds.

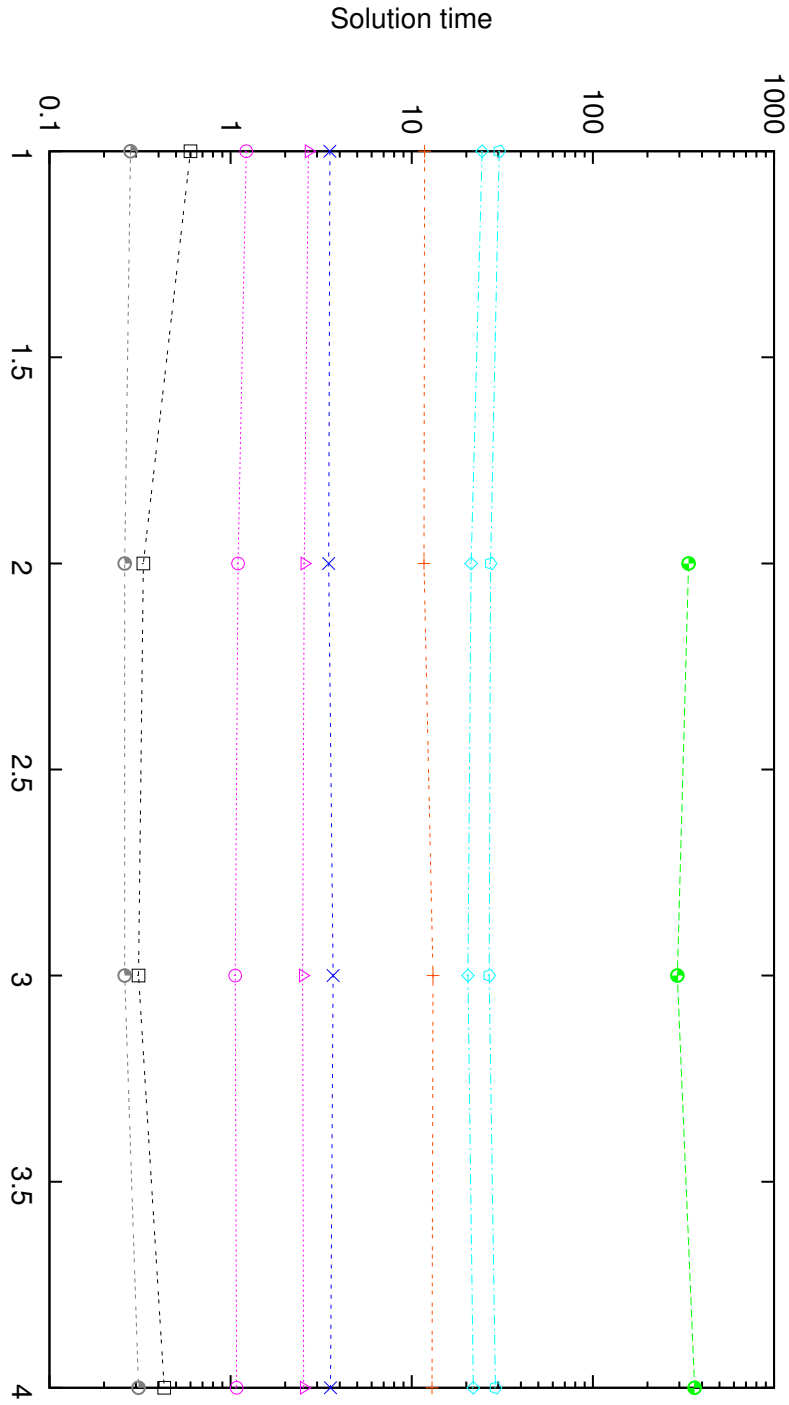

Fig. 679. Solution time in seconds for solving instances from class QCPp-20. The maximum solution time was set to 600 seconds.

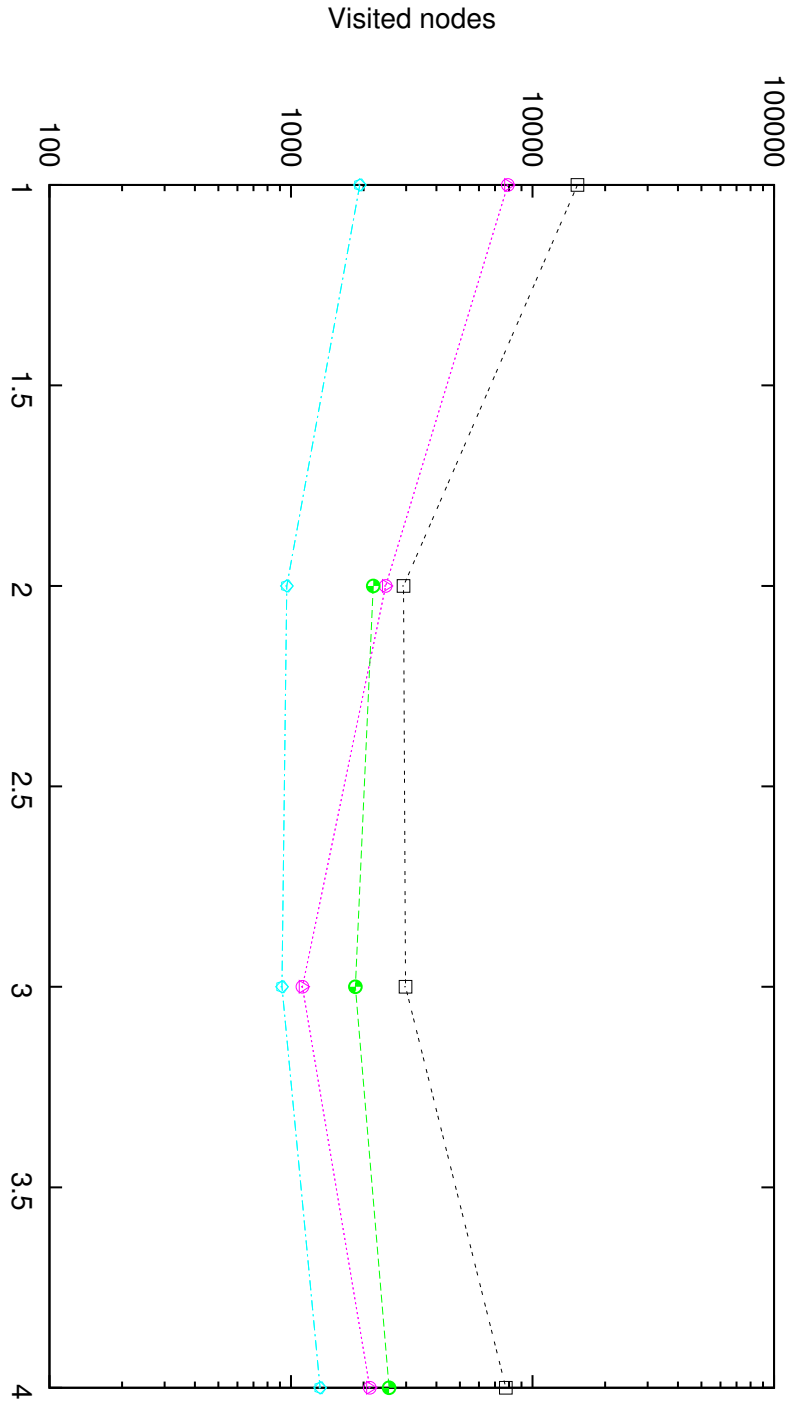

Fig. 680. Visited nodes required for solving instances from class QCPp-20. The maximum solution time was set to 600 seconds.

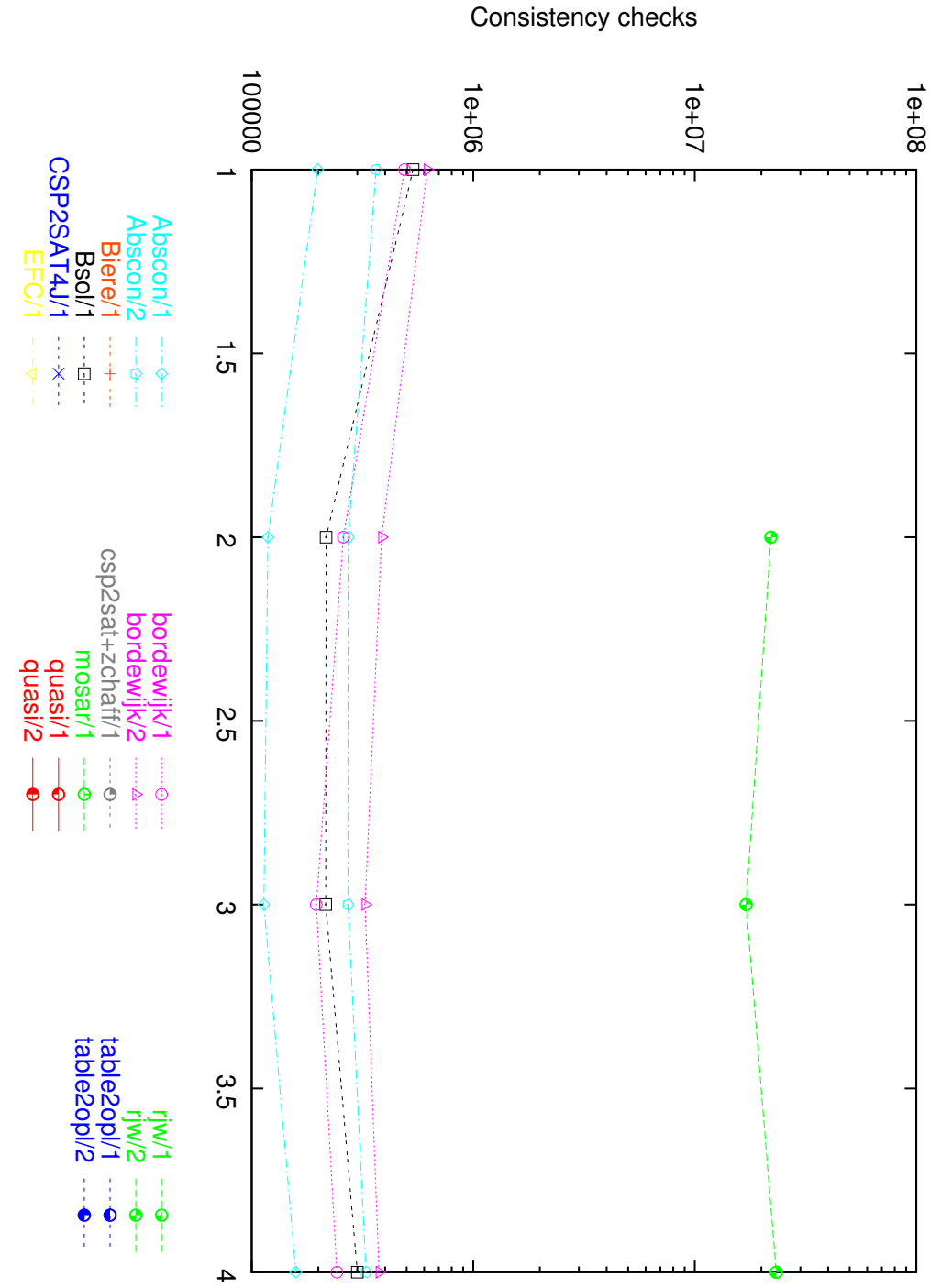

Fig. 681. Consistency checks required for solving instances from class QCPp-20. The maximum solution time was set to 600 seconds.

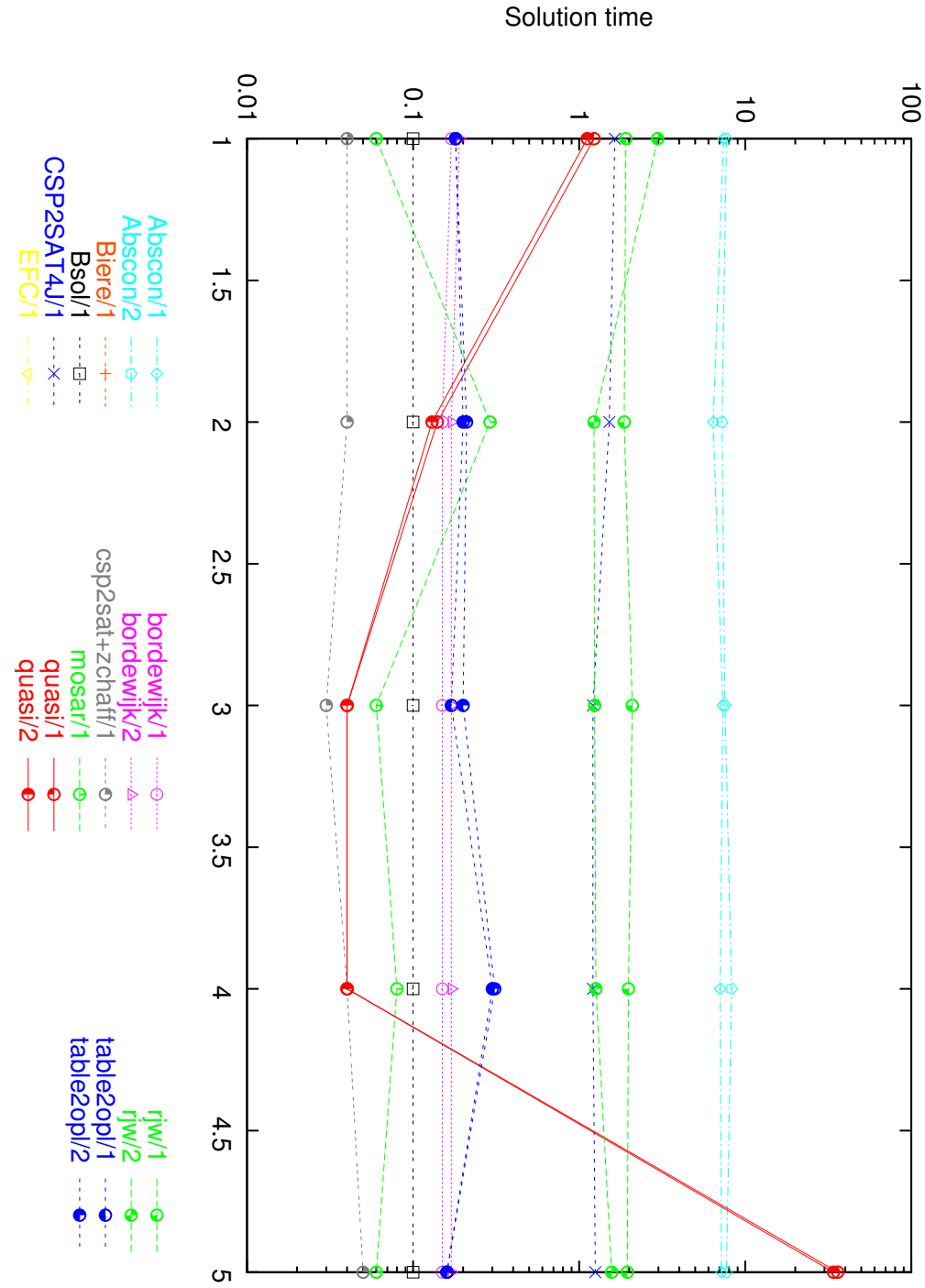

Fig. 682. Solution time in seconds for solving instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

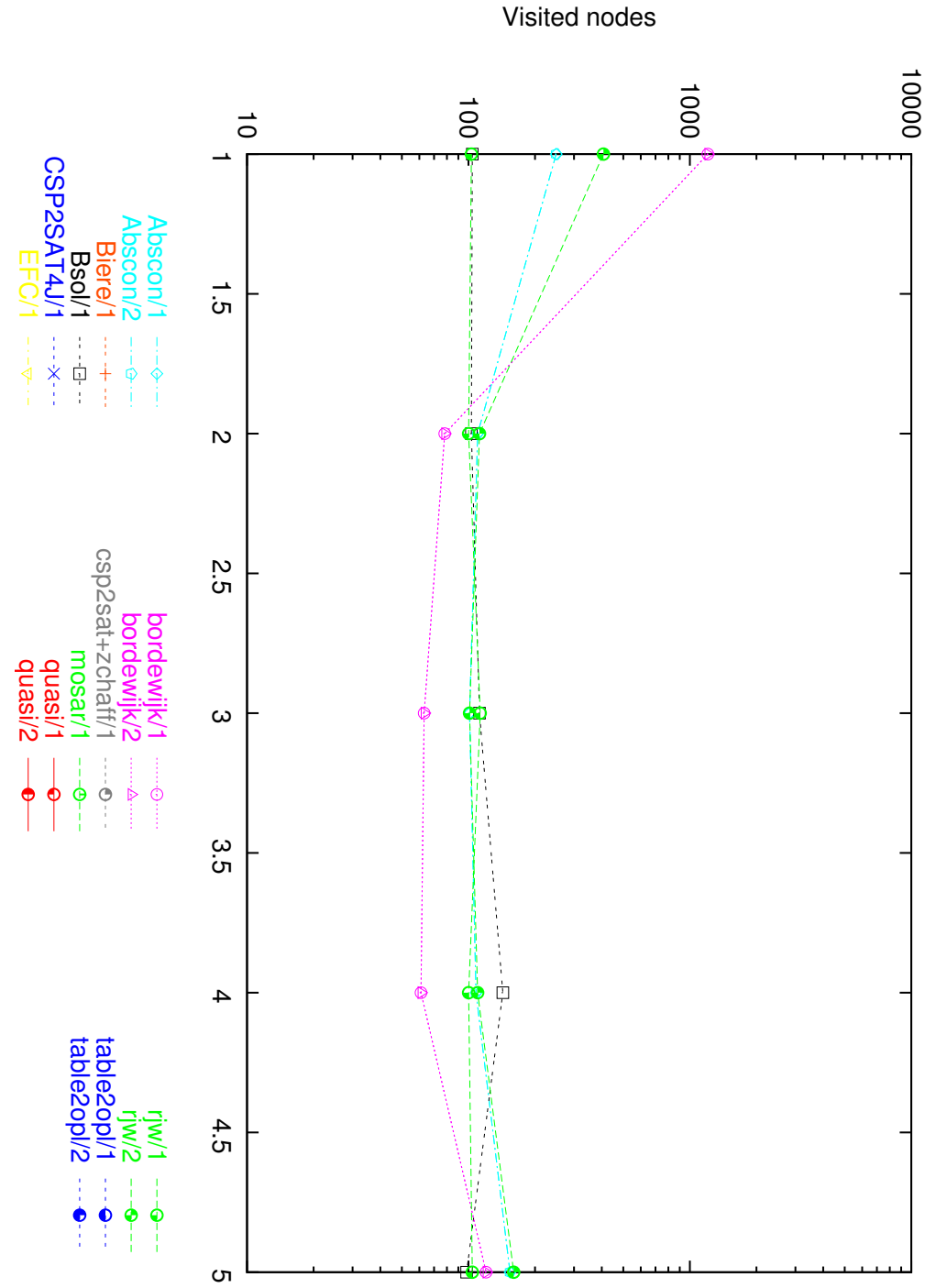

Fig. 683. Visited nodes required for solving instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

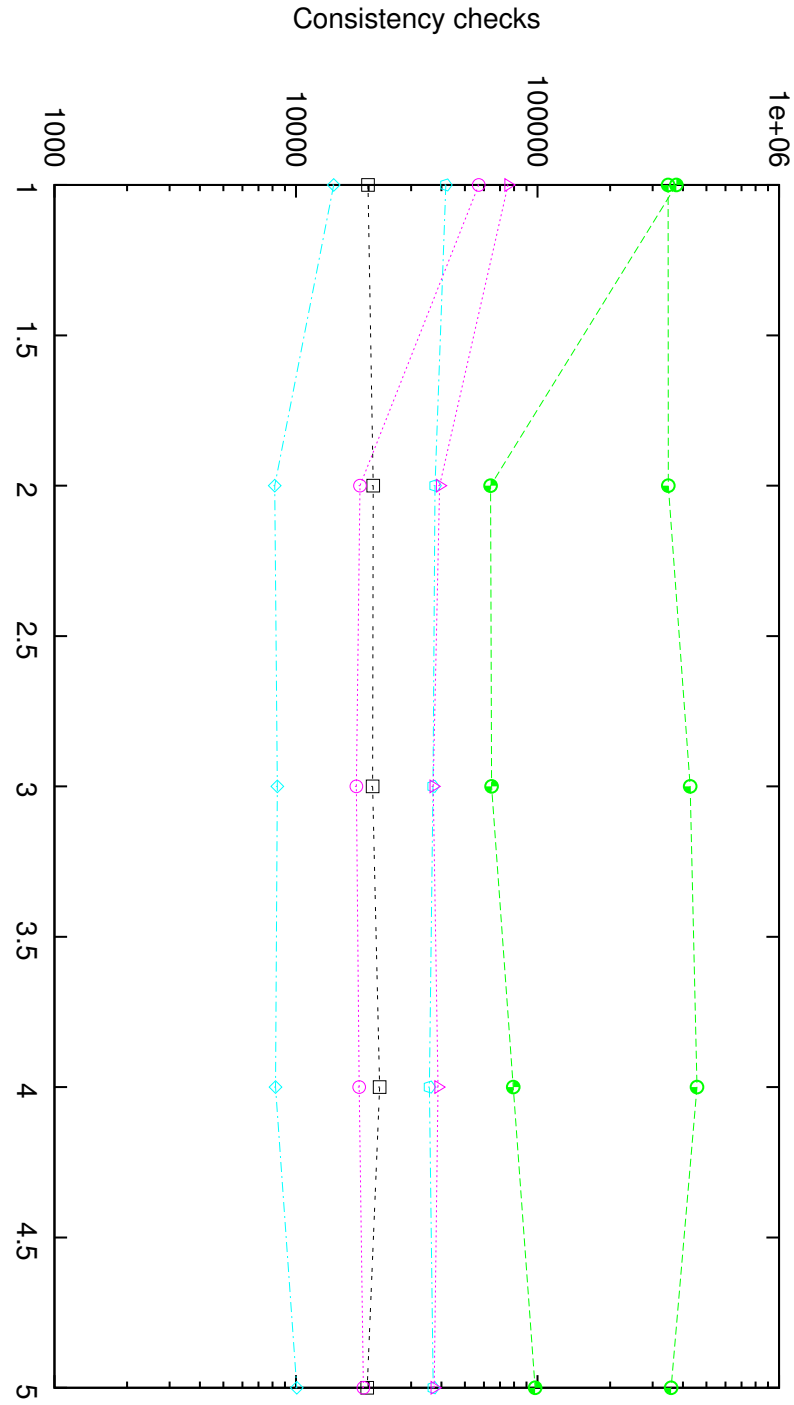

Fig. 684. Consistency checks required for solving instances from class `QCPp-10-easy`. The maximum solution time was set to 600 seconds.

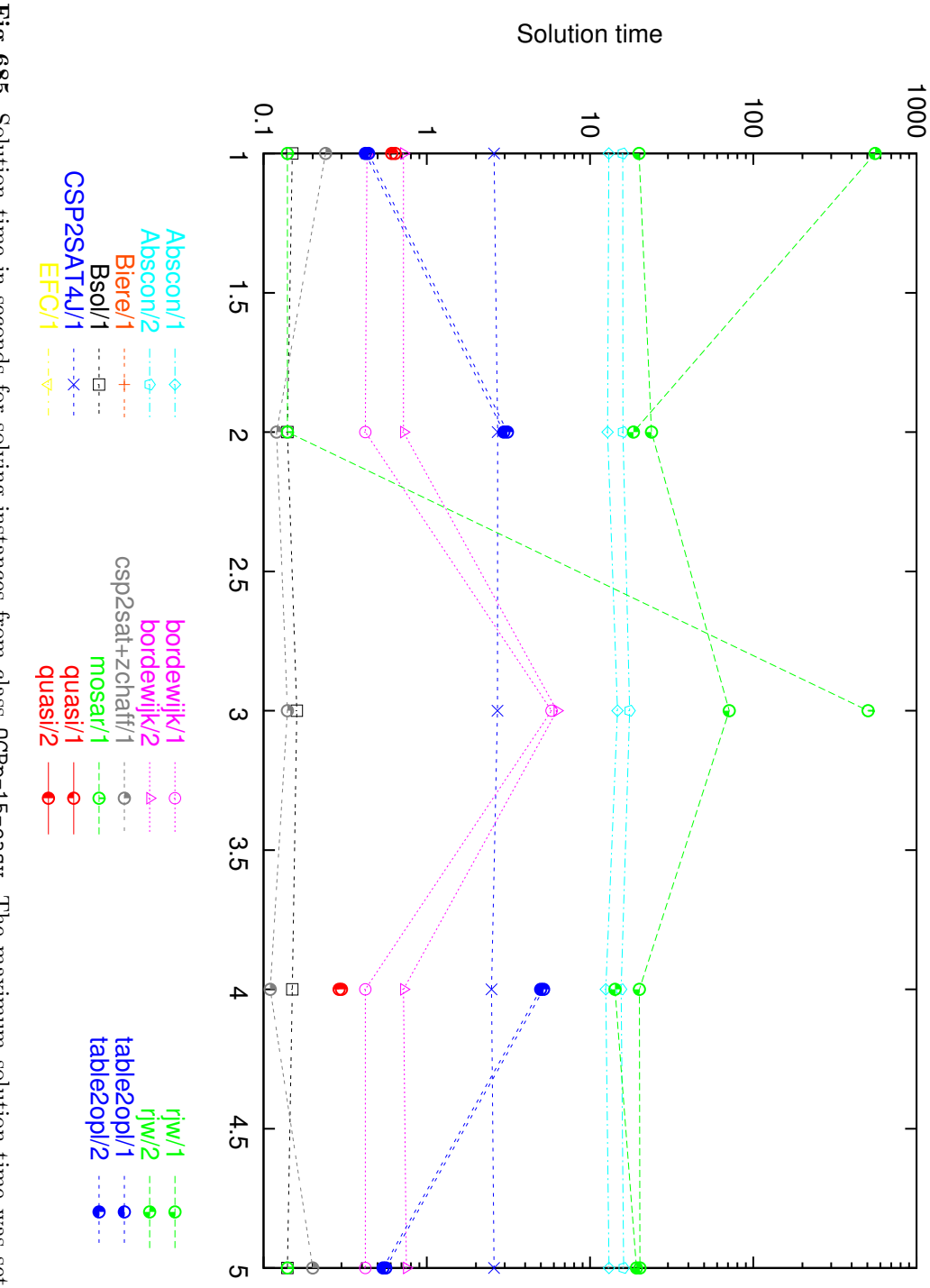

Fig. 685. Solution time in seconds for solving instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

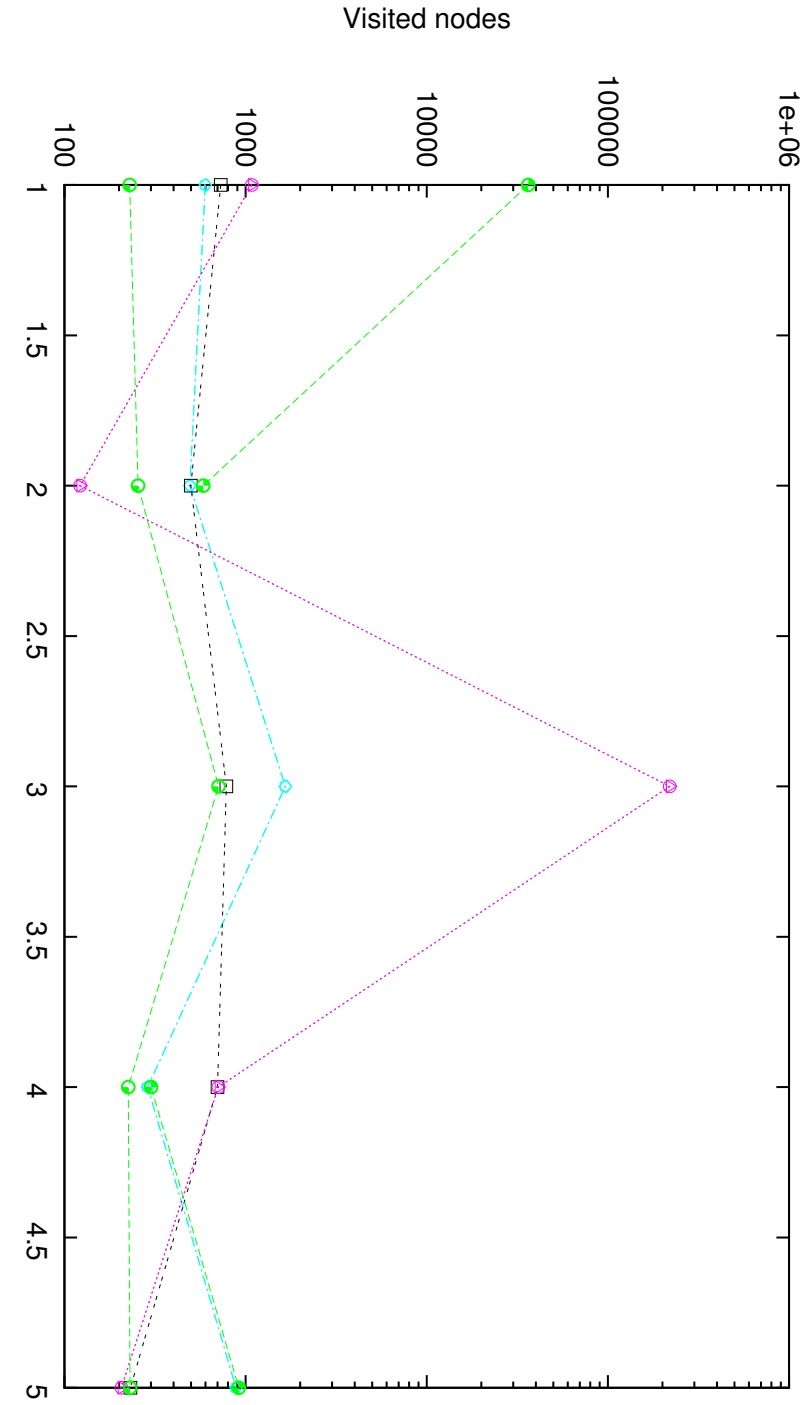

Fig. 686. Visited nodes required for solving instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

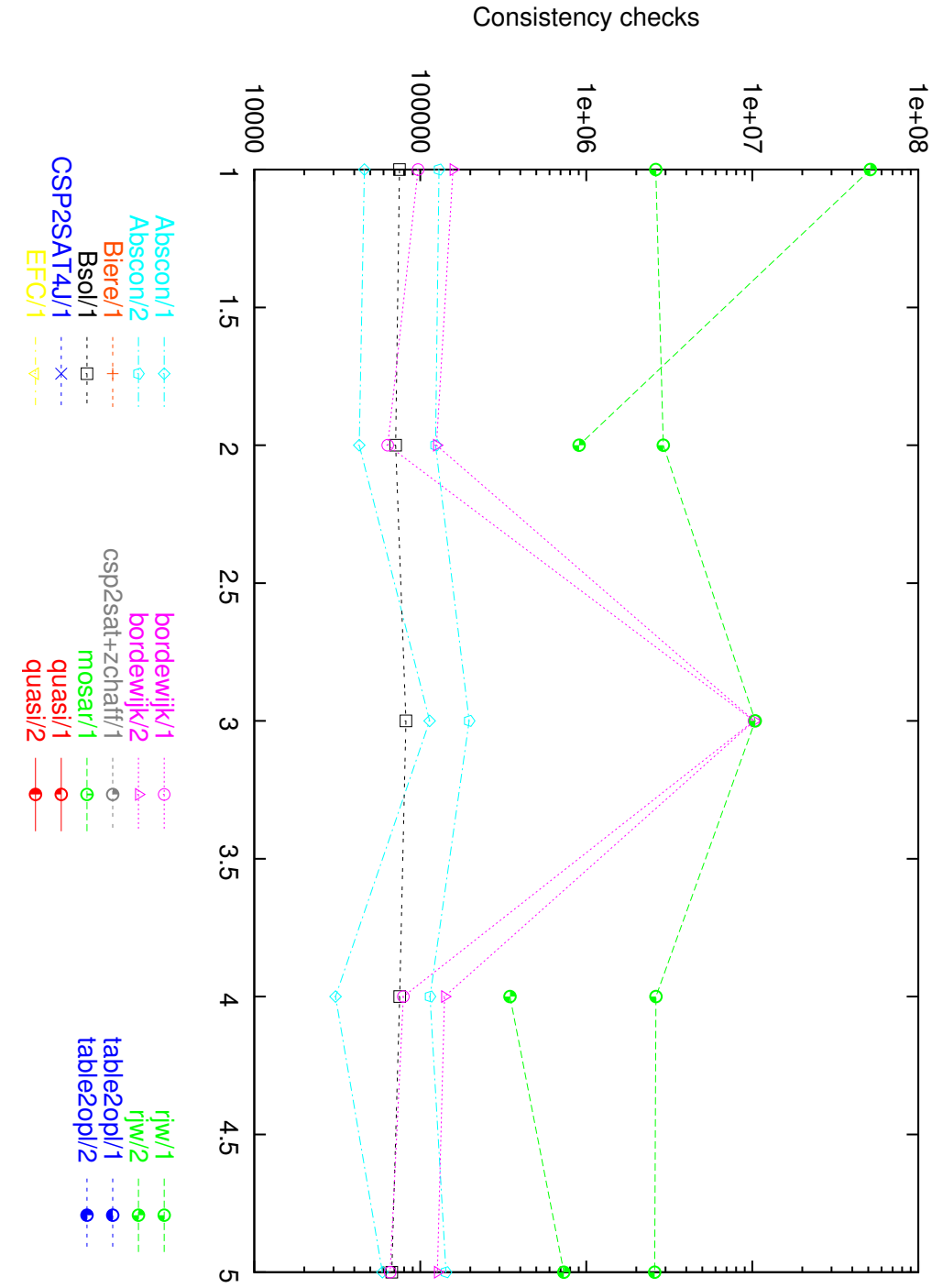

Fig. 687. Consistency checks required for solving instances from class `QCPp-15-easy`. The maximum solution time was set to 600 seconds.

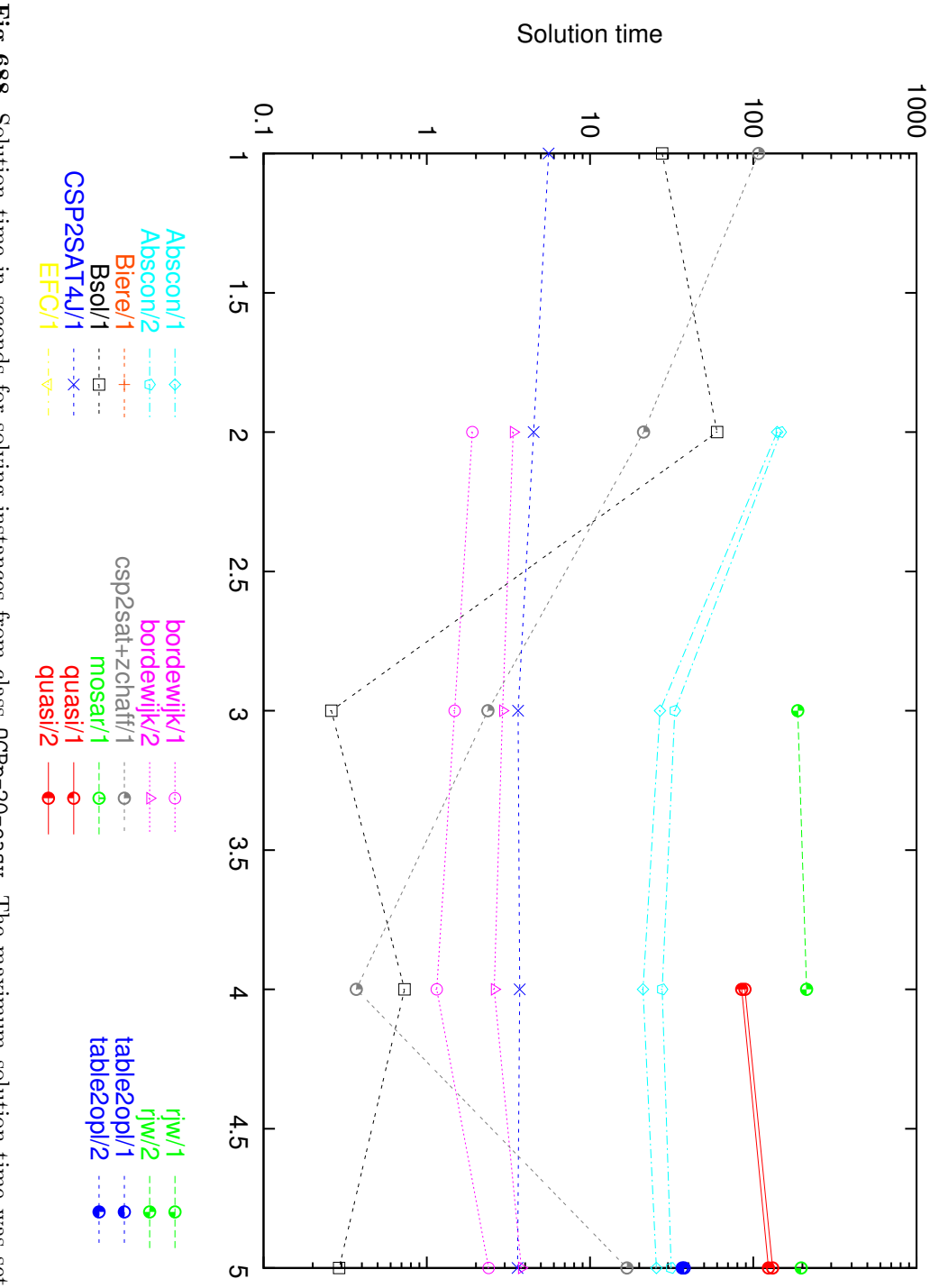

Fig. 688. Solution time in seconds for solving instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

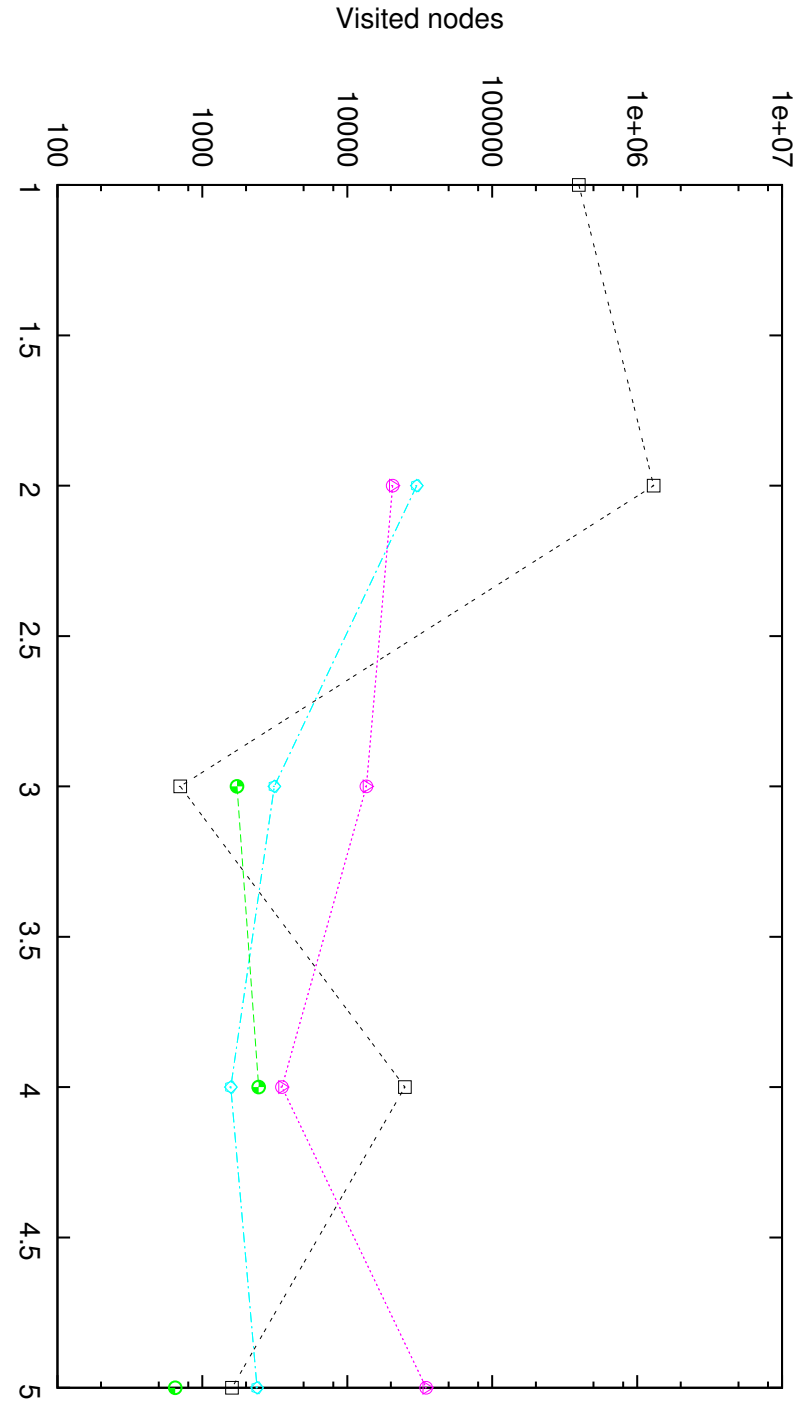

Fig. 689. Visited nodes required for solving instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

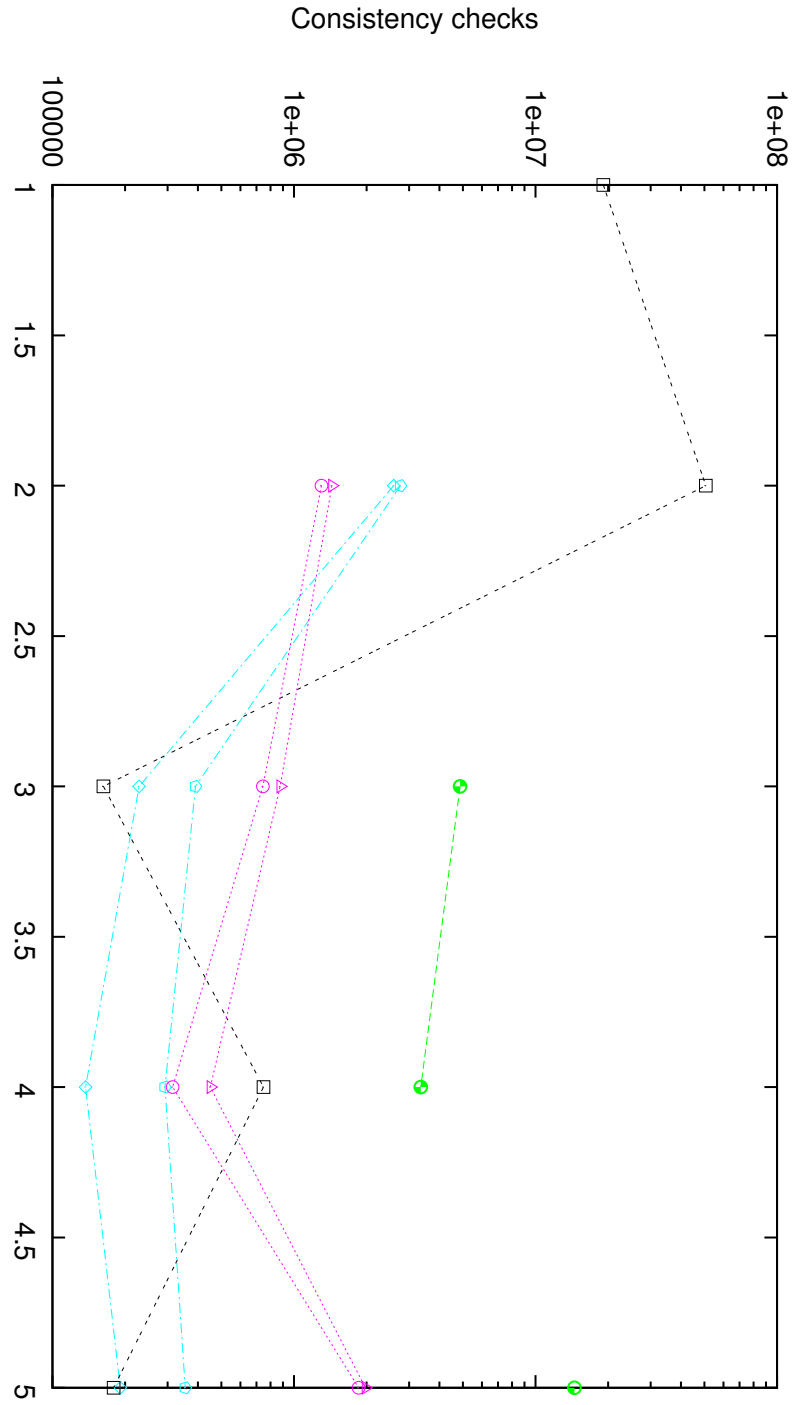

Fig. 690. Consistency checks required for solving instances from class `QCPp-20-easy`. The maximum solution time was set to 600 seconds.

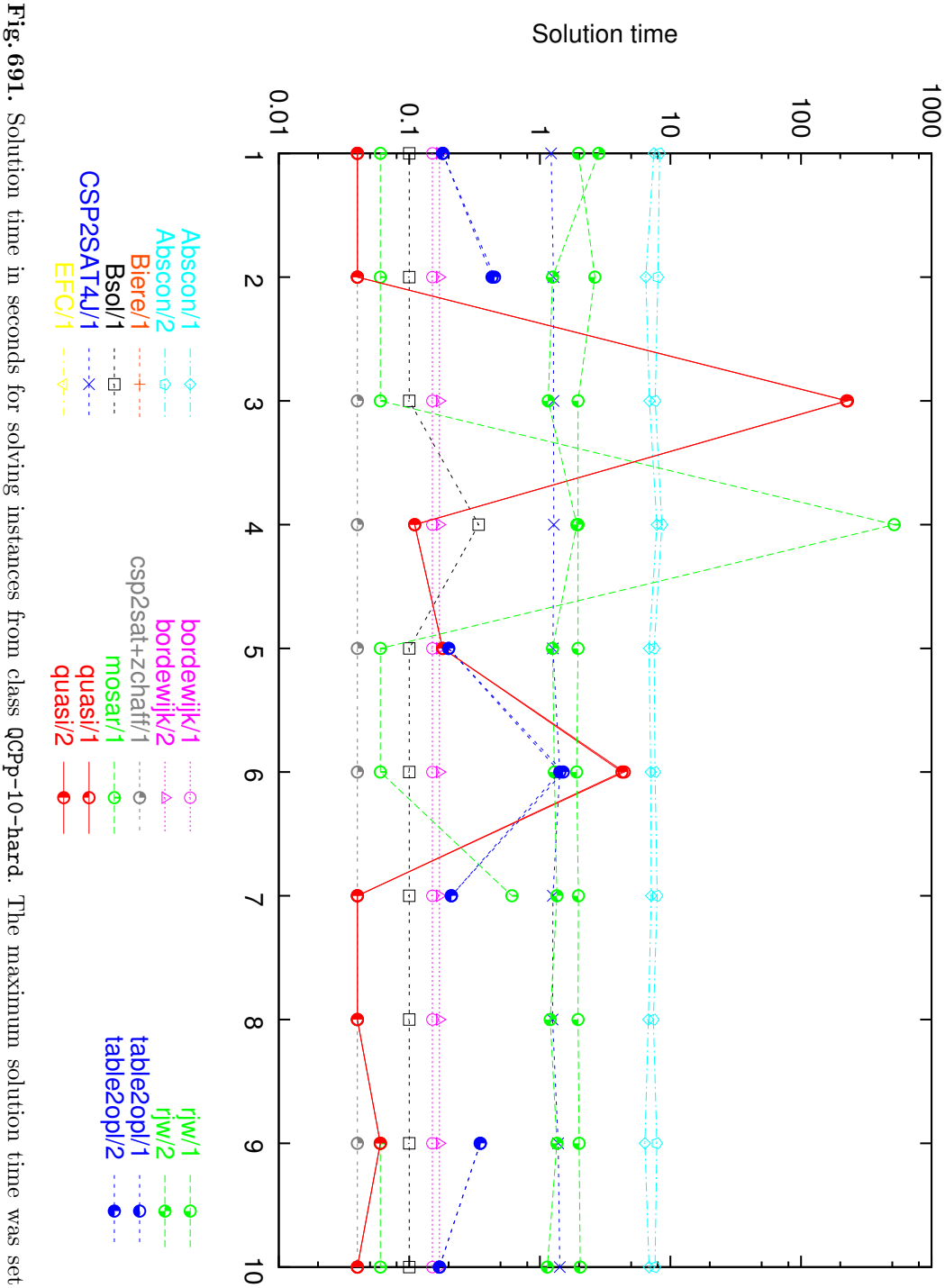

Fig. 691. Solution time in seconds for solving instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

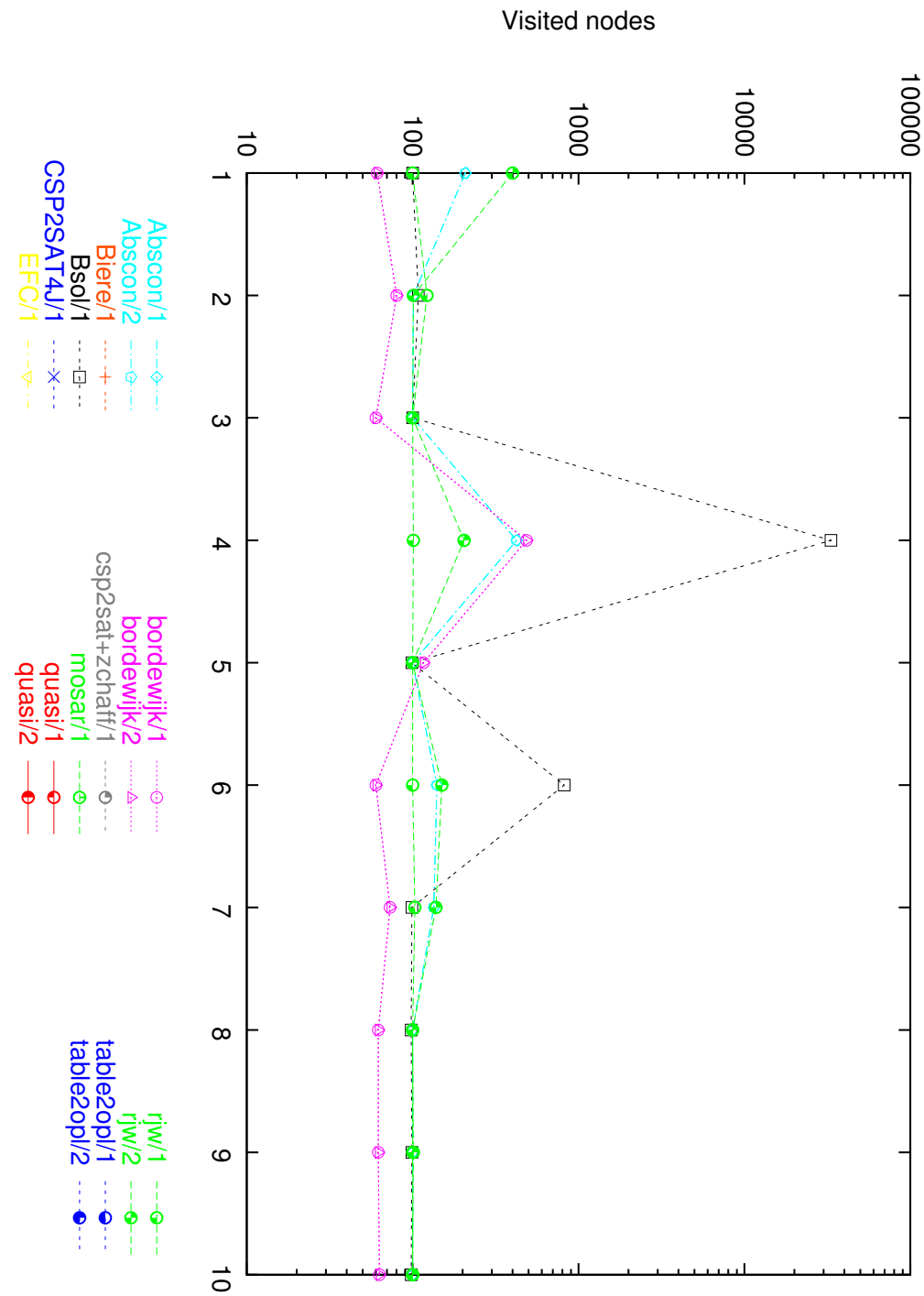

Fig. 692. Visited nodes required for solving instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

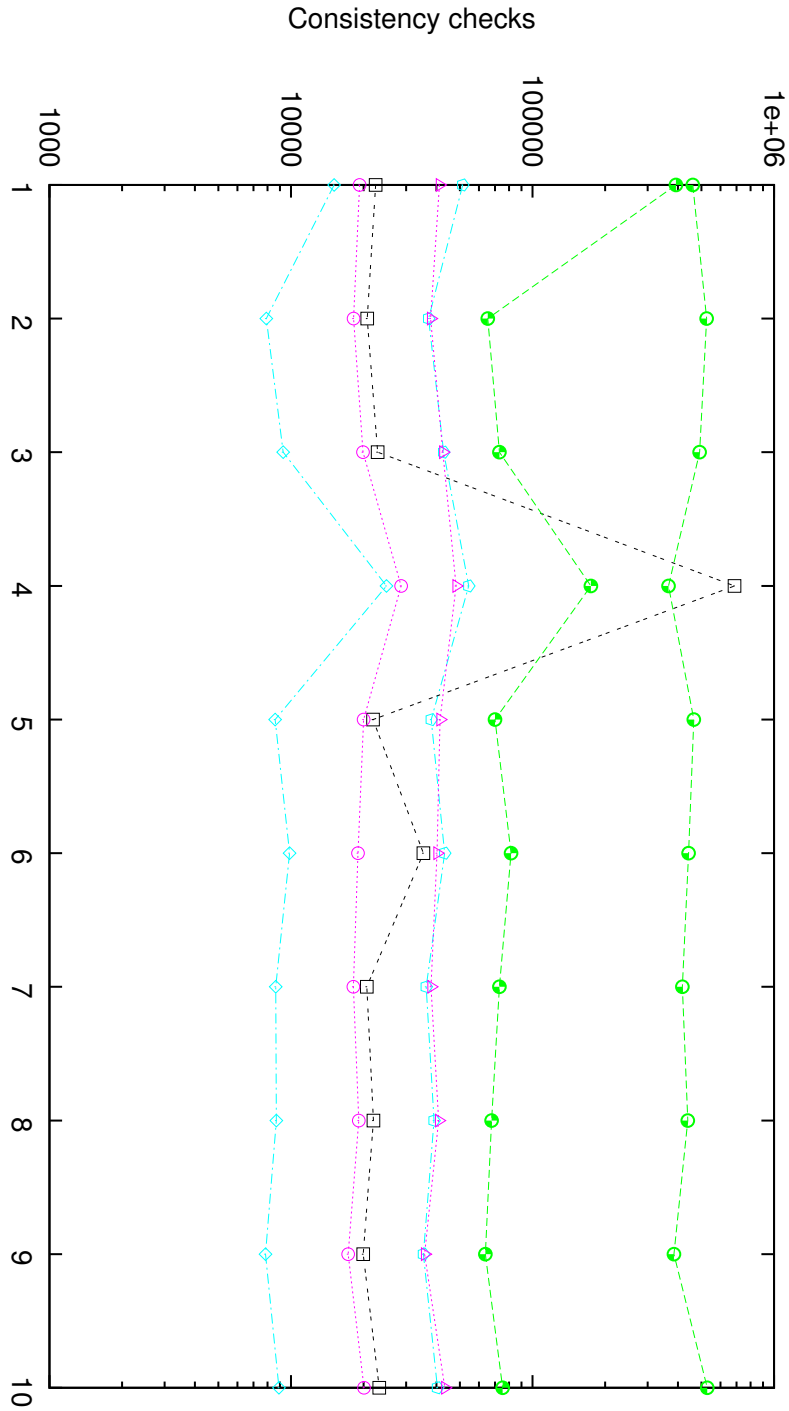

Fig. 693. Consistency checks required for solving instances from class `QCPp-10-hard`. The maximum solution time was set to 600 seconds.

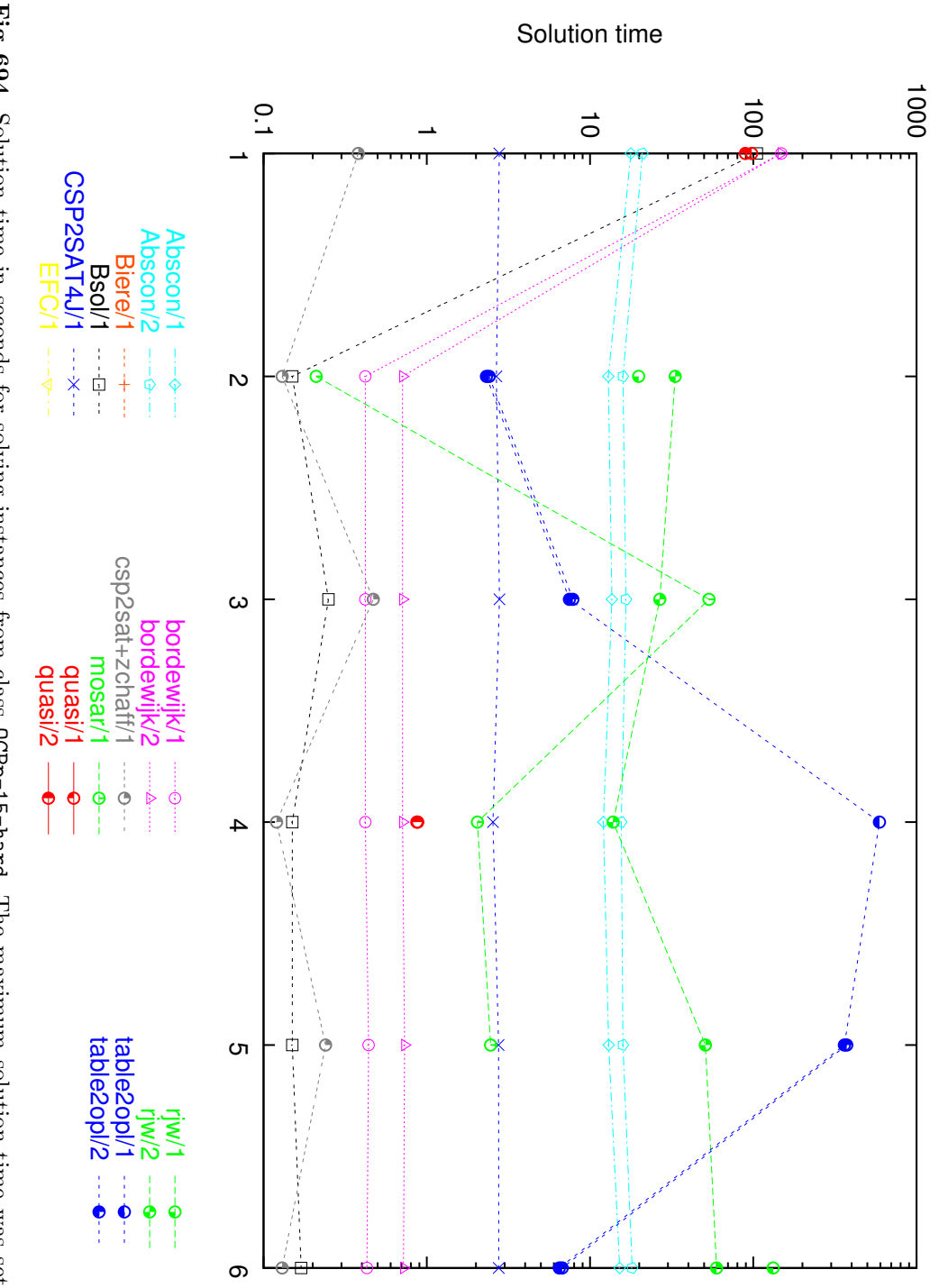

Fig. 694. Solution time in seconds for solving instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

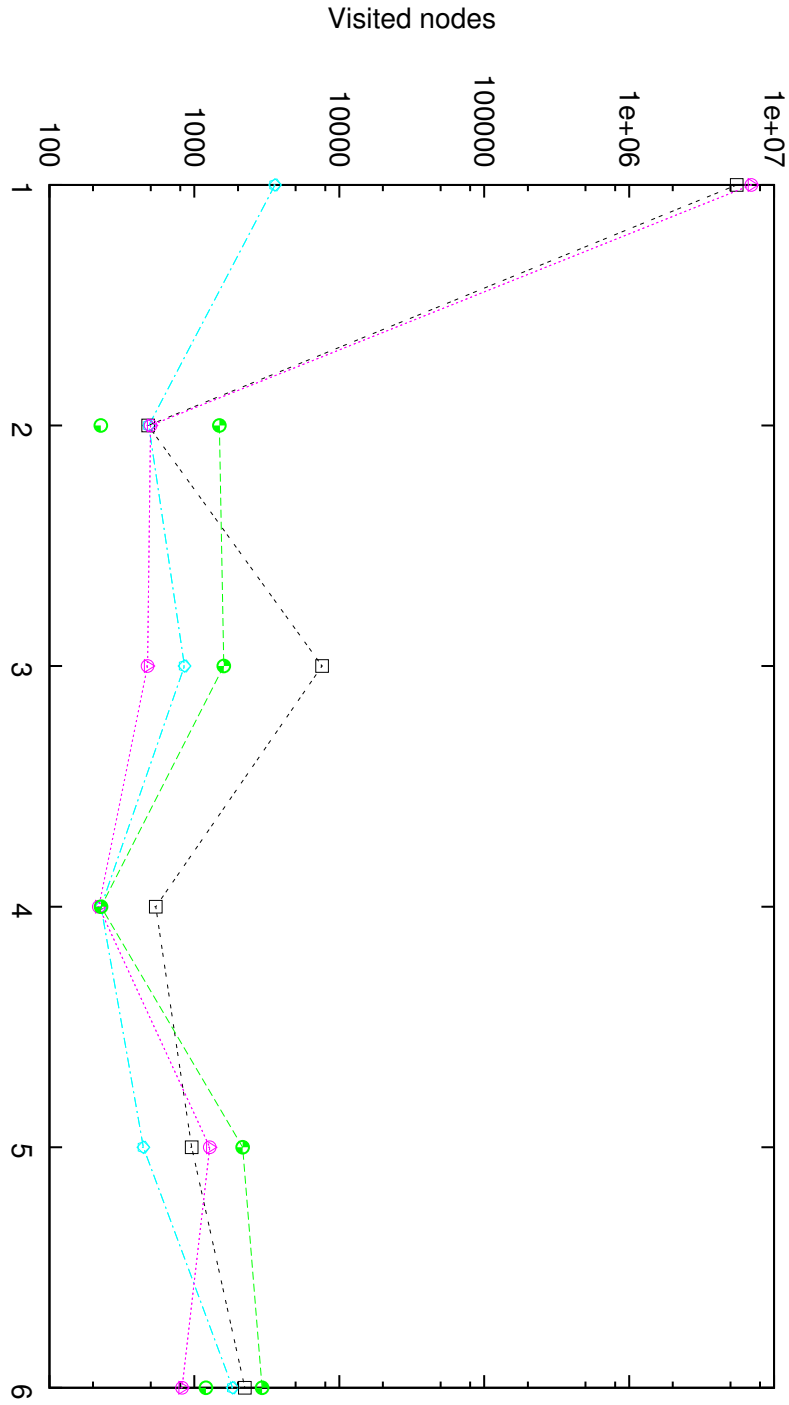

Fig. 695. Visited nodes required for solving instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

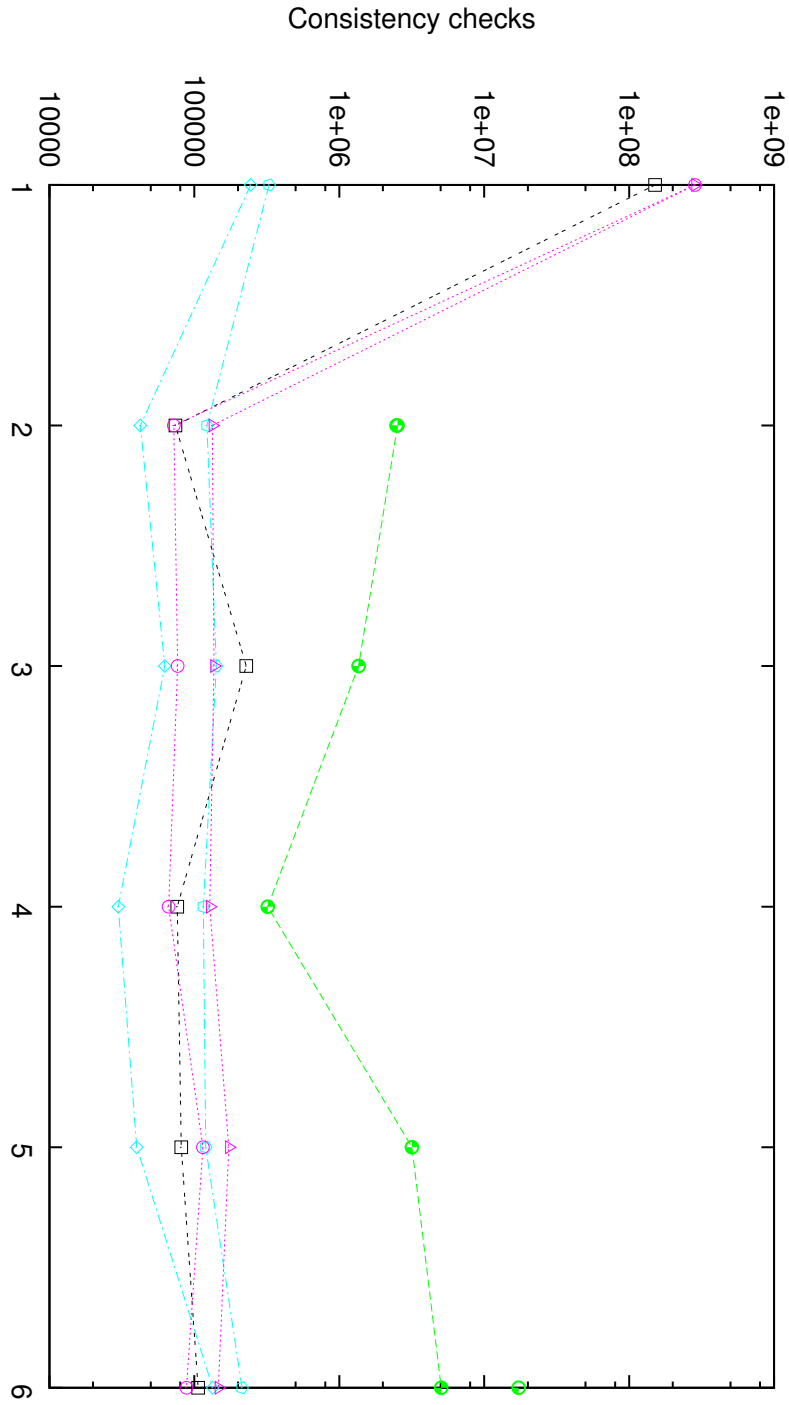

Fig. 696. Consistency checks required for solving instances from class `QCPp-15-hard`. The maximum solution time was set to 600 seconds.

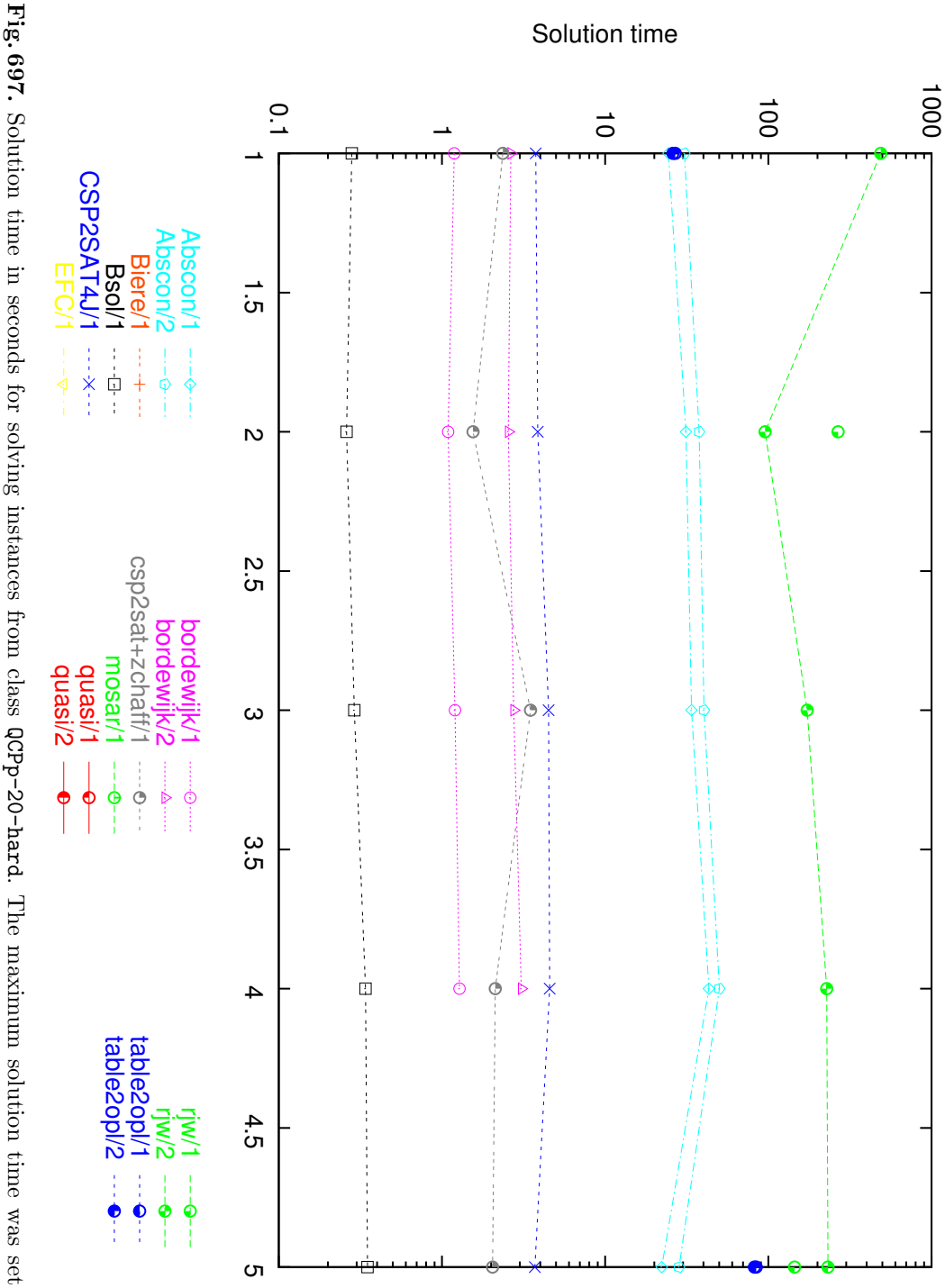

Fig. 697. Solution time in seconds for solving instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

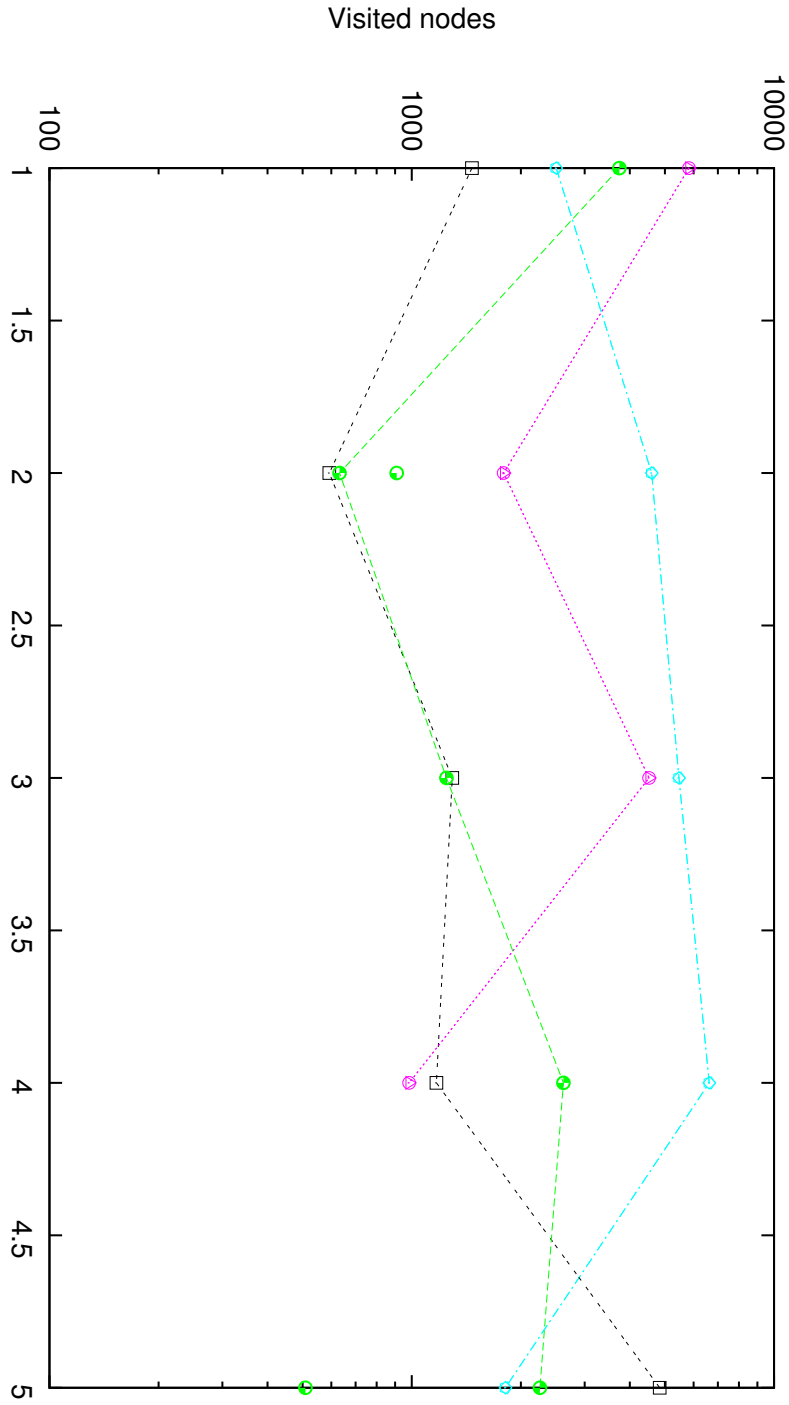

Fig. 698. Visited nodes required for solving instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

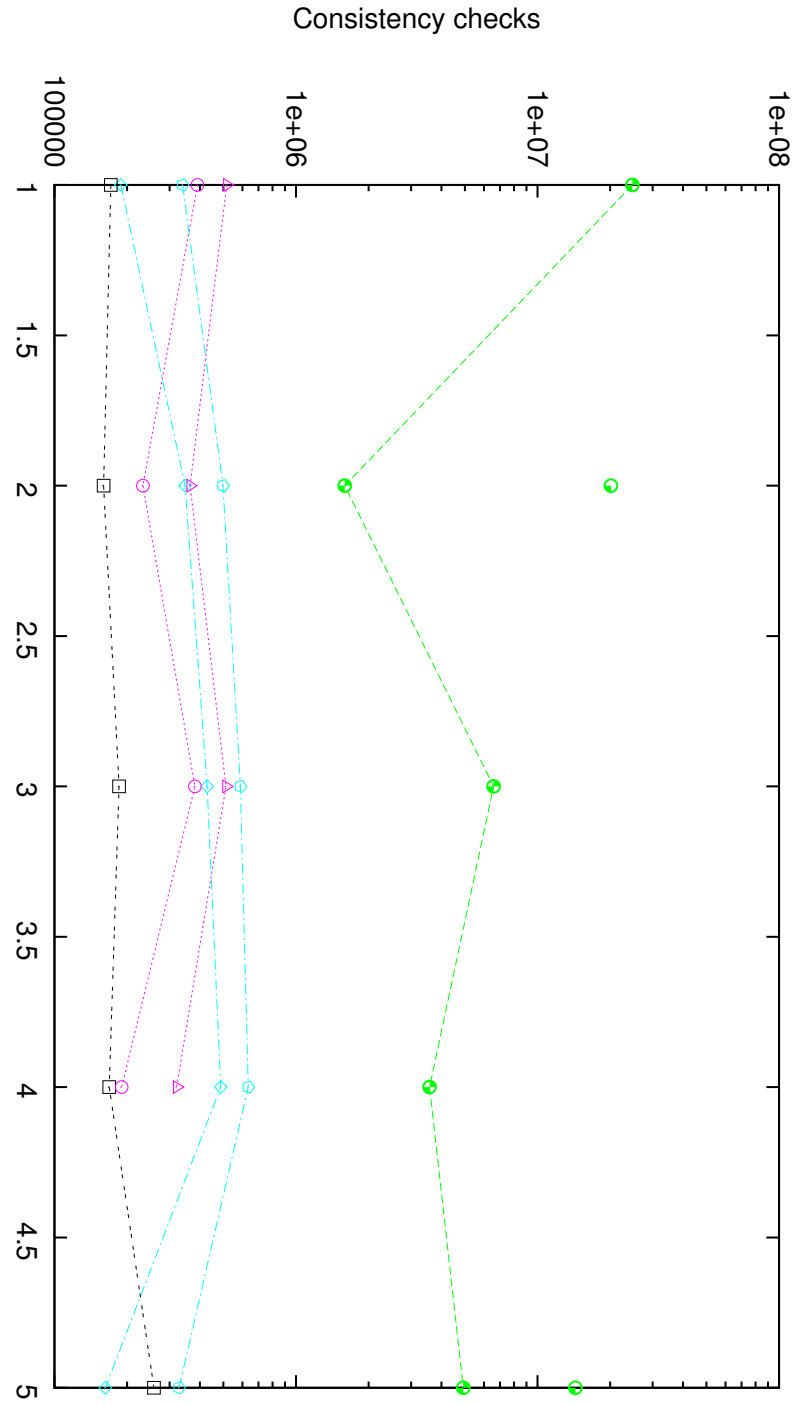

Fig. 699. Consistency checks required for solving instances from class `QCPp-20-hard`. The maximum solution time was set to 600 seconds.

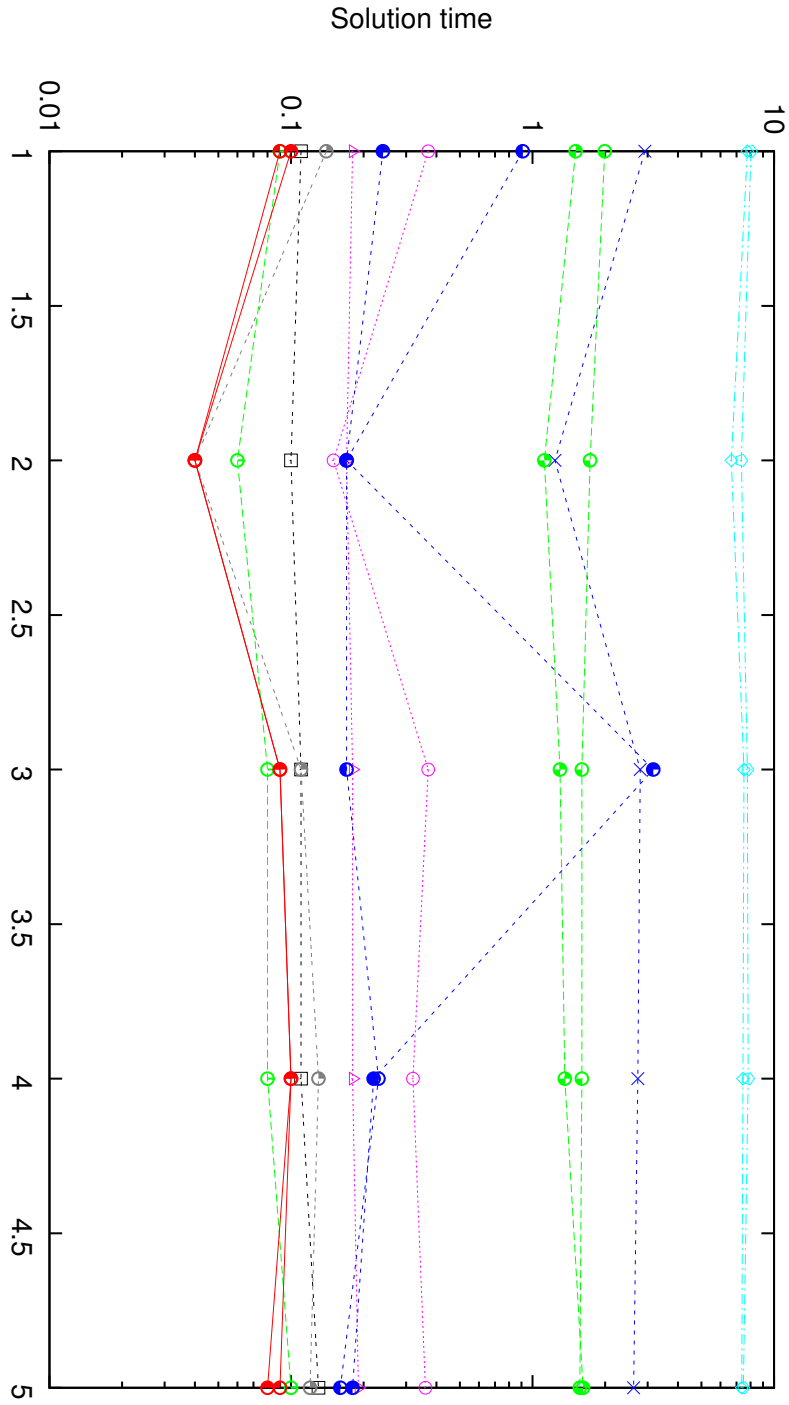

Fig. 700. Solution time in seconds for solving instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

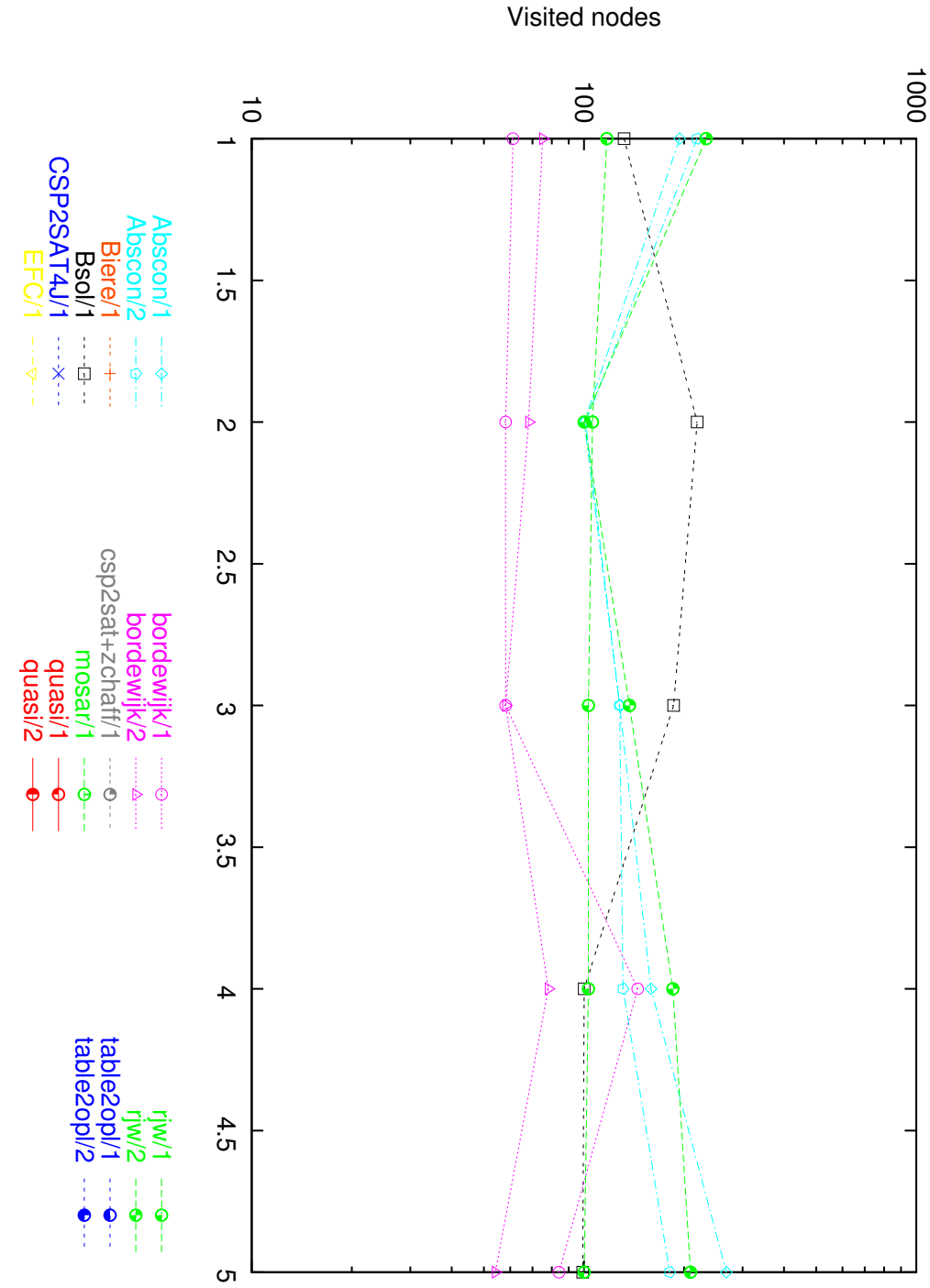

Fig. 701. Visited nodes required for solving instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

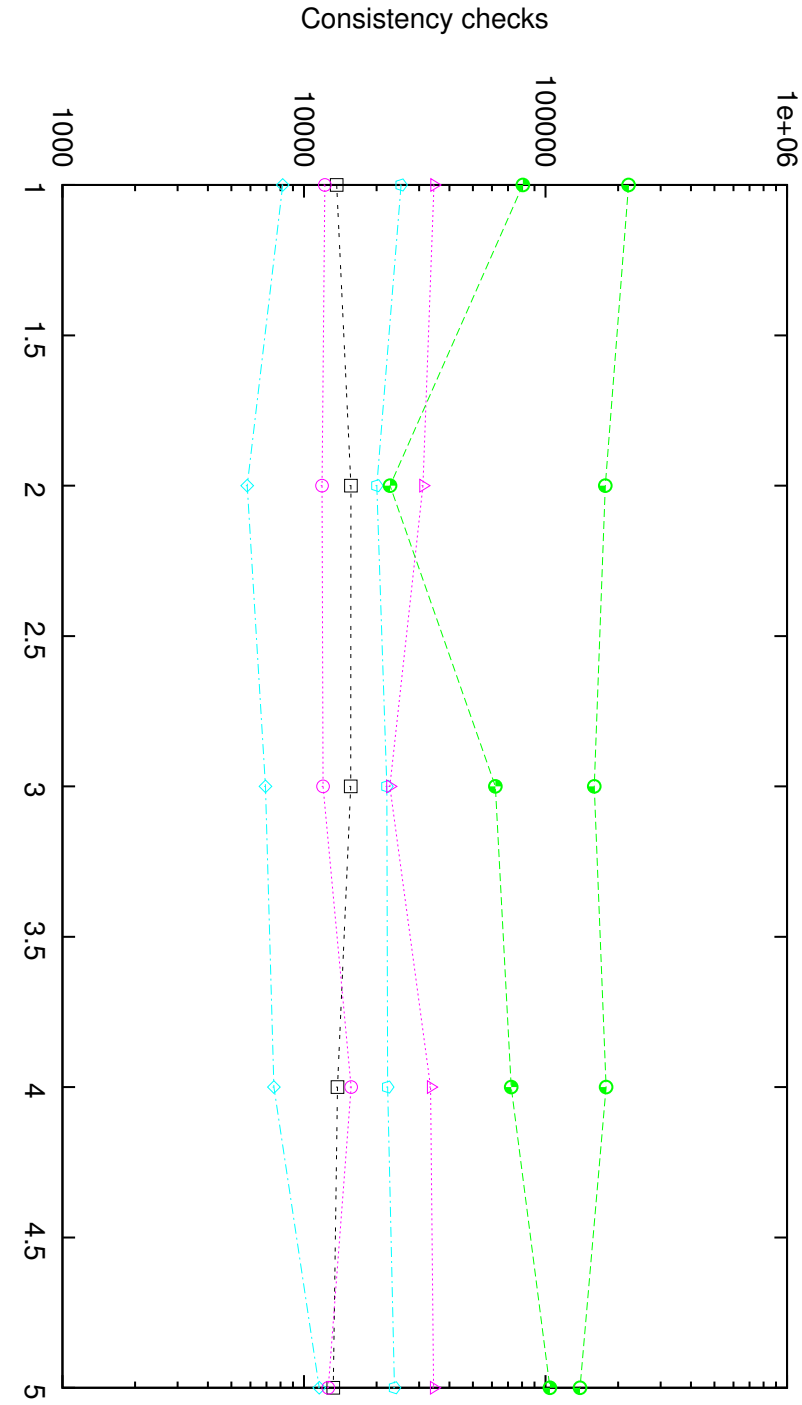

Fig. 702. Consistency checks required for solving instances from class `QWH-10-easy`. The maximum solution time was set to 600 seconds.

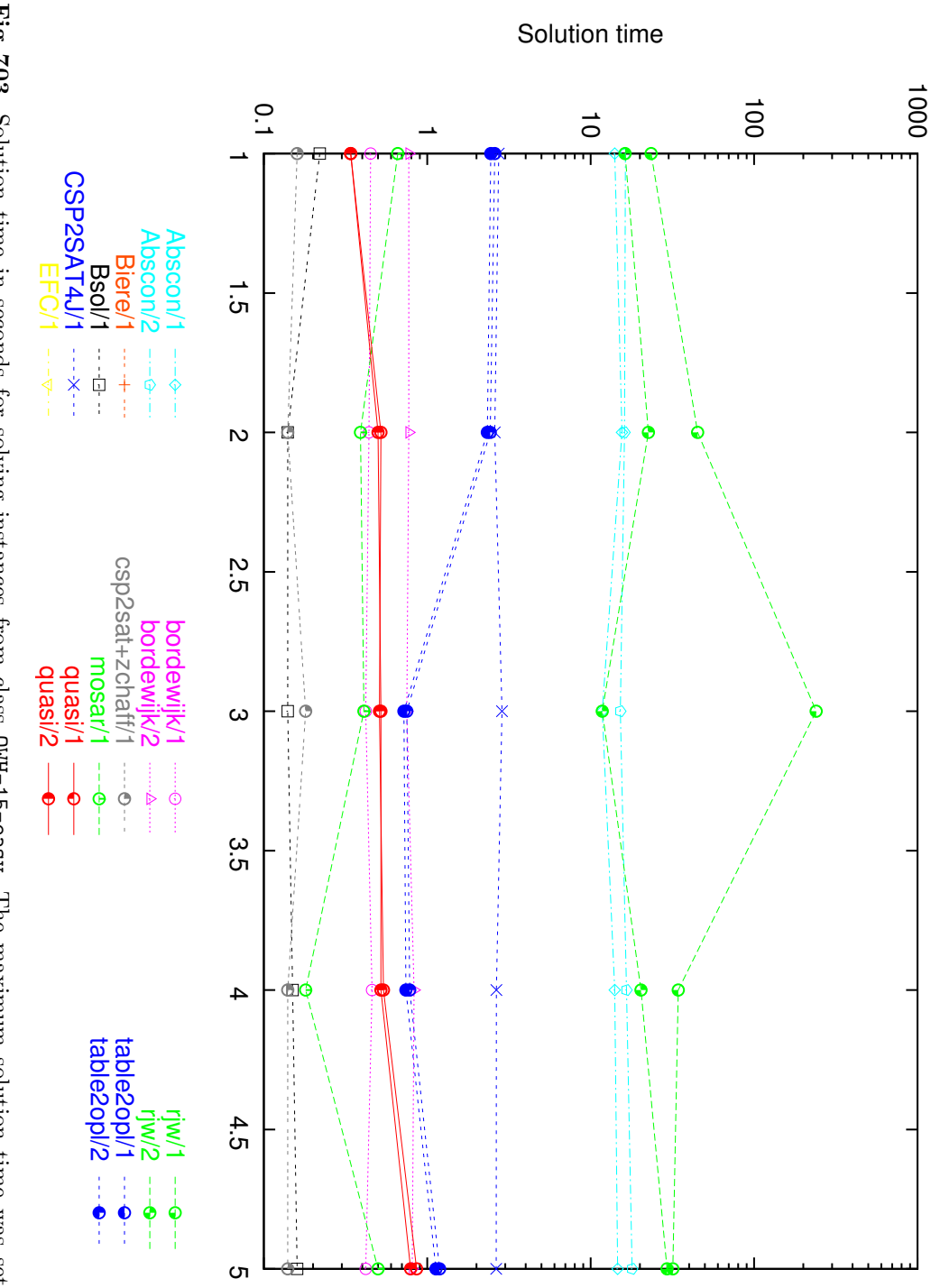

Fig. 703. Solution time in seconds for solving instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

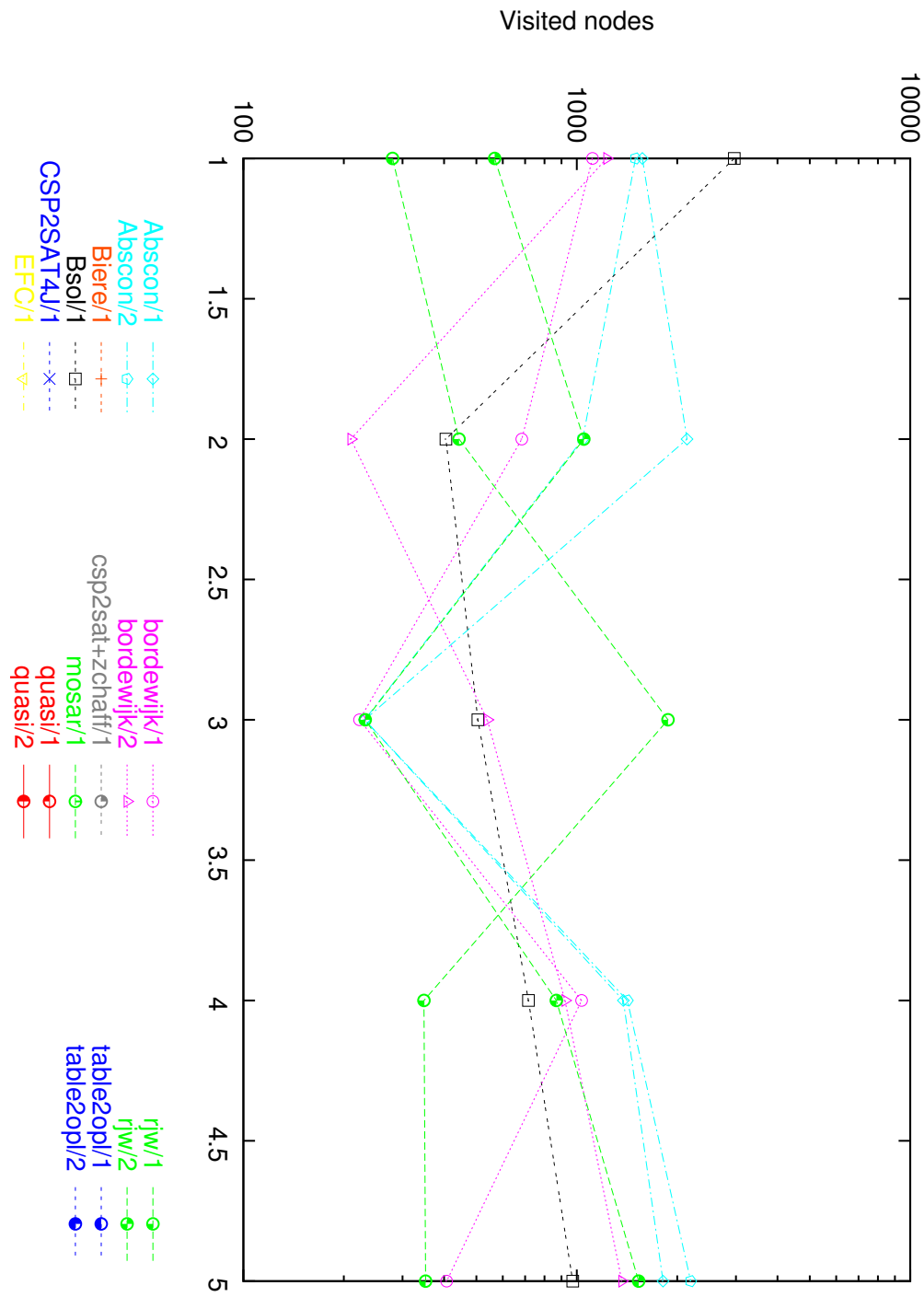

Fig. 704. Visited nodes required for solving instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

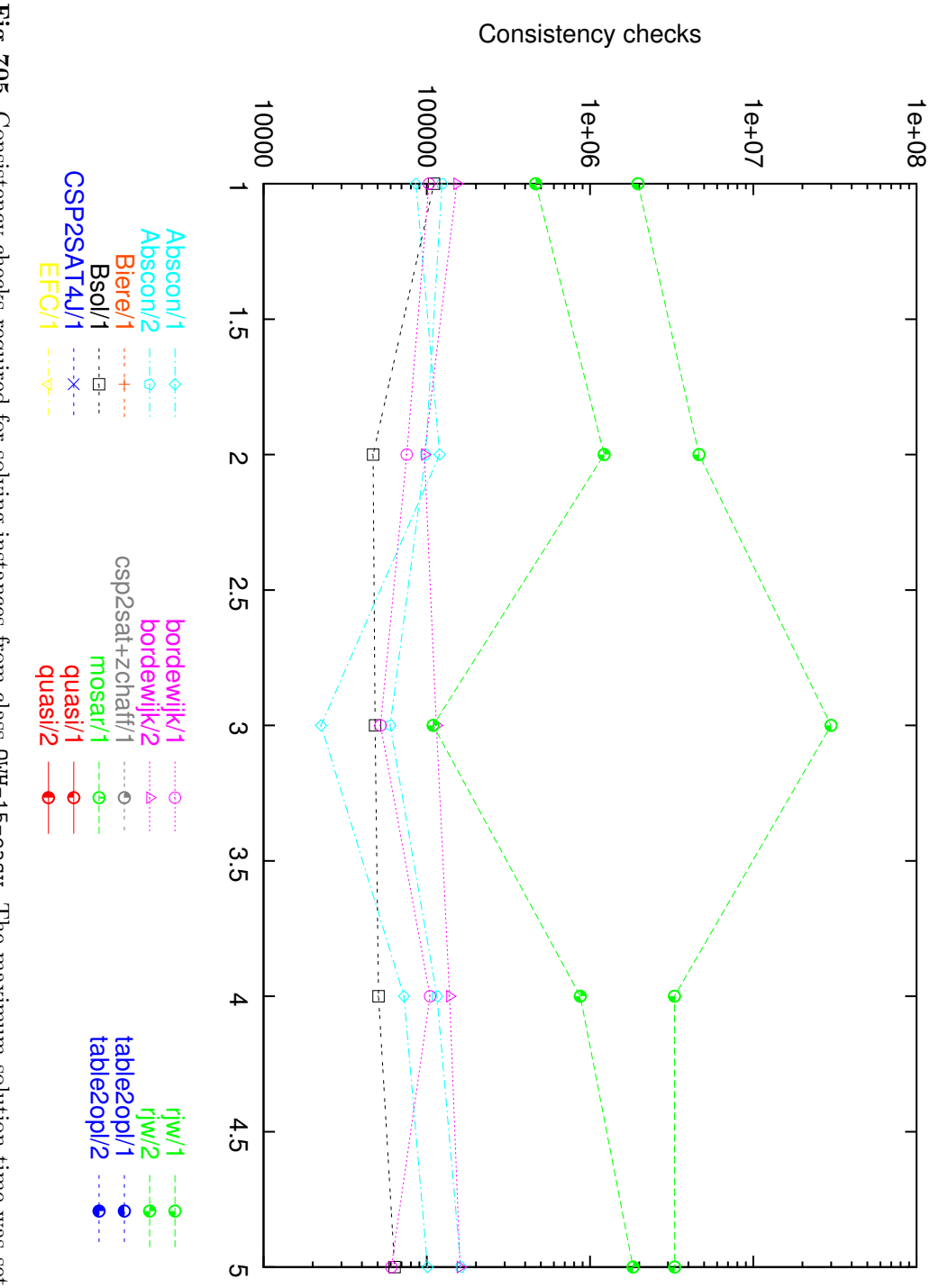

Fig. 705. Consistency checks required for solving instances from class `QWH-15-easy`. The maximum solution time was set to 600 seconds.

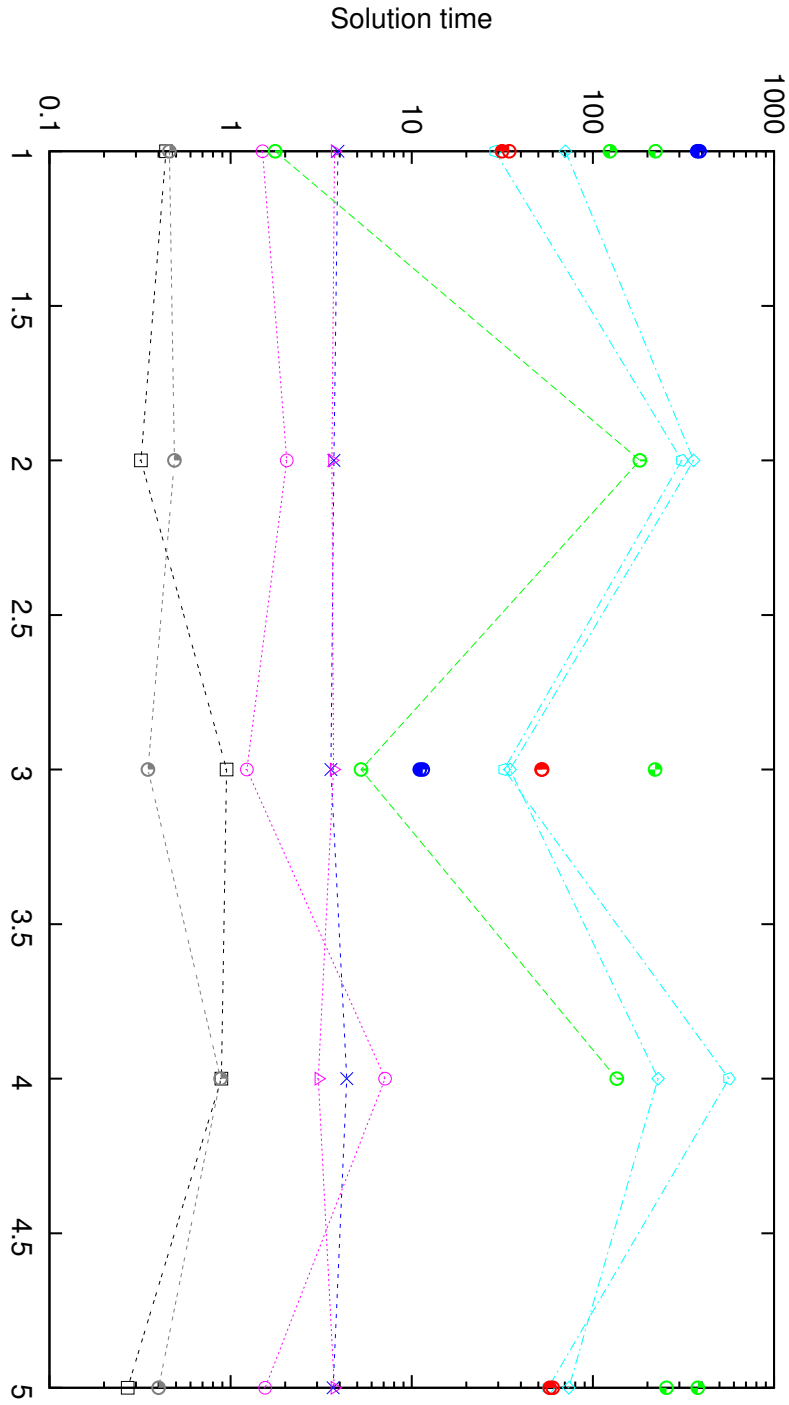

Fig. 706. Solution time in seconds for solving instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

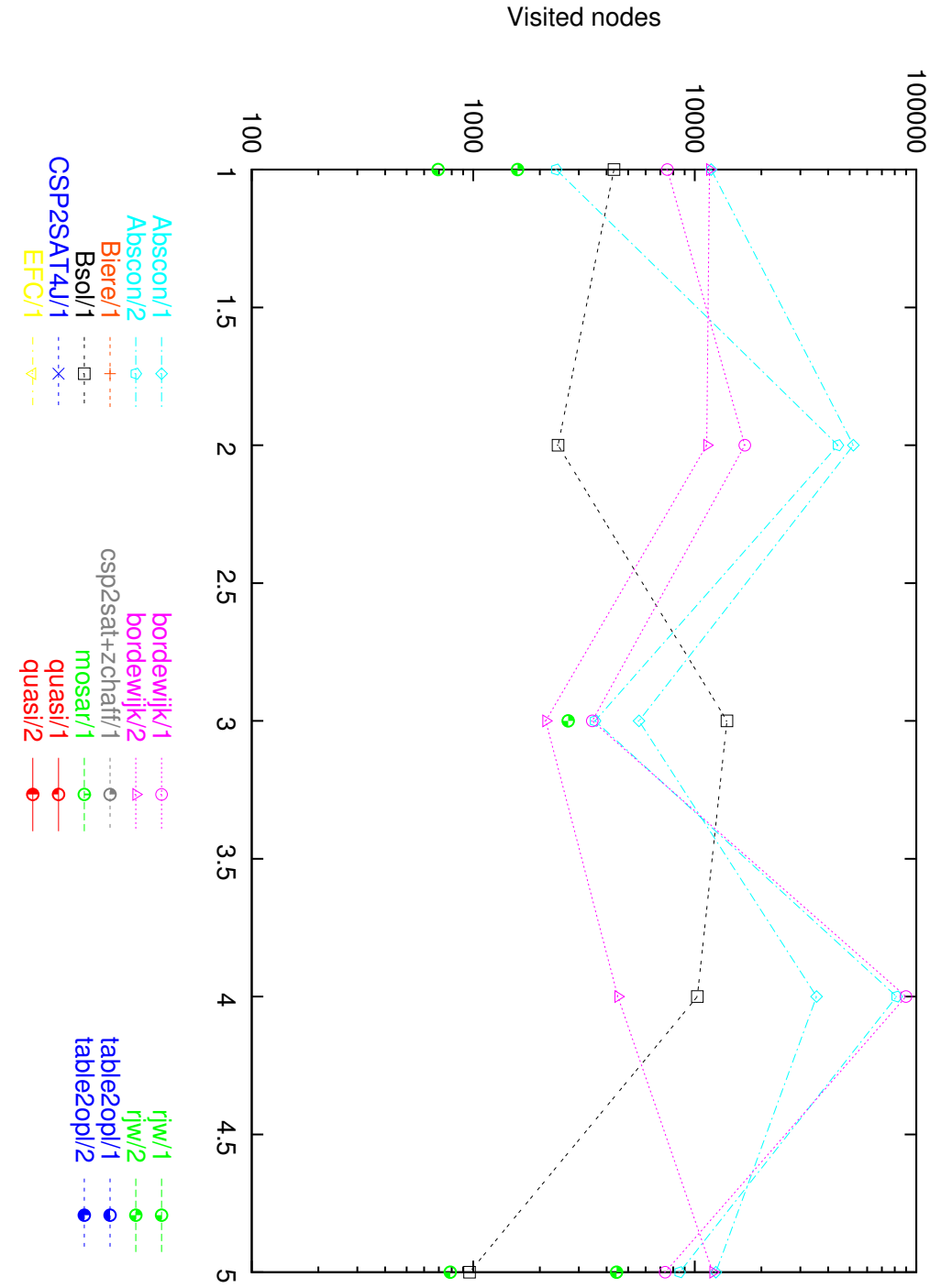

Fig. 707. Visited nodes required for solving instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

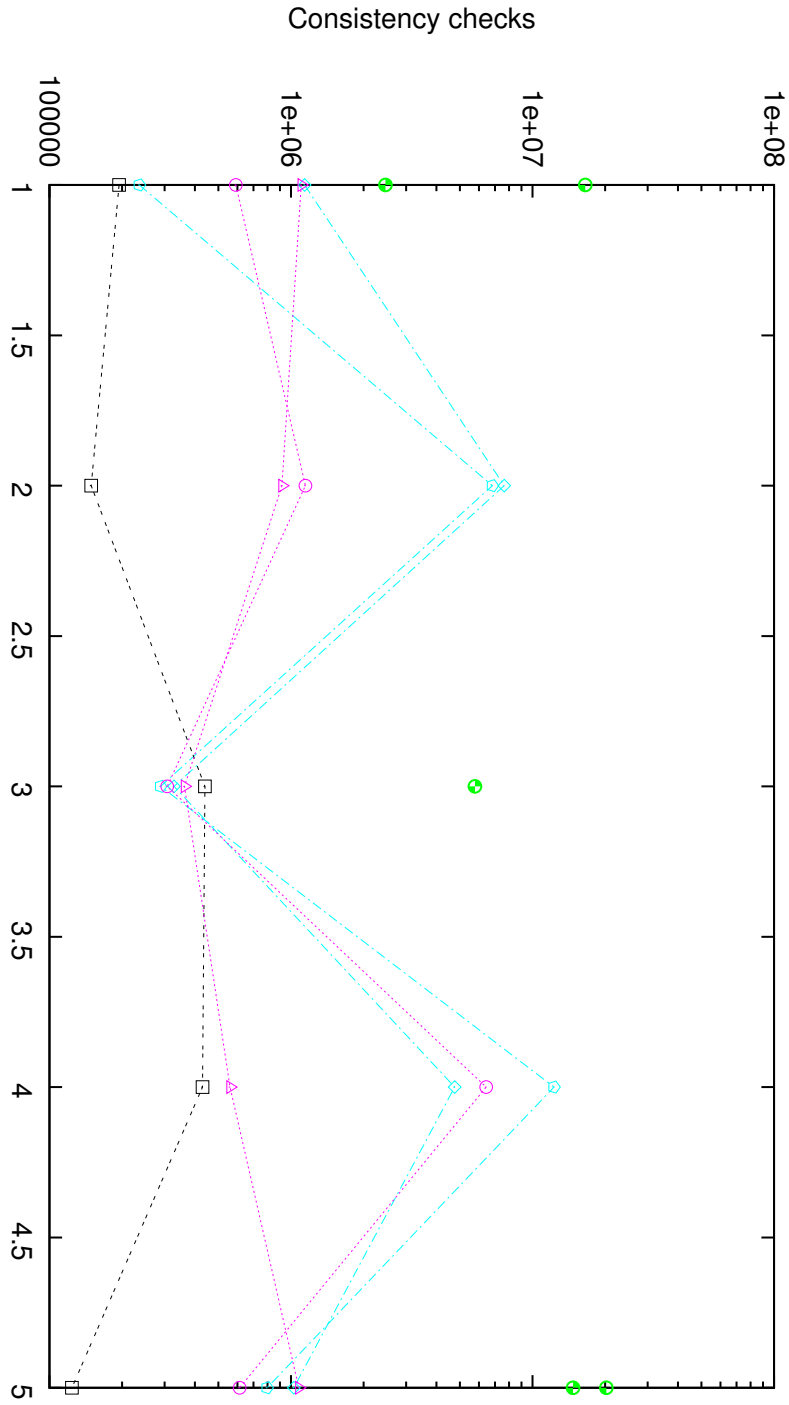

Fig. 708. Consistency checks required for solving instances from class `QWH-20-easy`. The maximum solution time was set to 600 seconds.

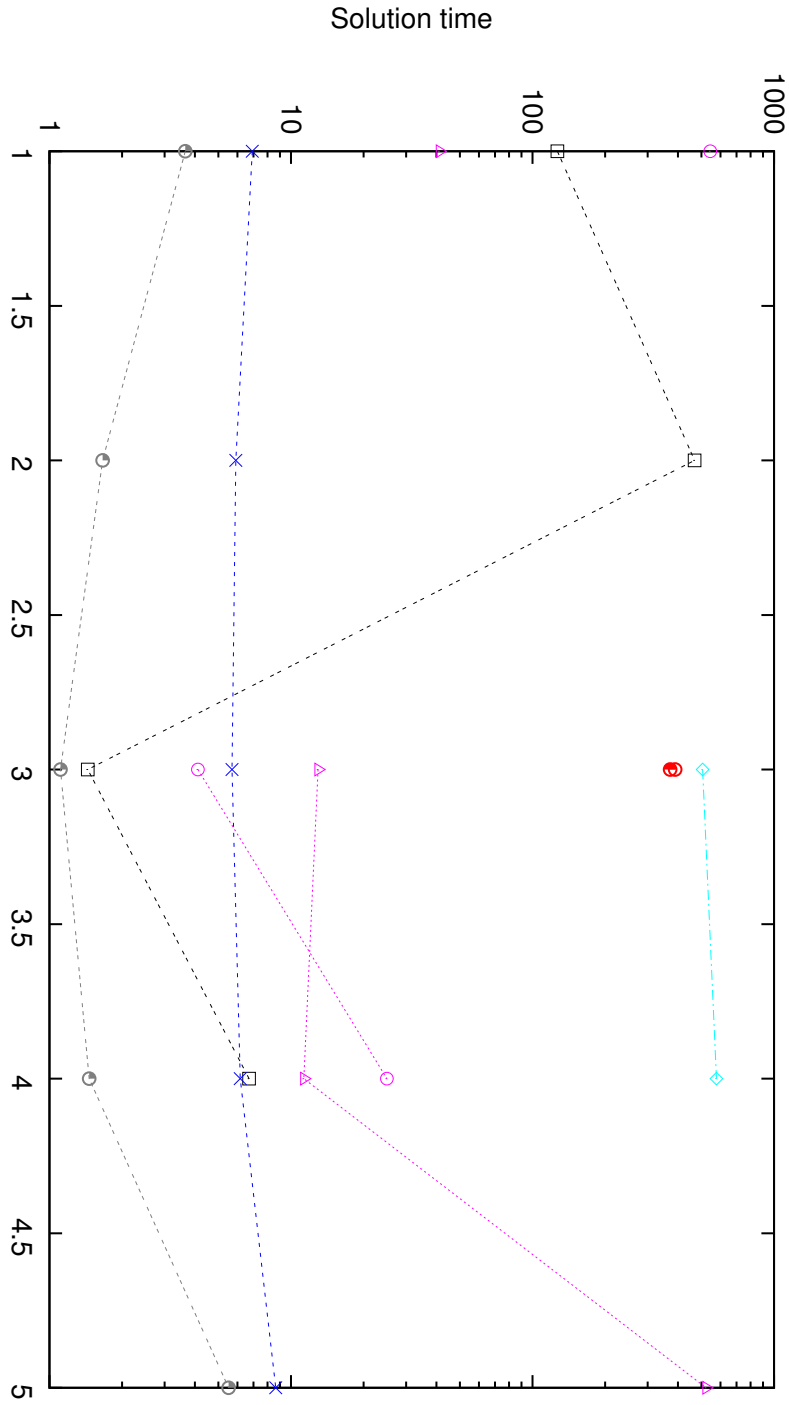

Fig. 709. Solution time in seconds for solving instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

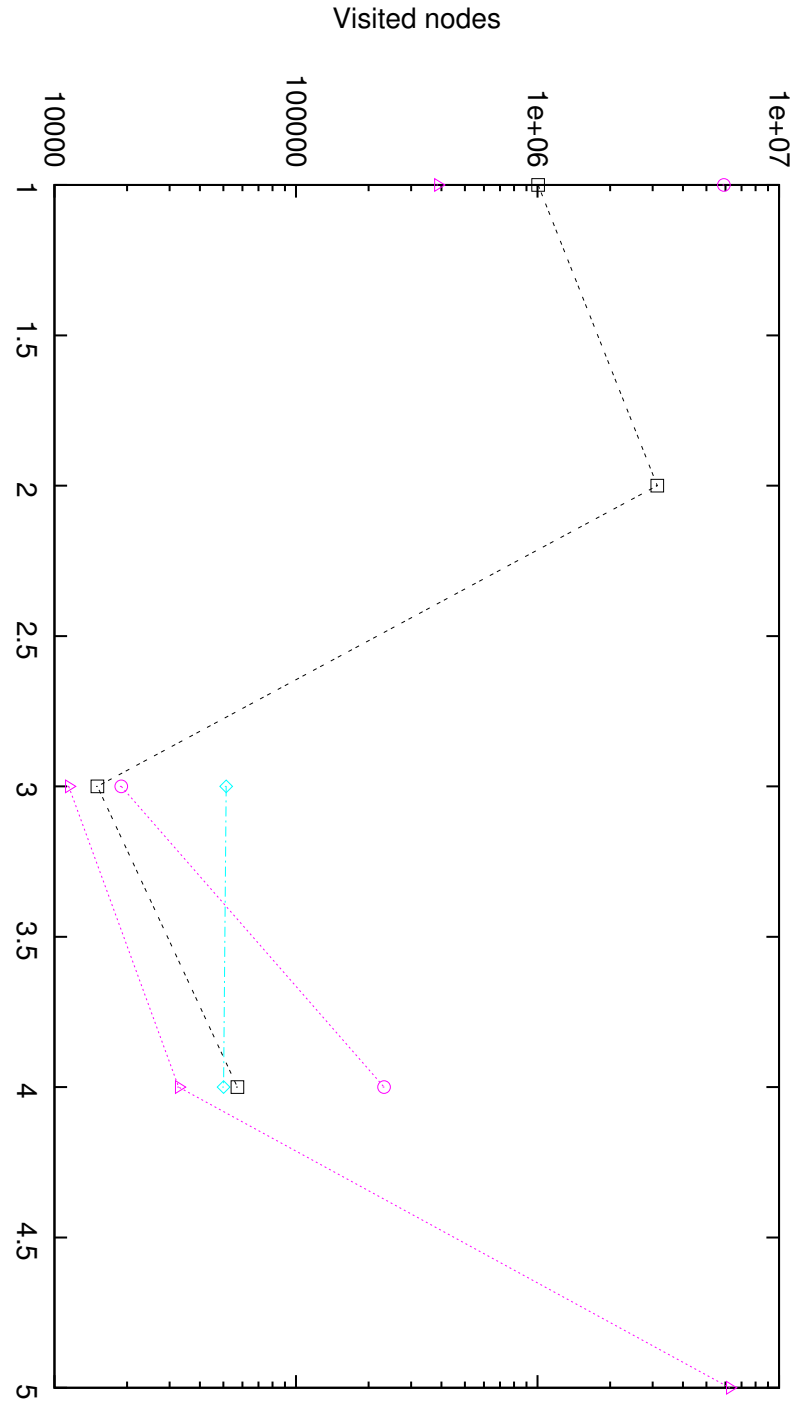

Fig. 710. Visited nodes required for solving instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

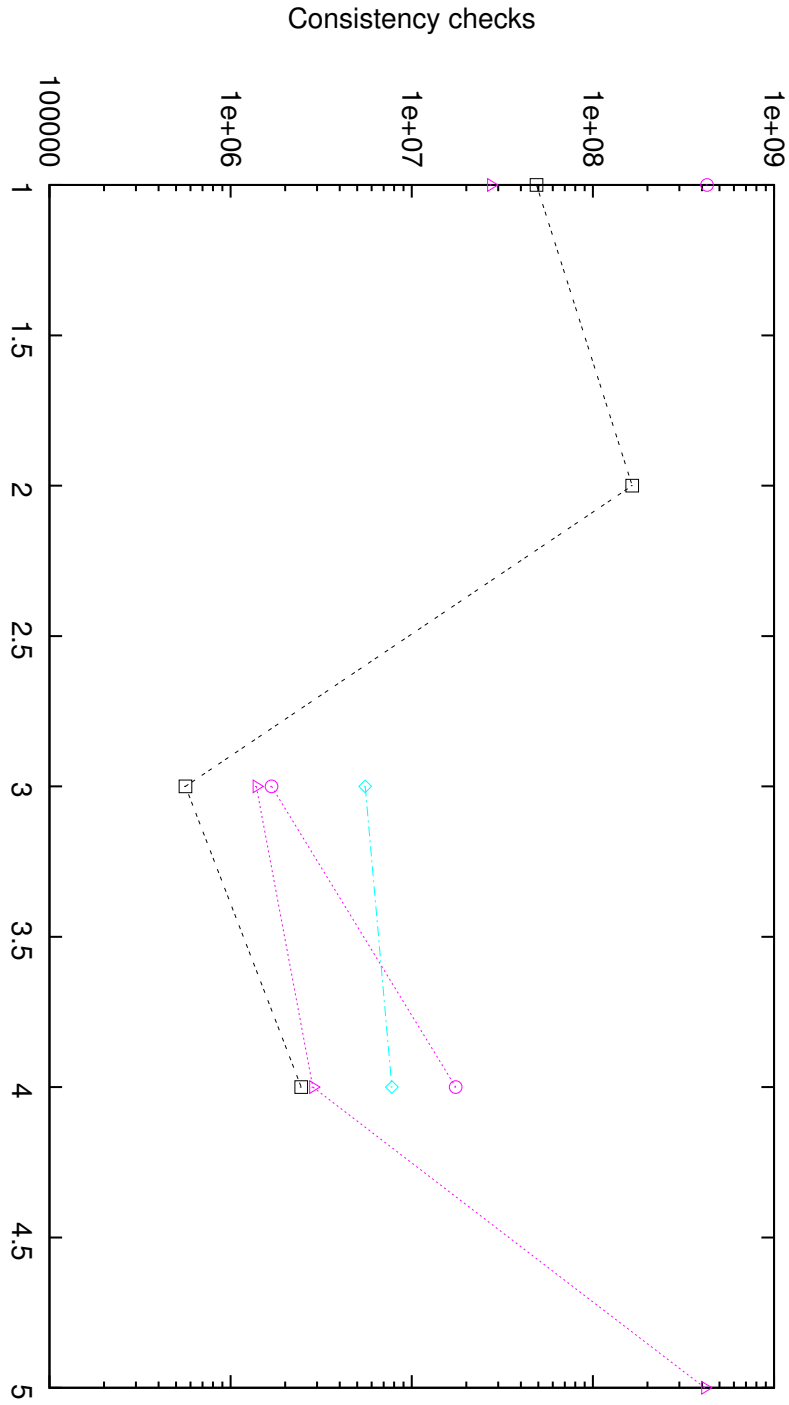

Fig. 711. Consistency checks required for solving instances from class `QWH-25-easy`. The maximum solution time was set to 600 seconds.

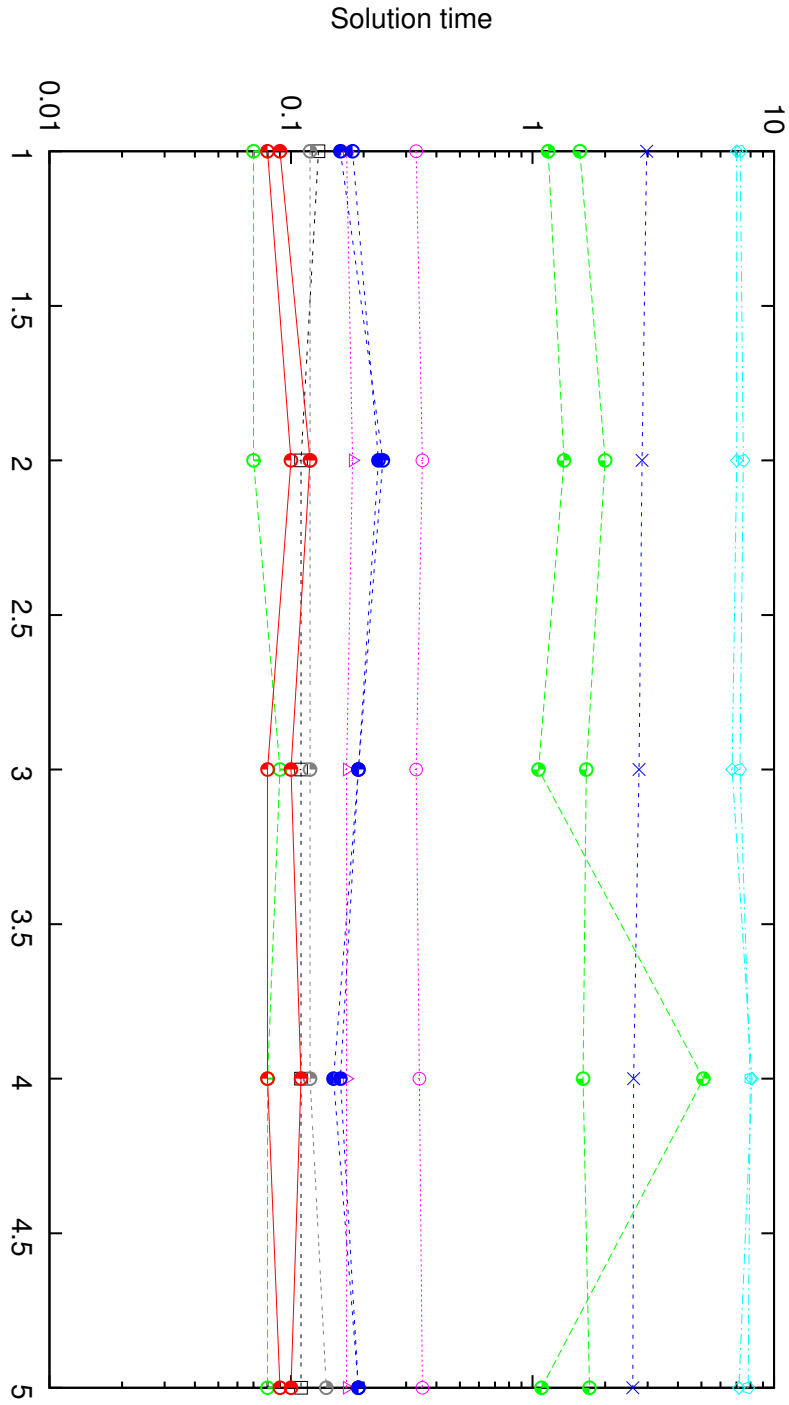

Fig. 712. Solution time in seconds for solving instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

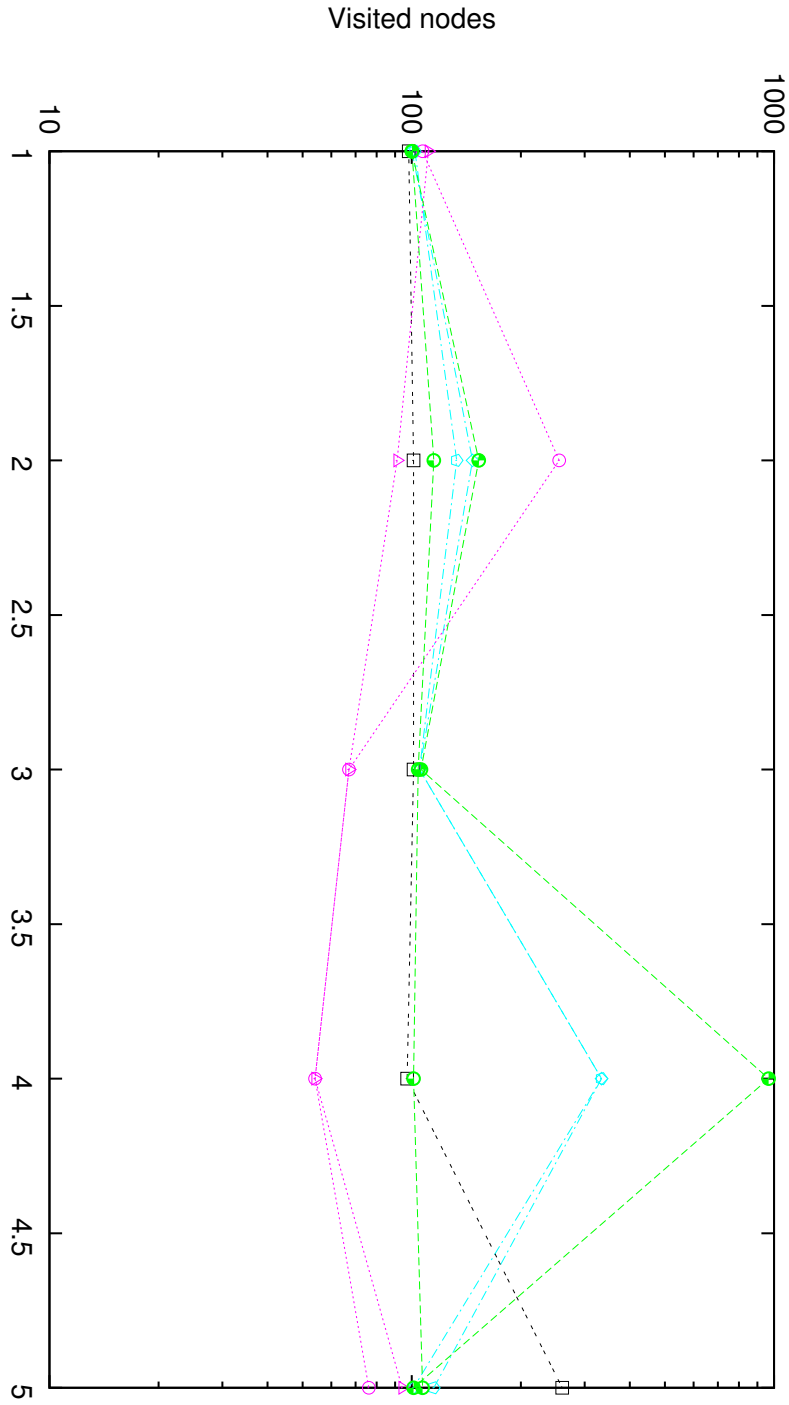

Fig. 713. Visited nodes required for solving instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

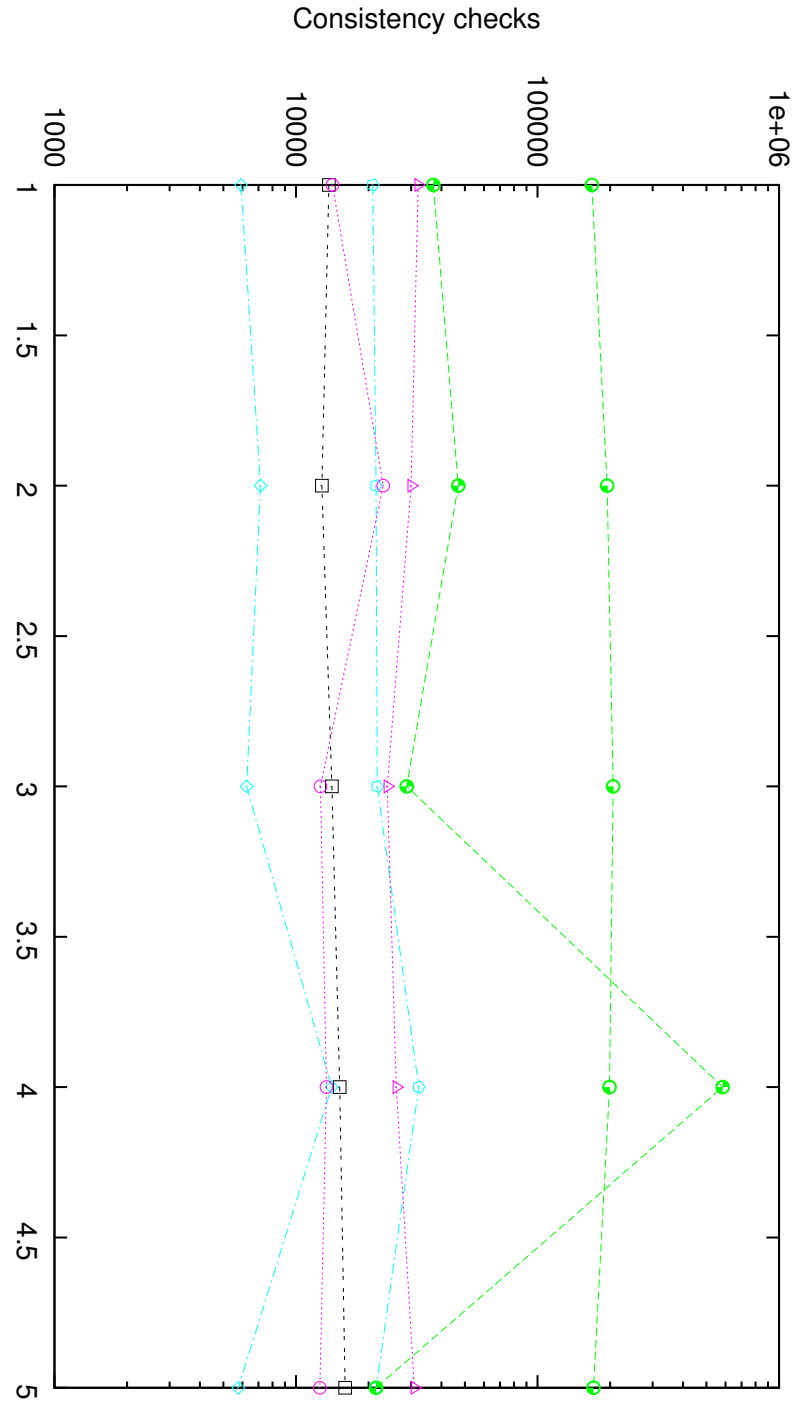

Fig. 714. Consistency checks required for solving instances from class `QWH-10-hard`. The maximum solution time was set to 600 seconds.

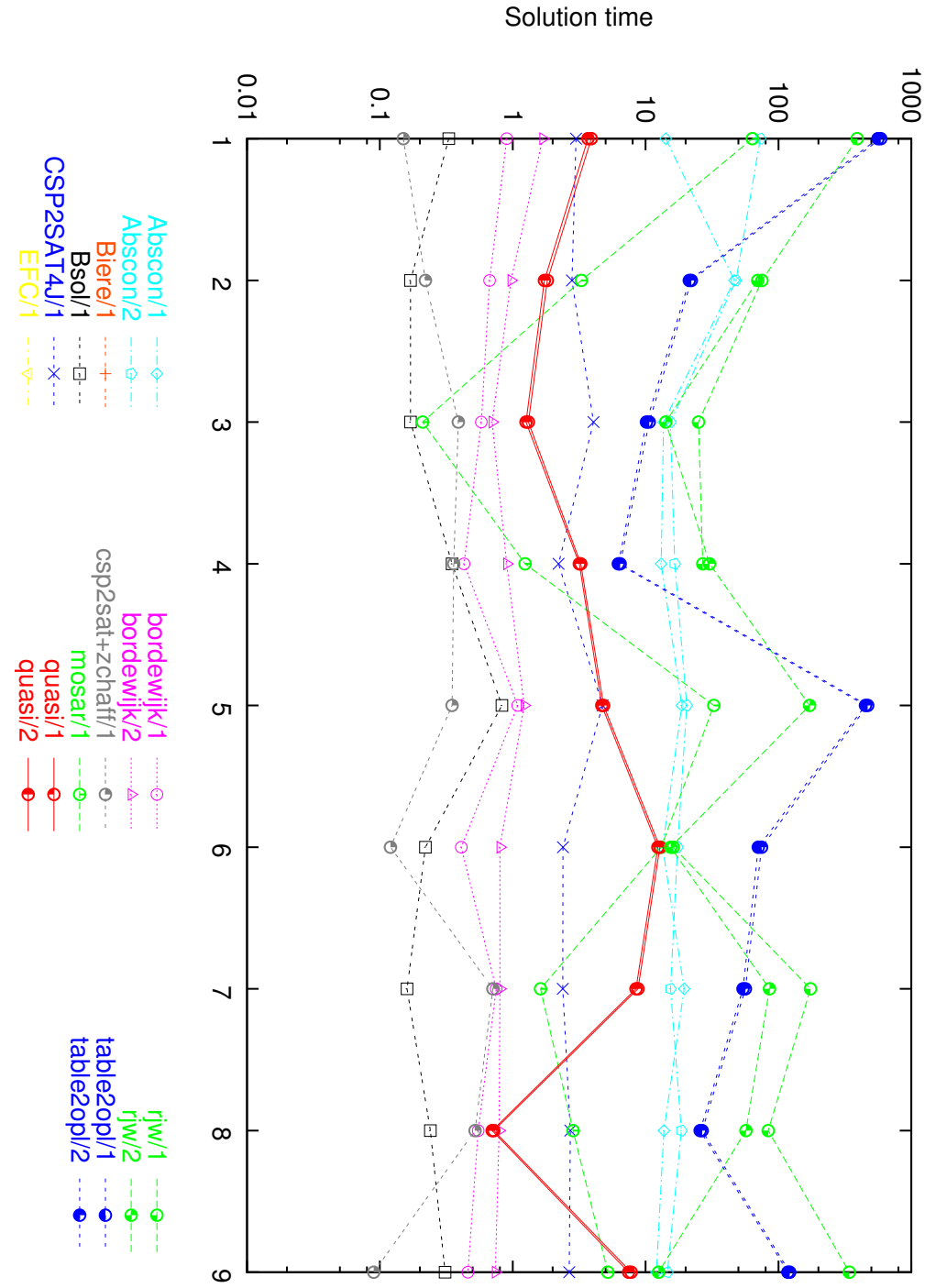

Fig. 715. Solution time in seconds for solving instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

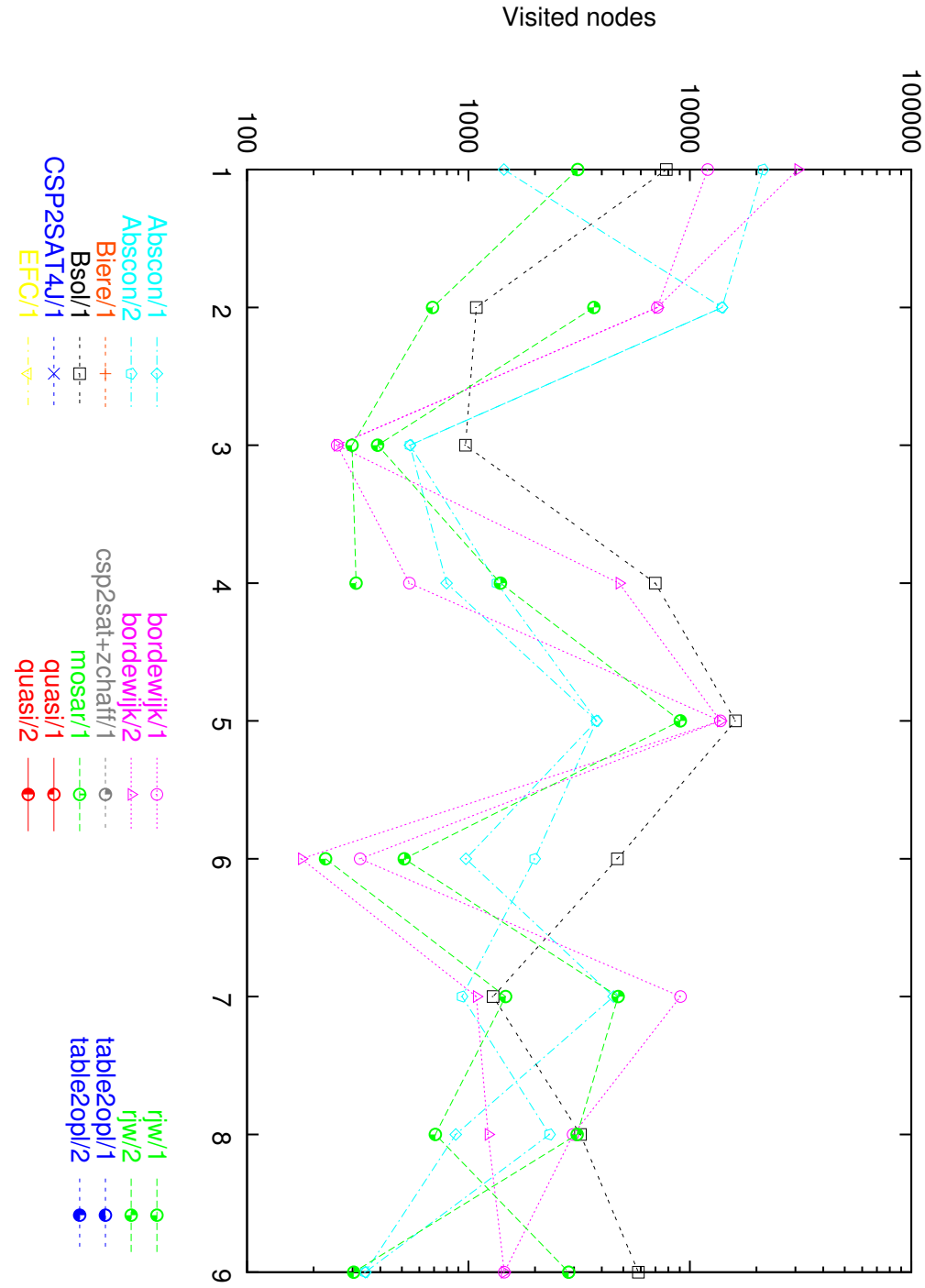

Fig. 716. Visited nodes required for solving instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

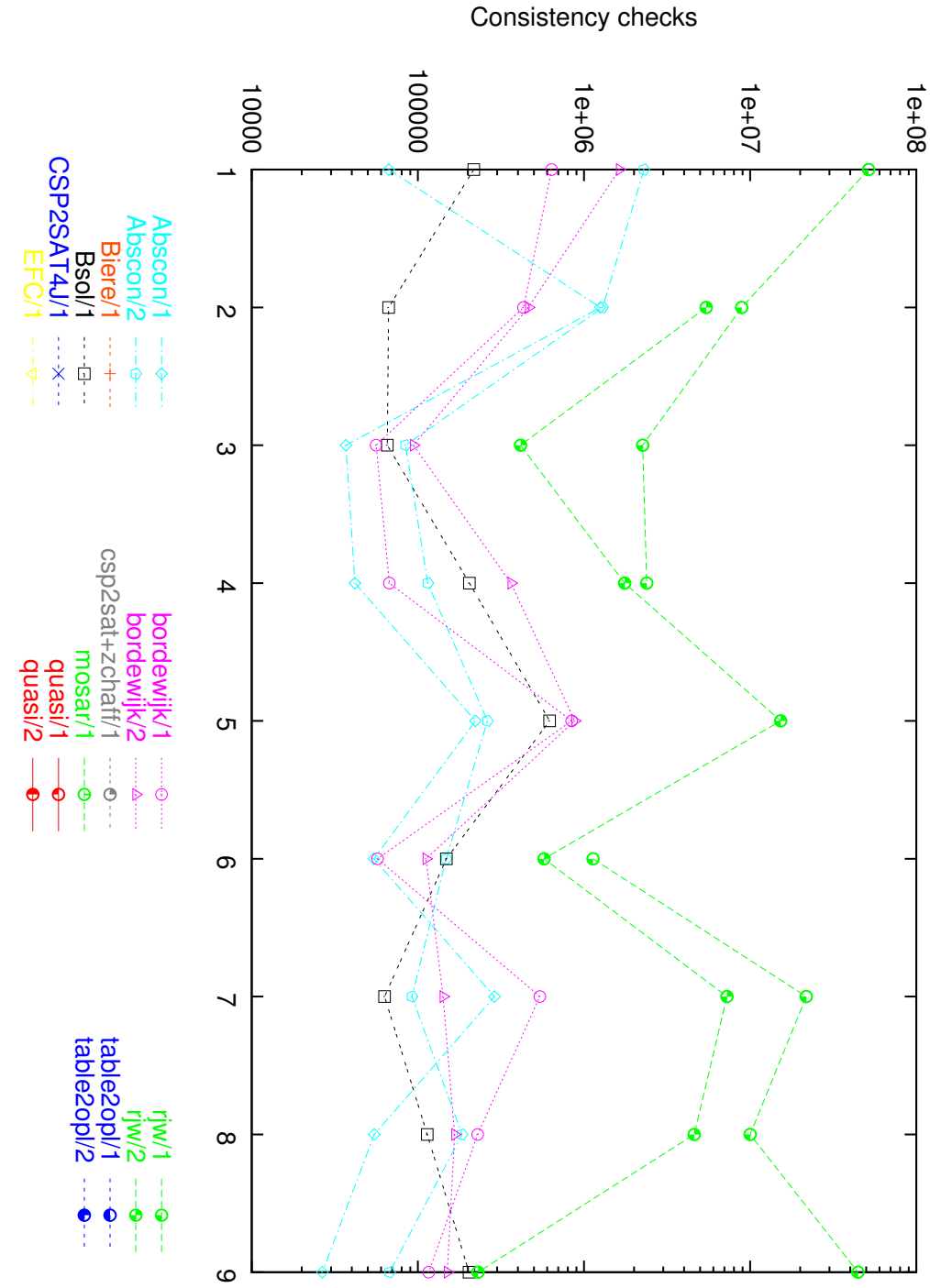

Fig. 717. Consistency checks required for solving instances from class `QWH-15-hard`. The maximum solution time was set to 600 seconds.

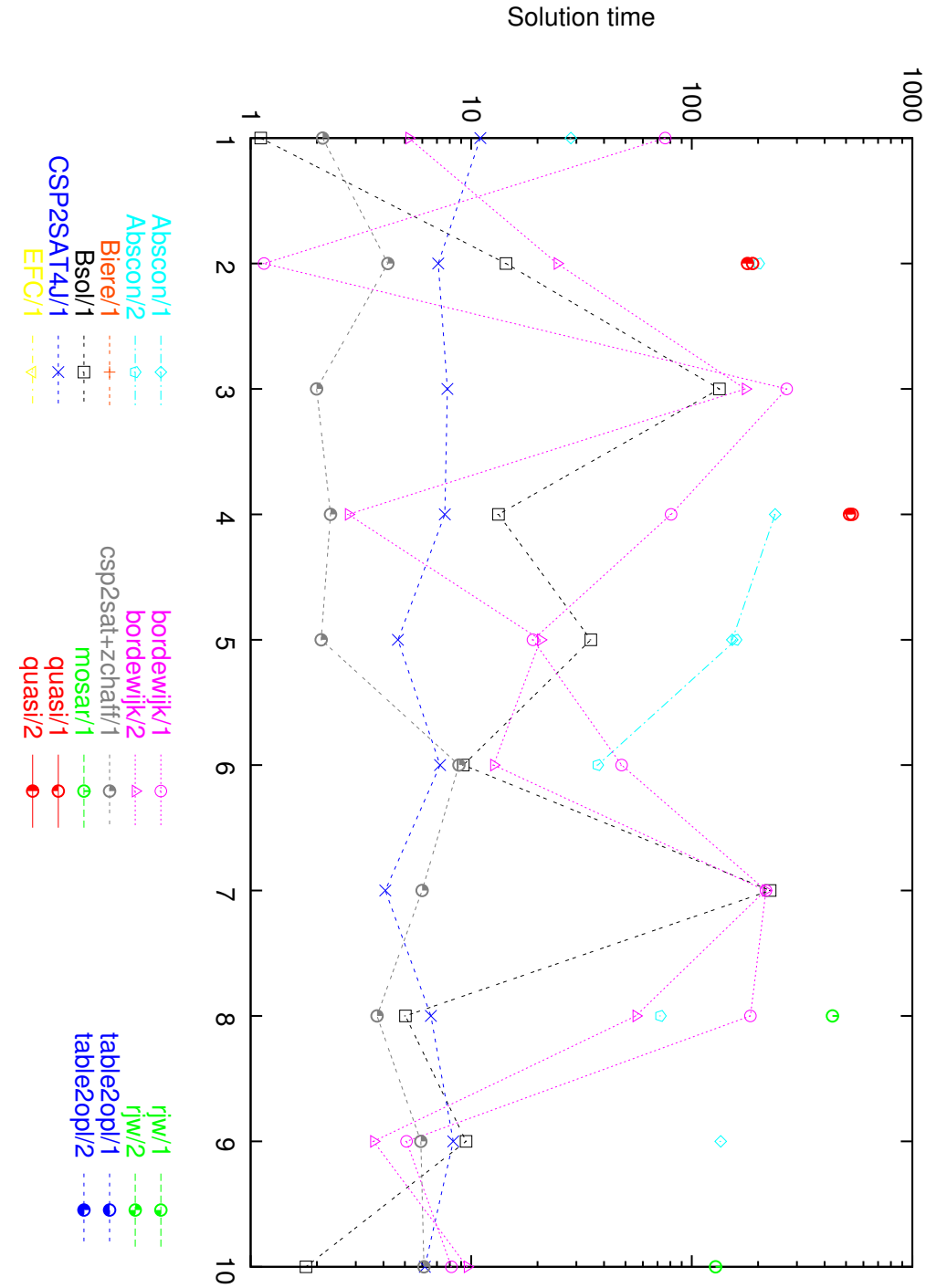

Fig. 718. Solution time in seconds for solving instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

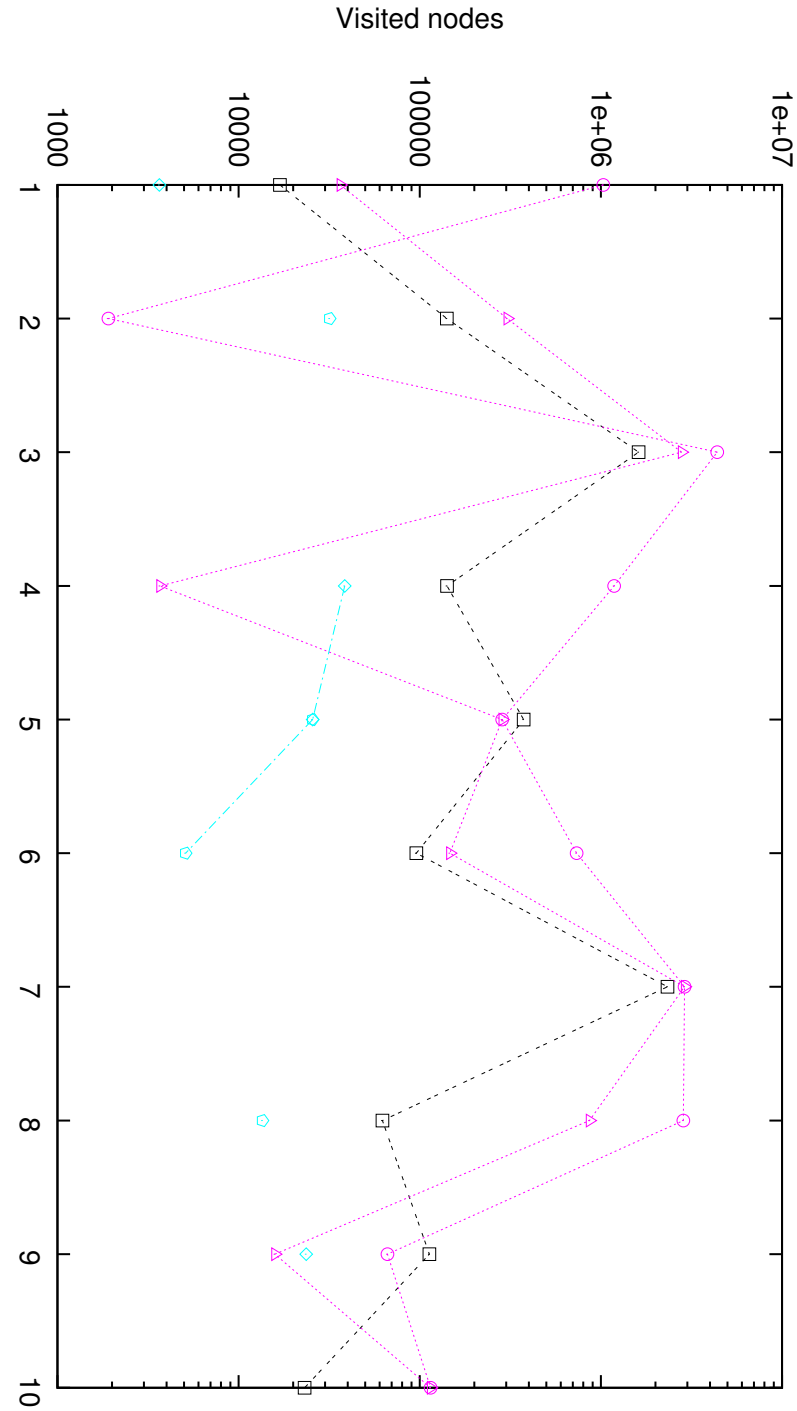

Fig. 719. Visited nodes required for solving instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

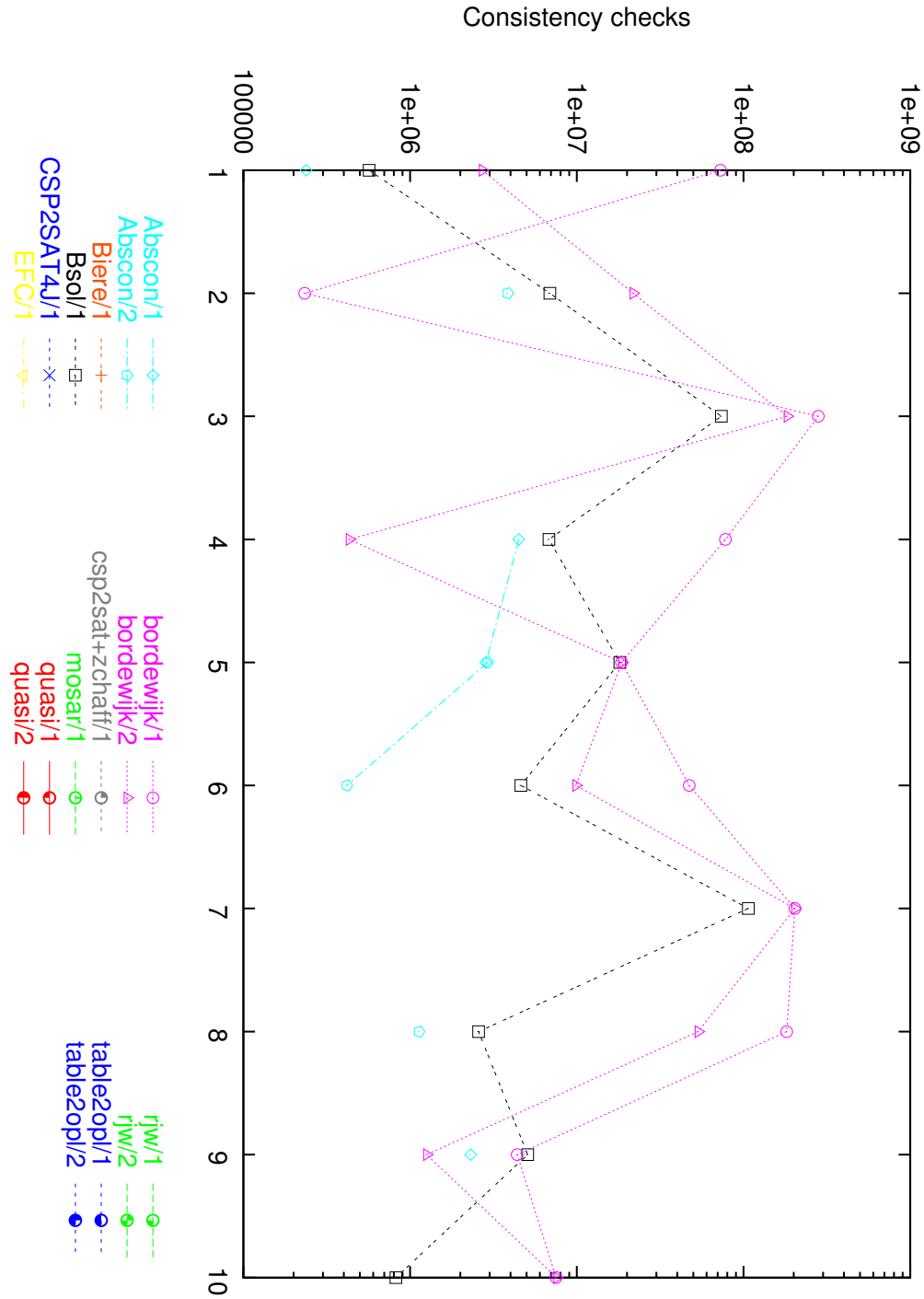

Fig. 720. Consistency checks required for solving instances from class `QWH-20-hard`. The maximum solution time was set to 600 seconds.

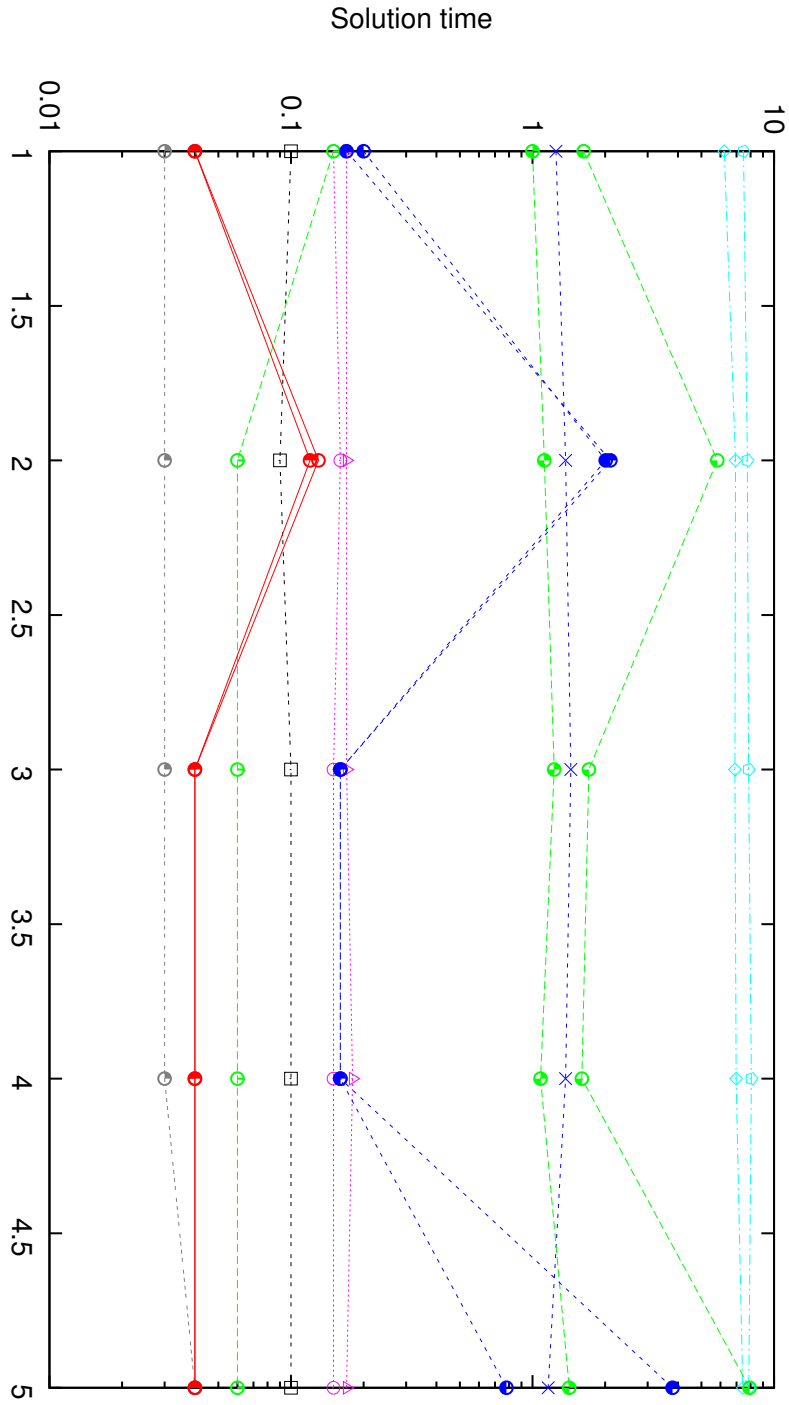

Fig. 721. Solution time in seconds for solving instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

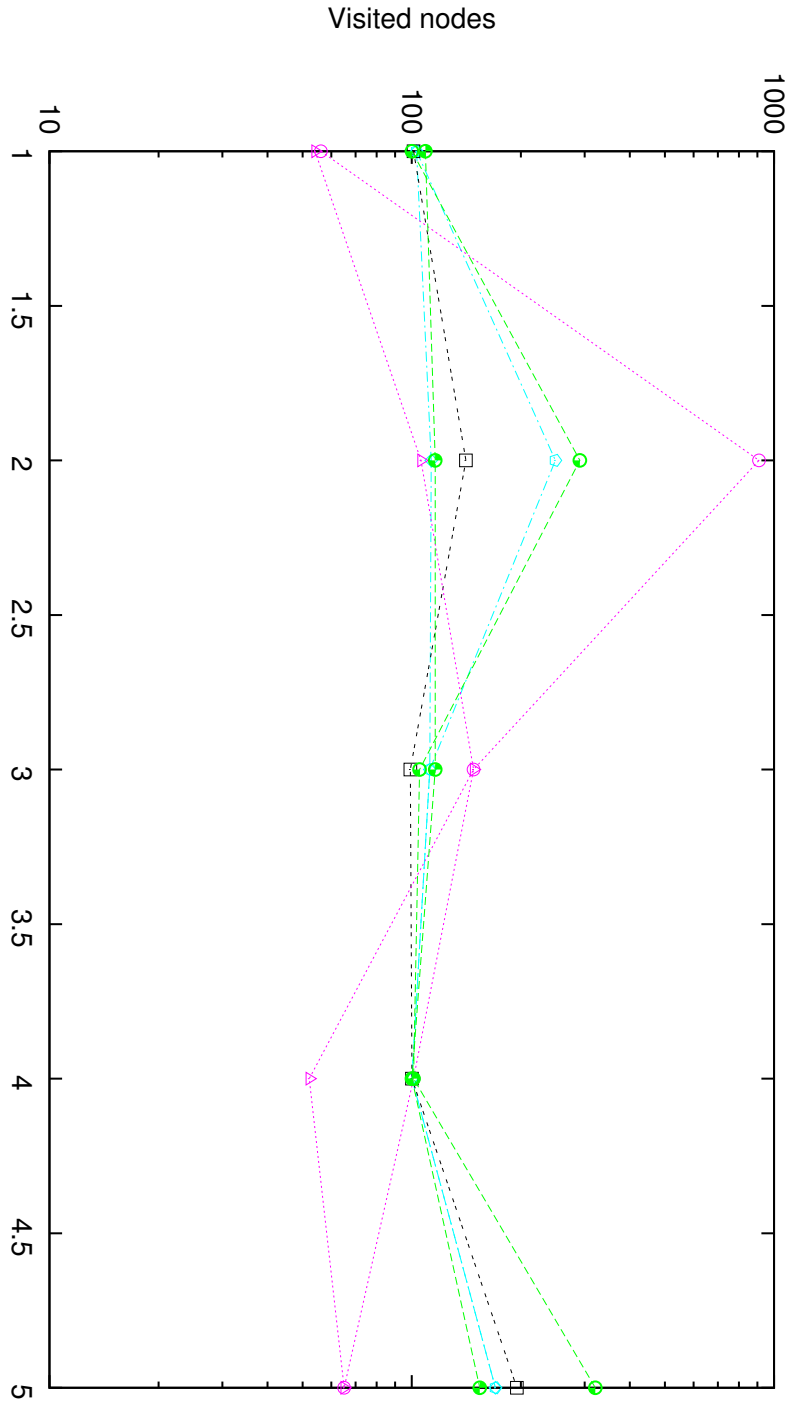

Fig. 722. Visited nodes required for solving instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

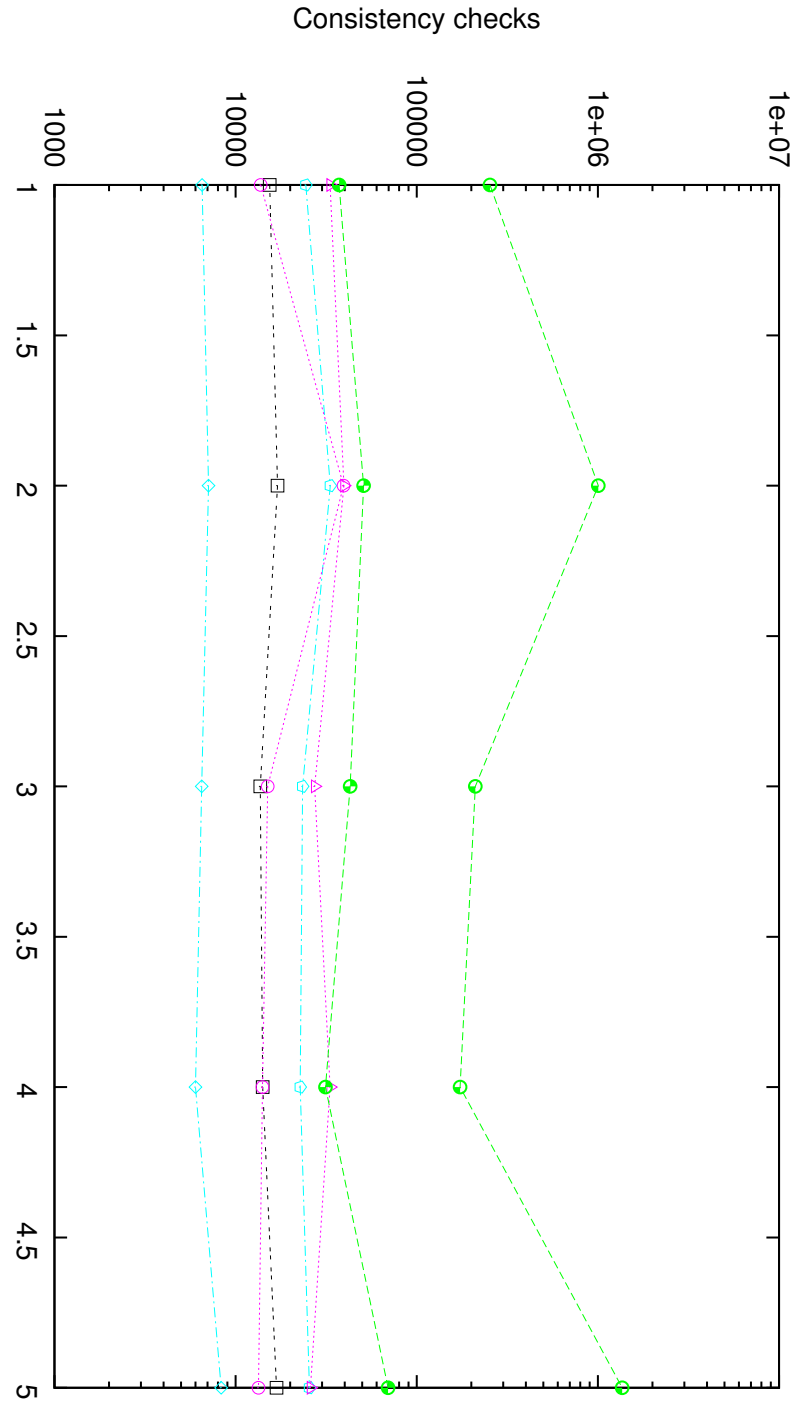

Fig. 723. Consistency checks required for solving instances from class `QWHp-10-easy`. The maximum solution time was set to 600 seconds.

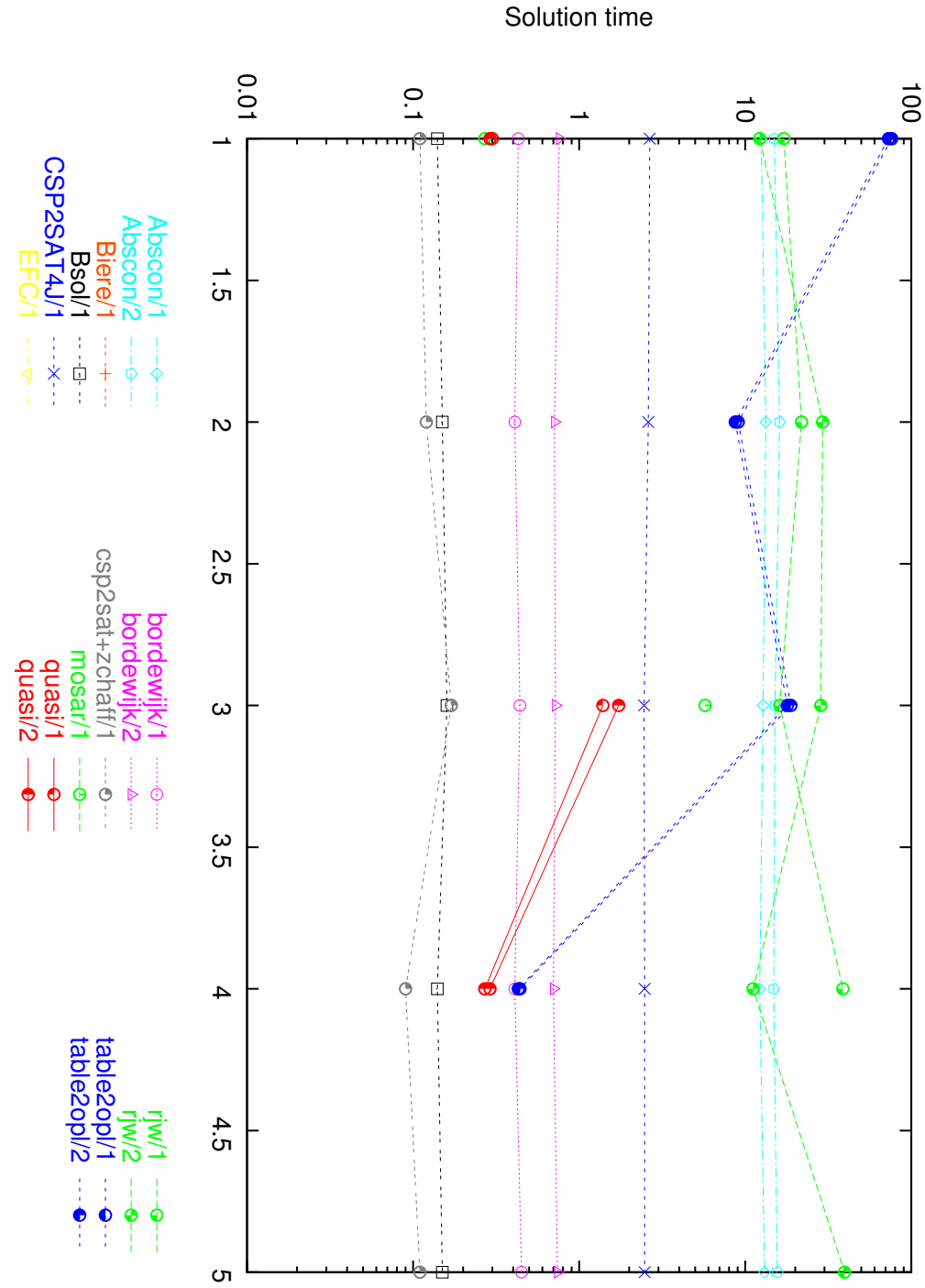

Fig. 724. Solution time in seconds for solving instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

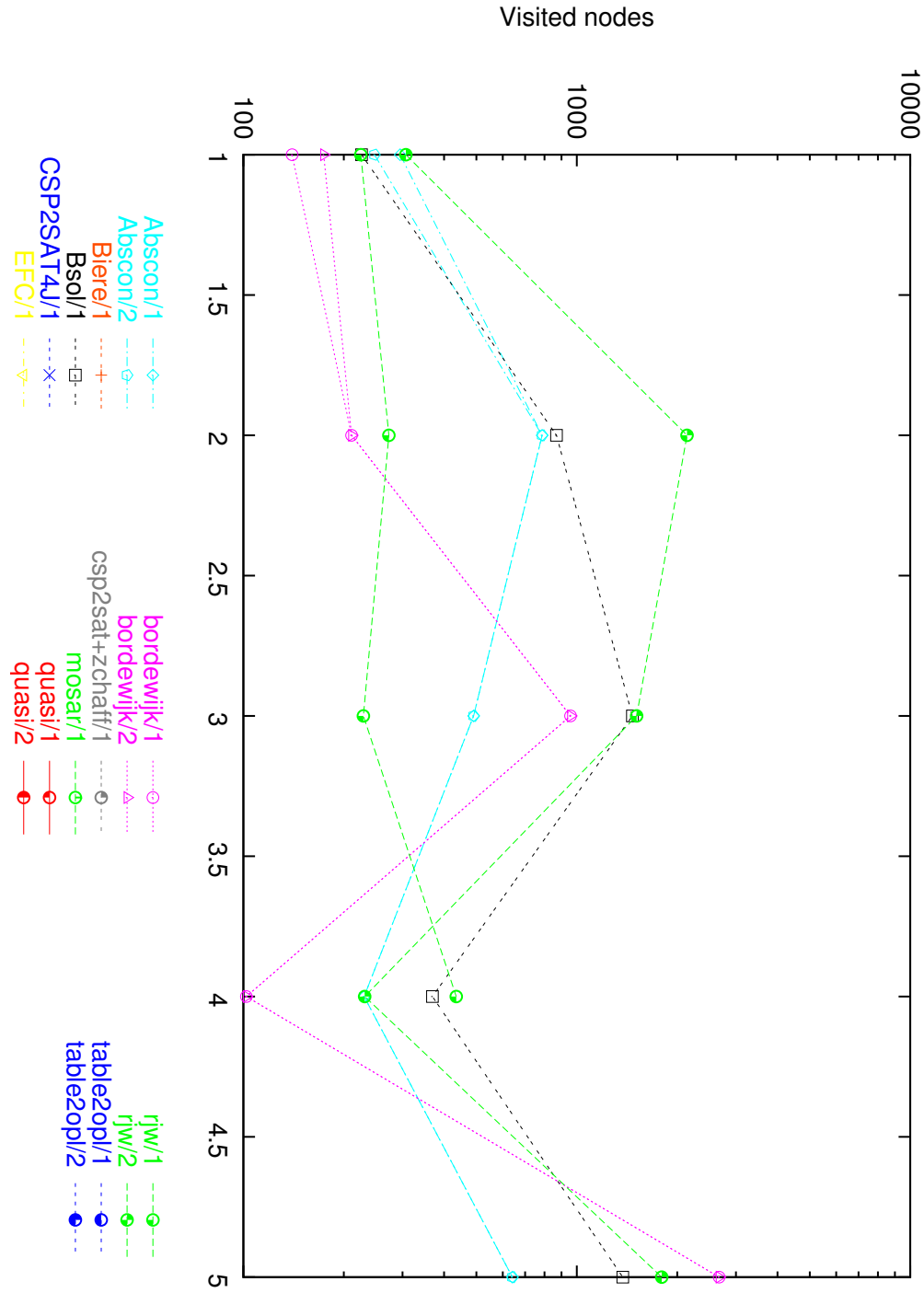

Fig. 725. Visited nodes required for solving instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

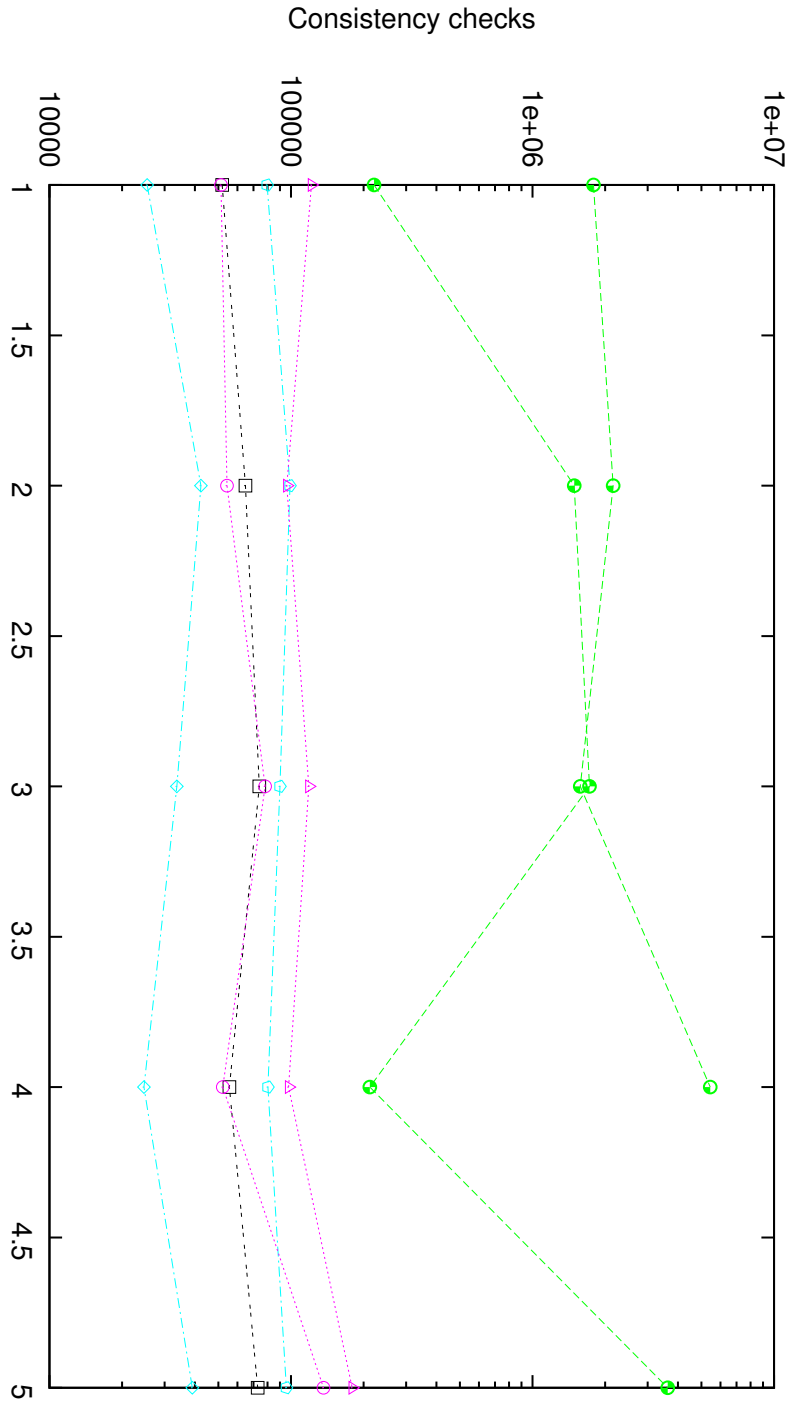

Fig. 726. Consistency checks required for solving instances from class `QWHp-15-easy`. The maximum solution time was set to 600 seconds.

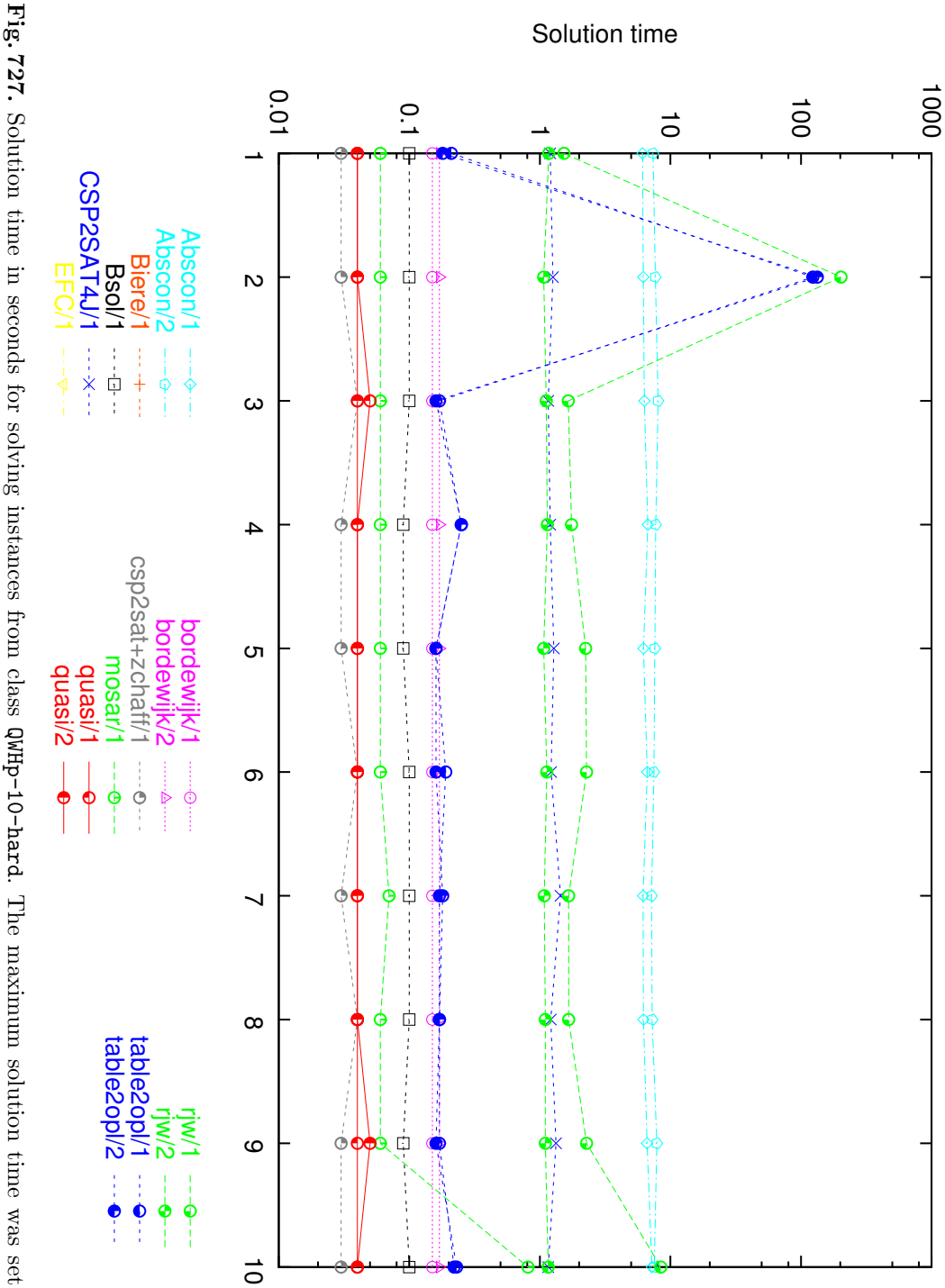

Fig. 727. Solution time in seconds for solving instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

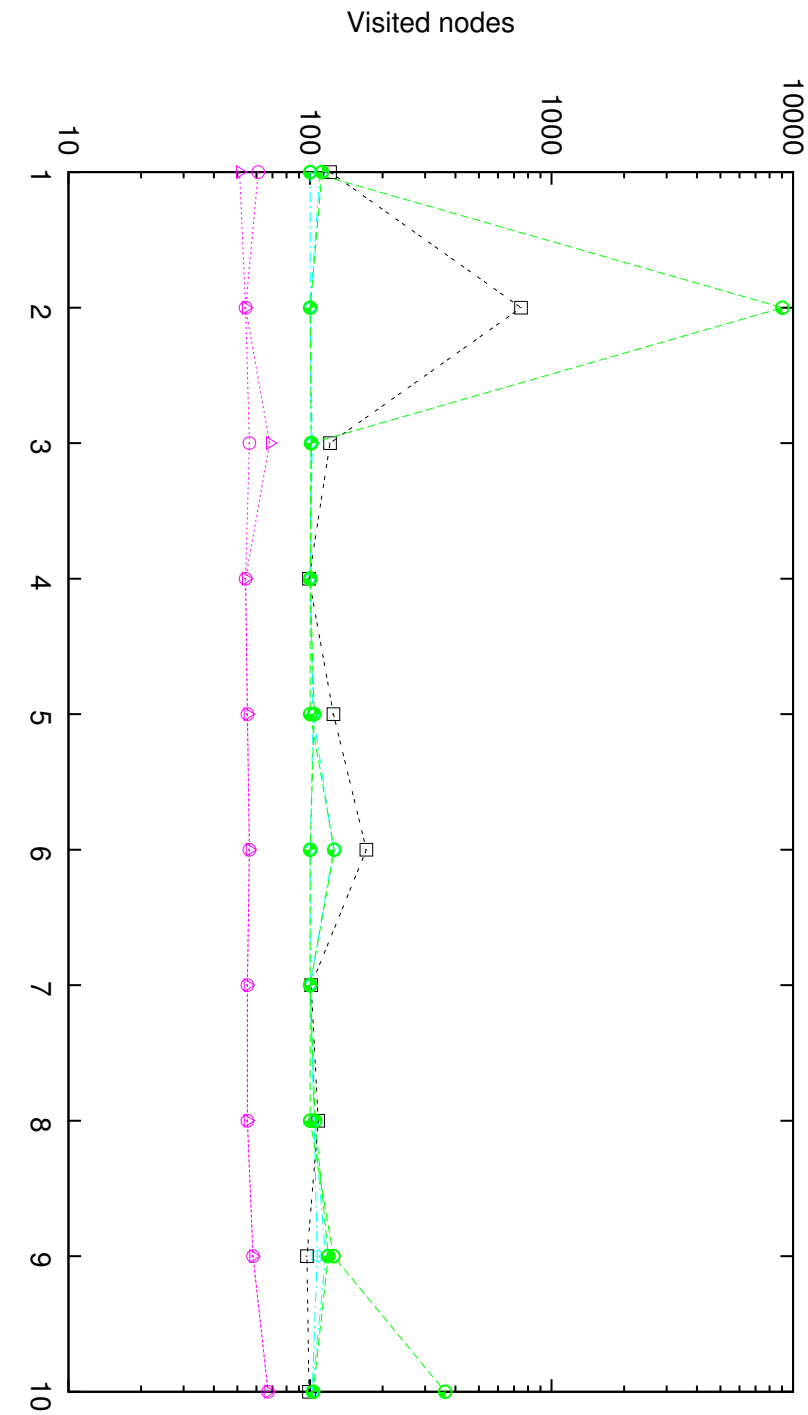

Fig. 728. Visited nodes required for solving instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

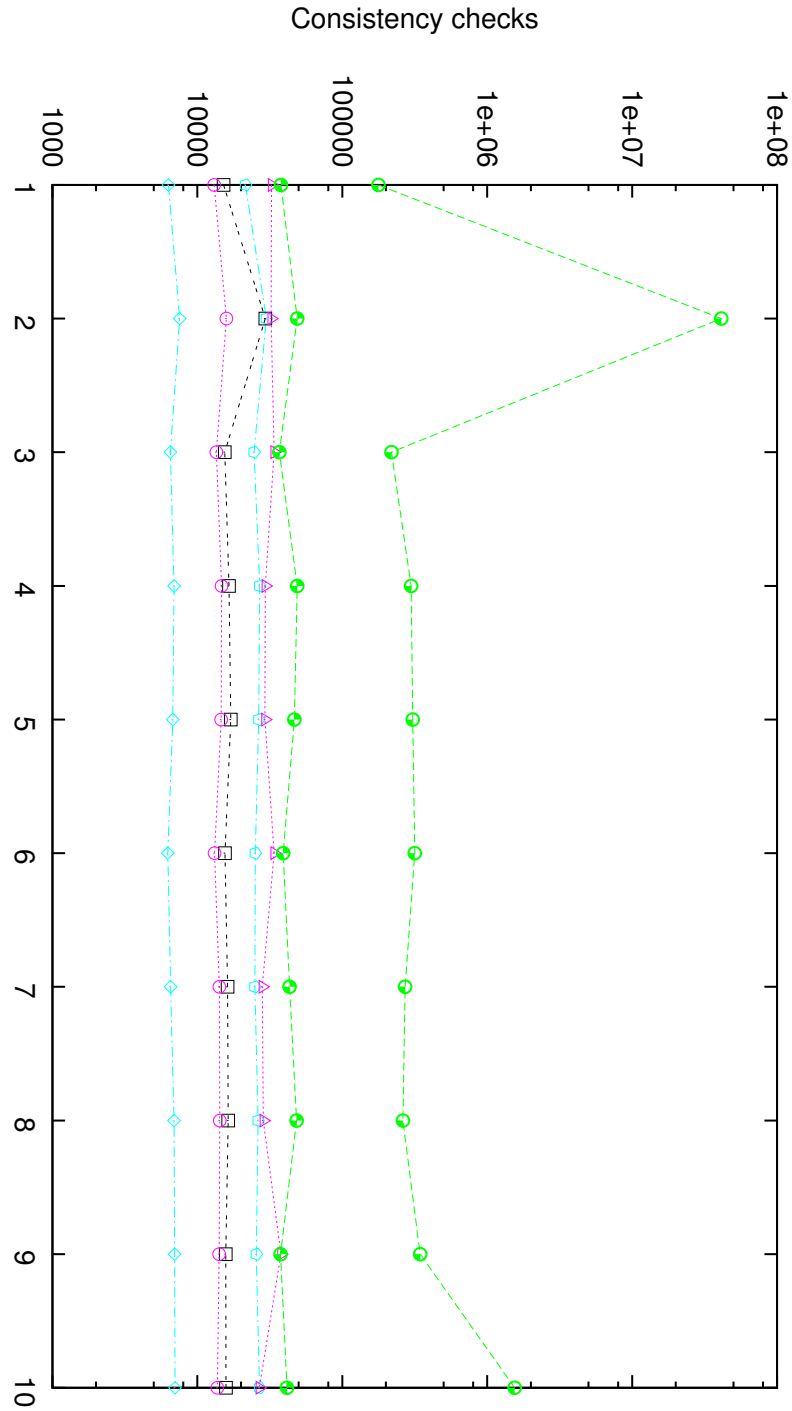

Fig. 729. Consistency checks required for solving instances from class `QWHp-10-hard`. The maximum solution time was set to 600 seconds.

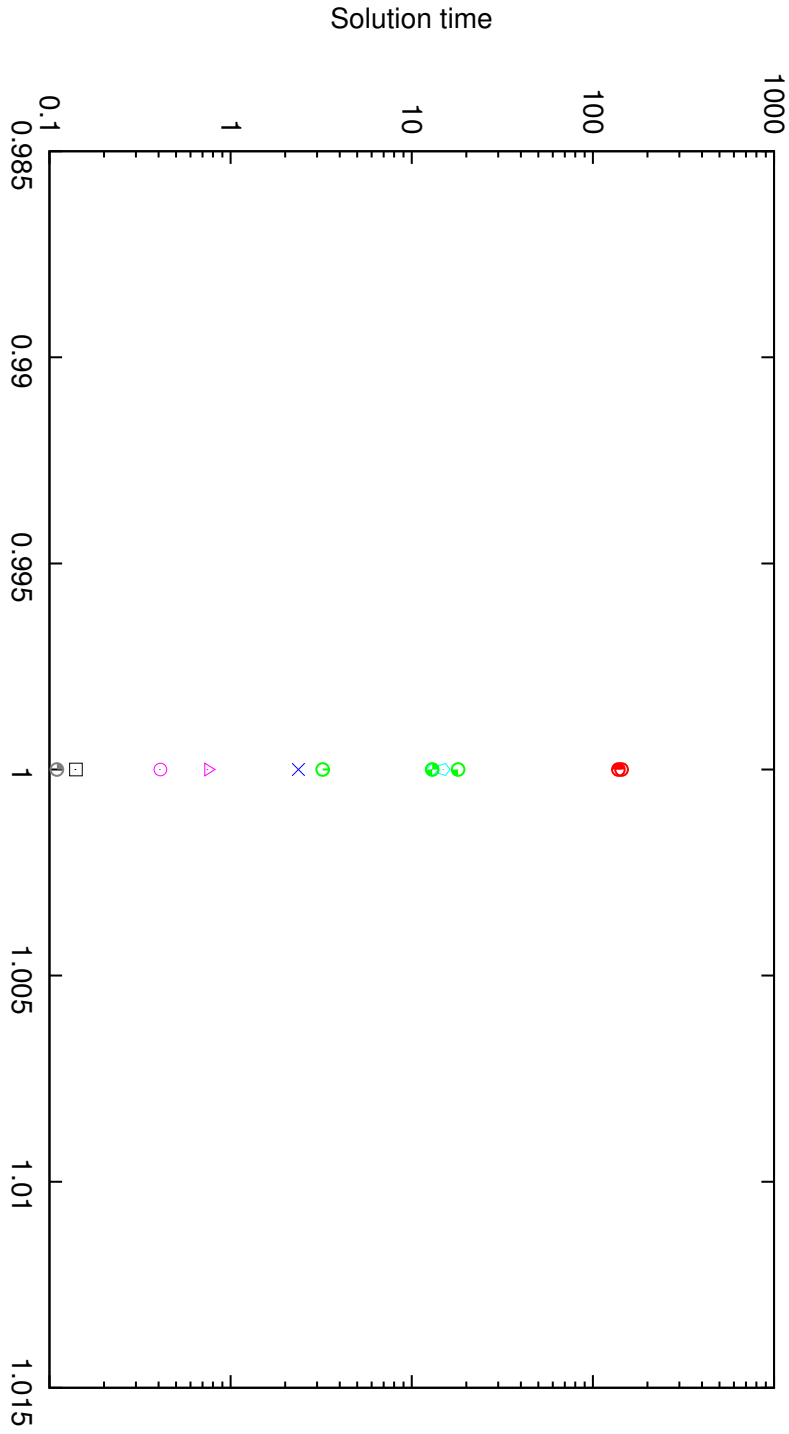

Fig. 730. Solution time in seconds for solving instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

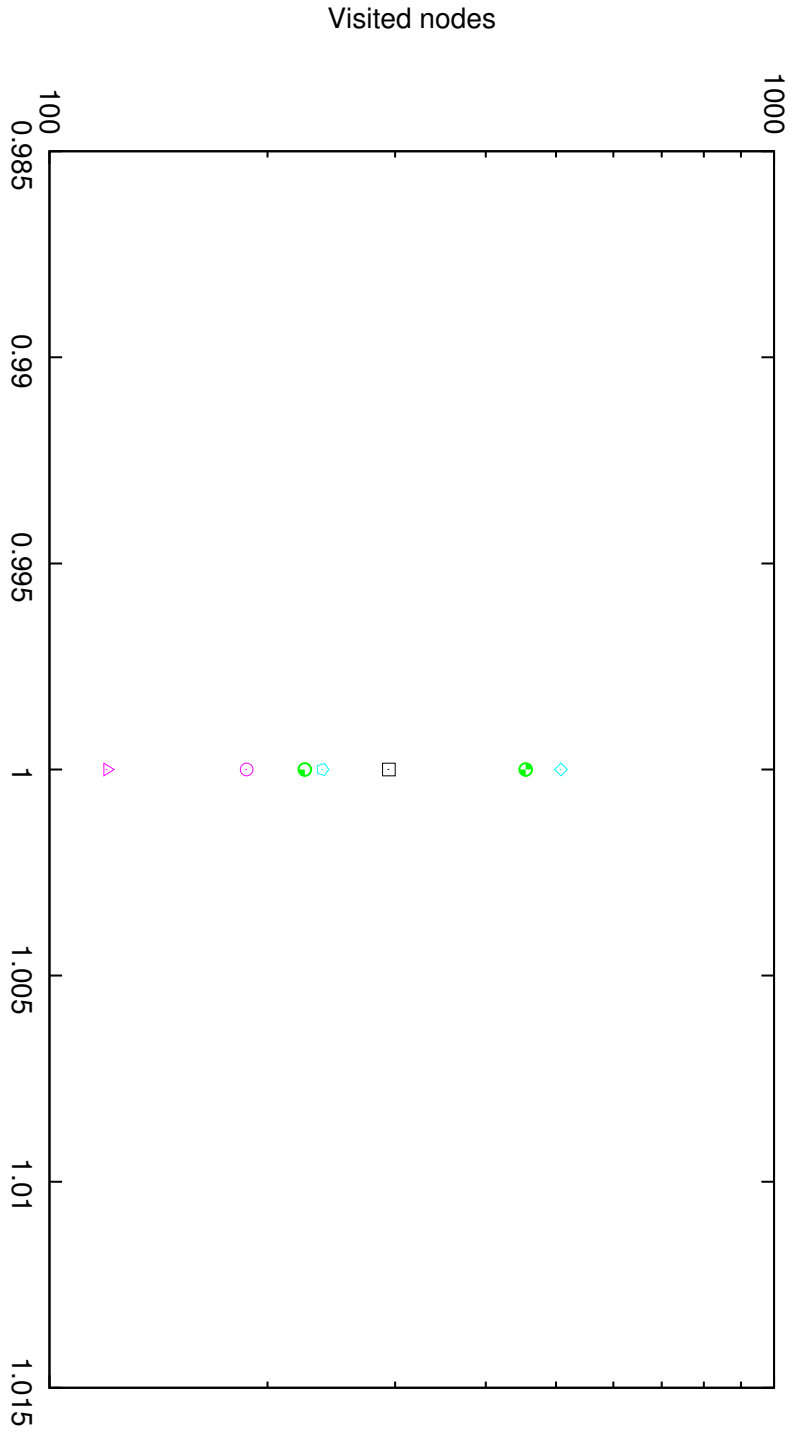

Fig. 731. Visited nodes required for solving instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

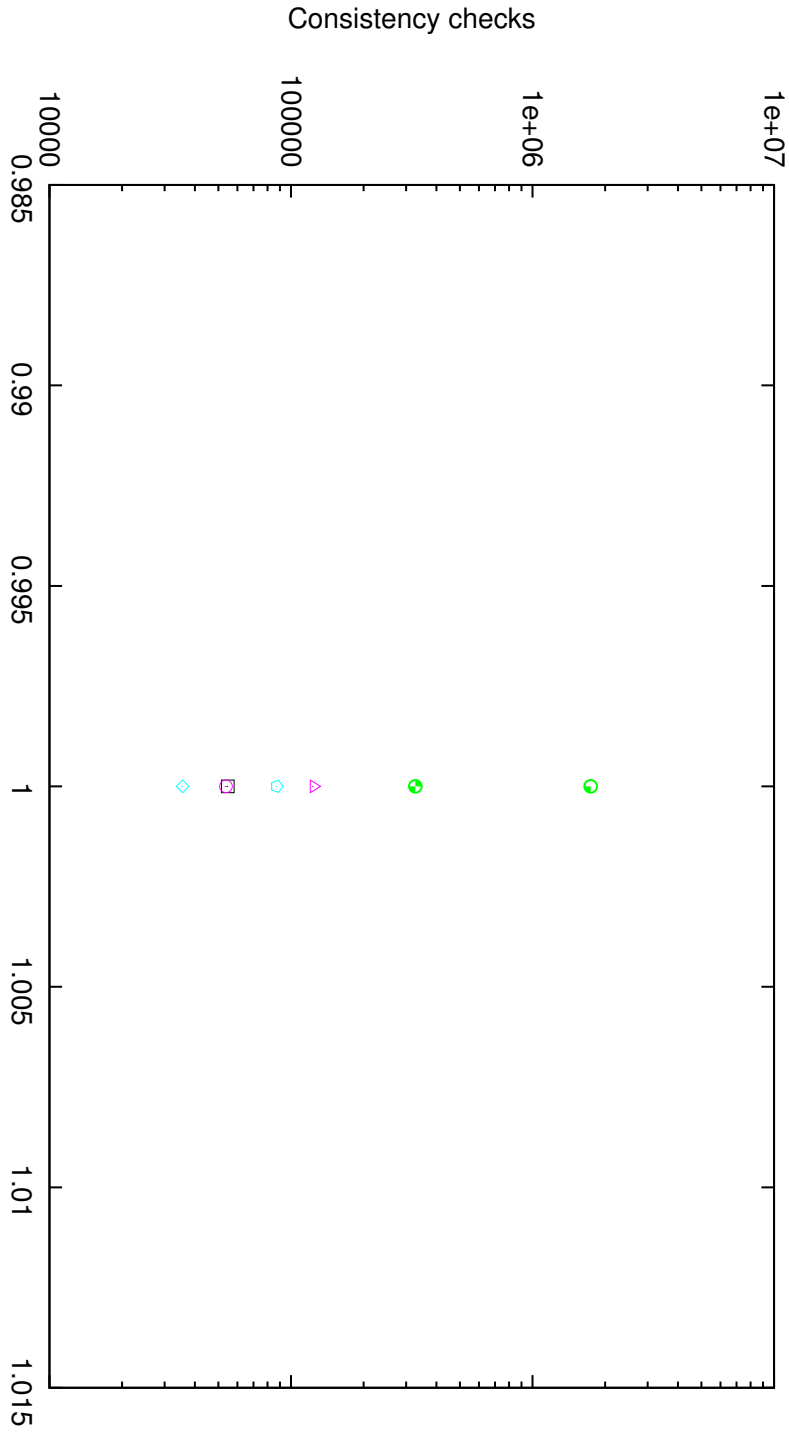

Fig. 732. Consistency checks required for solving instances from class `QWHp-15-hard`. The maximum solution time was set to 600 seconds.

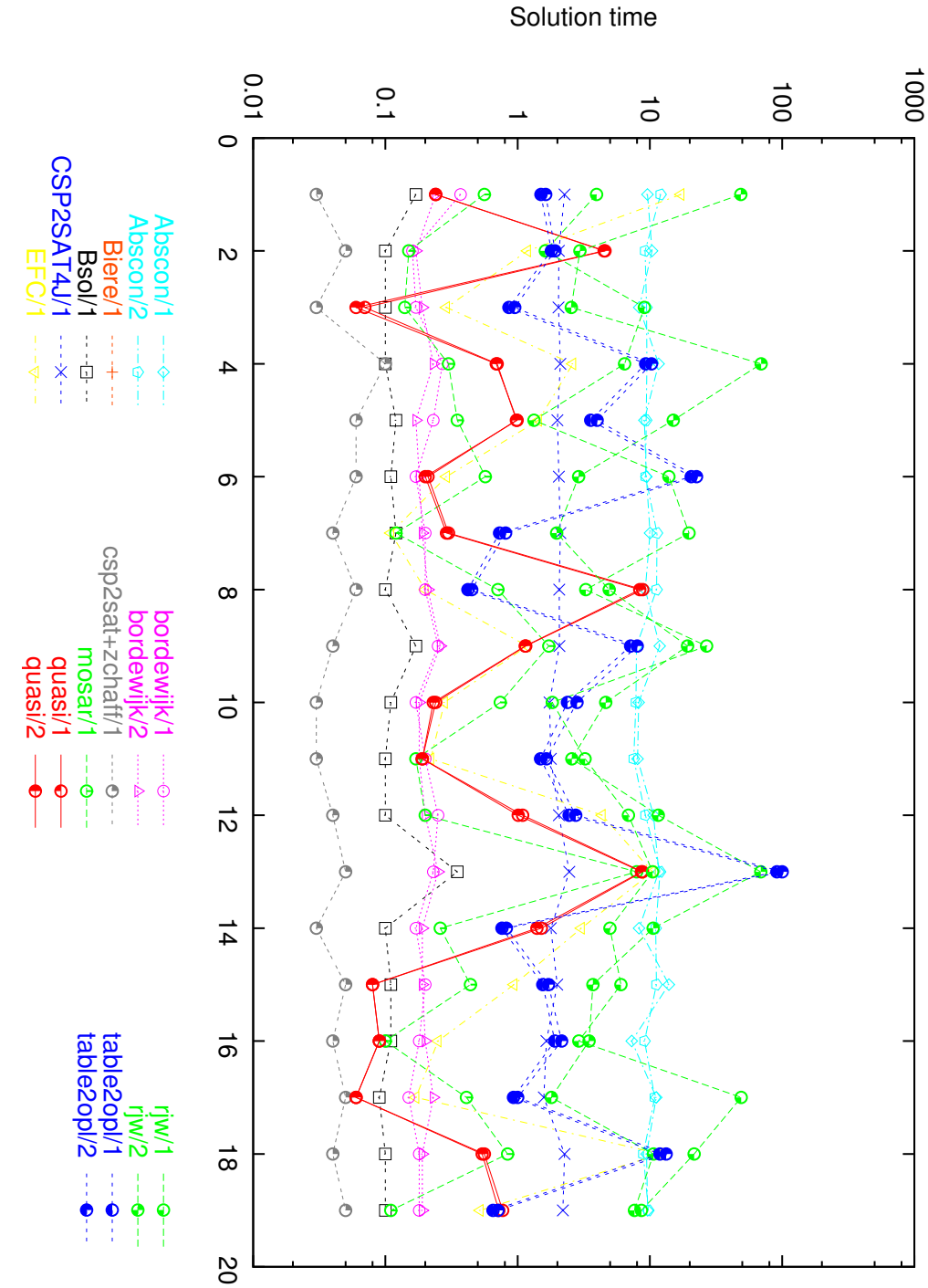

Fig. 733. Solution time in seconds for solving instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

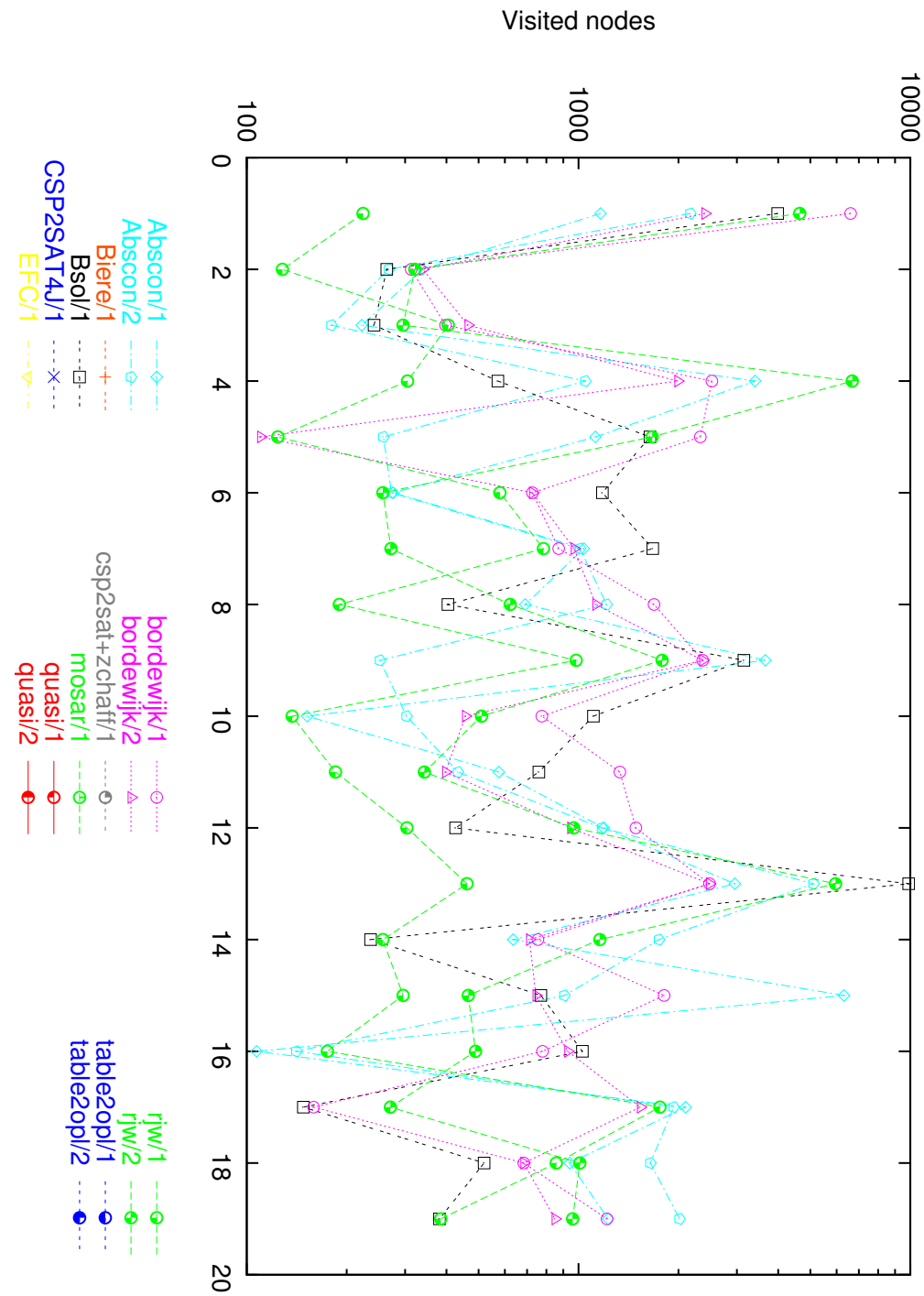

Fig. 734. Visited nodes required for solving instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

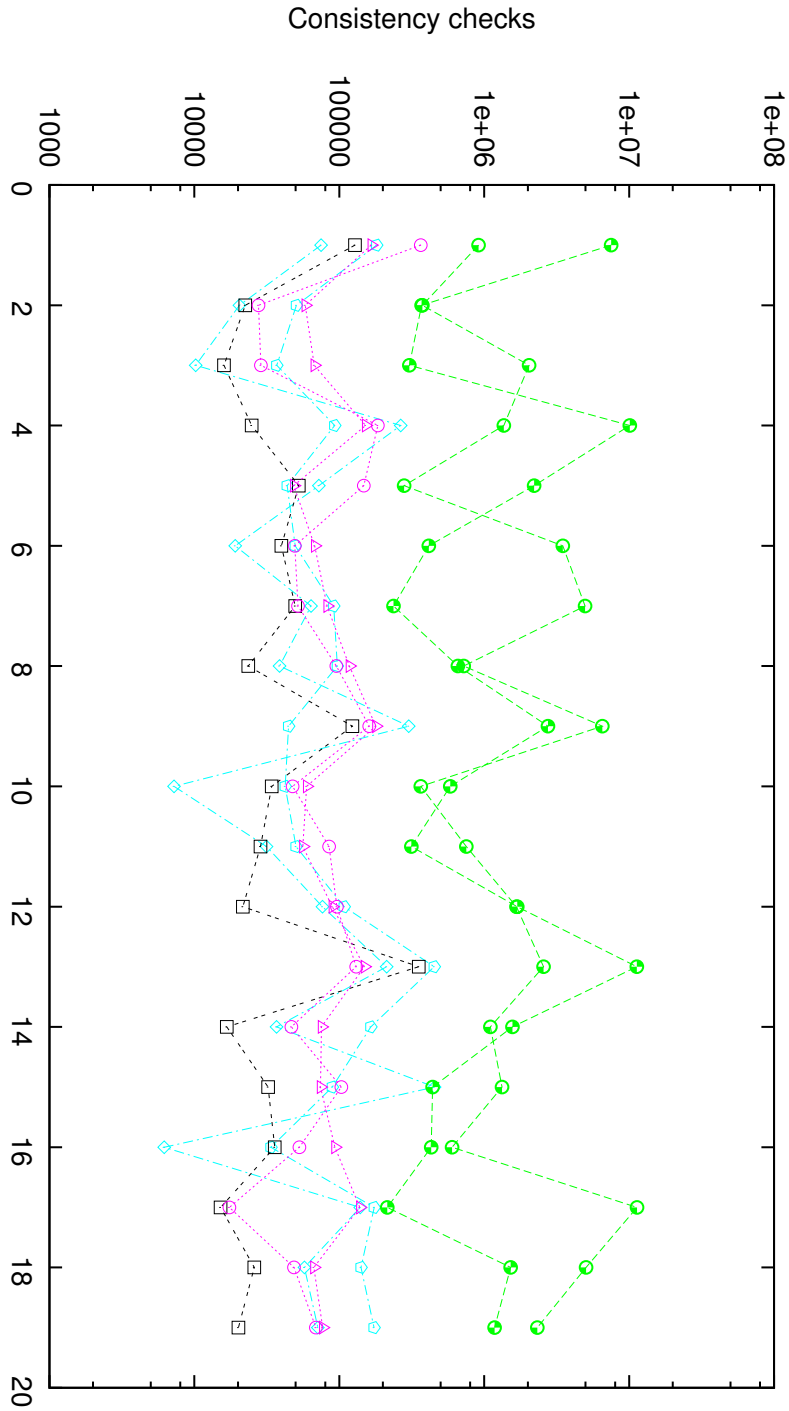

Fig. 735. Consistency checks required for solving instances from class `bqwh15-106`. The maximum solution time was set to 600 seconds.

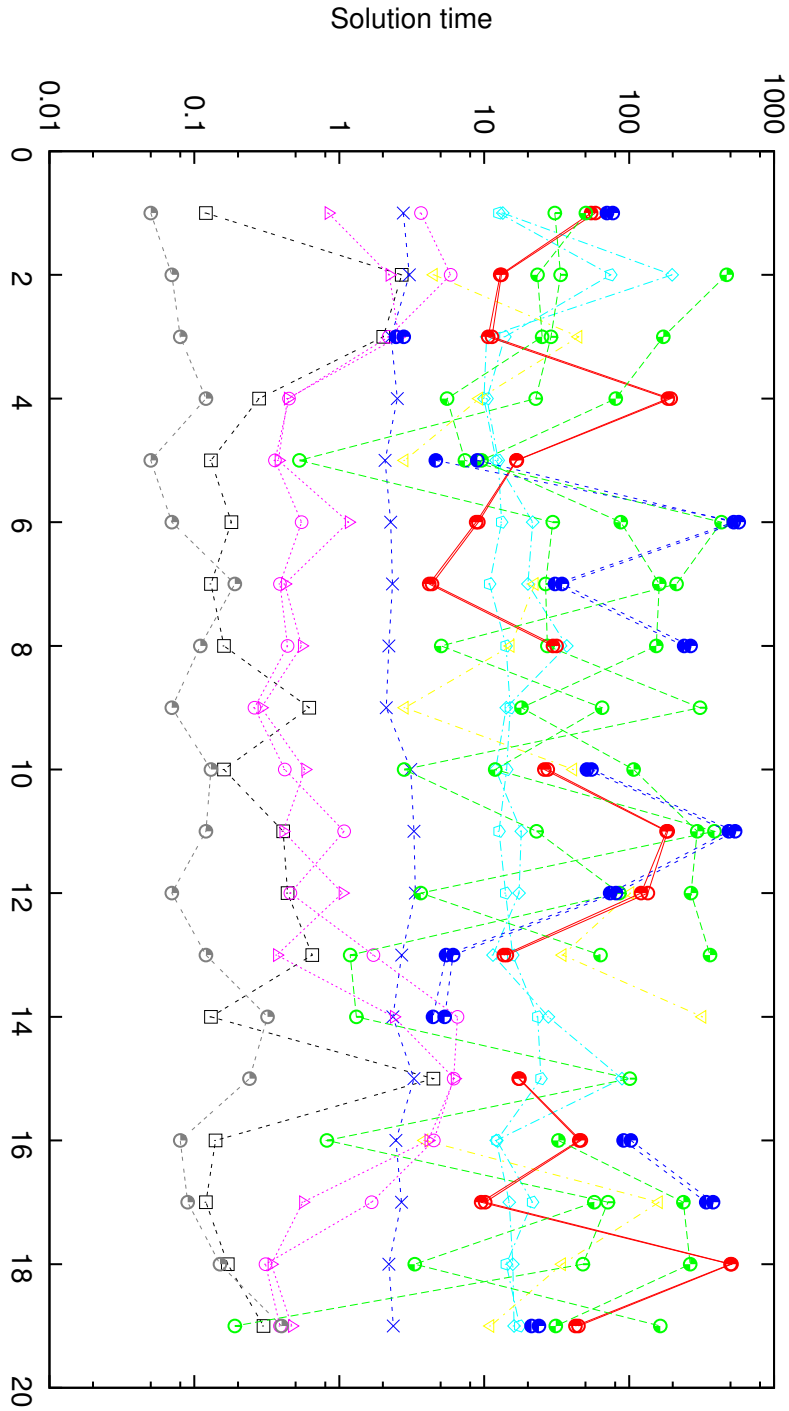

Fig. 736. Solution time in seconds for solving instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

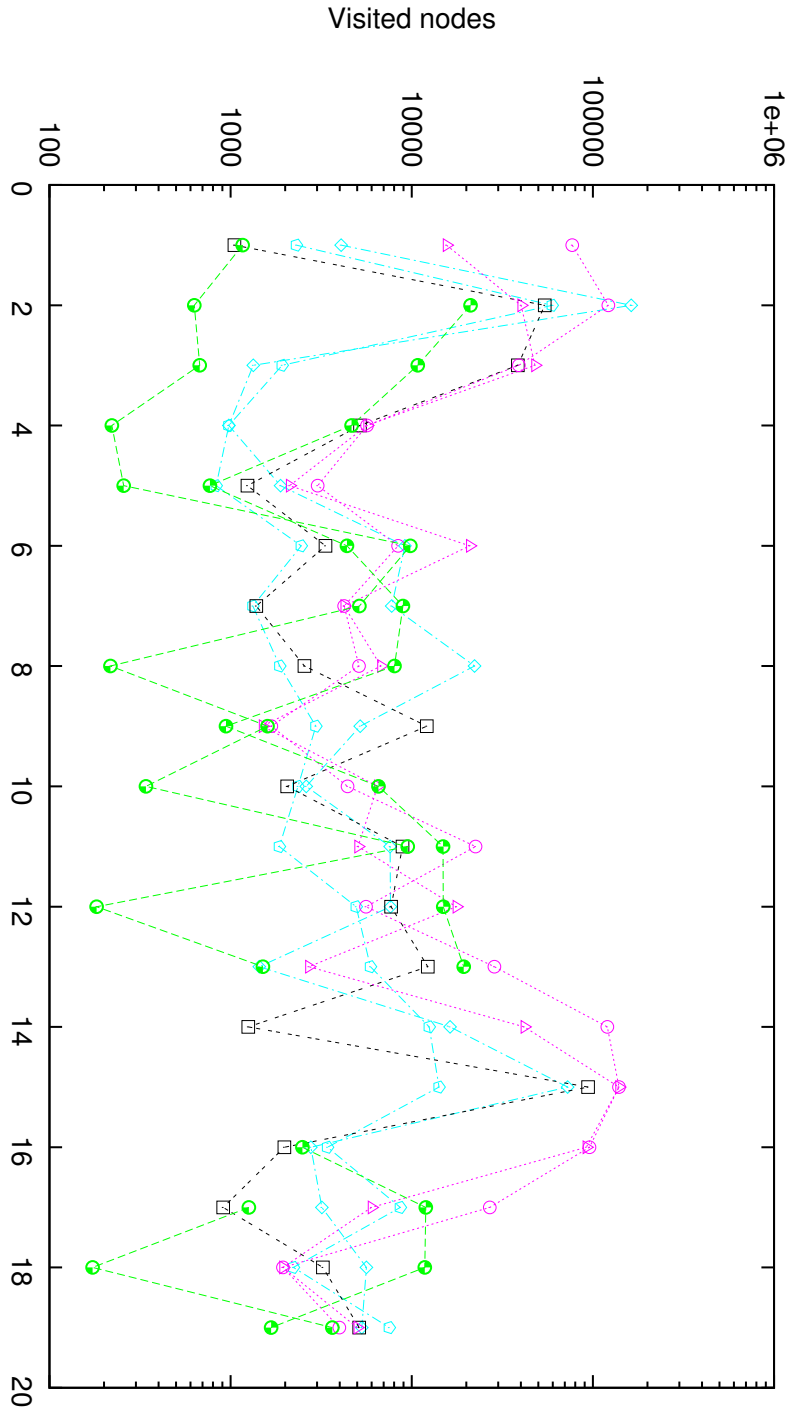

Fig. 737. Visited nodes required for solving instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

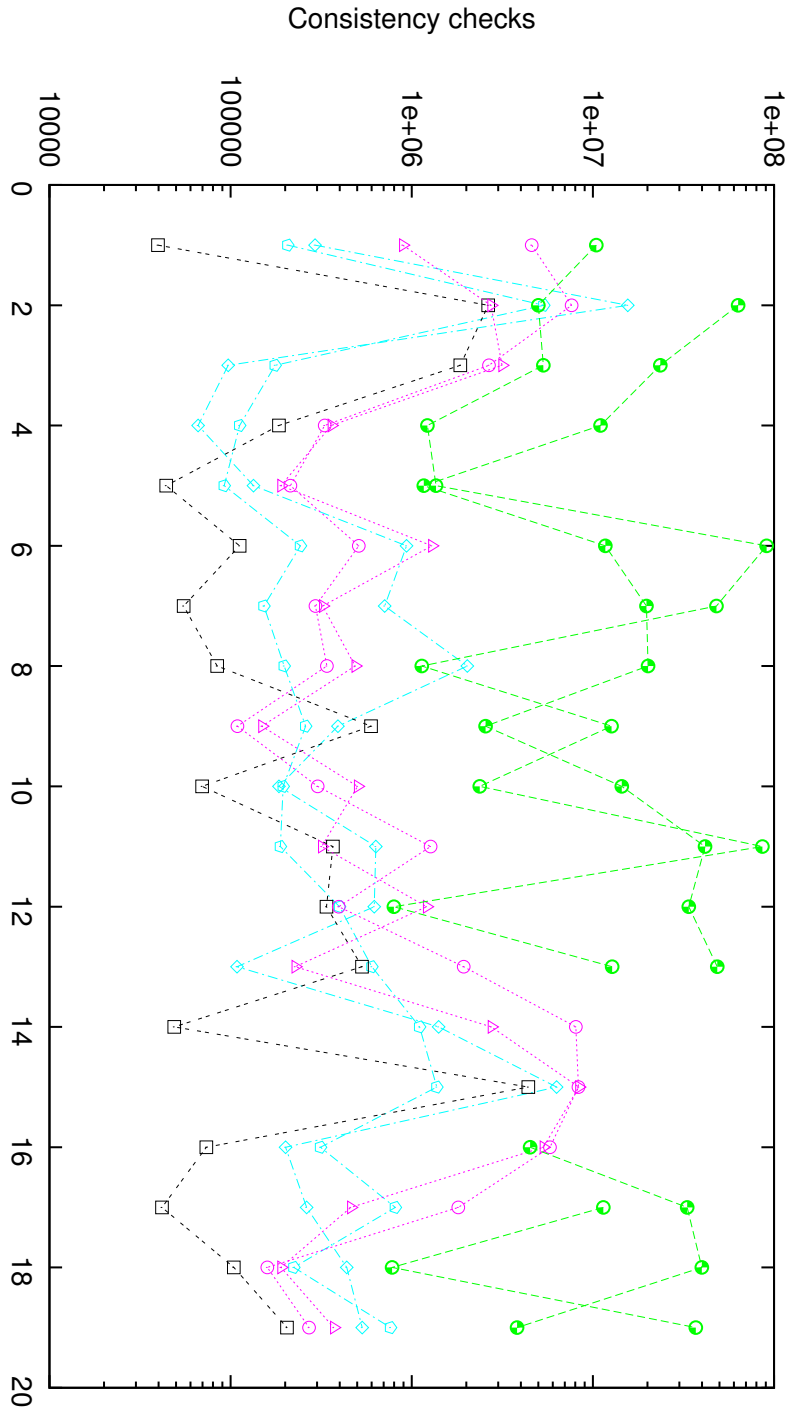

Fig. 738. Consistency checks required for solving instances from class `bqwh18-141`. The maximum solution time was set to 600 seconds.

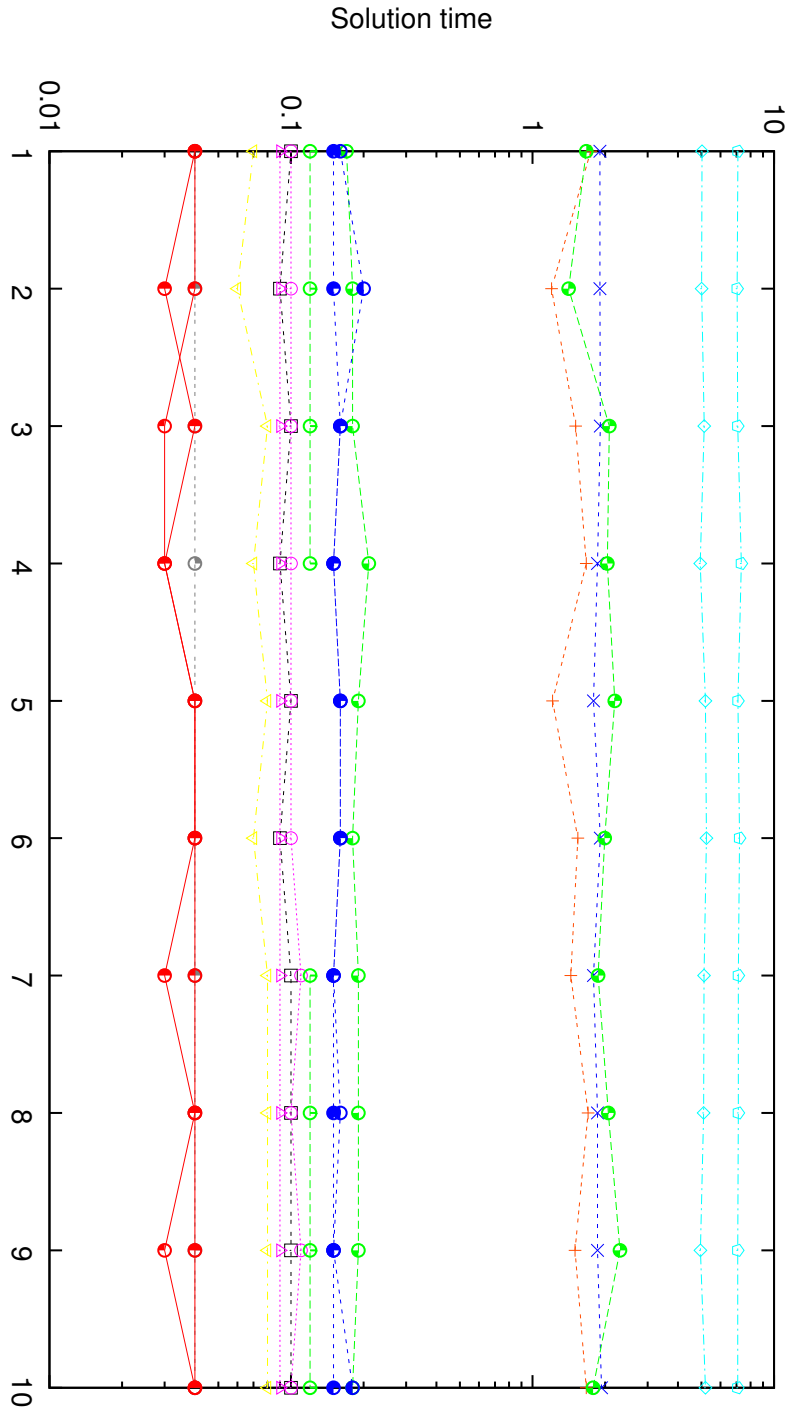

Fig. 739. Solution time in seconds for solving instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

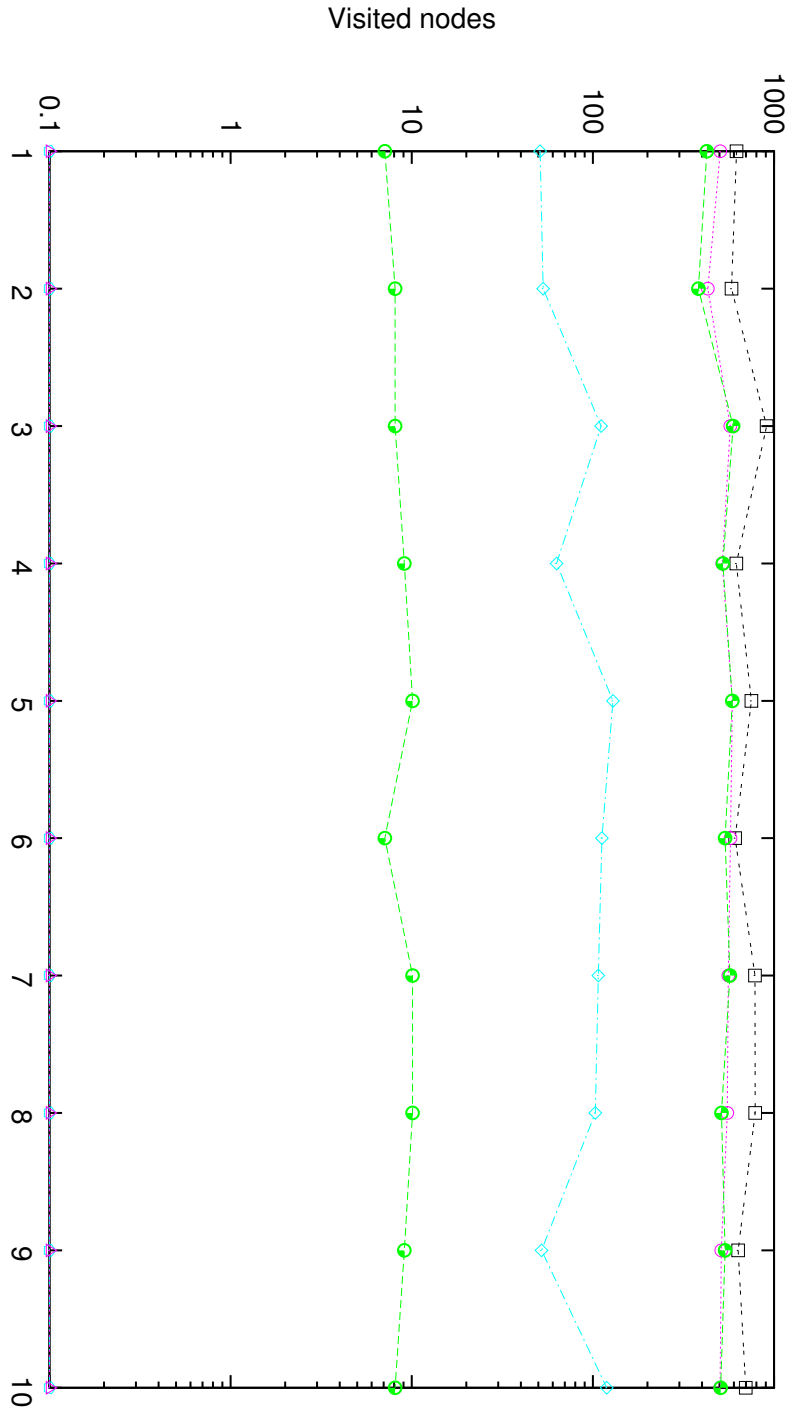

Fig. 740. Visited nodes required for solving instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

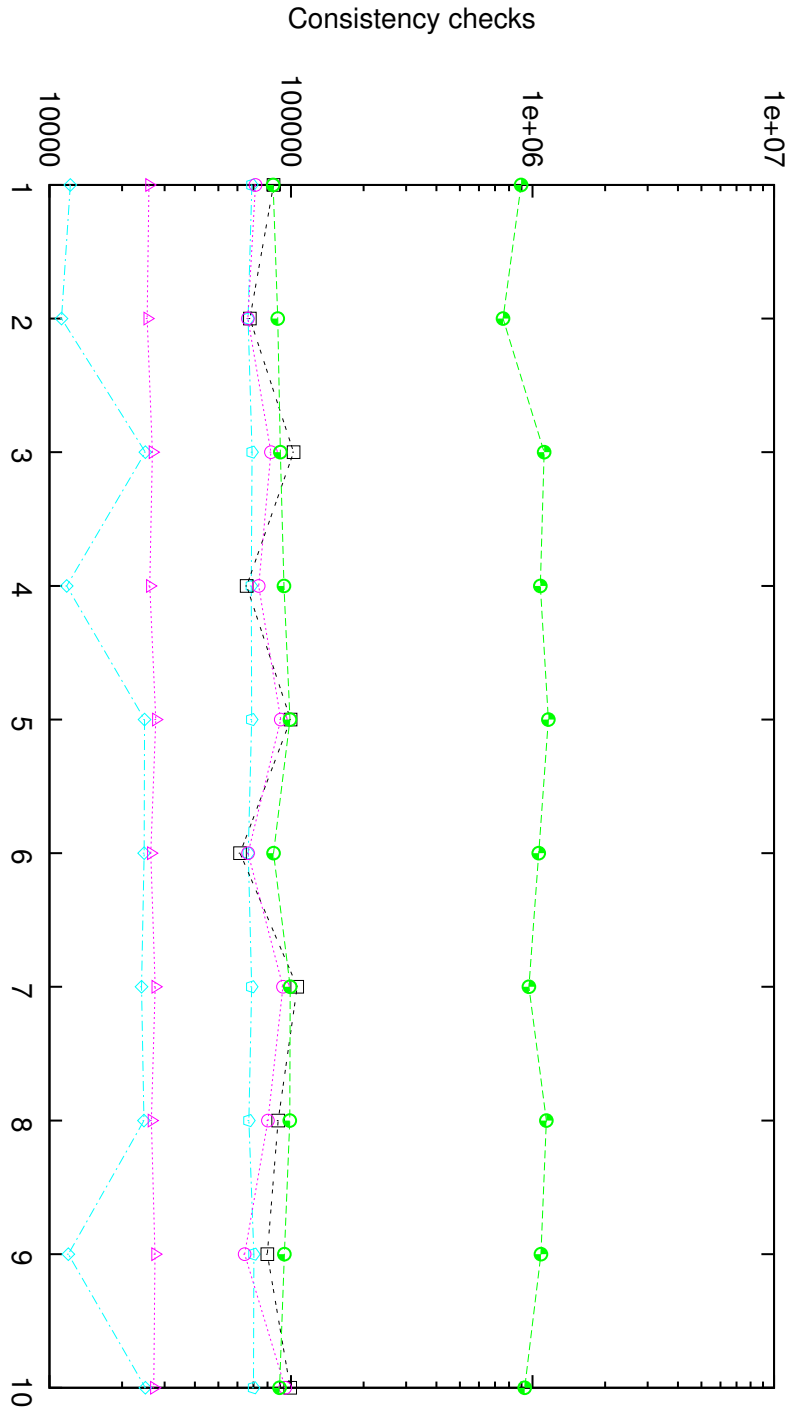

Fig. 7.41. Consistency checks required for solving instances from class `composed-25-1-2`. The maximum solution time was set to 600 seconds.

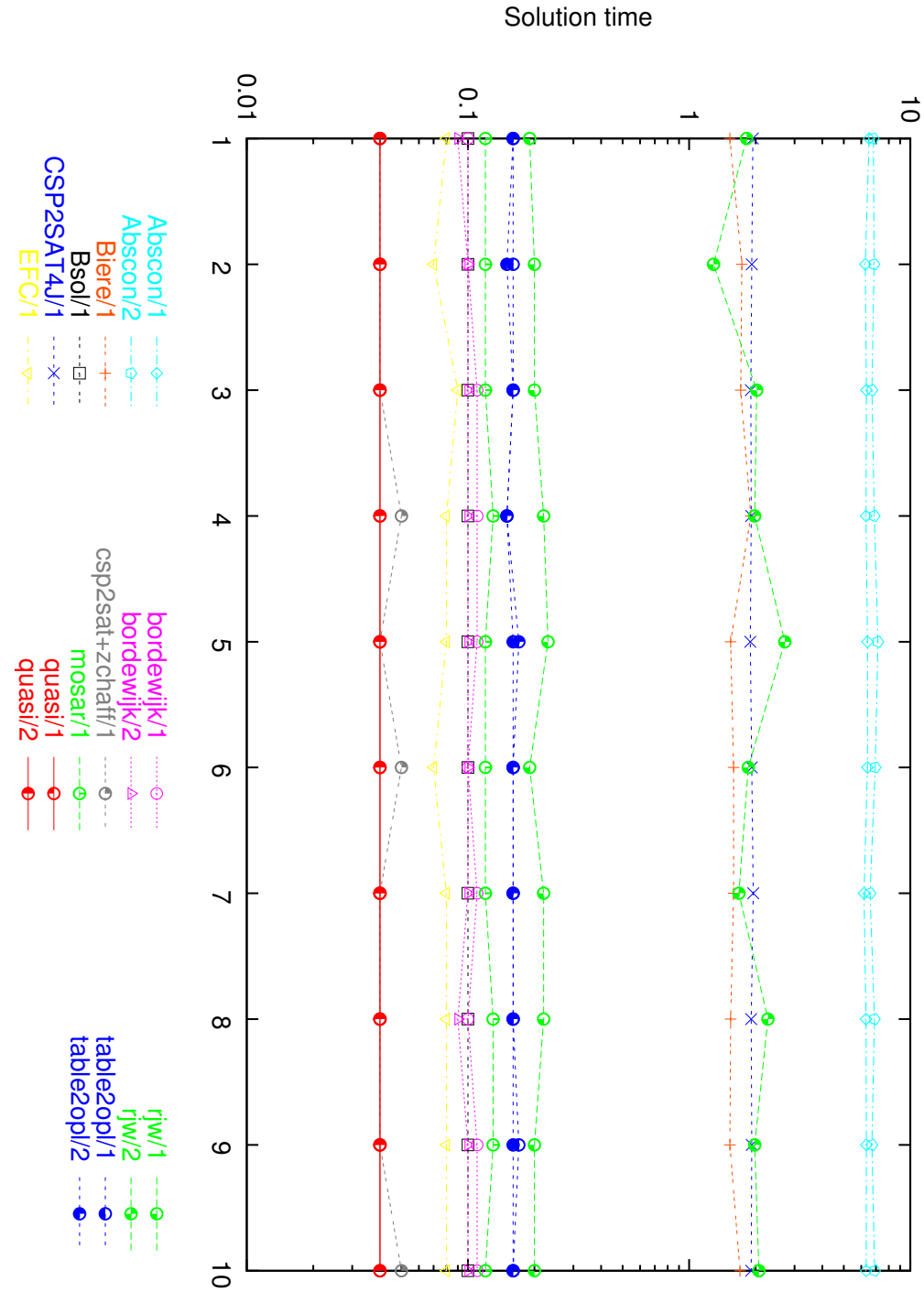

Fig. 742. Solution time in seconds for solving instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

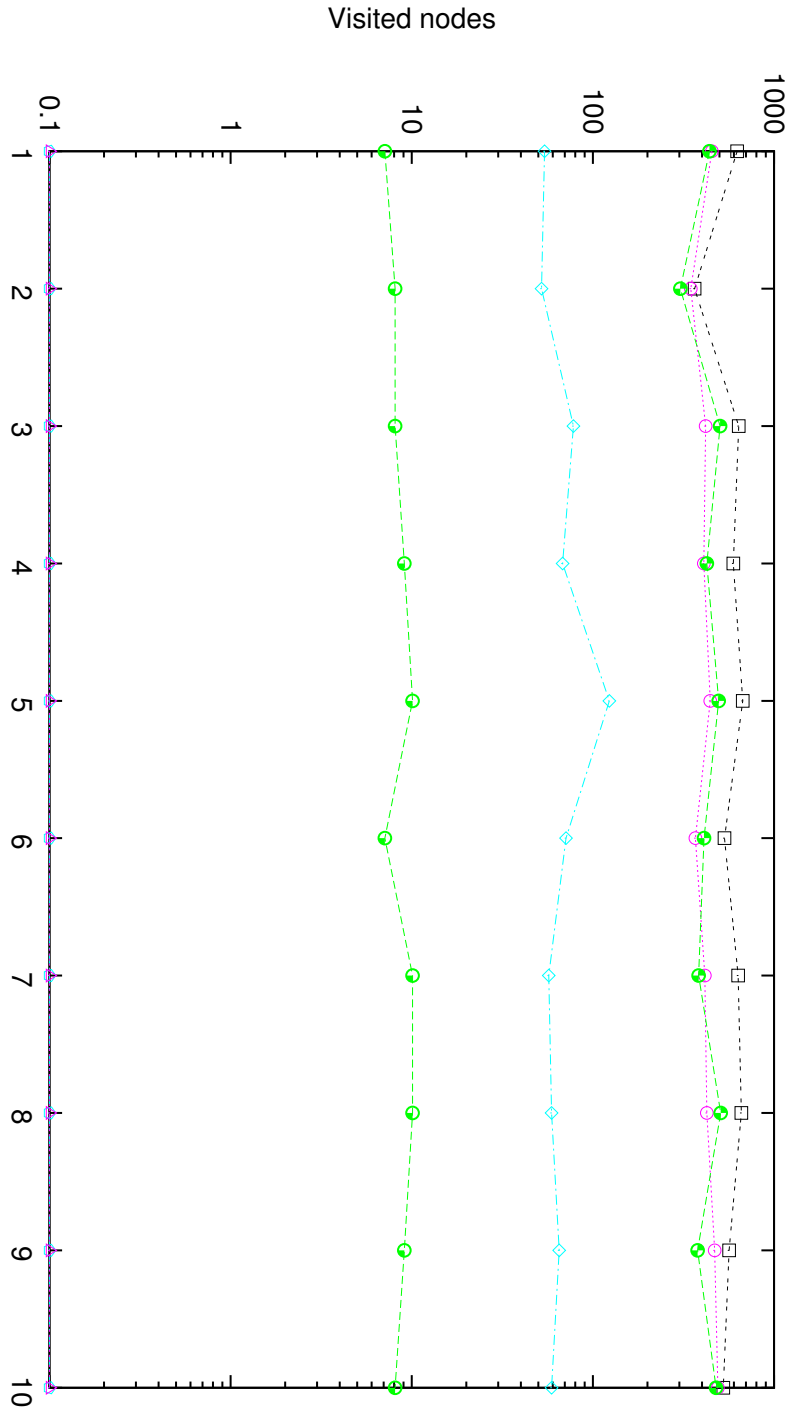

Fig. 7.43. Visited nodes required for solving instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

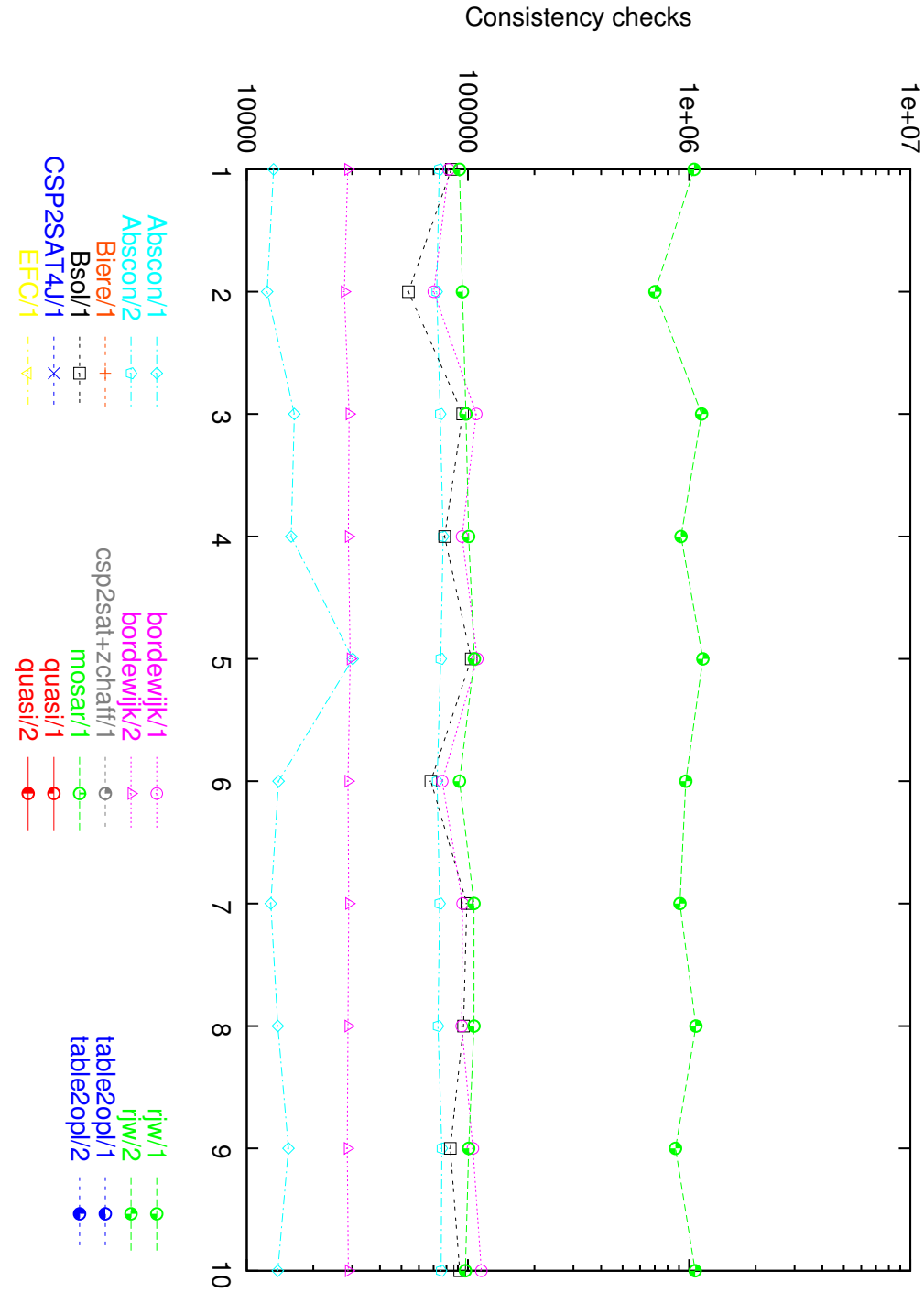

Fig. 744. Consistency checks required for solving instances from class `composed-25-1-25`. The maximum solution time was set to 600 seconds.

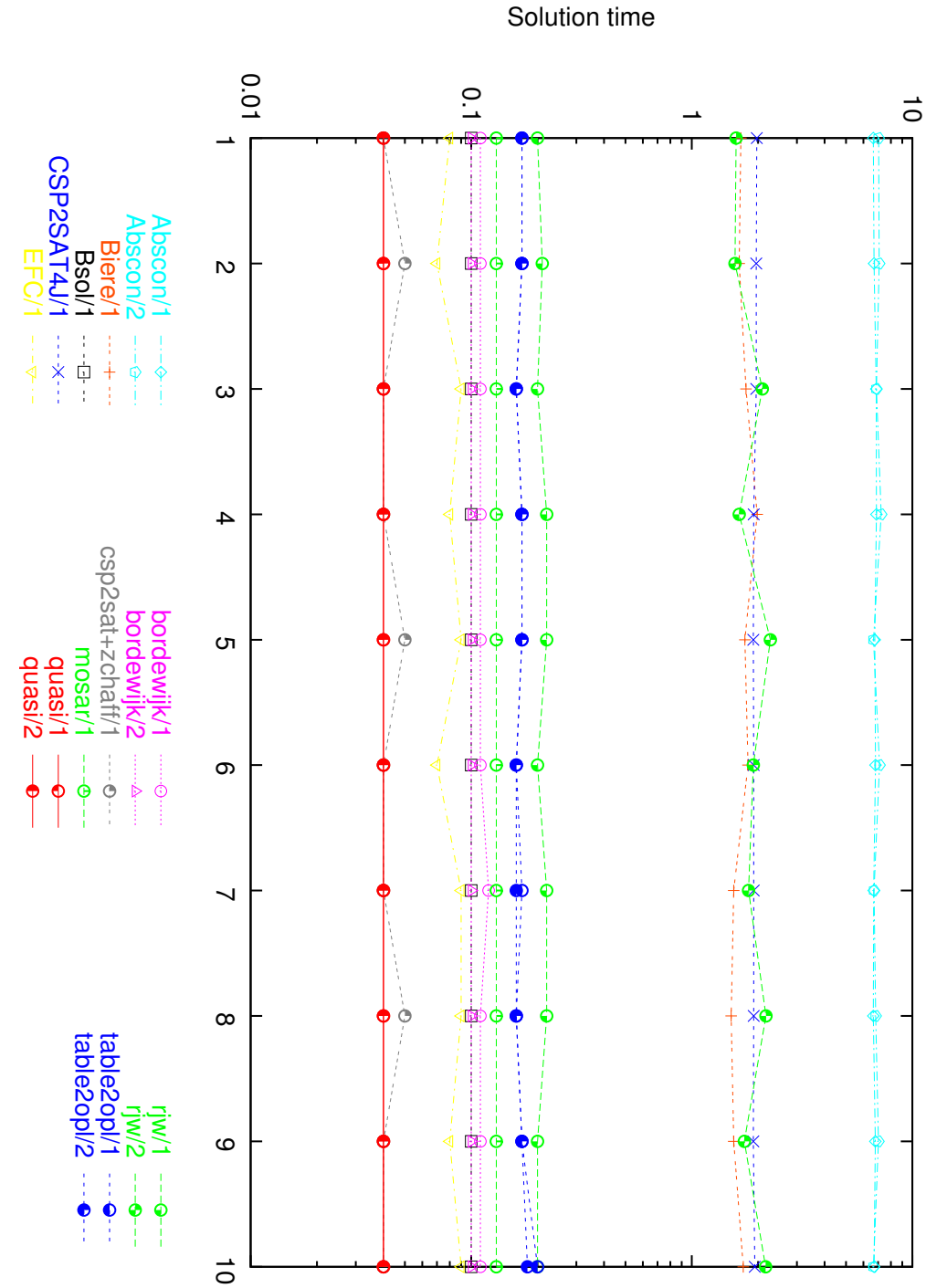

Fig. 7.45. Solution time in seconds for solving instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

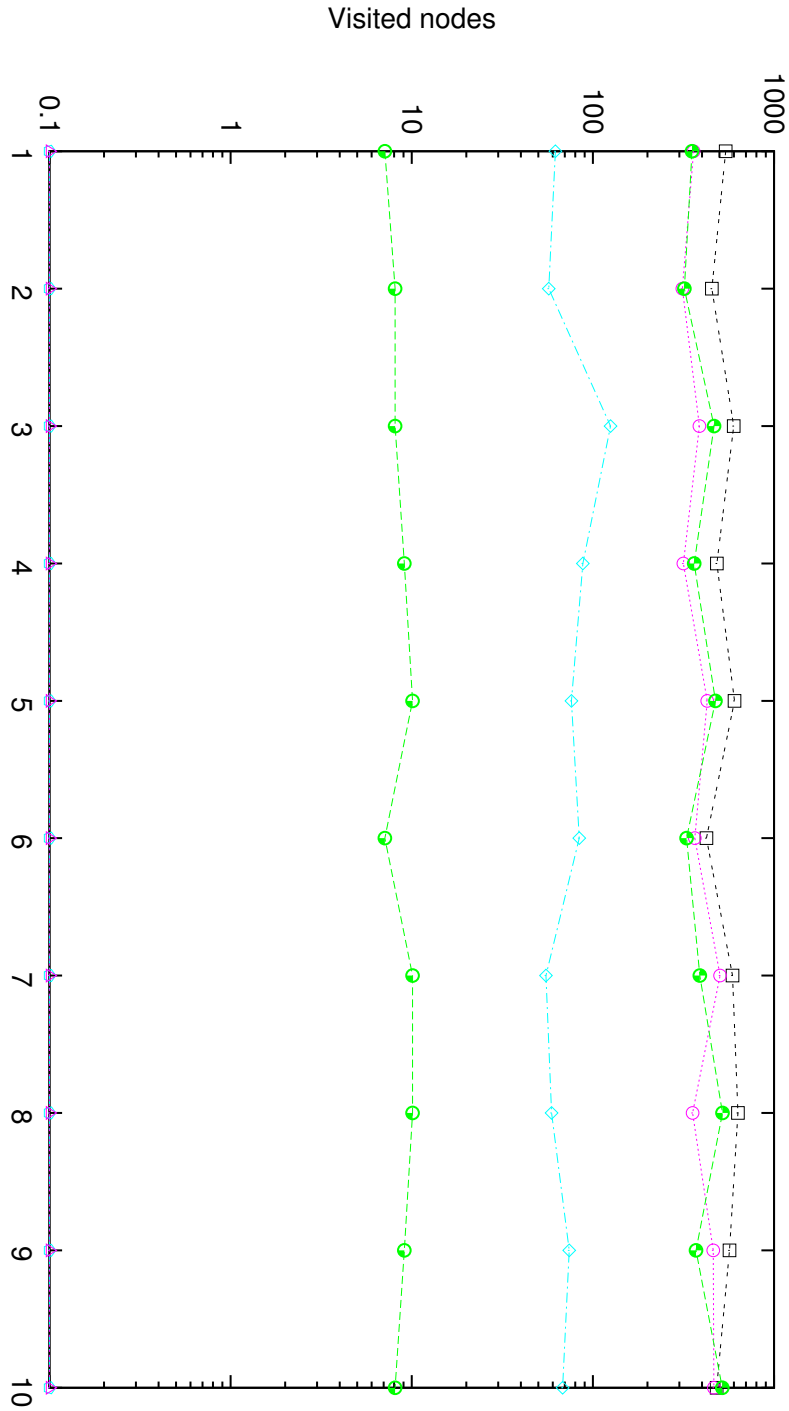

Fig. 746. Visited nodes required for solving instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

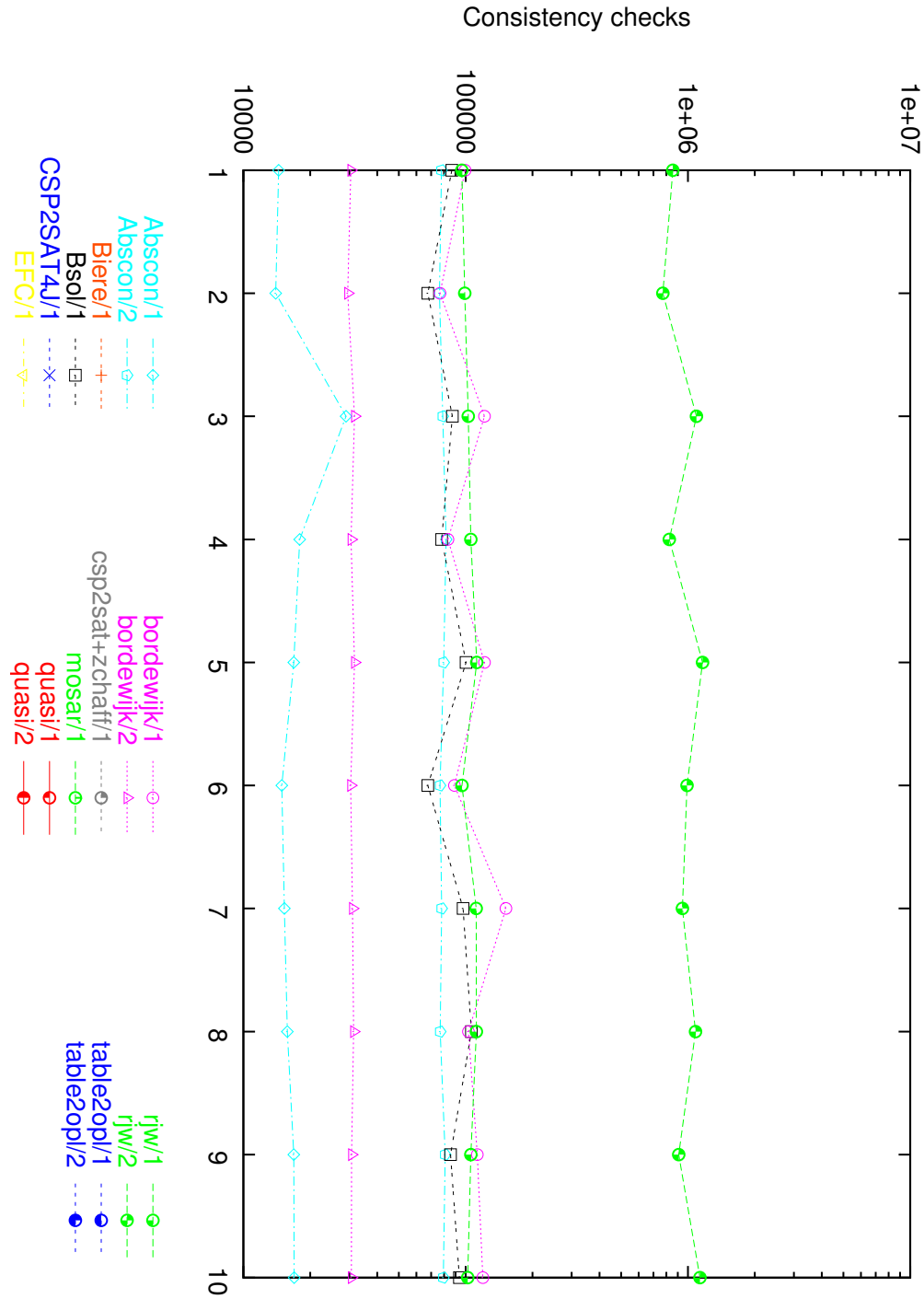

Fig. 747. Consistency checks required for solving instances from class `composed-25-1-40`. The maximum solution time was set to 600 seconds.

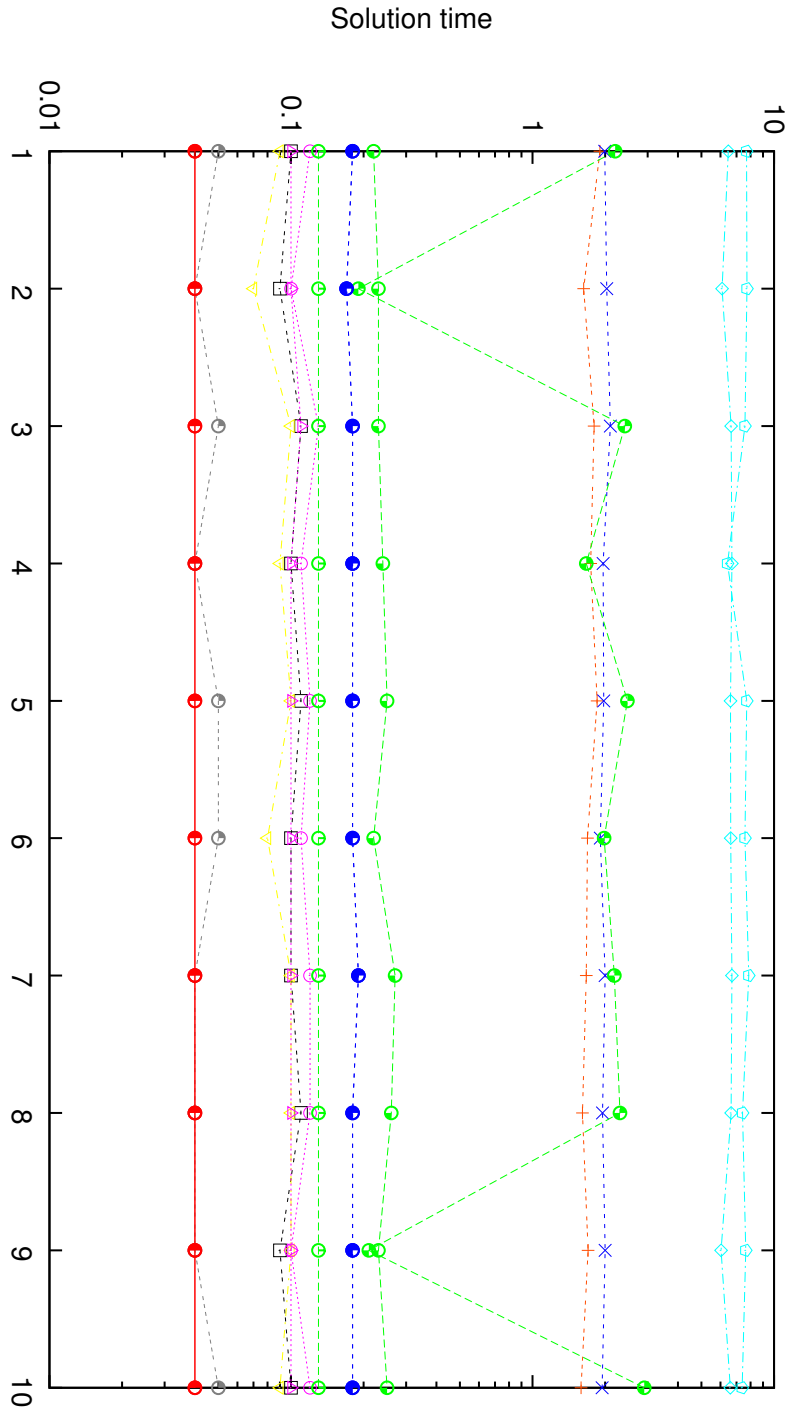

Fig. 7.48. Solution time in seconds for solving instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

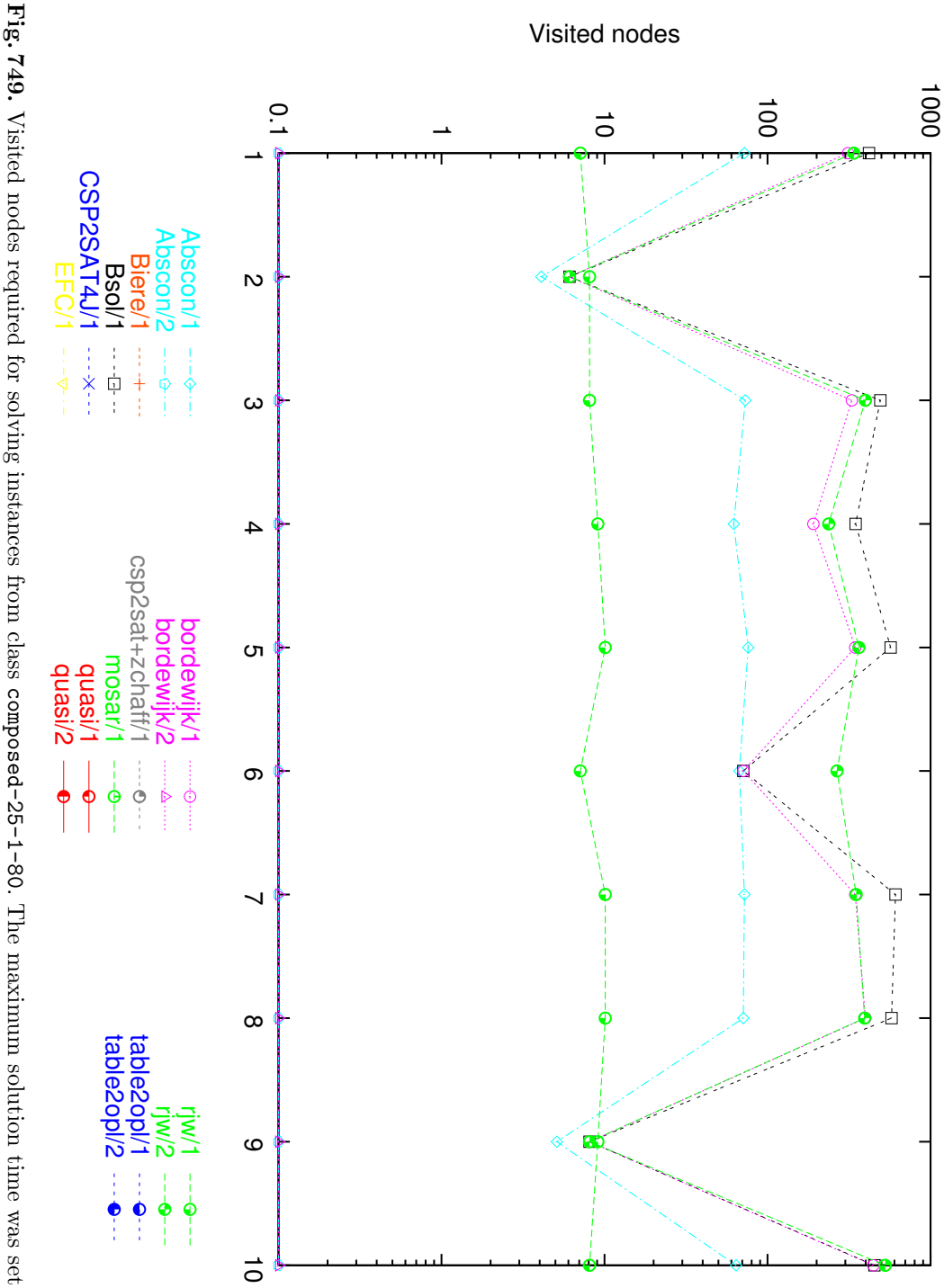

Fig. 749. Visited nodes required for solving instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

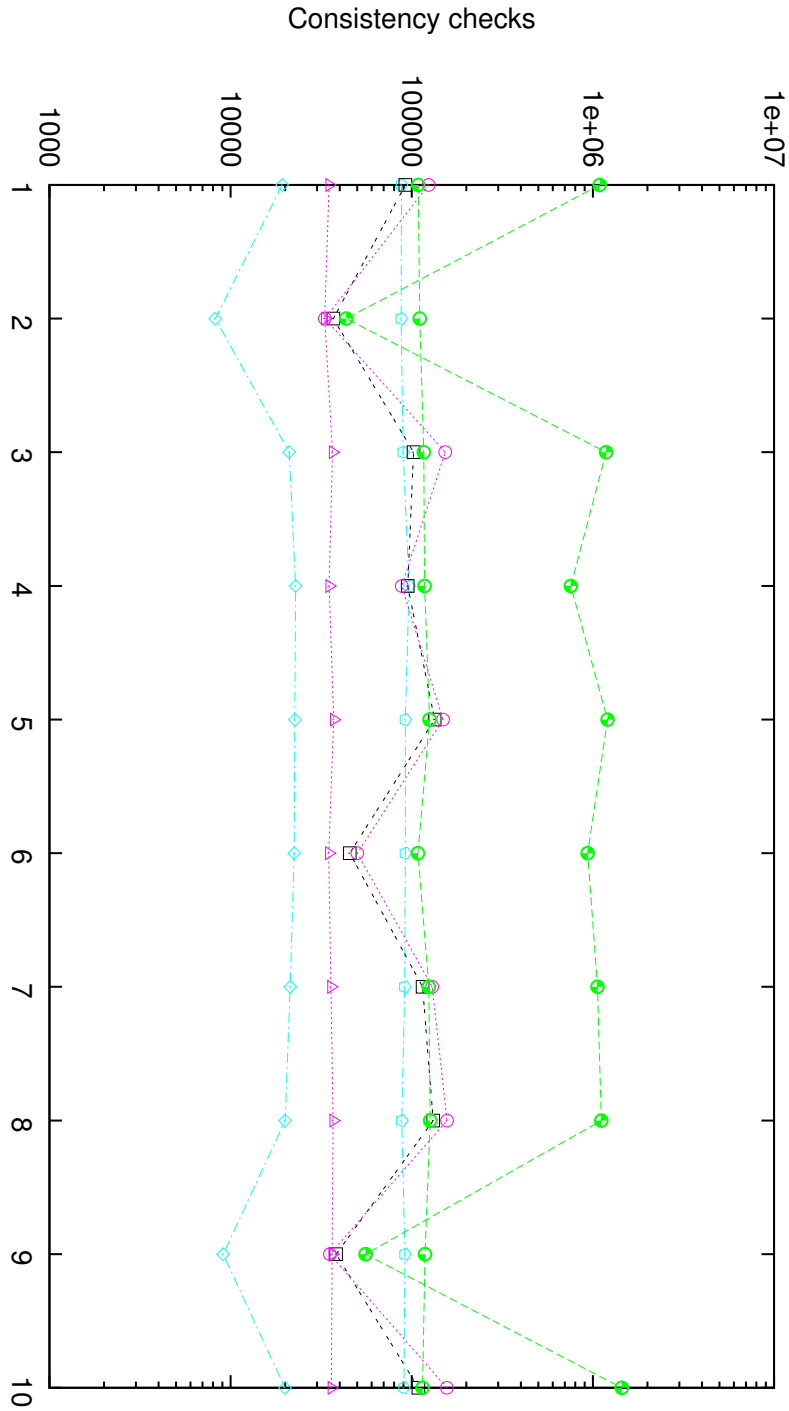

Fig. 750. Consistency checks required for solving instances from class `composed-25-1-80`. The maximum solution time was set to 600 seconds.

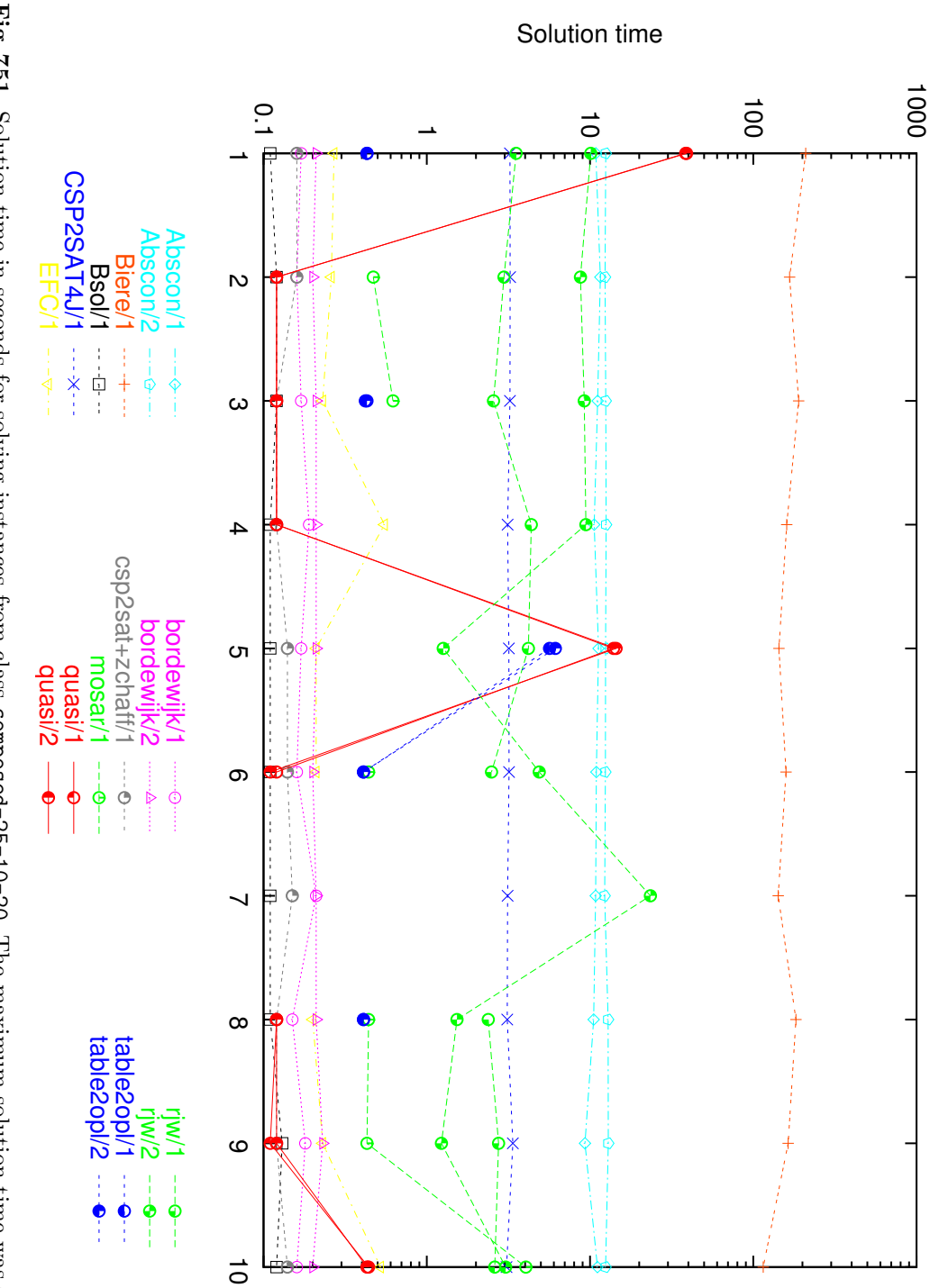

Fig. 751. Solution time in seconds for solving instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

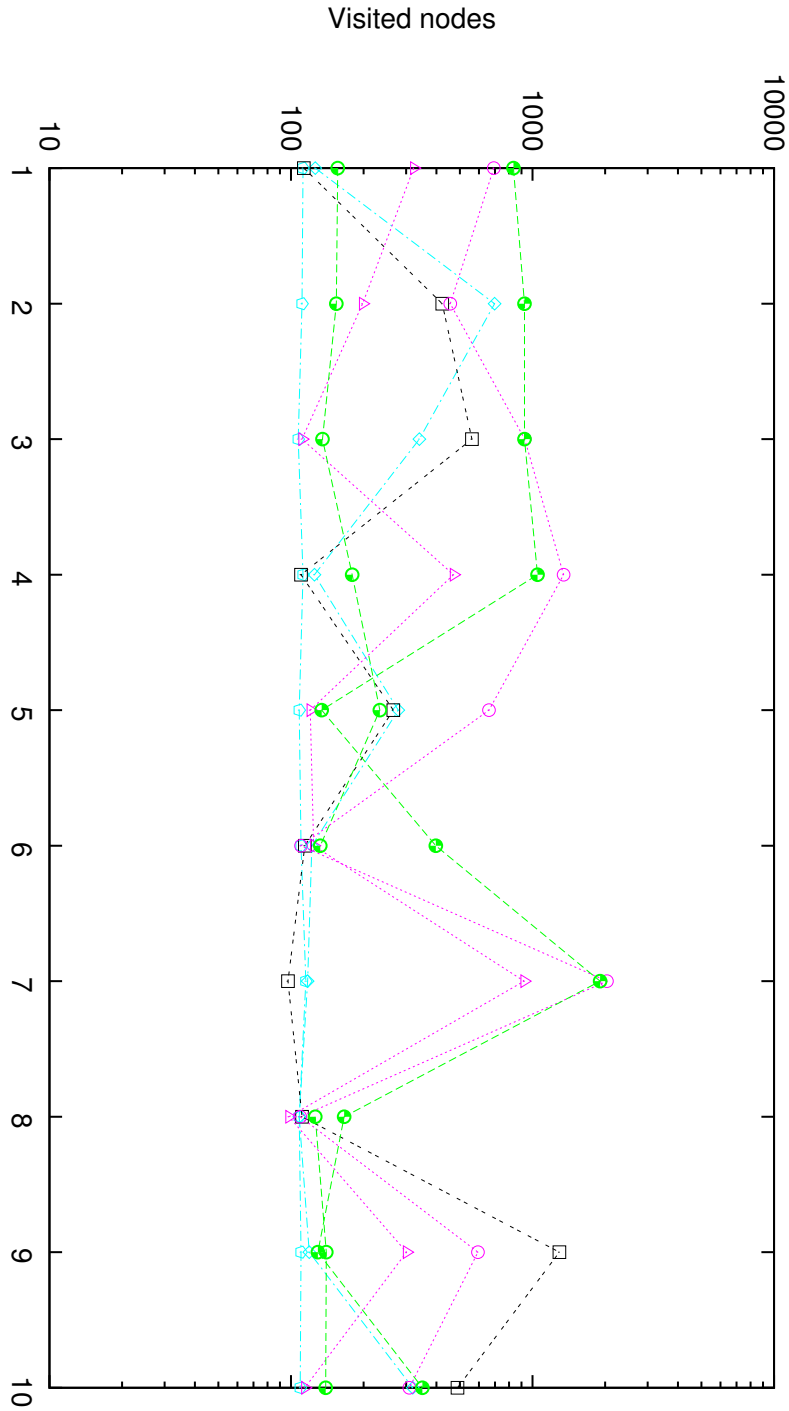

Fig. 752. Visited nodes required for solving instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

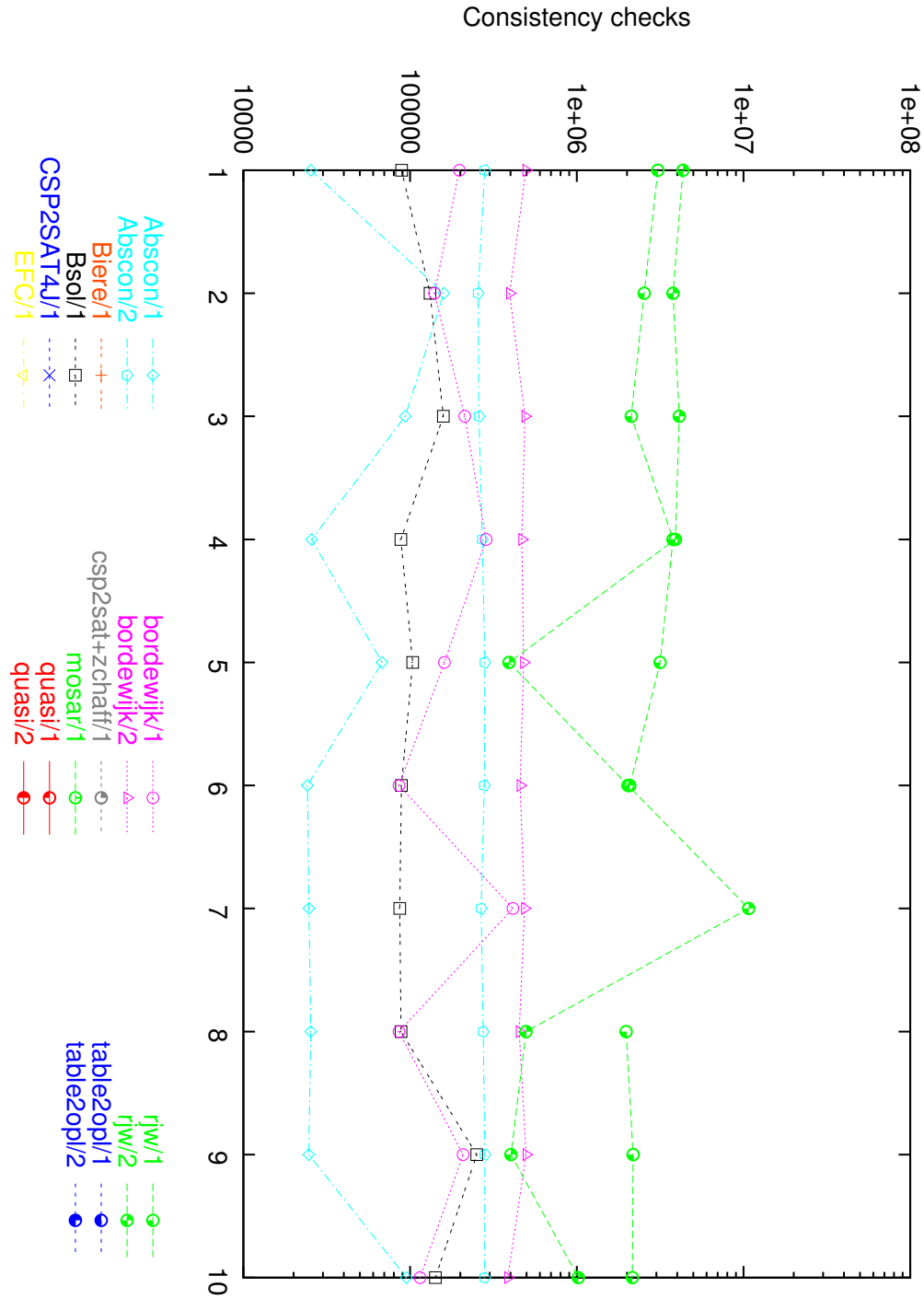

Fig. 753. Consistency checks required for solving instances from class `composed-25-10-20`. The maximum solution time was set to 600 seconds.

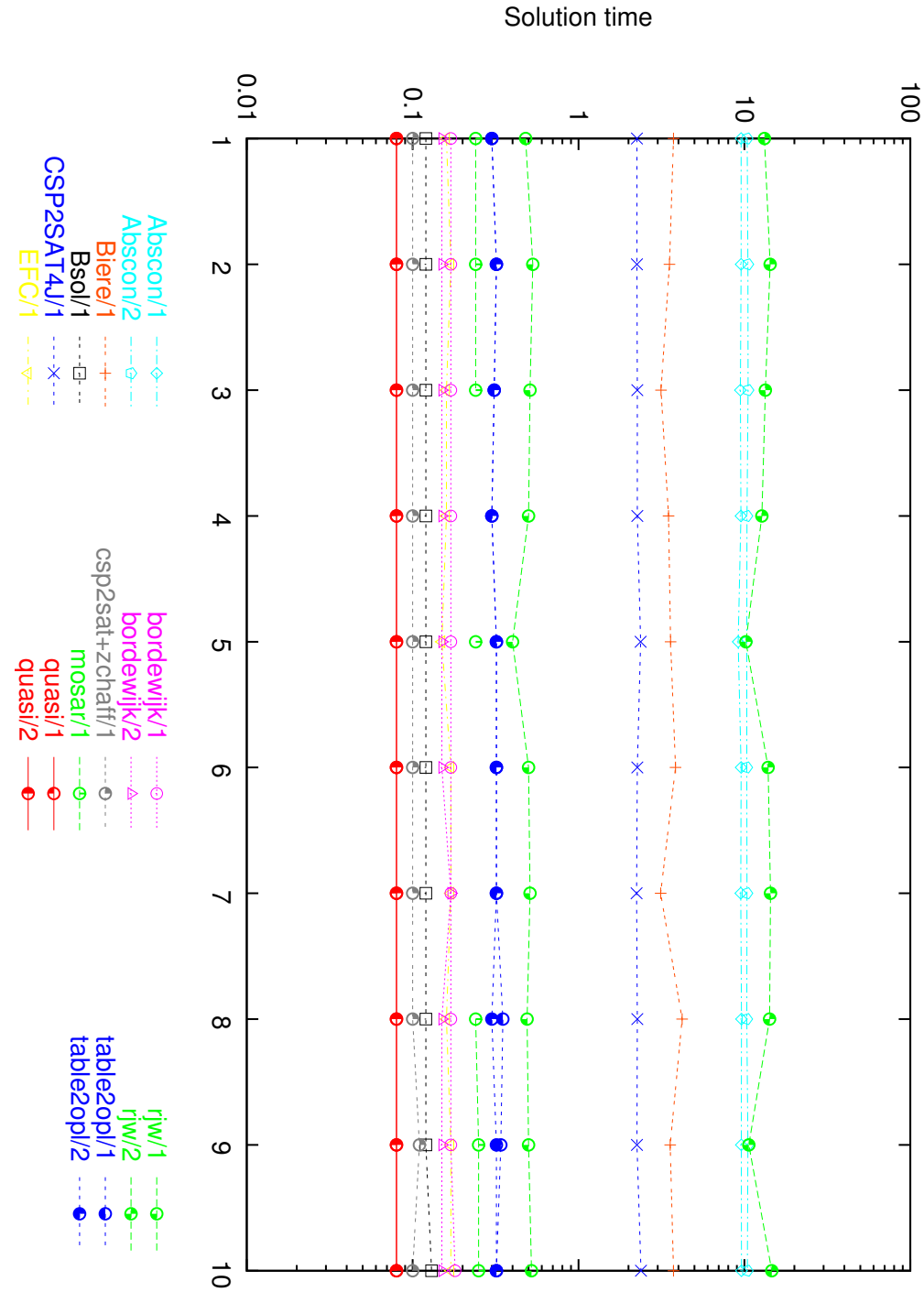

Fig. 754. Solution time in seconds for solving instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

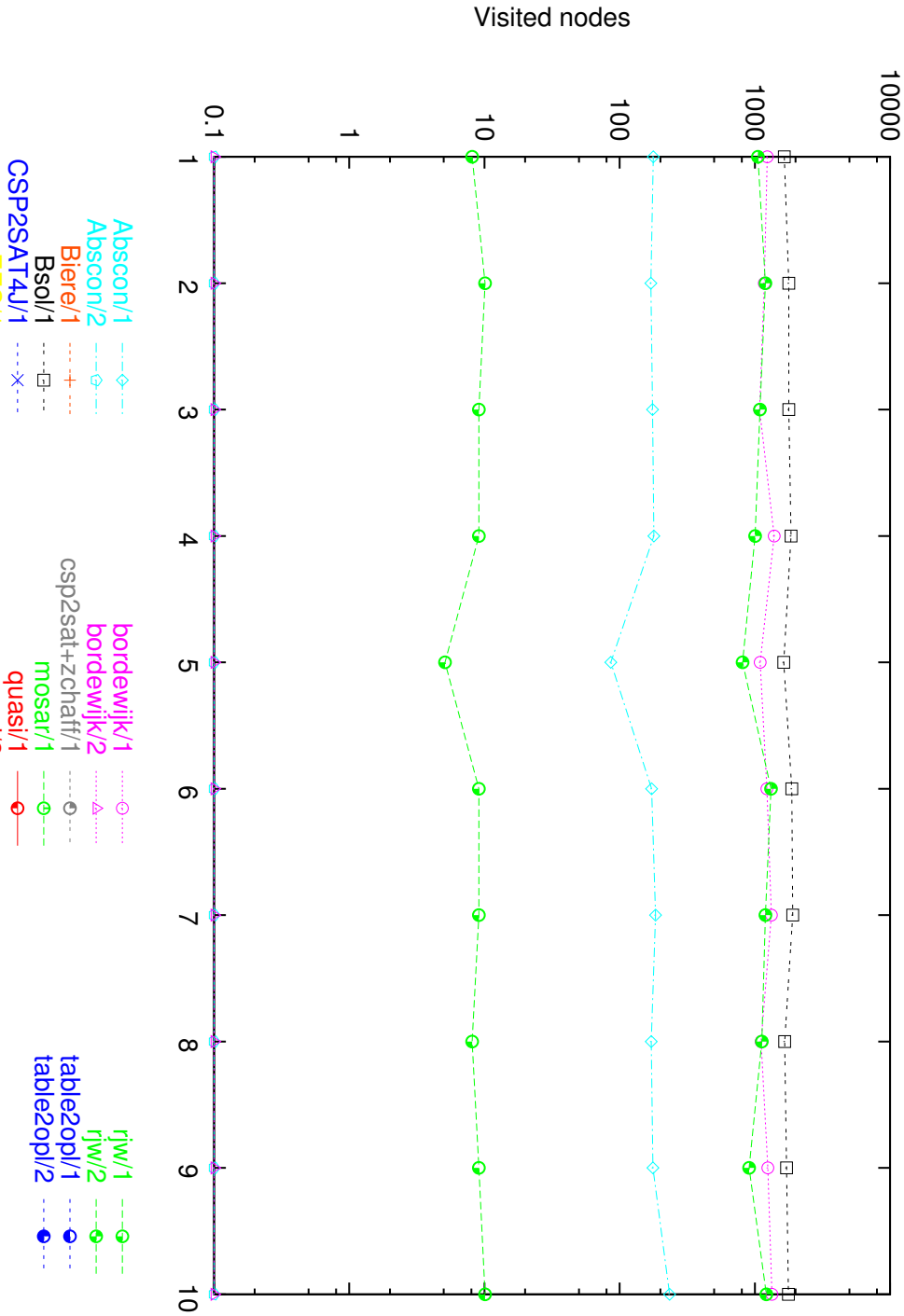

Fig. 755. Visited nodes required for solving instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

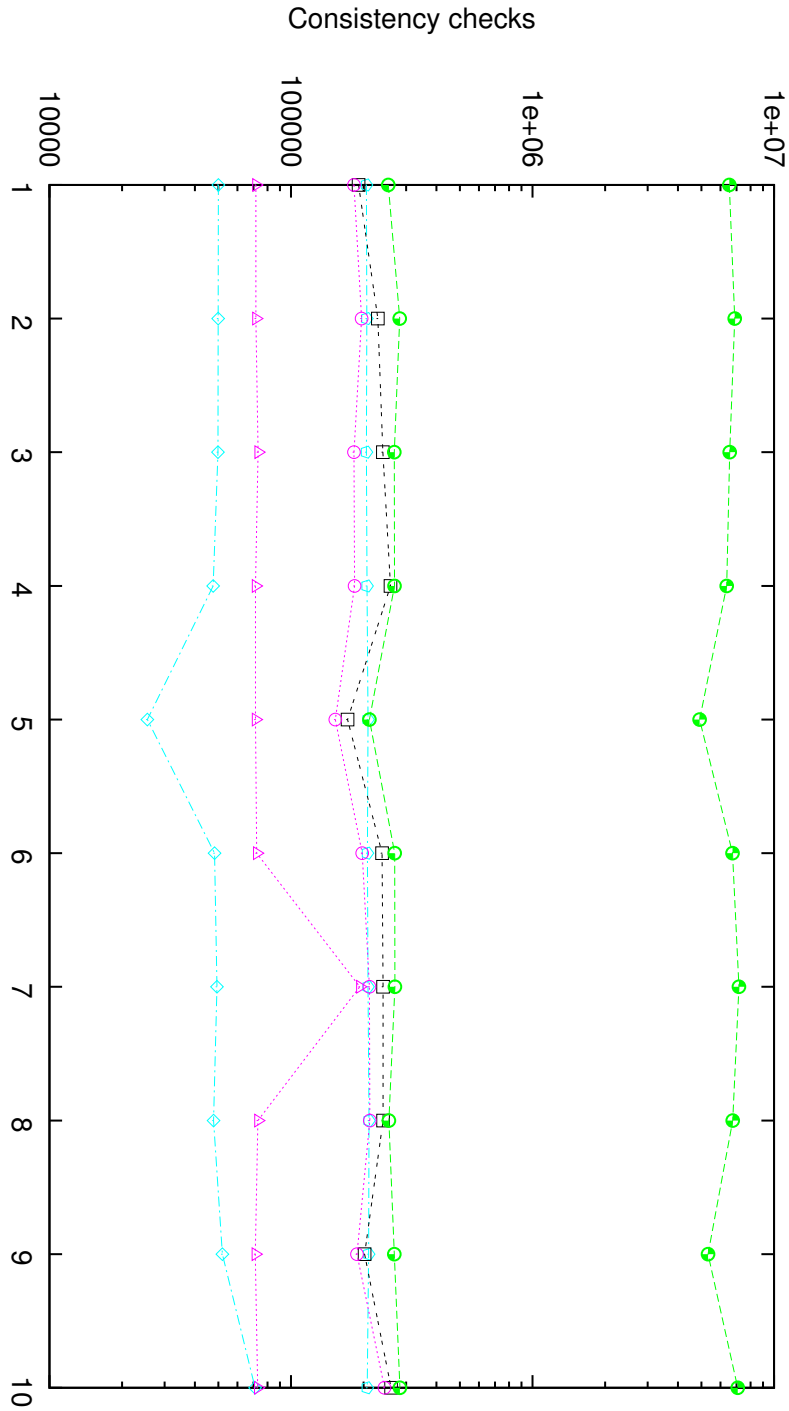

Fig. 756. Consistency checks required for solving instances from class `composed-75-1-2`. The maximum solution time was set to 600 seconds.

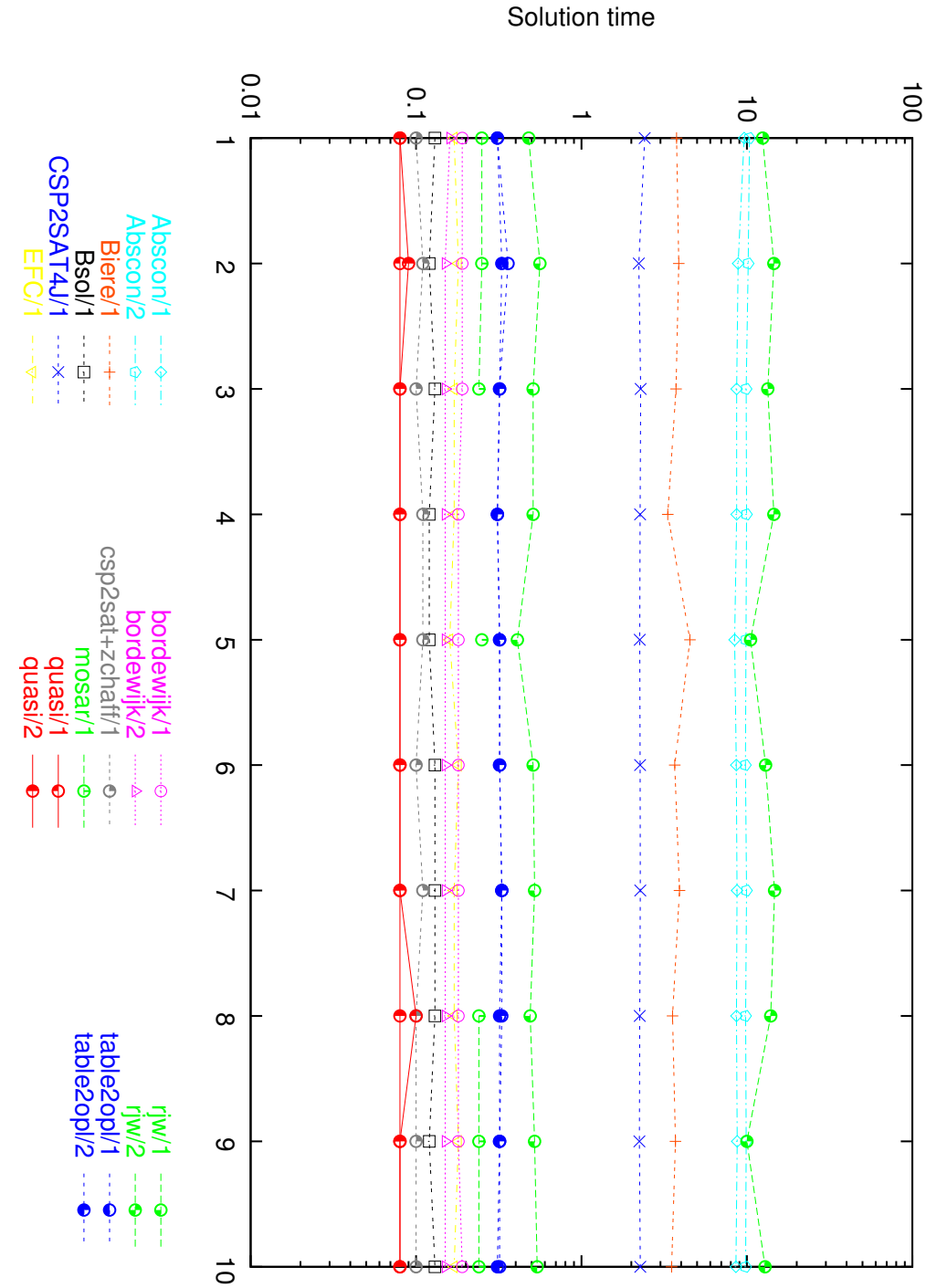

Fig. 757. Solution time in seconds for solving instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

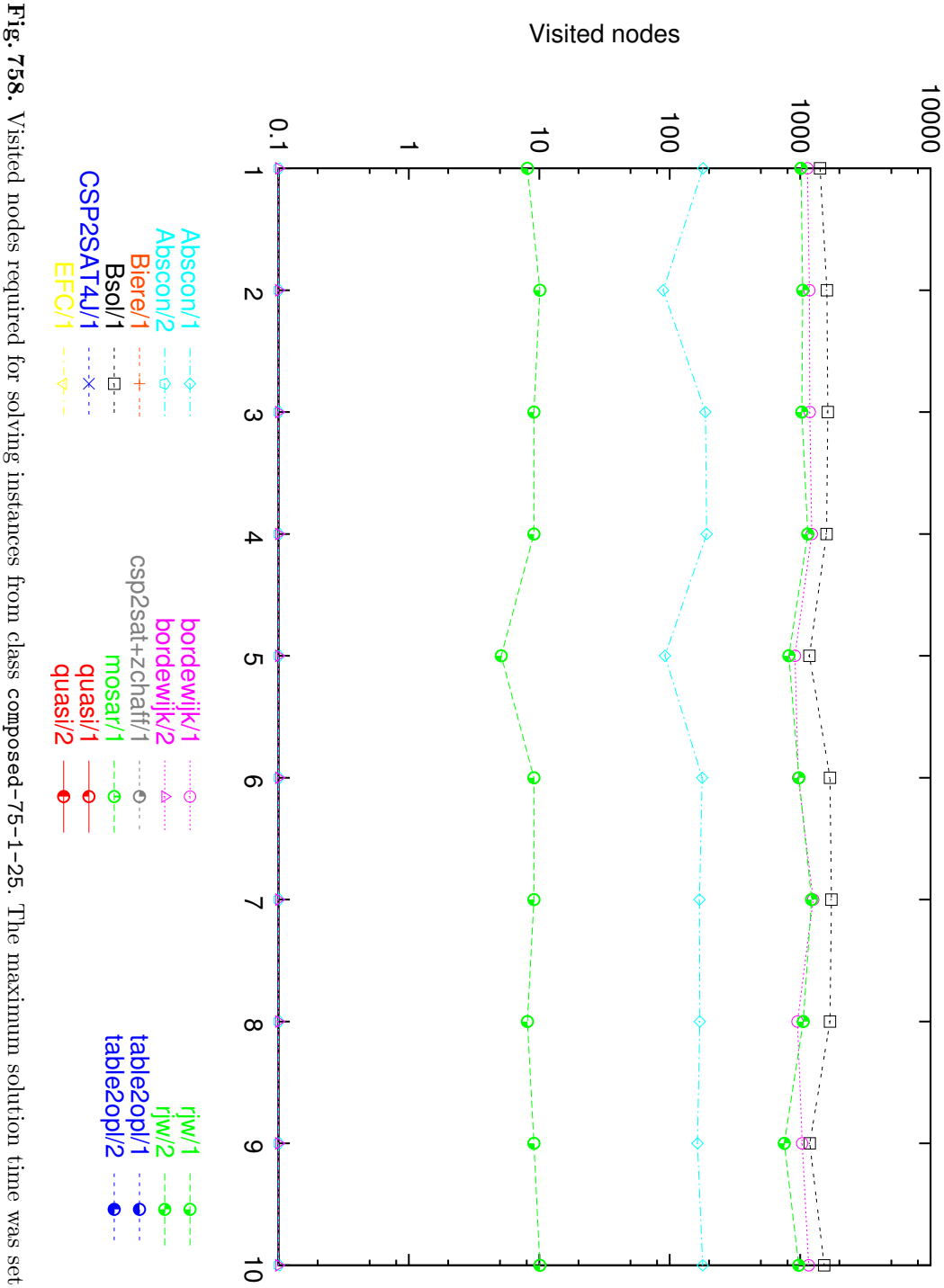

Fig. 758. Visited nodes required for solving instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

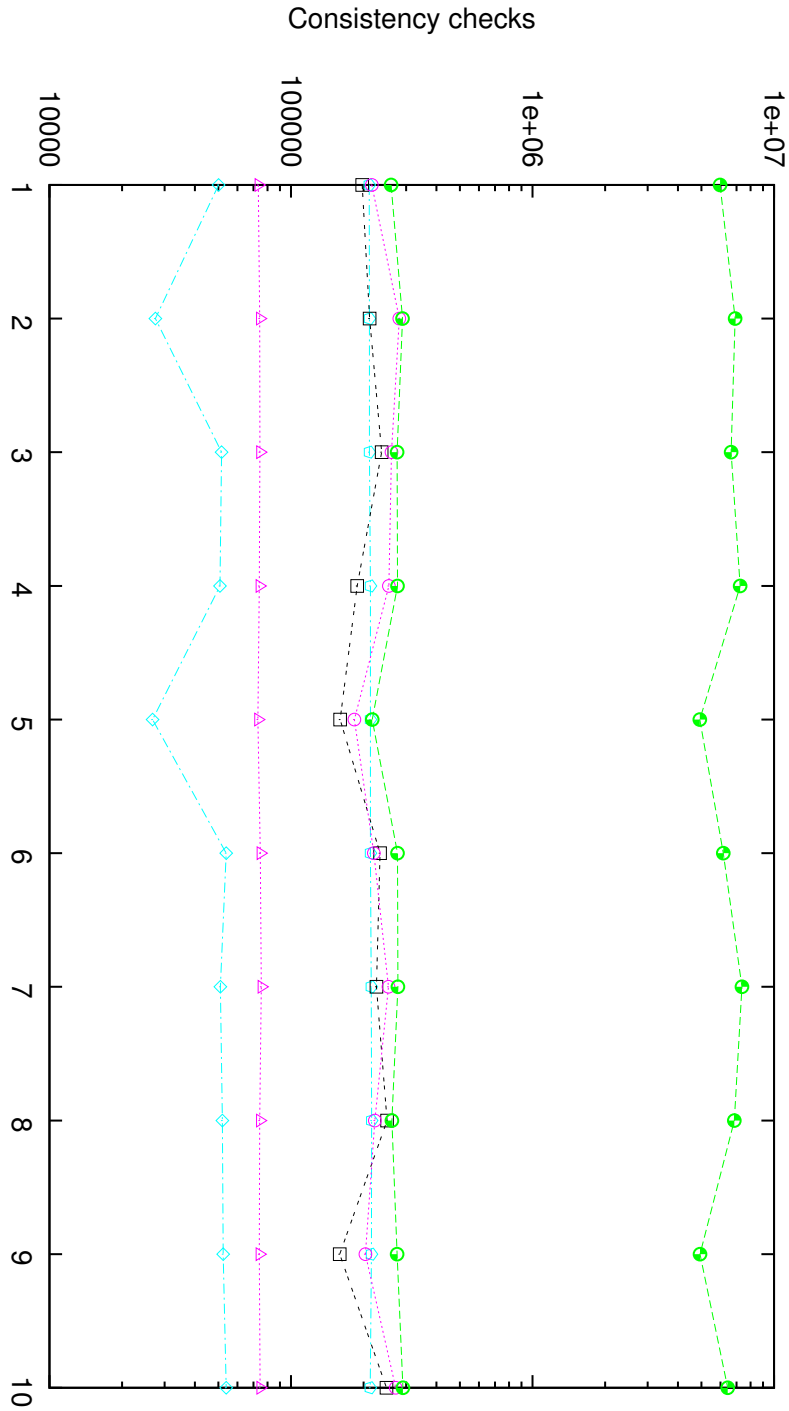

Fig. 759. Consistency checks required for solving instances from class `composed-75-1-25`. The maximum solution time was set to 600 seconds.

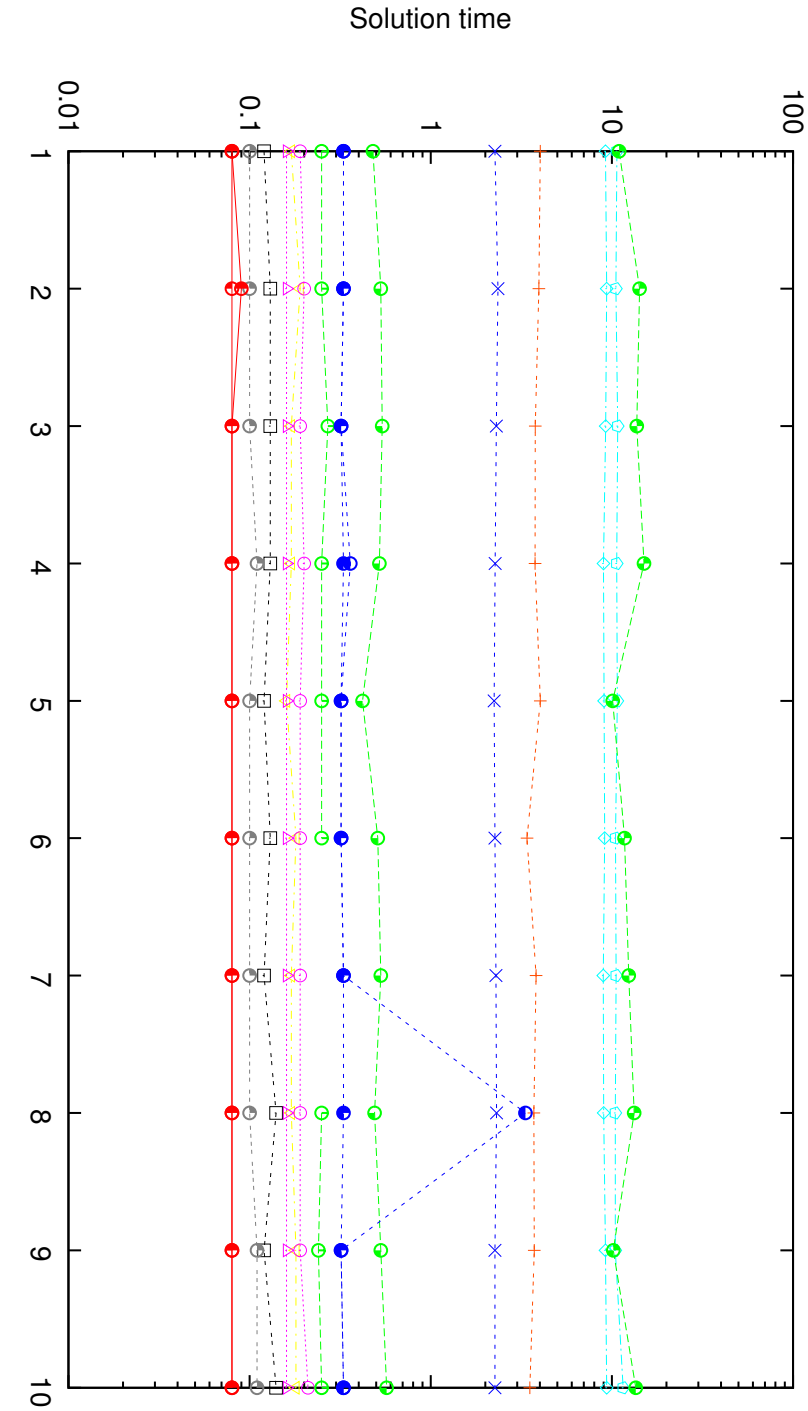

Fig. 760. Solution time in seconds for solving instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

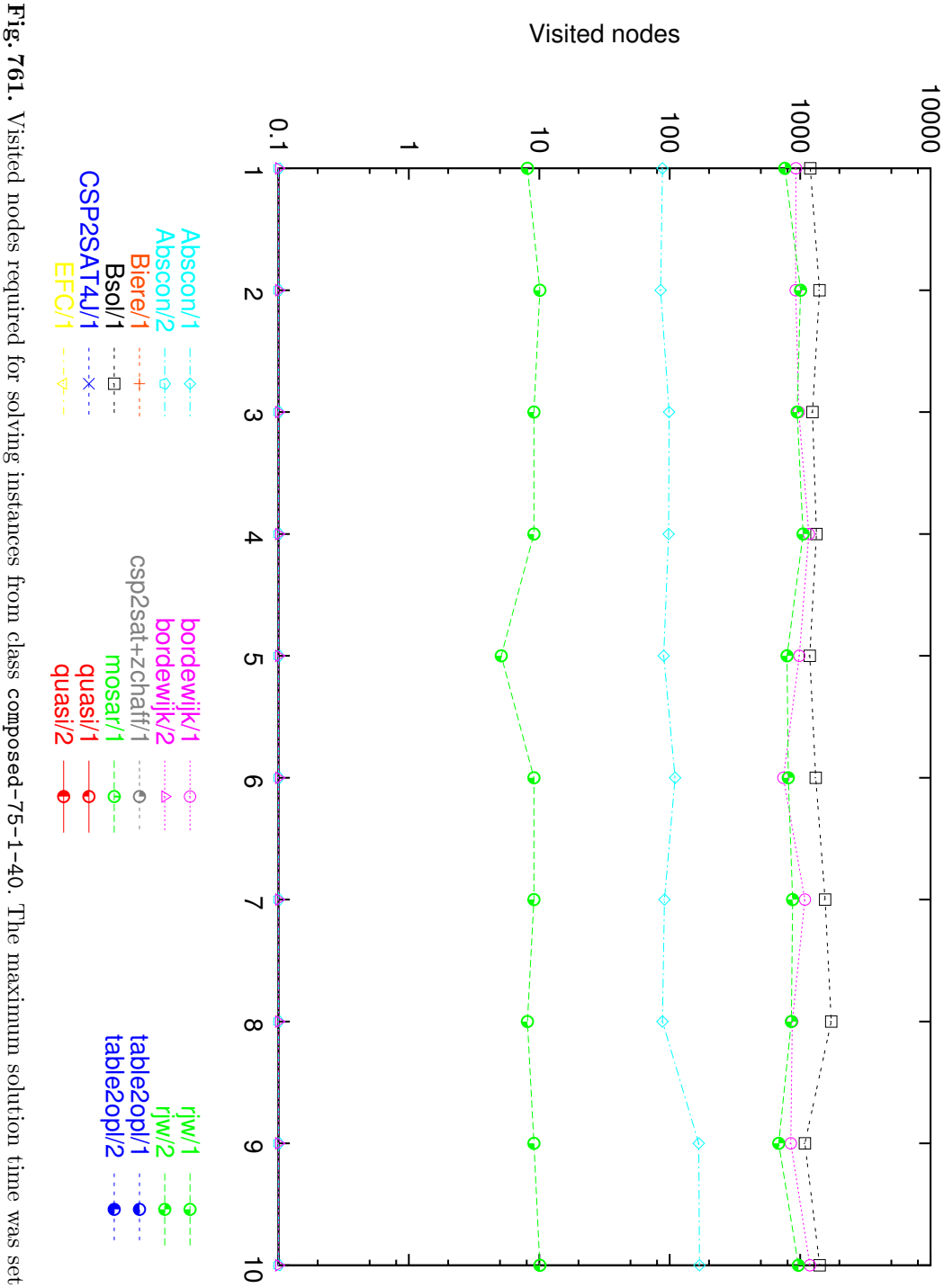

Fig. 761. Visited nodes required for solving instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

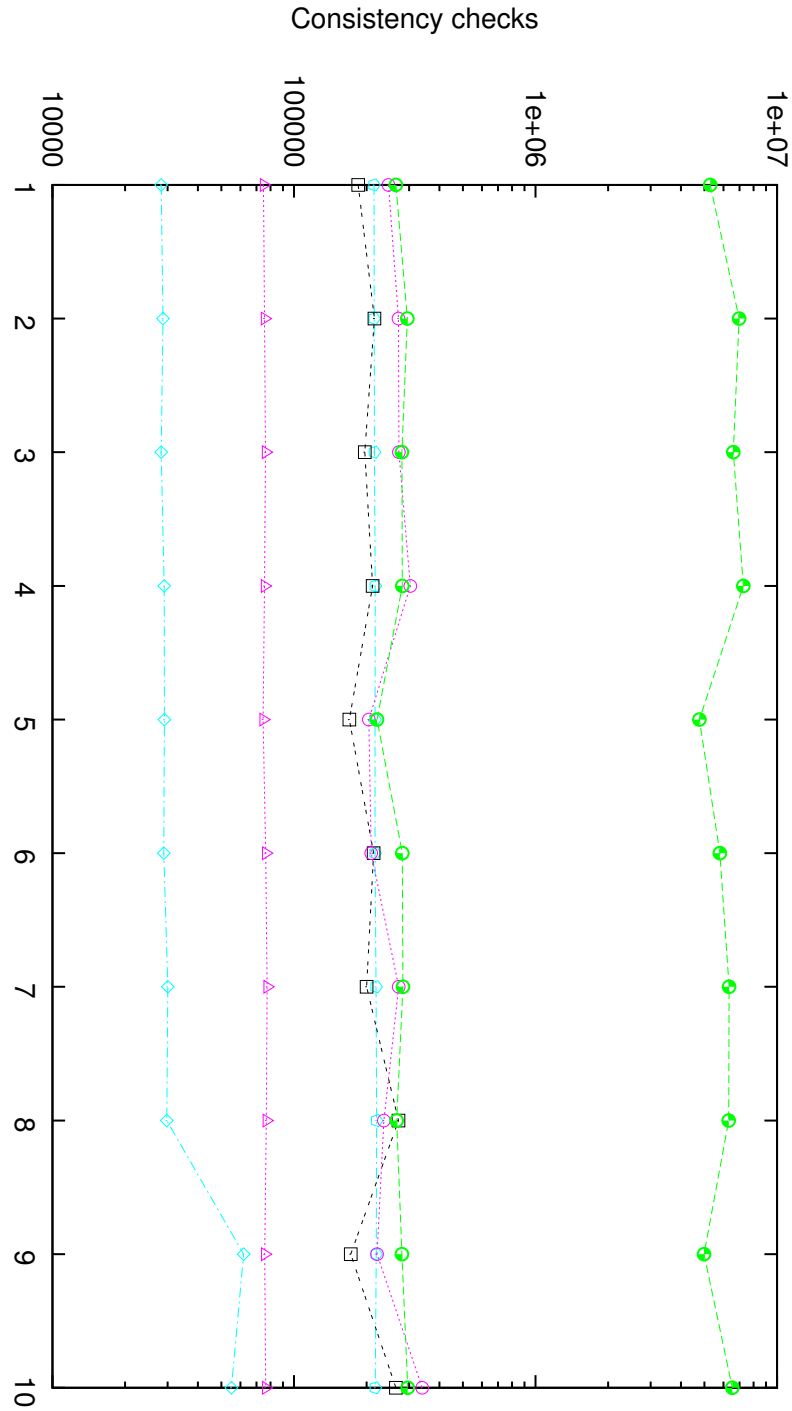

Fig. 762. Consistency checks required for solving instances from class `composed-75-1-40`. The maximum solution time was set to 600 seconds.

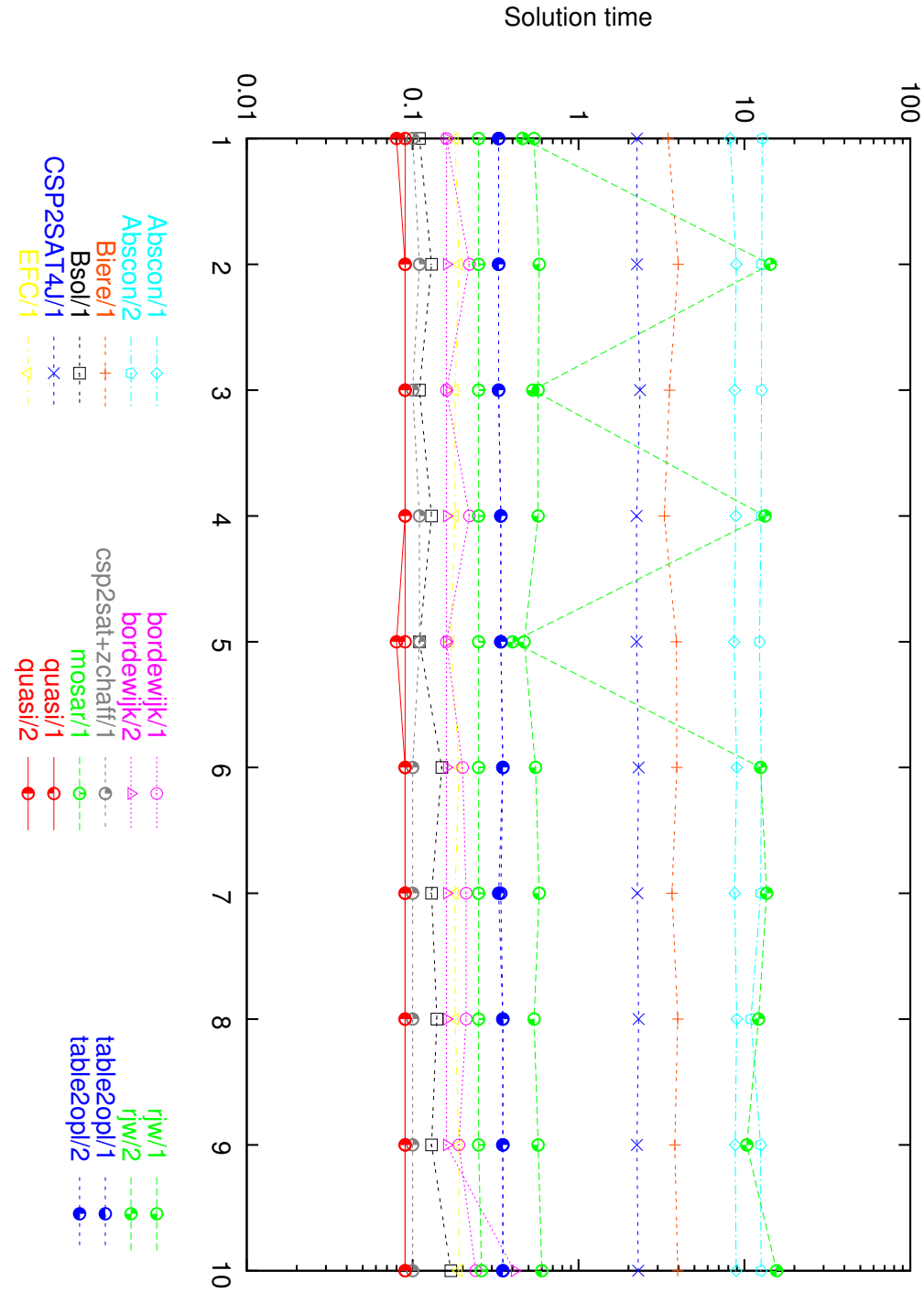

Fig. 763. Solution time in seconds for solving instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

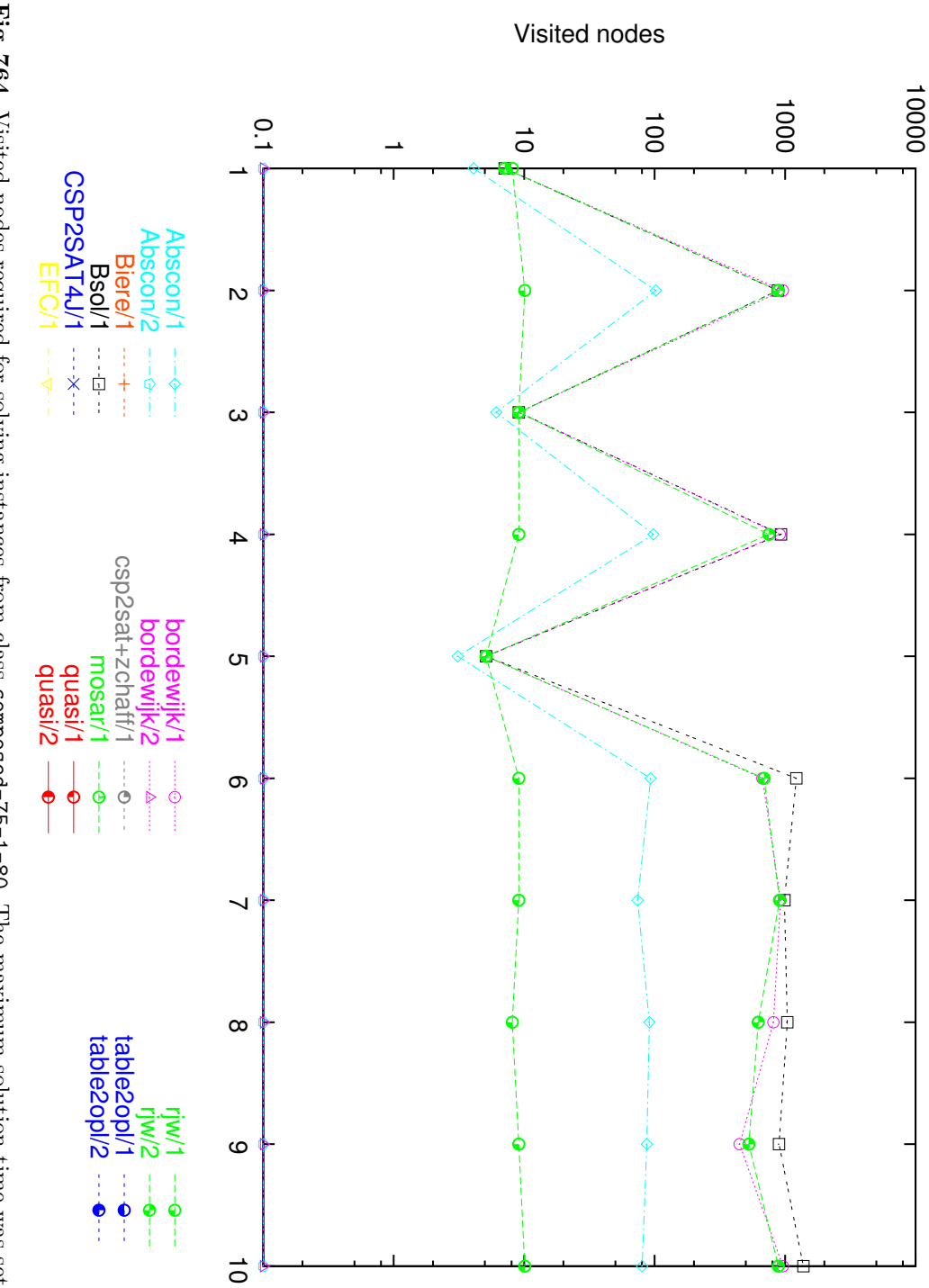

Fig. 764. Visited nodes required for solving instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

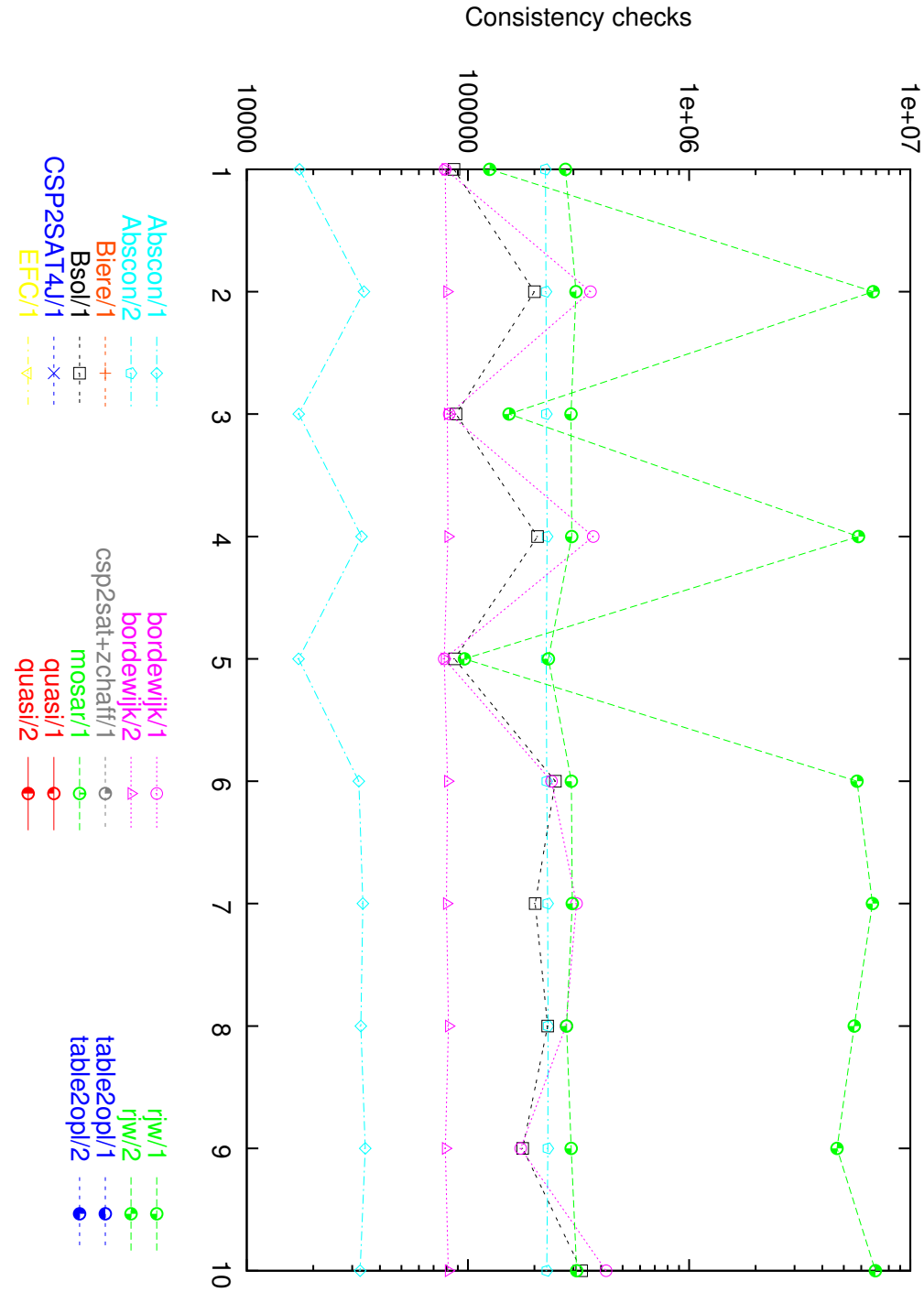

Fig. 765. Consistency checks required for solving instances from class `composed-75-1-80`. The maximum solution time was set to 600 seconds.

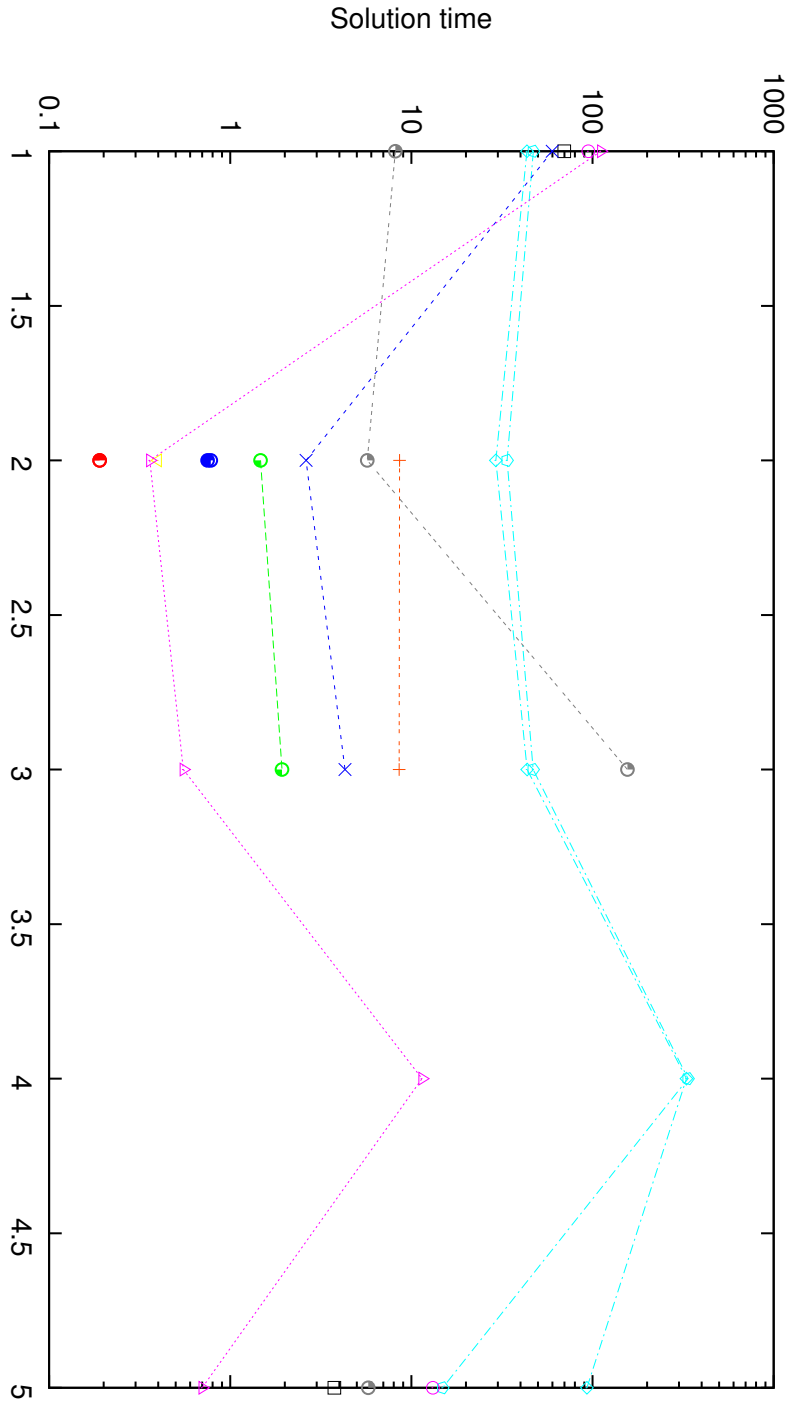

Fig. 766. Solution time in seconds for solving instances from class `cril`. The maximum solution time was set to 600 seconds.

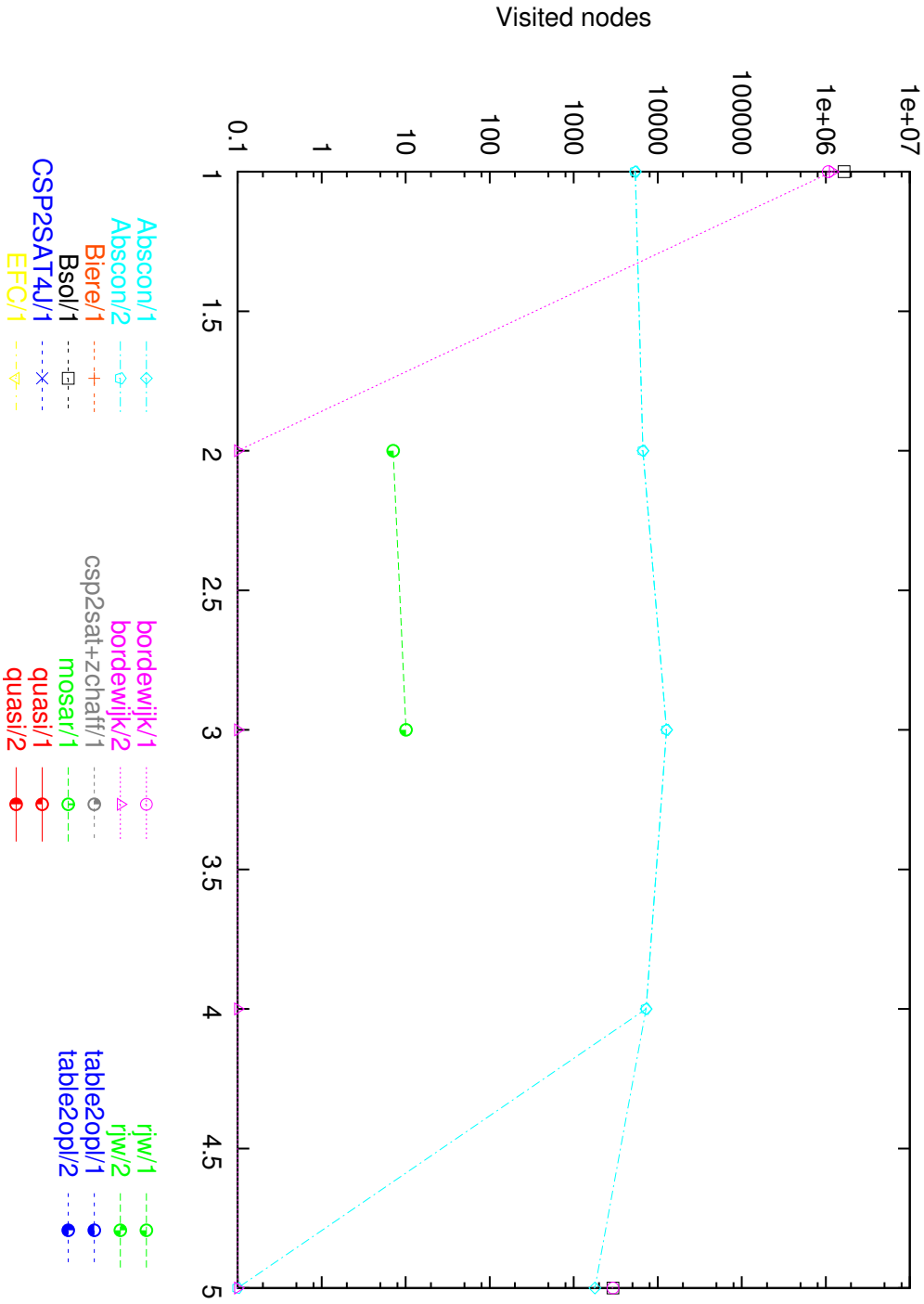

Fig. 767. Visited nodes required for solving instances from class `cril`. The maximum solution time was set to 600 seconds.

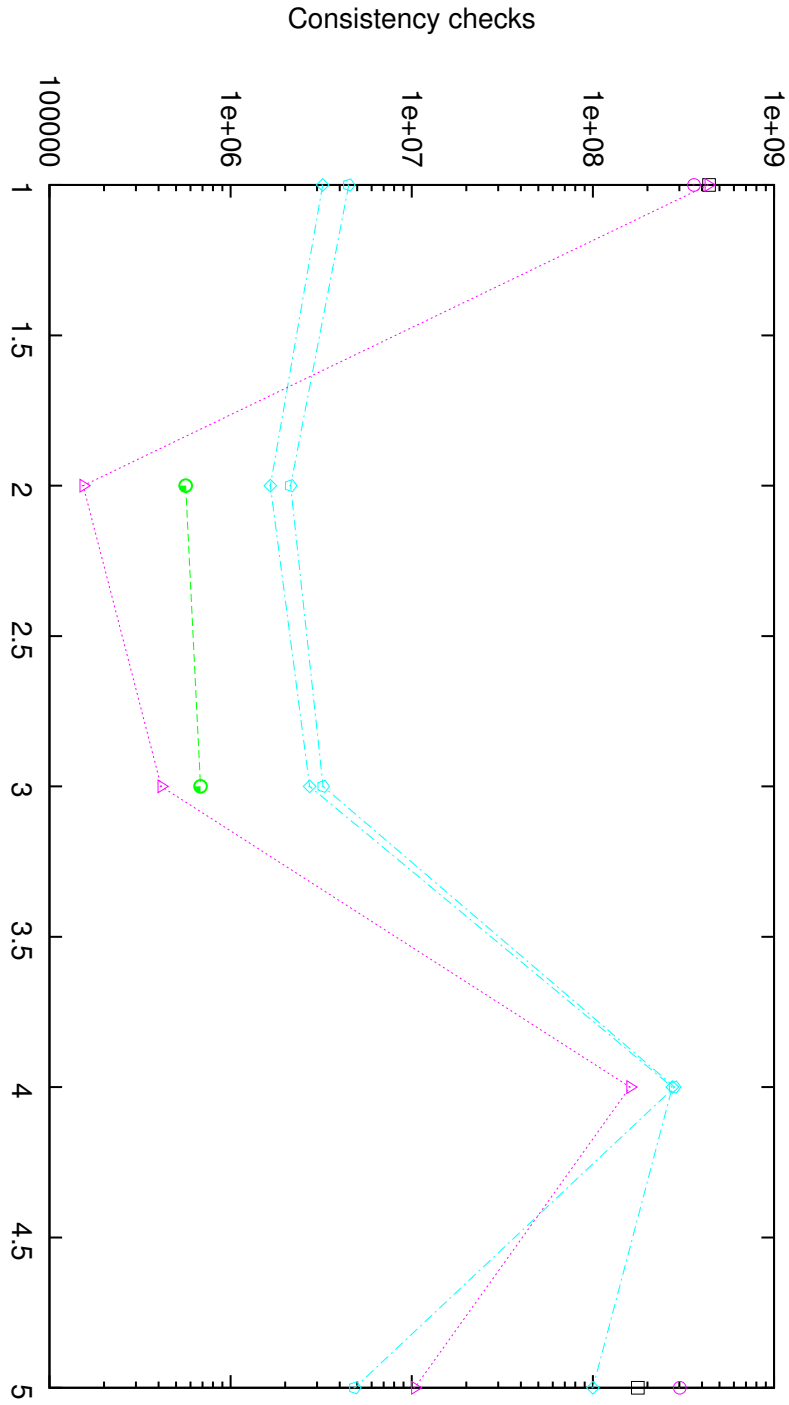

Fig. 768. Consistency checks required for solving instances from class `cril`. The maximum solution time was set to 600 seconds.

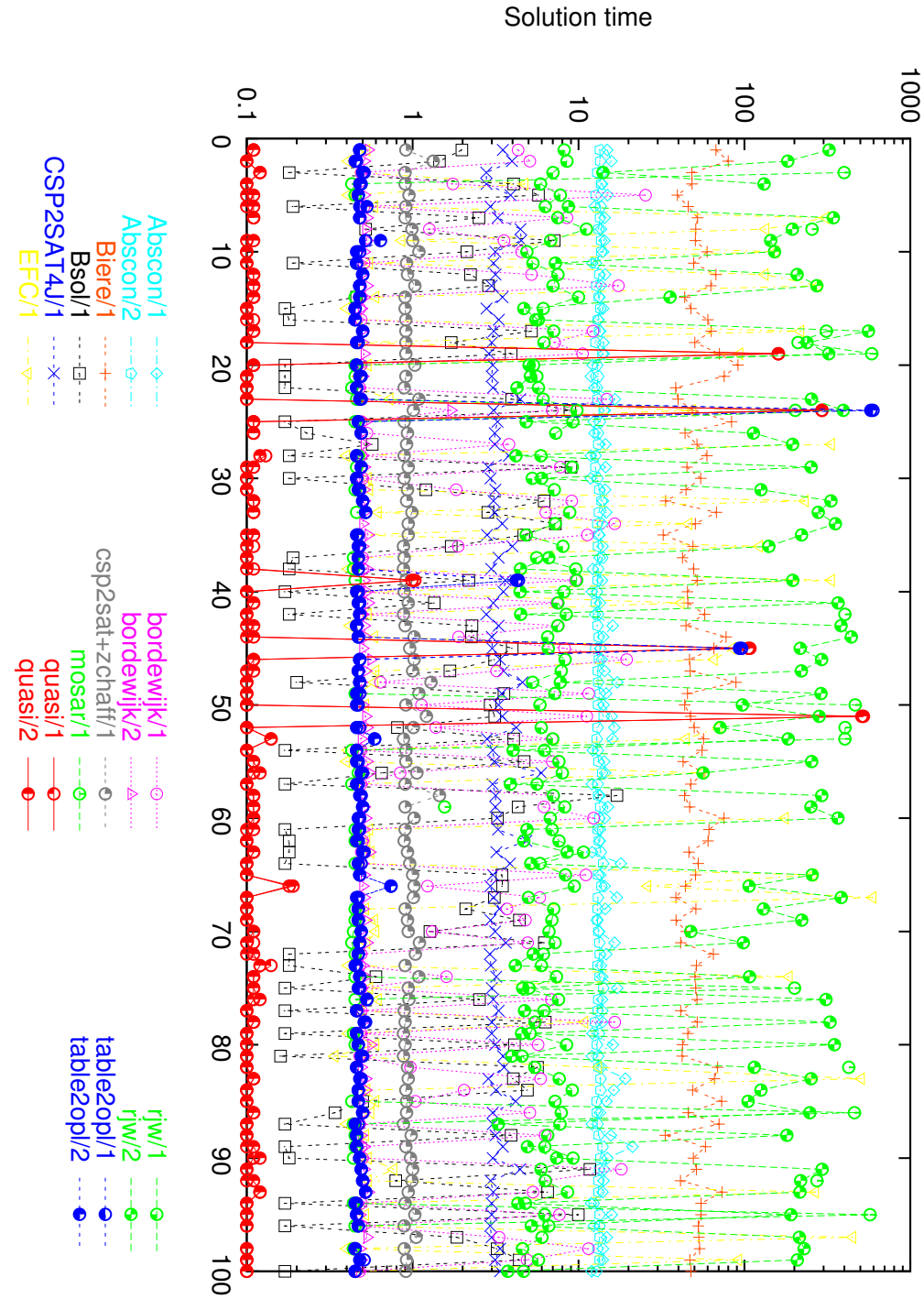

Fig. 769. Solution time in seconds for solving instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

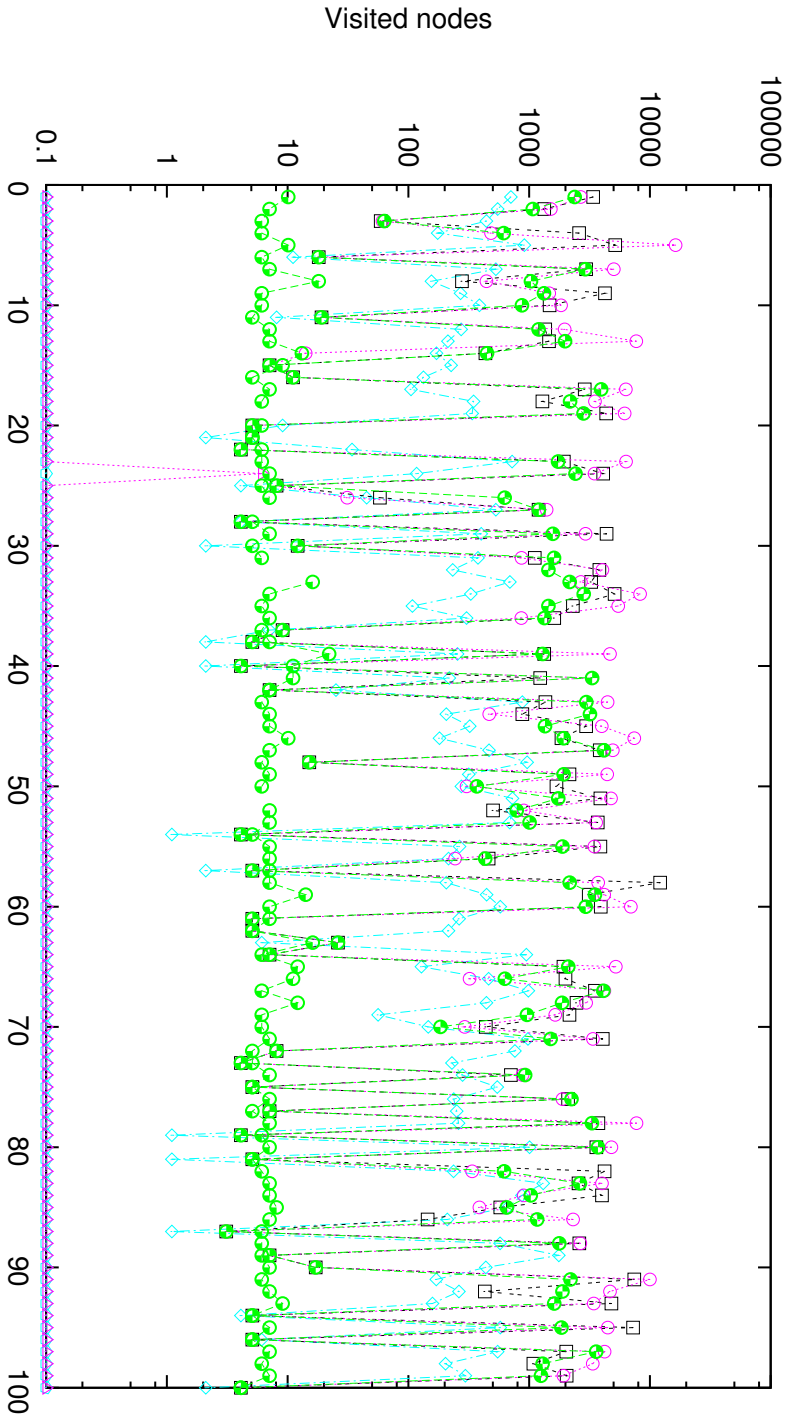

Fig. 770. Visited nodes required for solving instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

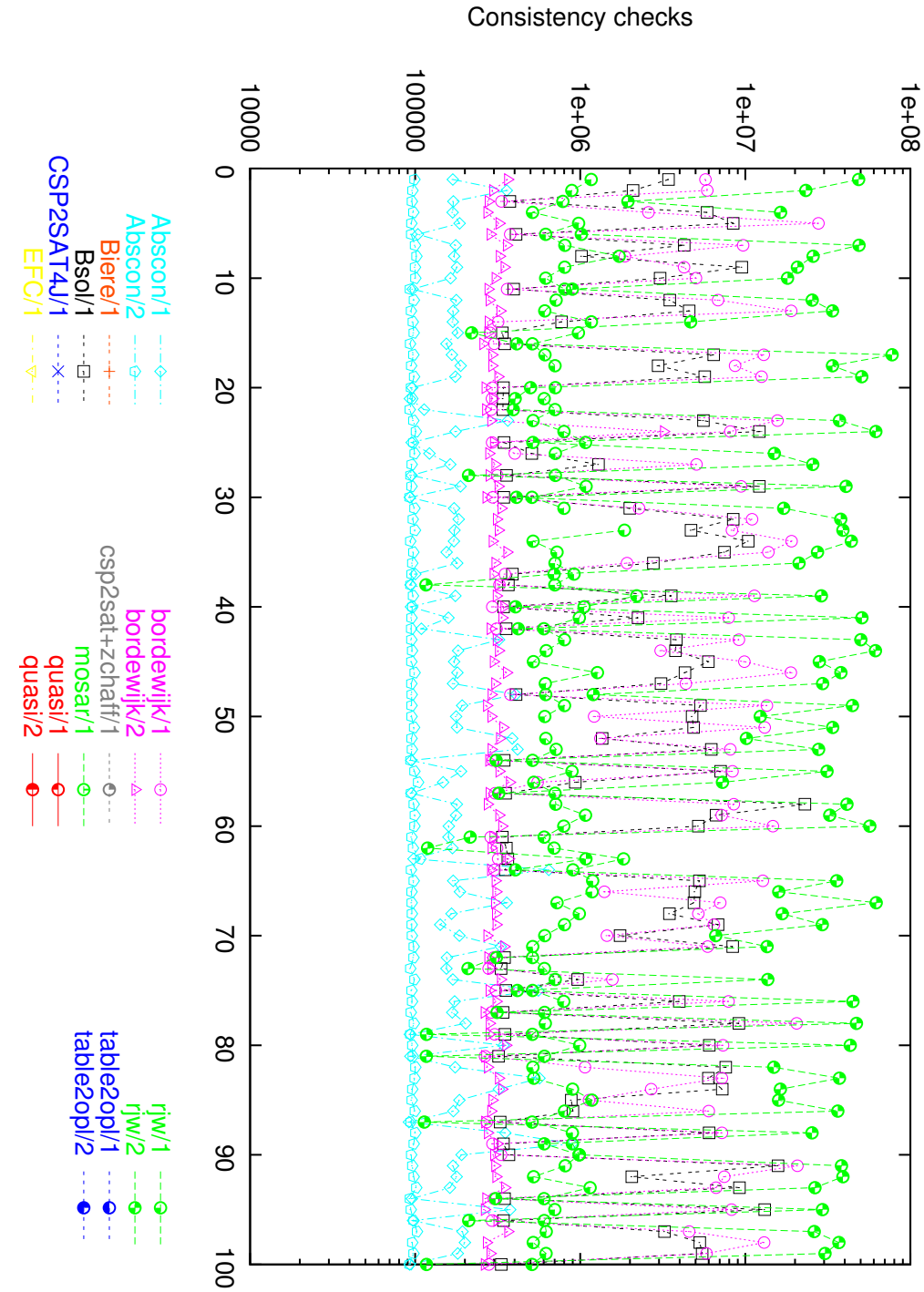

Fig. 771. Consistency checks required for solving instances from class `ehi-85`. The maximum solution time was set to 600 seconds.

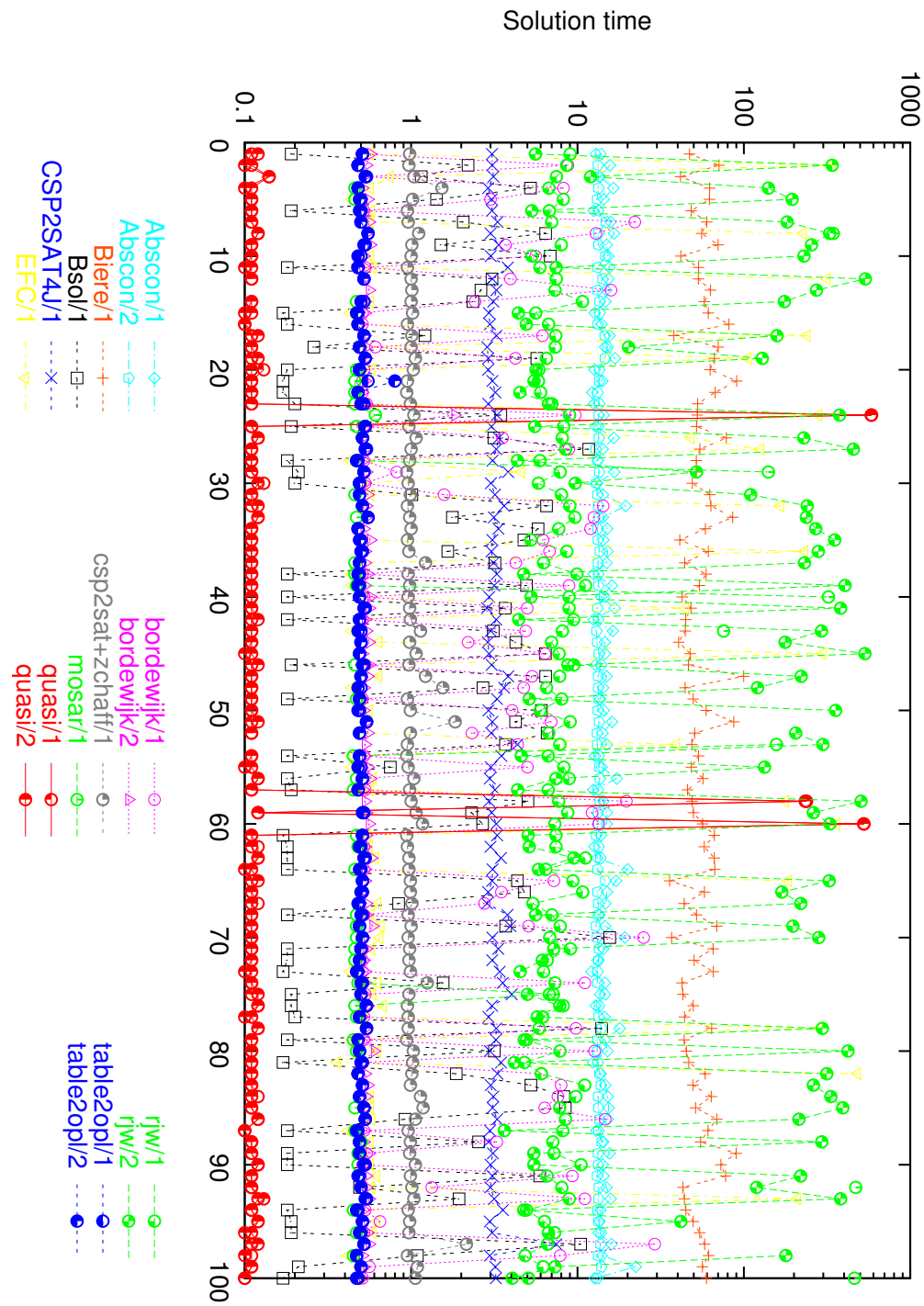

Fig. 772. Solution time in seconds for solving instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

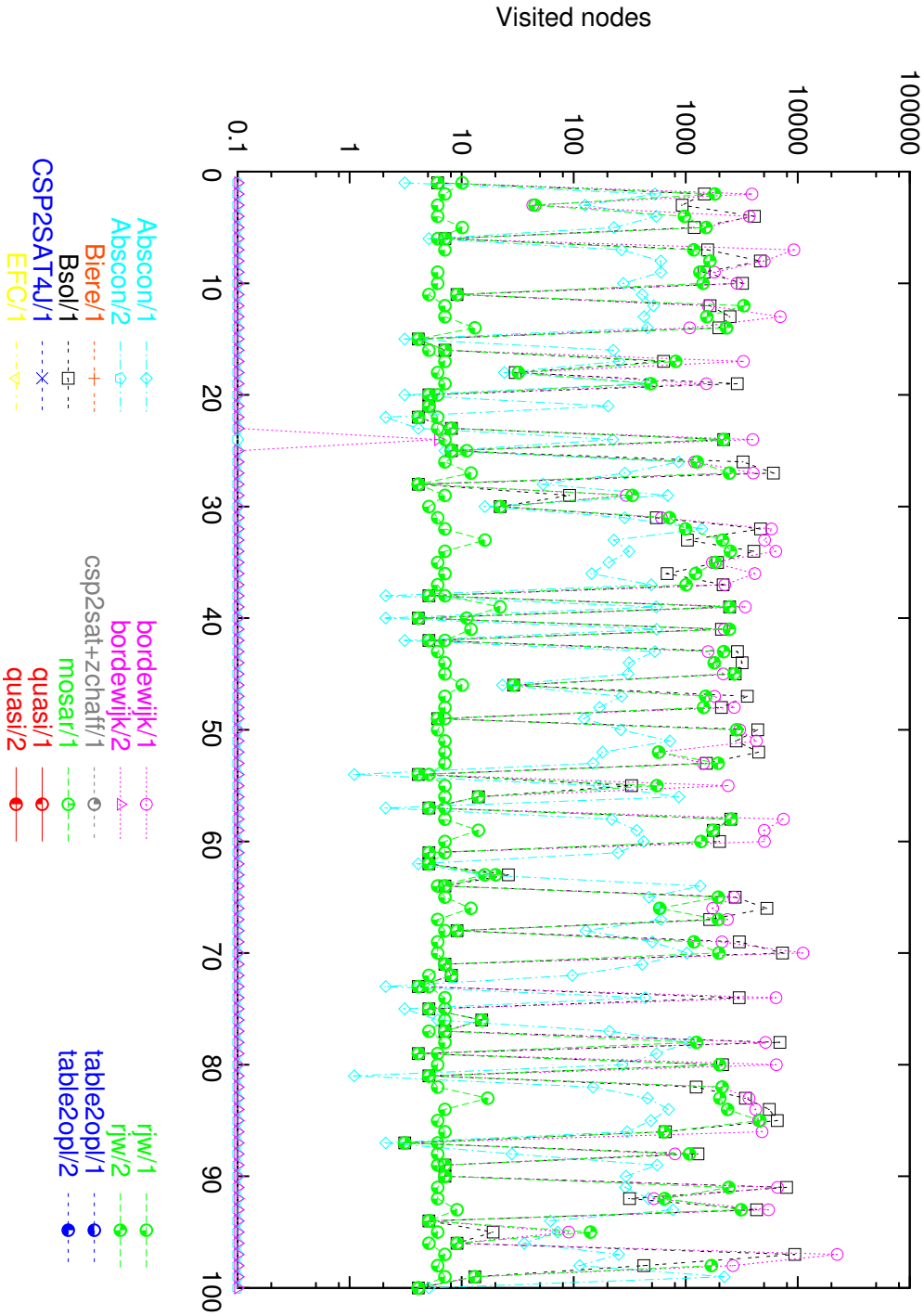

Fig. 773. Visited nodes required for solving instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

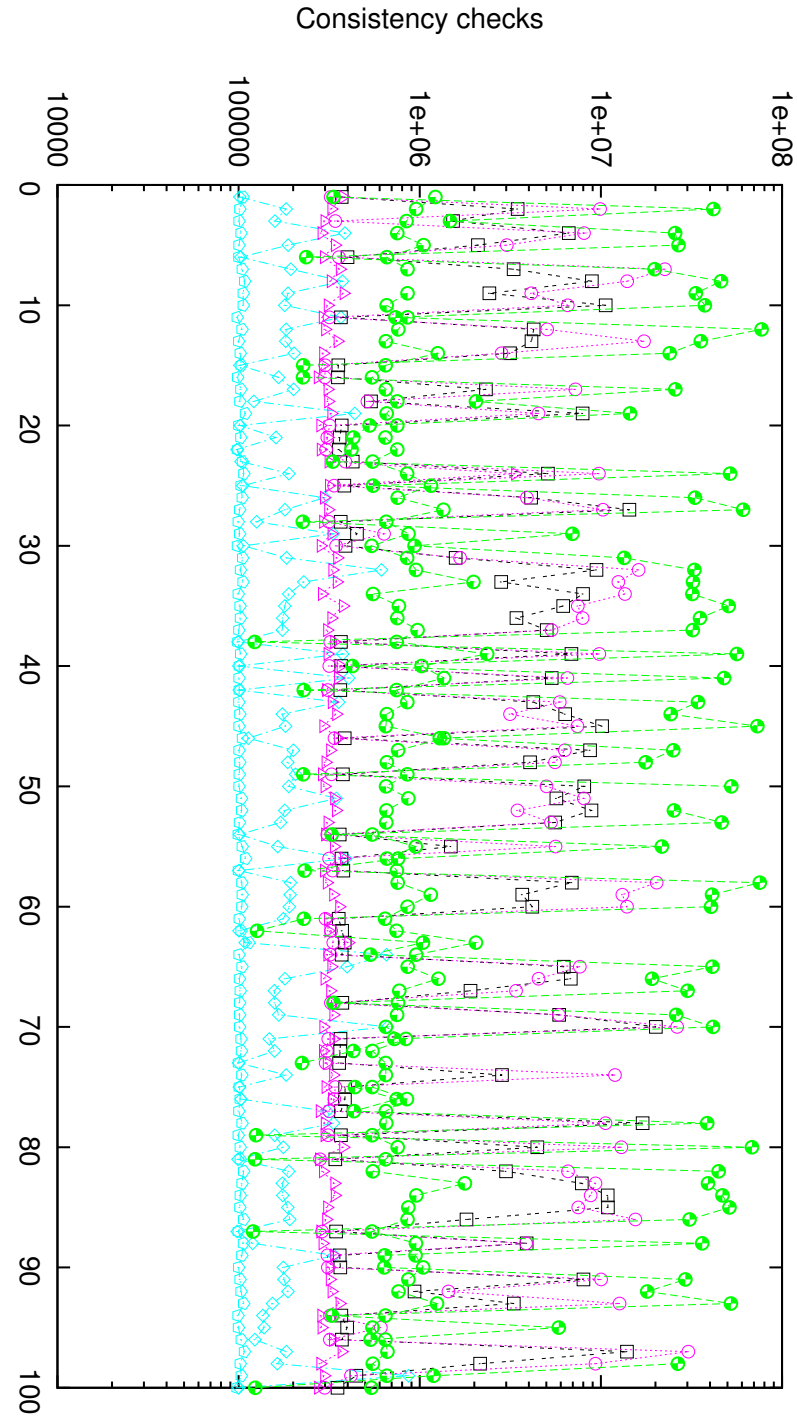

Fig. 774. Consistency checks required for solving instances from class `ehi-90`. The maximum solution time was set to 600 seconds.

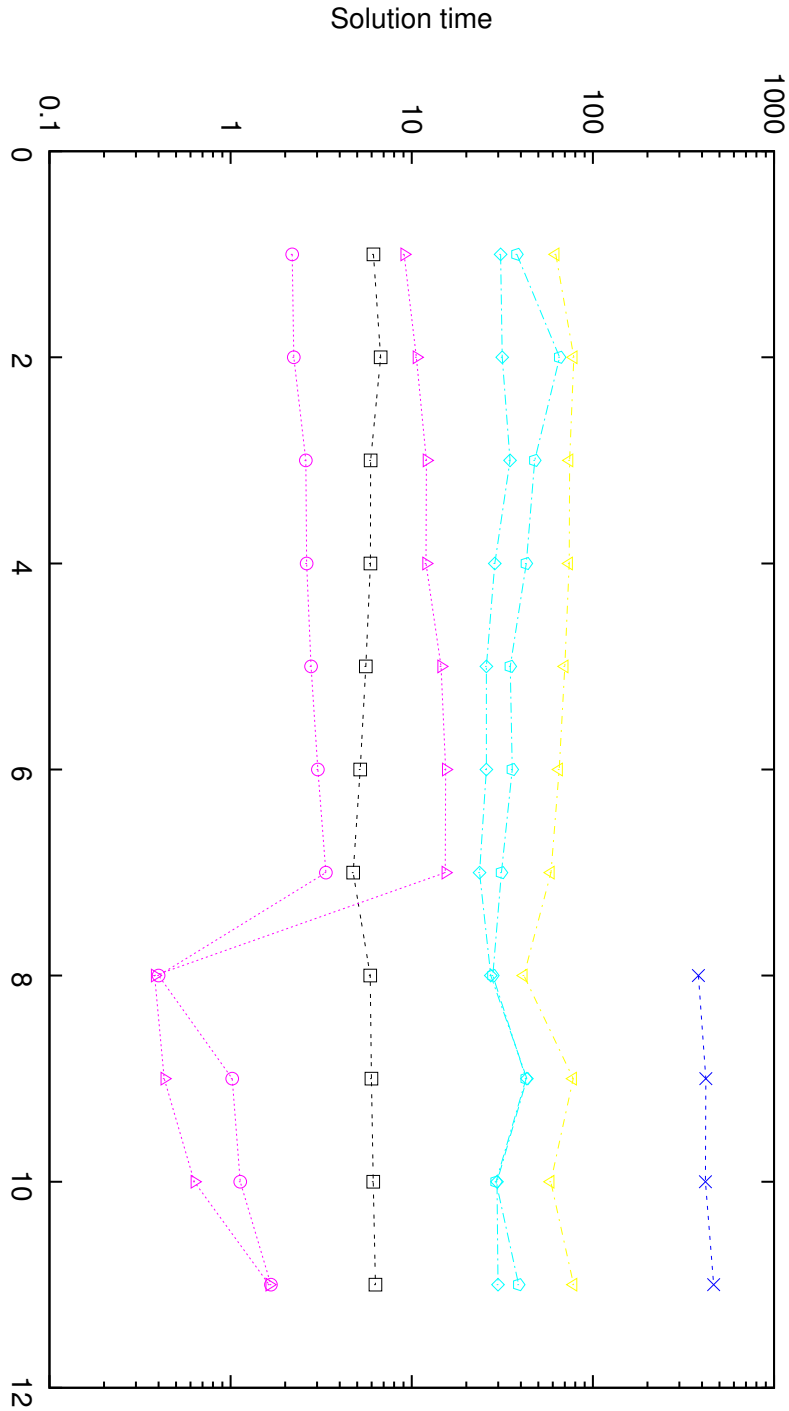

Fig. 775. Solution time in seconds for solving instances from class `fapp01`. The maximum solution time was set to 600 seconds.

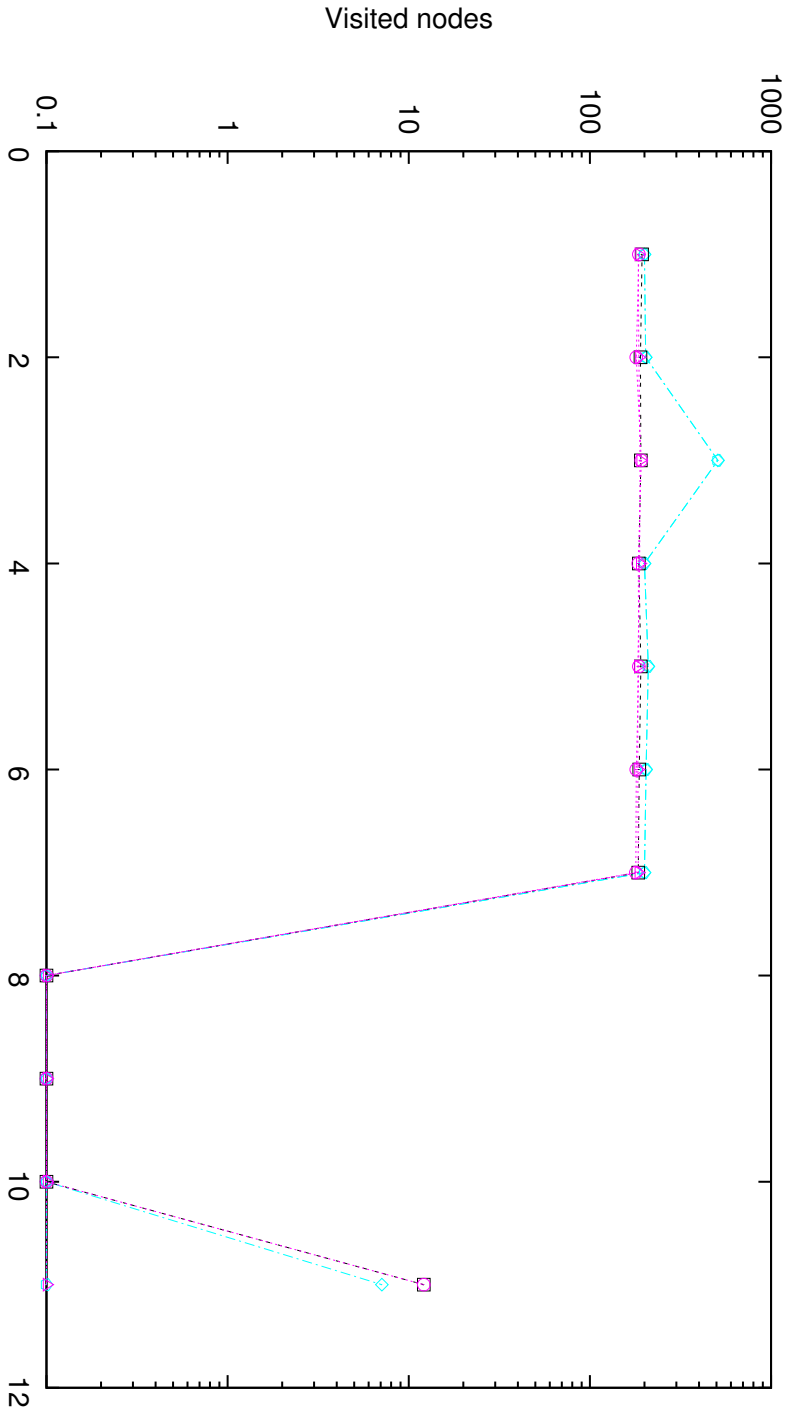

Fig. 776. Visited nodes required for solving instances from class `fapp01`. The maximum solution time was set to 600 seconds.

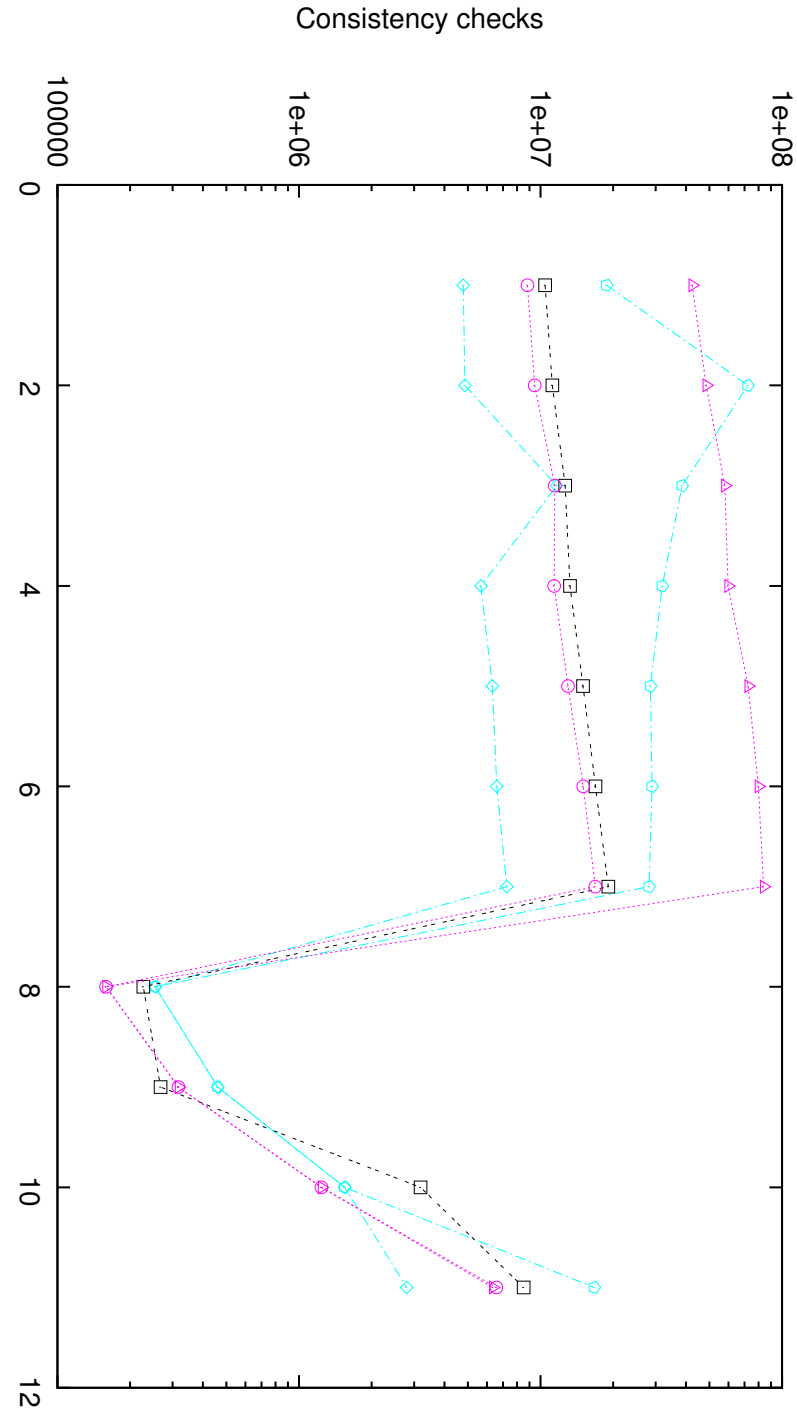

Fig. 777. Consistency checks required for solving instances from class `fapp01`. The maximum solution time was set to 600 seconds.

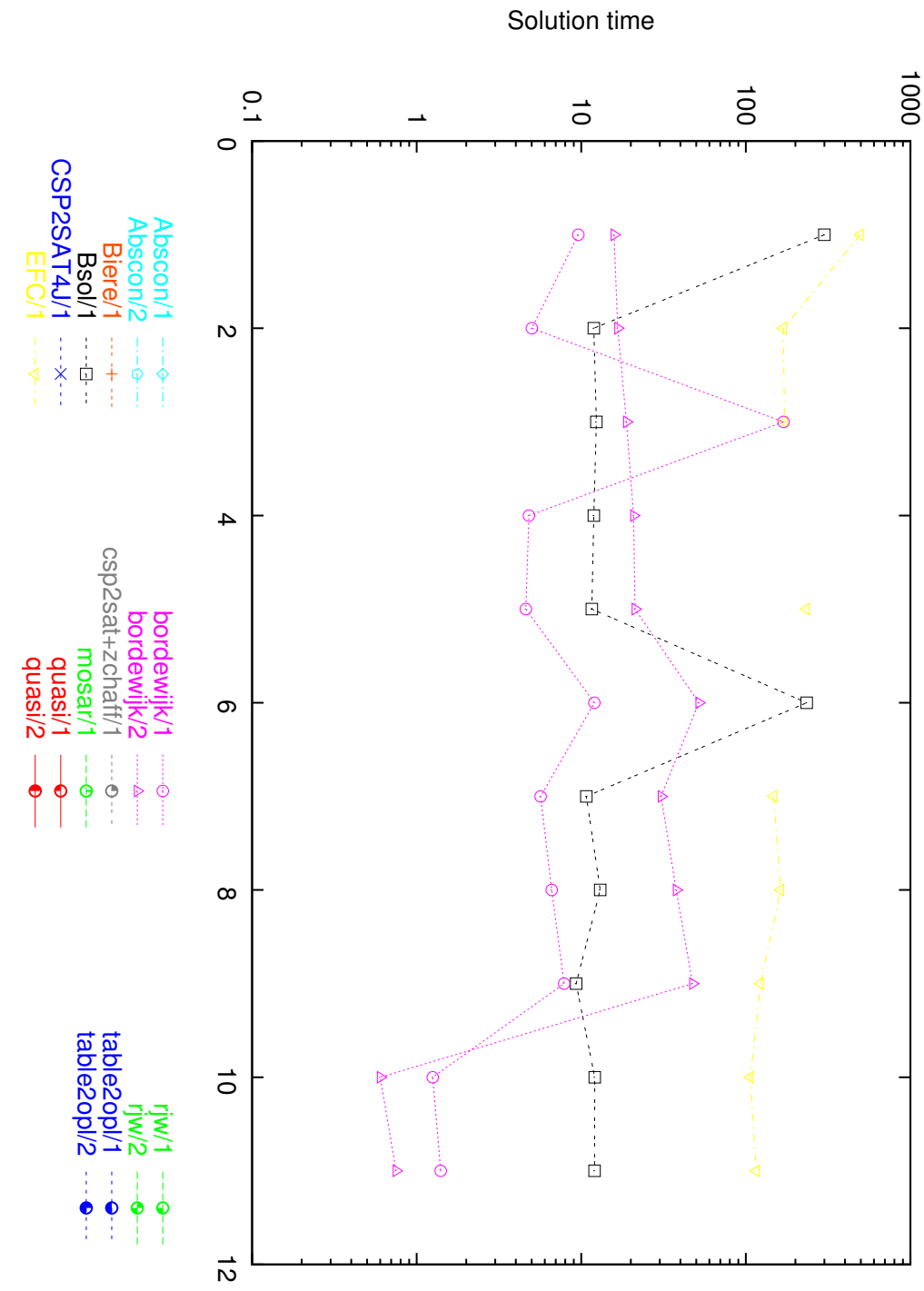

Fig. 778. Solution time in seconds for solving instances from class `fapp02`. The maximum solution time was set to 600 seconds.

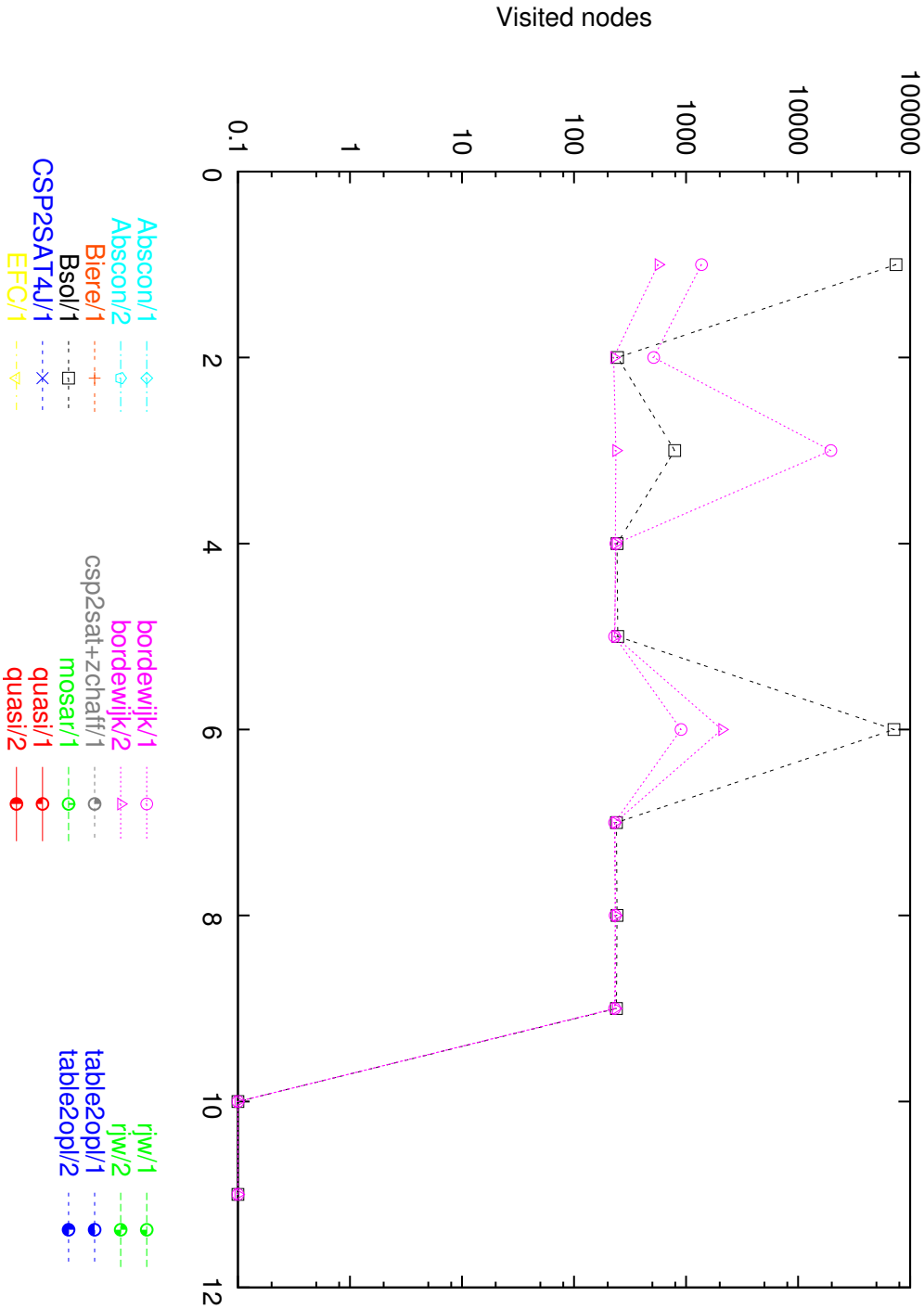

Fig. 779. Visited nodes required for solving instances from class `fapp02`. The maximum solution time was set to 600 seconds.

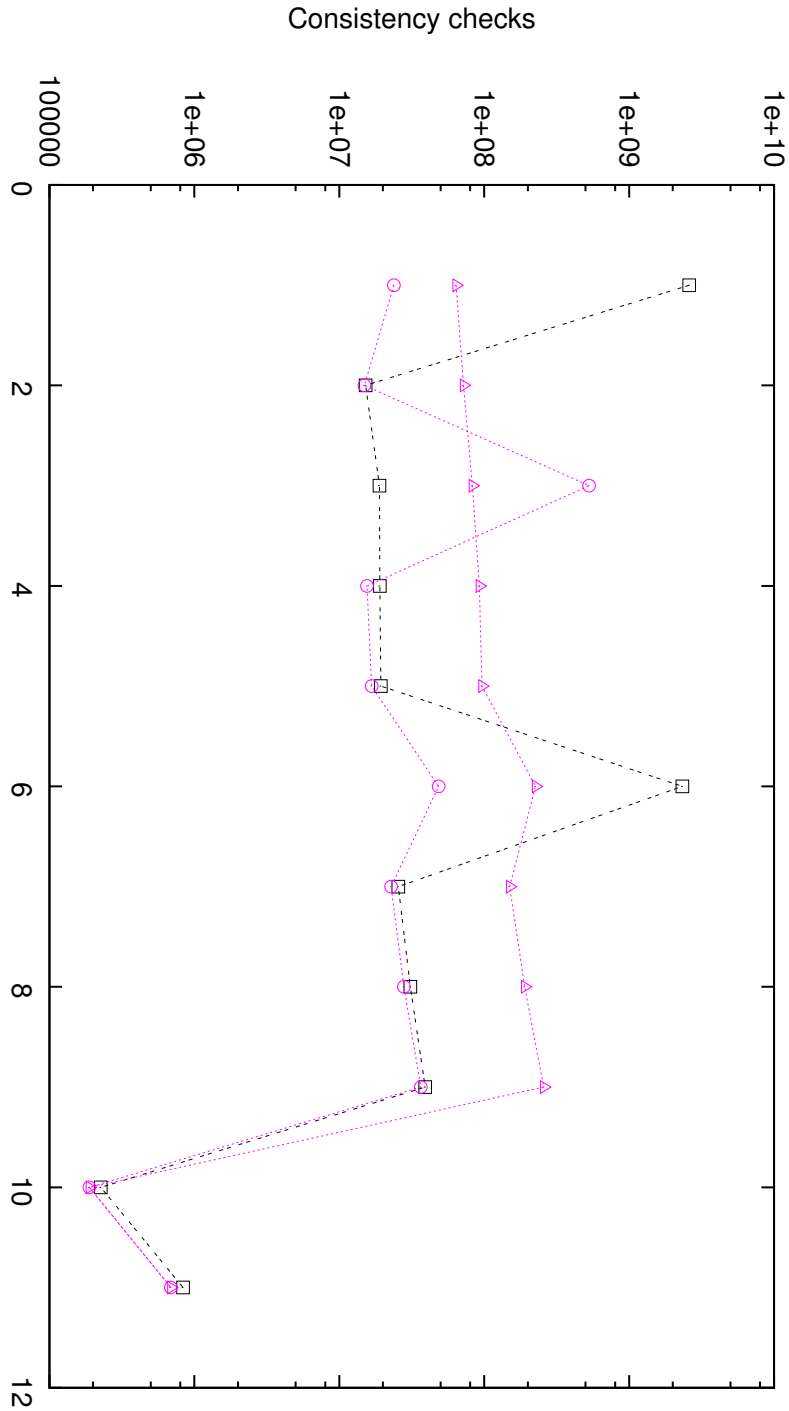

Fig. 780. Consistency checks required for solving instances from class `fapp02`. The maximum solution time was set to 600 seconds.

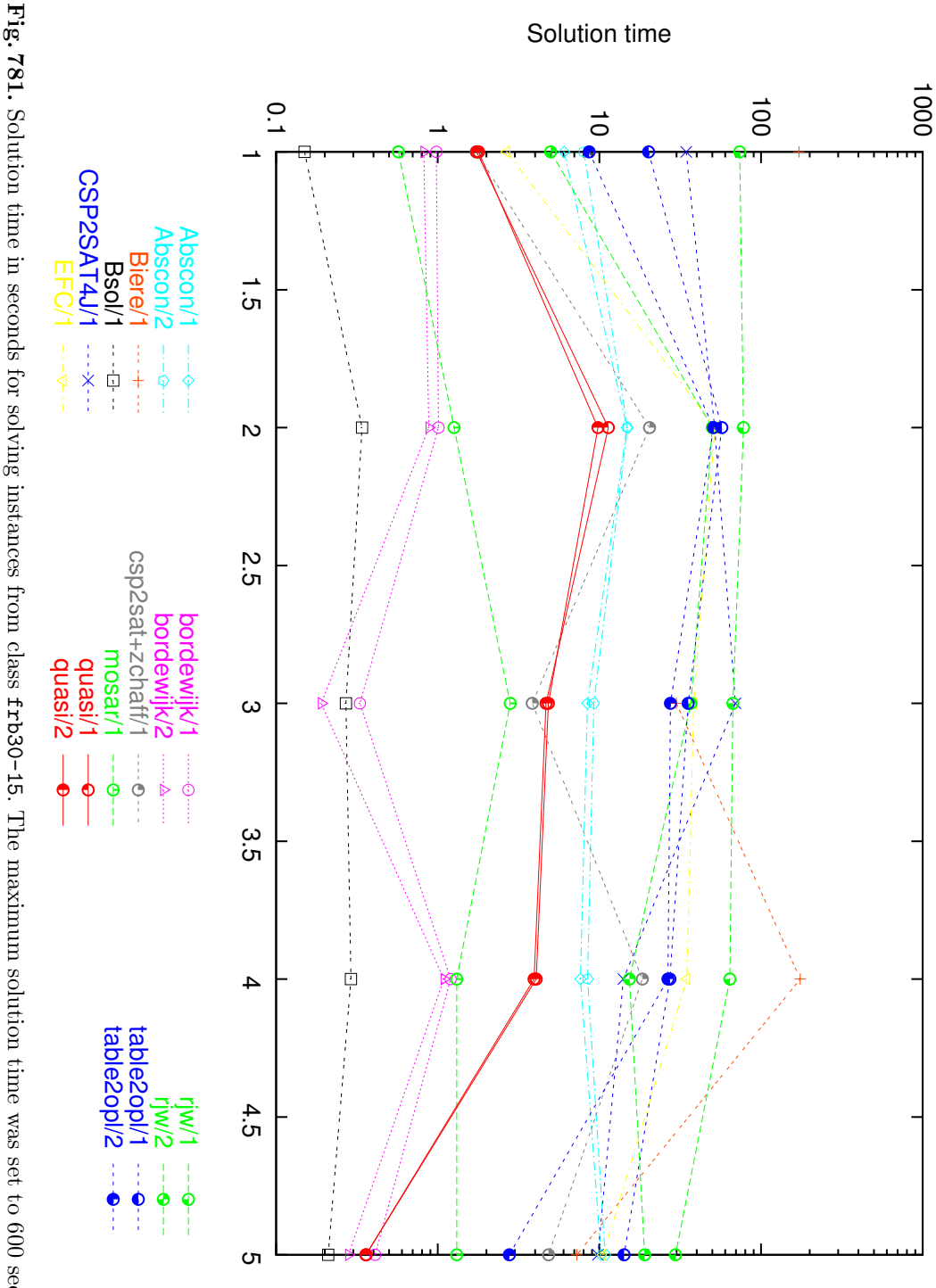

Fig. 781. Solution time in seconds for solving instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

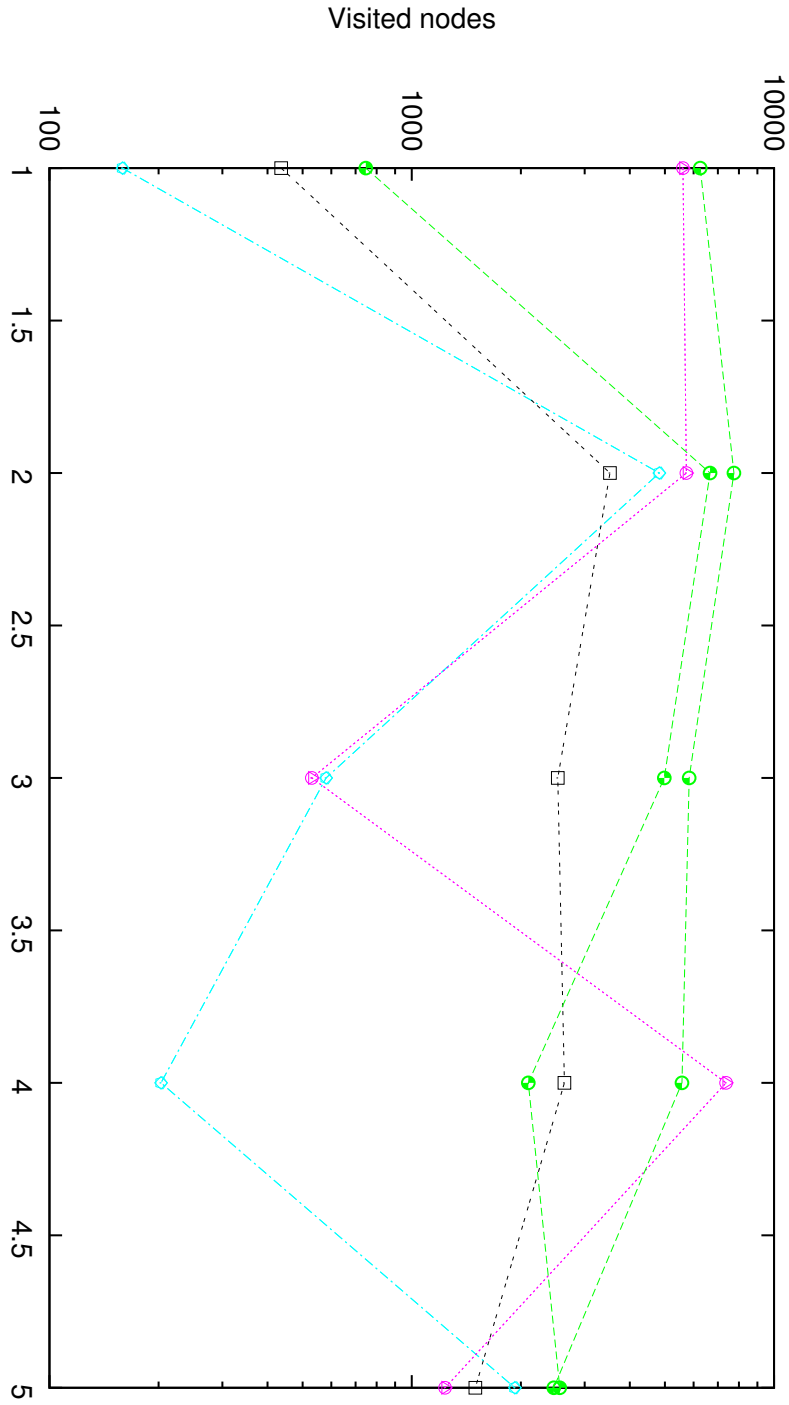

Fig. 782. Visited nodes required for solving instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

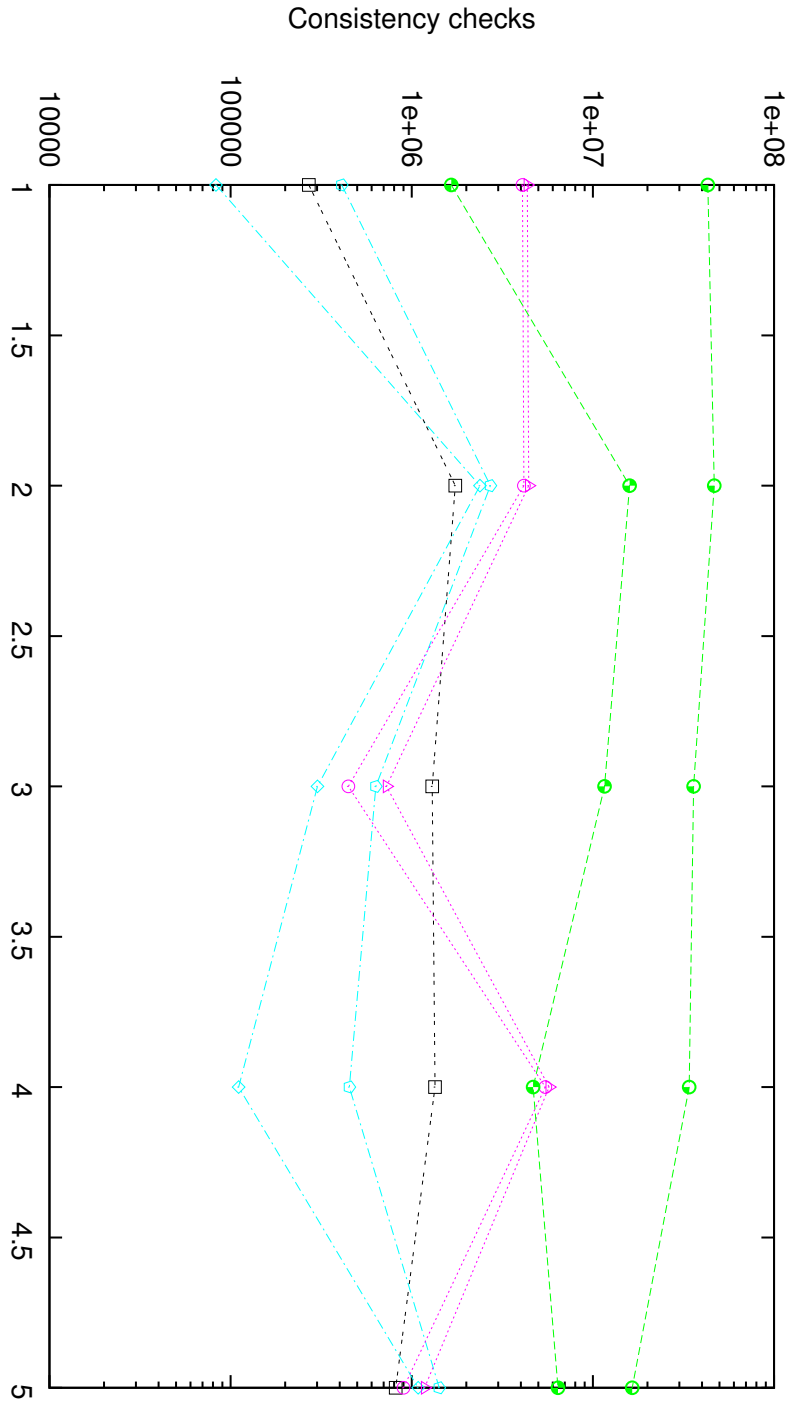

Fig. 783. Consistency checks required for solving instances from class `frb30-15`. The maximum solution time was set to 600 seconds.

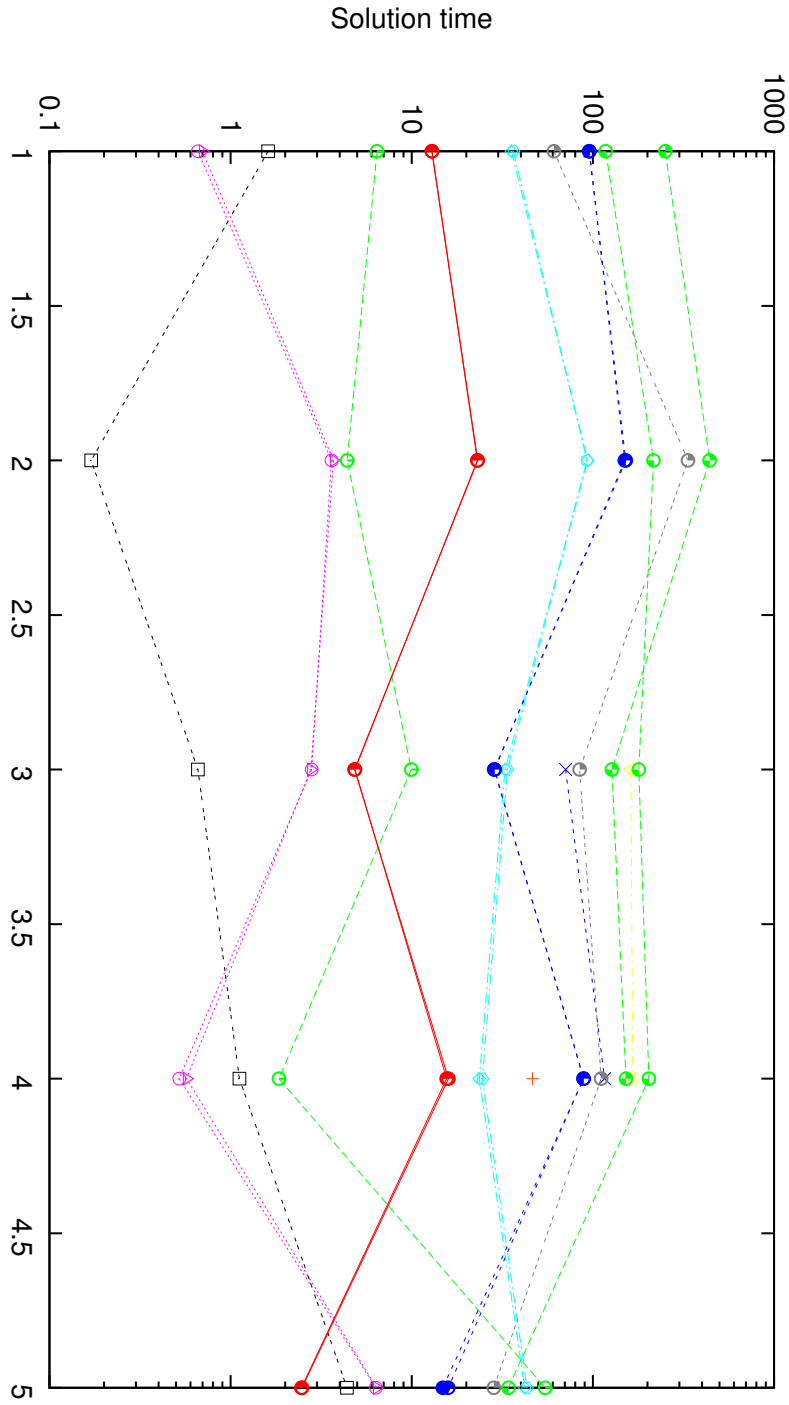

Fig. 784. Solution time in seconds for solving instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

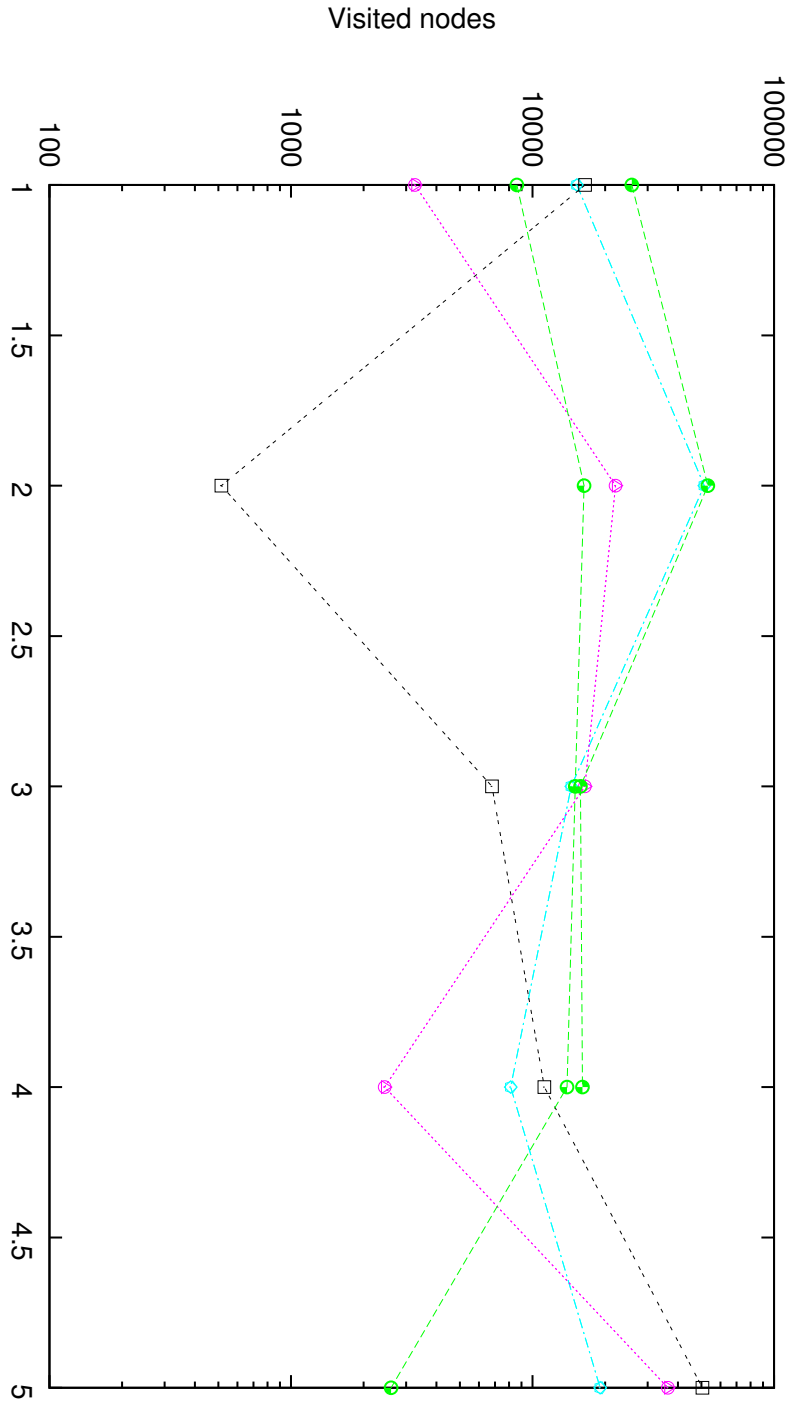

Fig. 785. Visited nodes required for solving instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

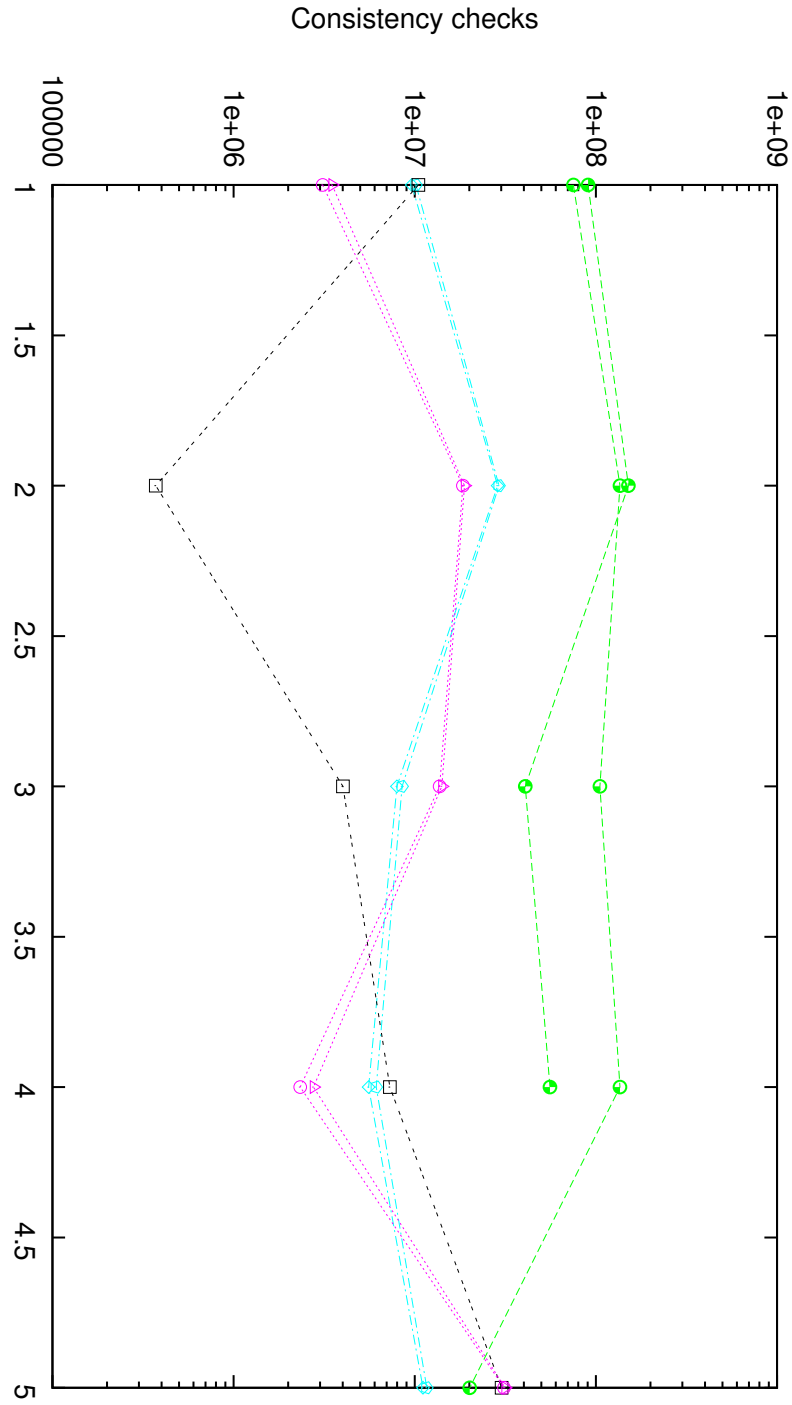

Fig. 786. Consistency checks required for solving instances from class `frb35-17`. The maximum solution time was set to 600 seconds.

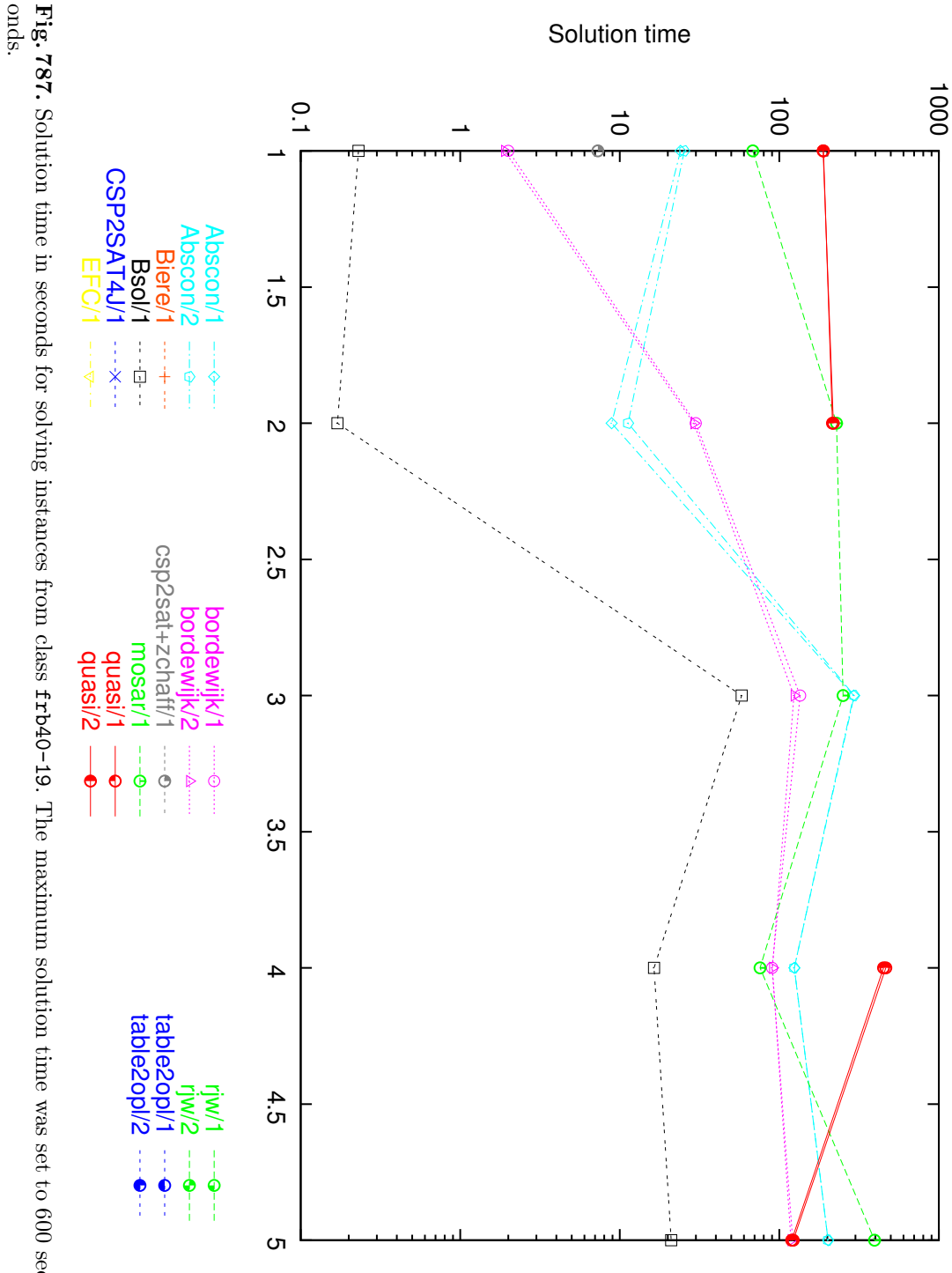

Fig. 787. Solution time in seconds for solving instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

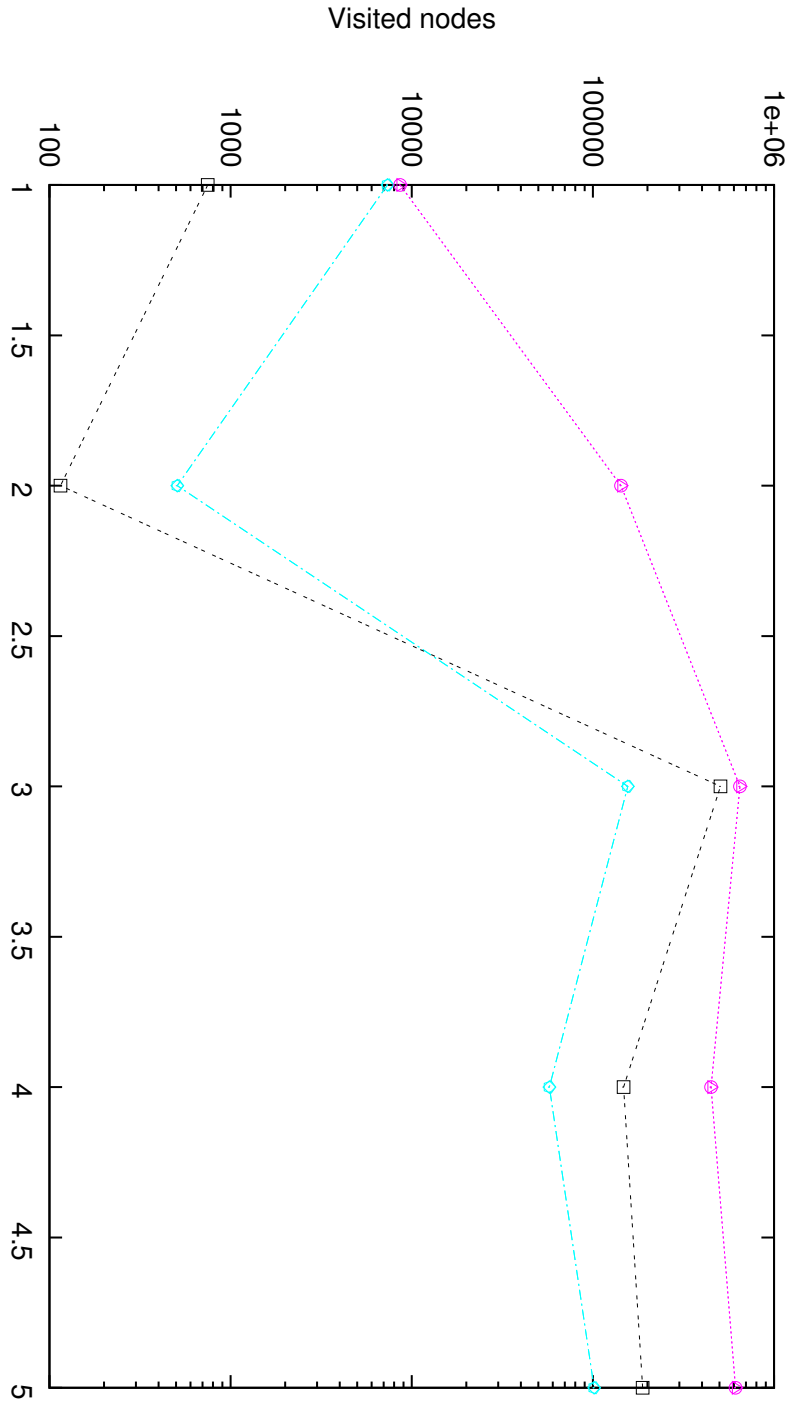

Fig. 788. Visited nodes required for solving instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

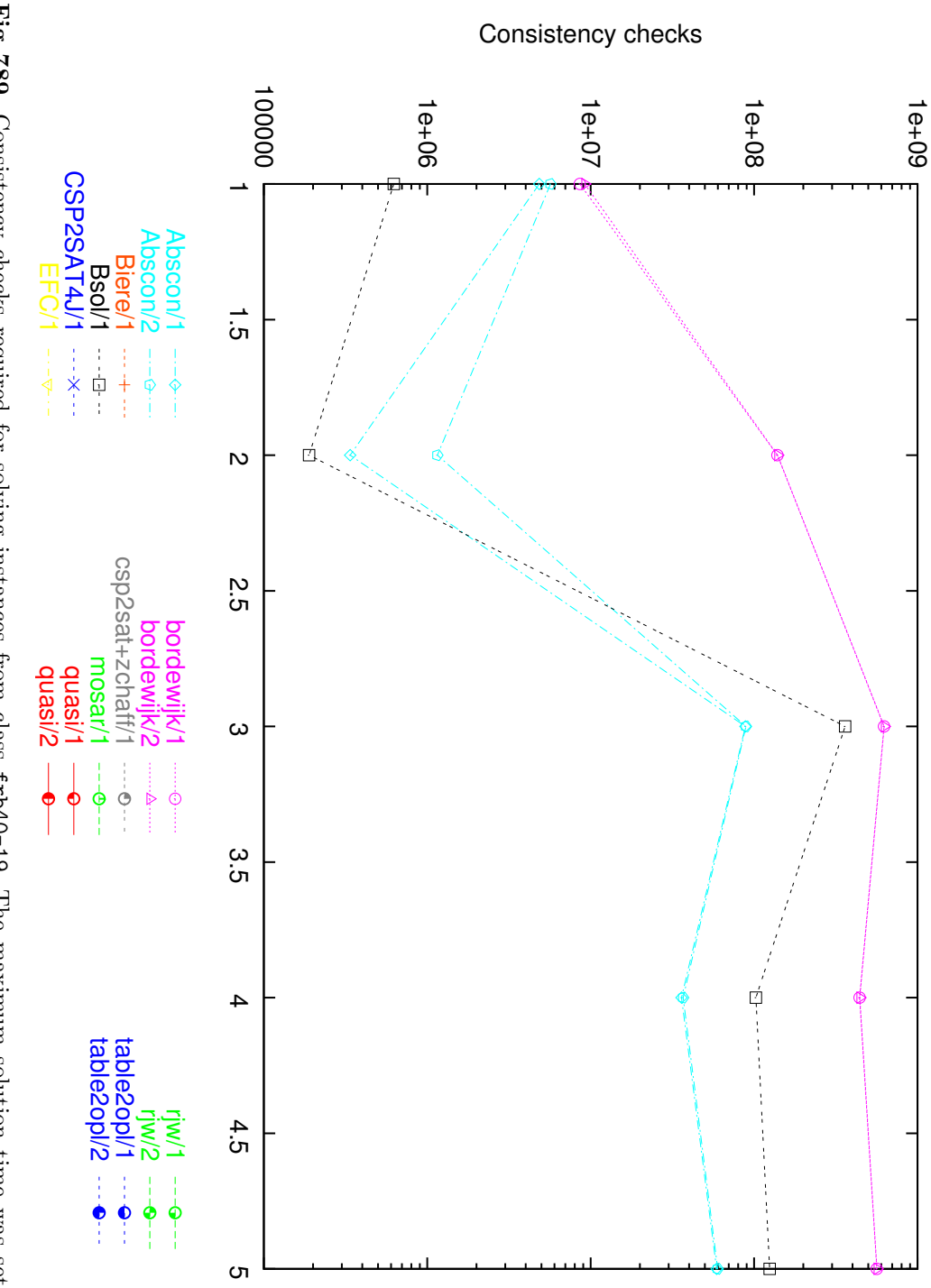

Fig. 789. Consistency checks required for solving instances from class `frb40-19`. The maximum solution time was set to 600 seconds.

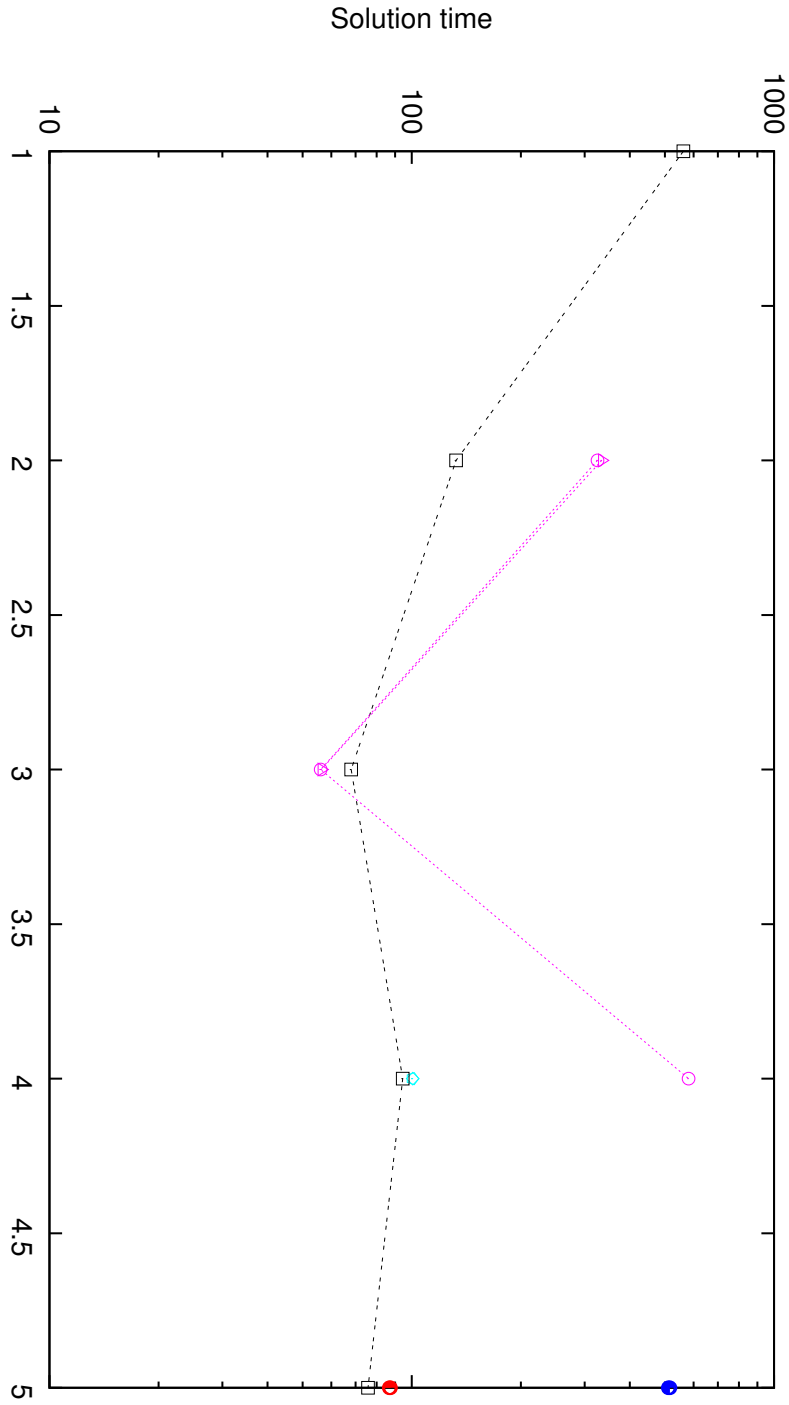

Fig. 790. Solution time in seconds for solving instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

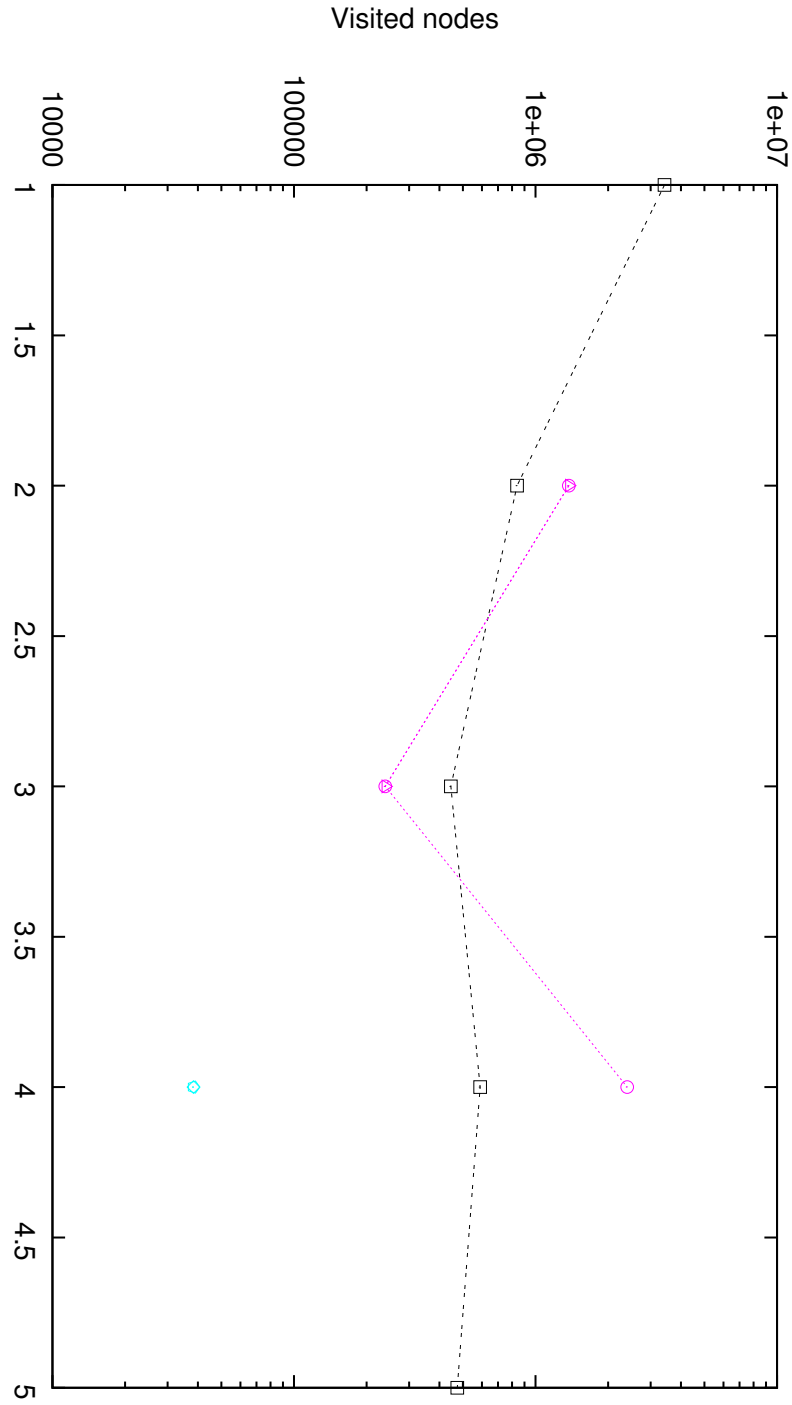

Fig. 791. Visited nodes required for solving instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

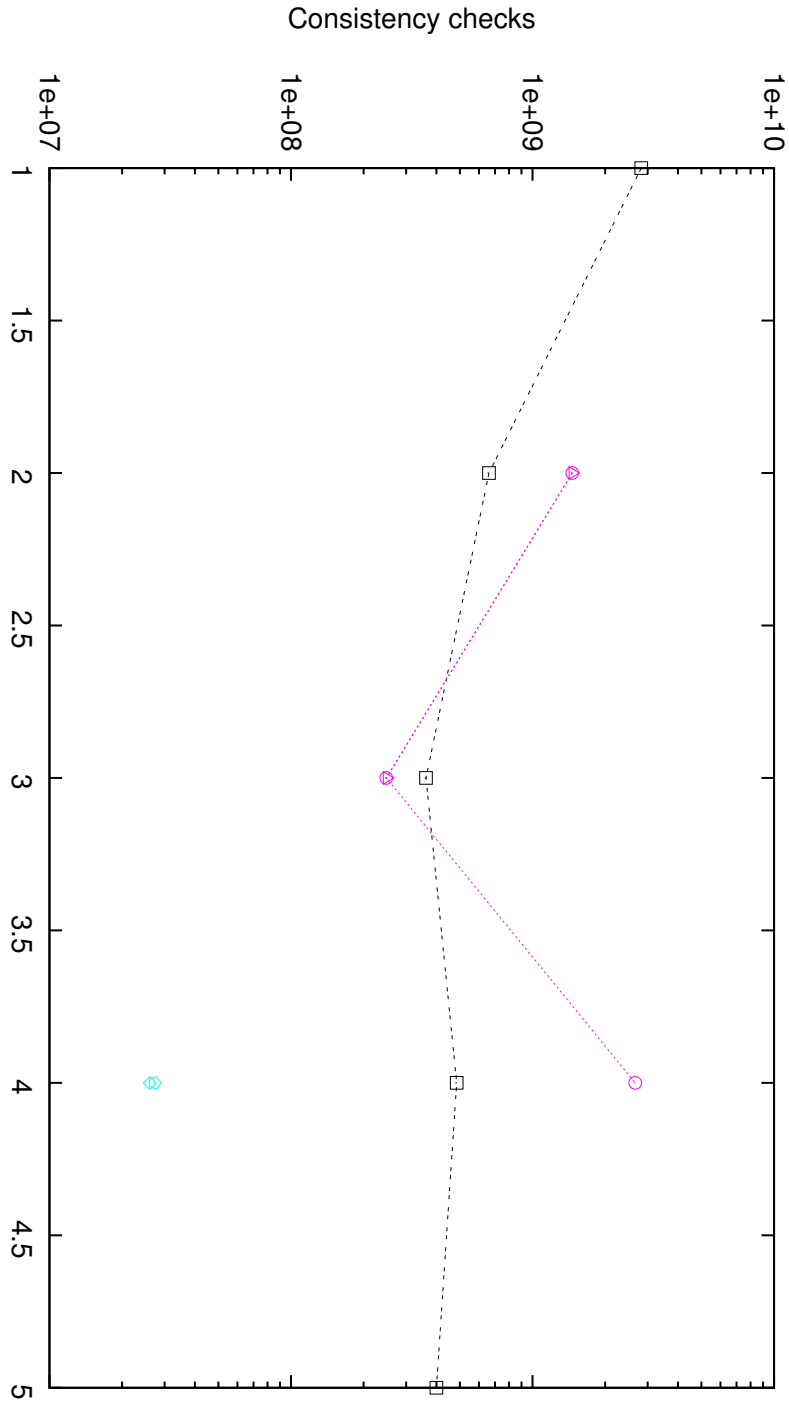

Fig. 792. Consistency checks required for solving instances from class `frb45-21`. The maximum solution time was set to 600 seconds.

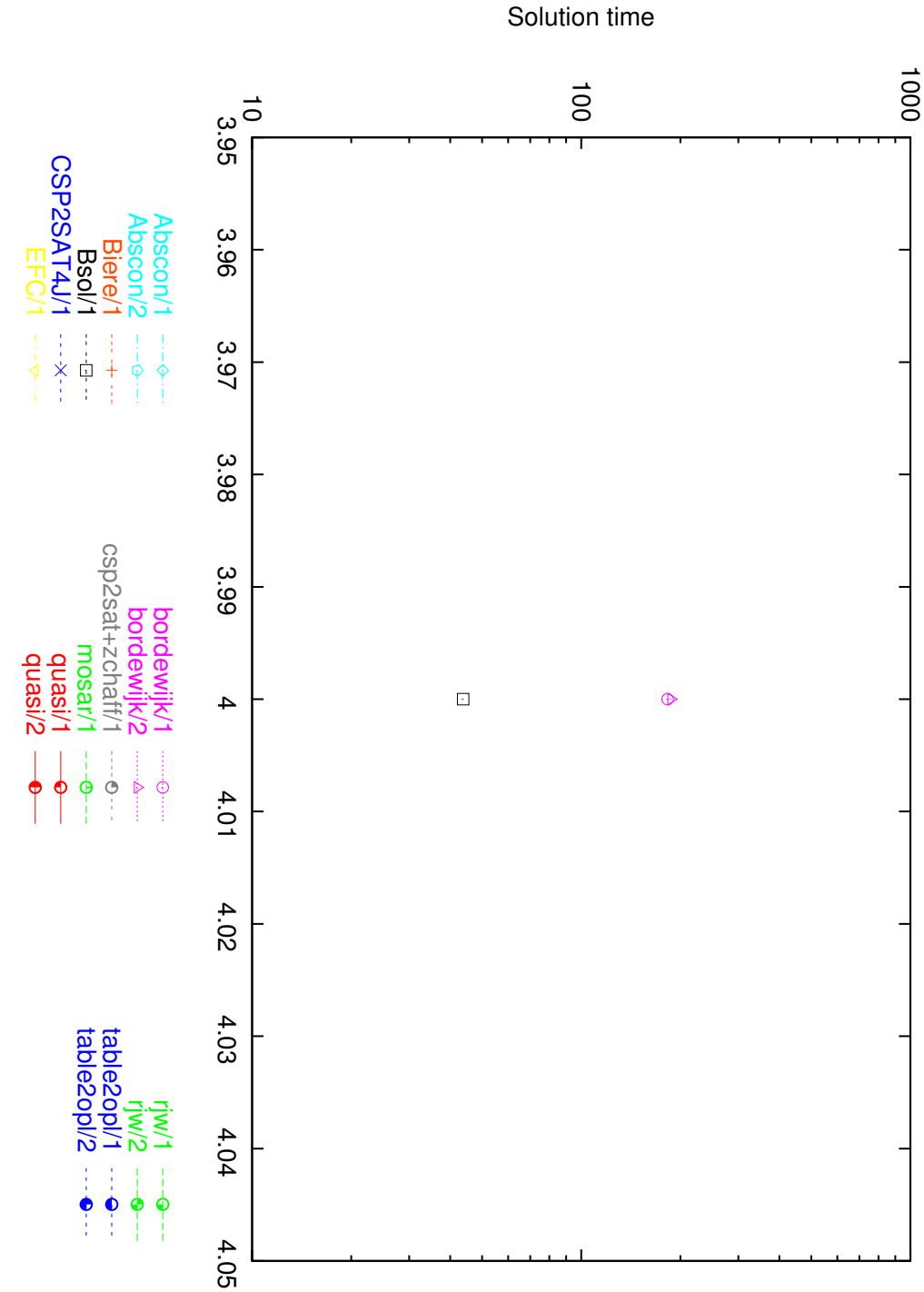

Fig. 793. Solution time in seconds for solving instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

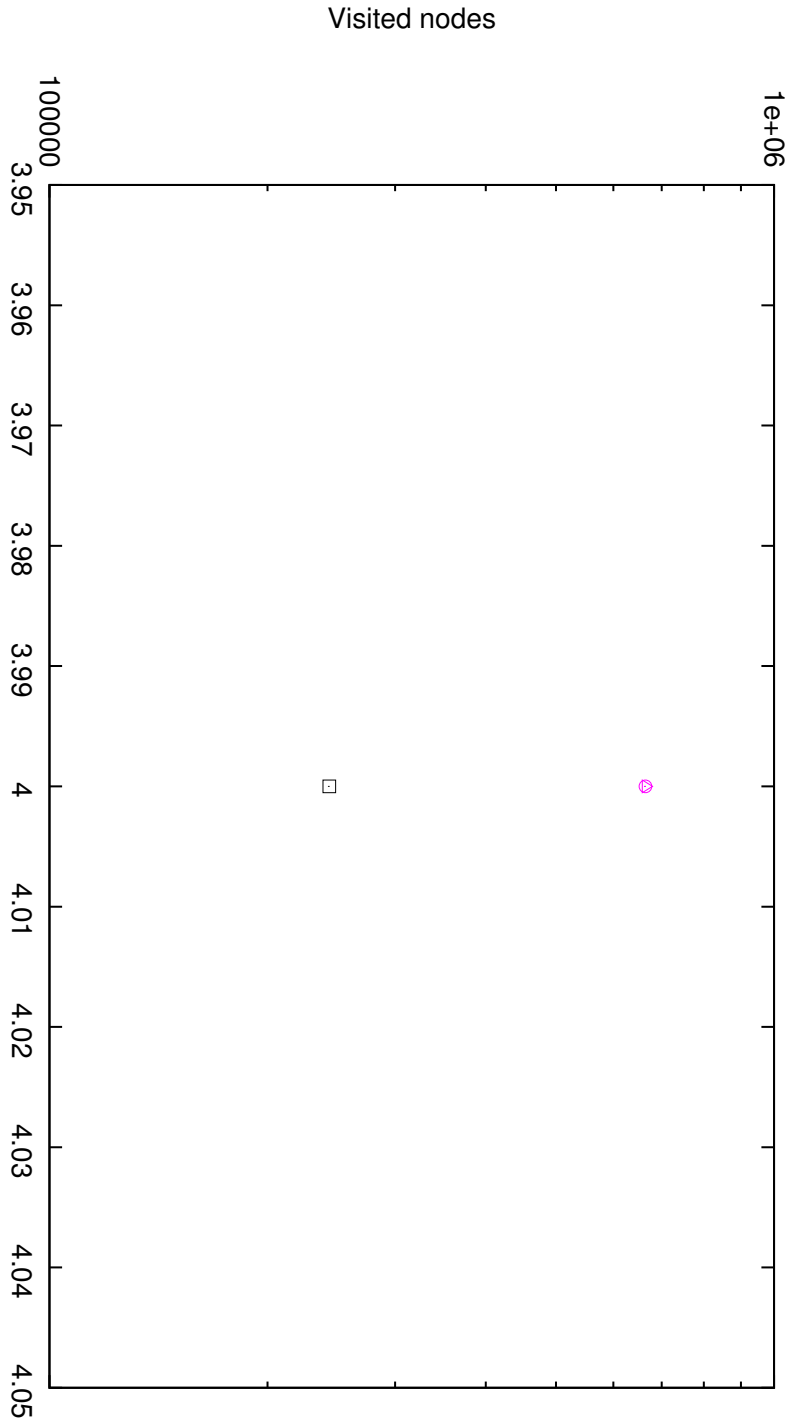

Fig. 794. Visited nodes required for solving instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

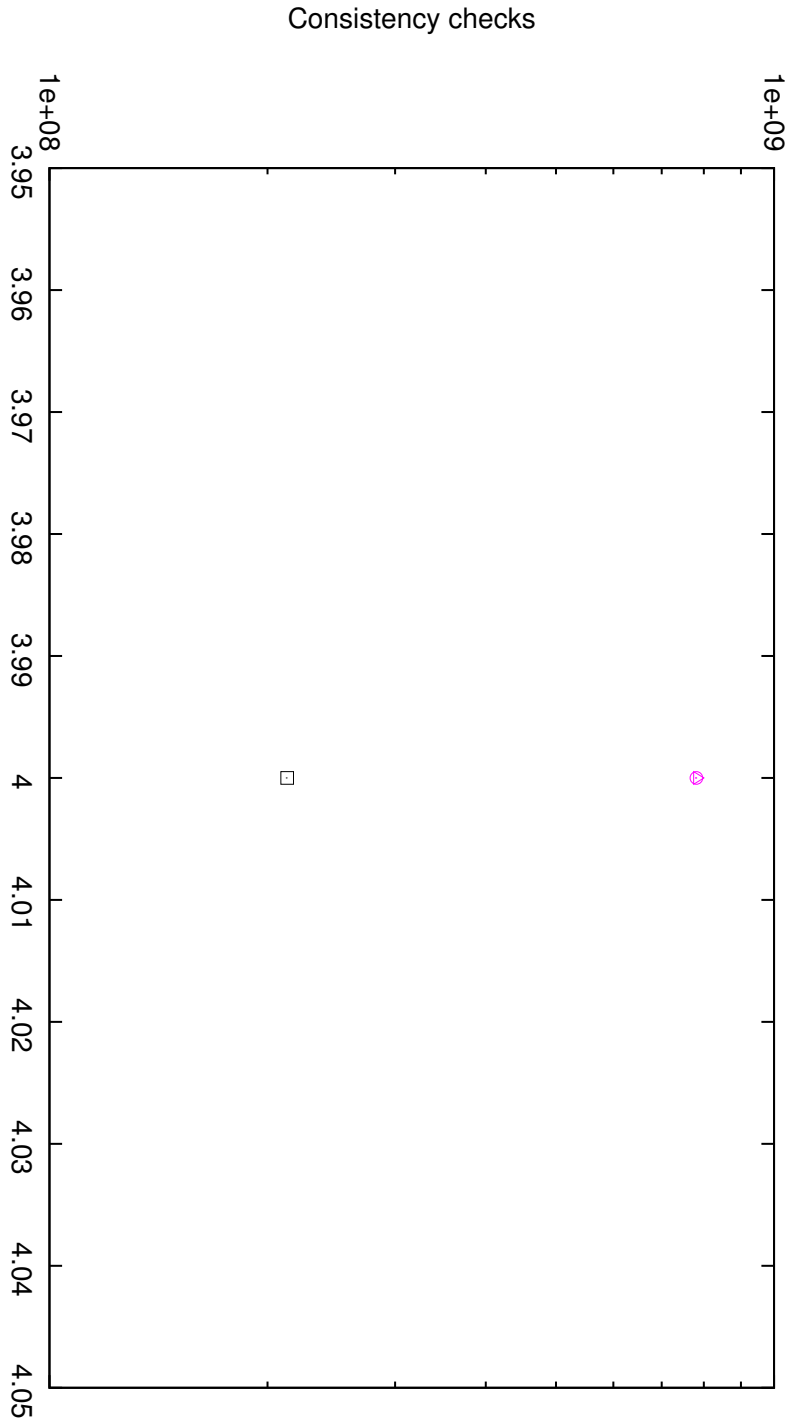

Fig. 795. Consistency checks required for solving instances from class `frb50-23`. The maximum solution time was set to 600 seconds.

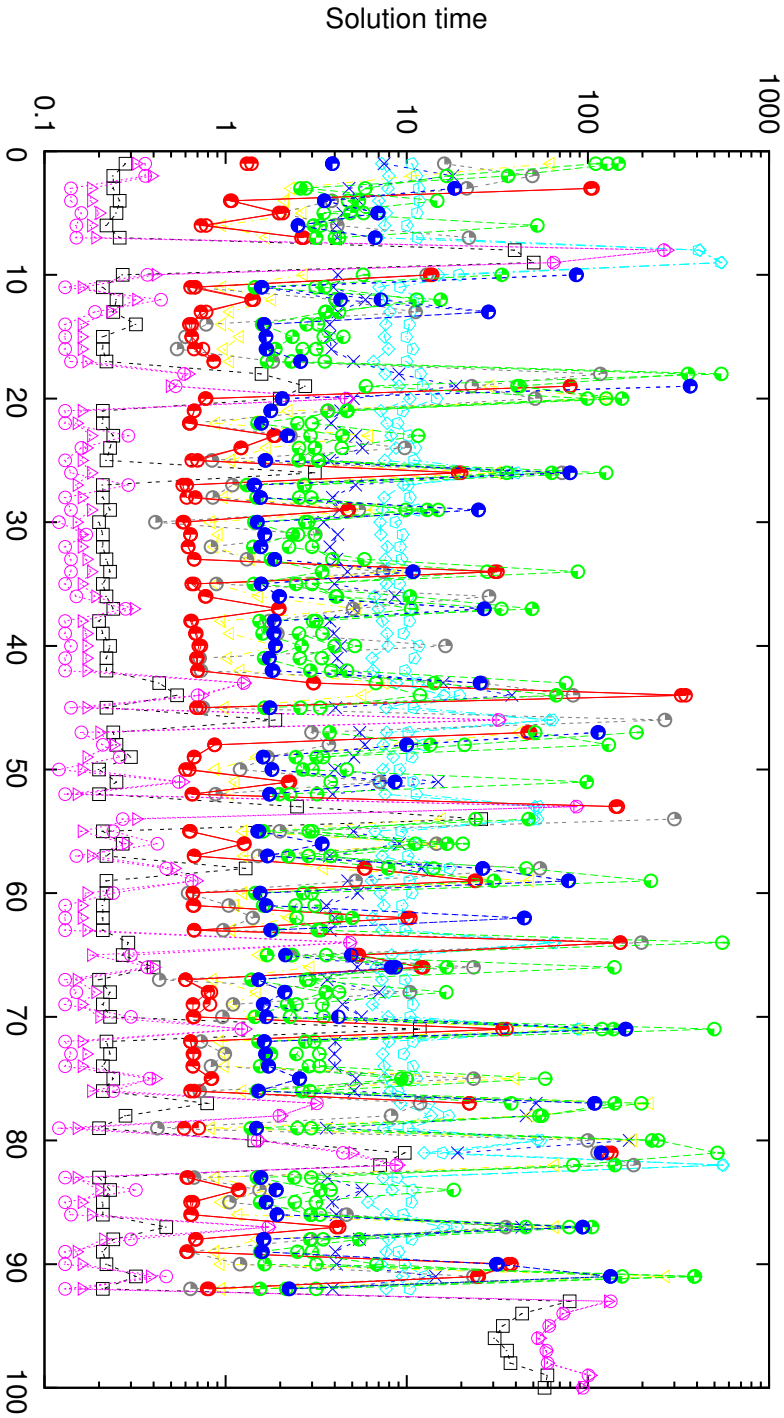

Fig. 796. Solution time in seconds for solving instances from class geom. The maximum solution time was set to 600 seconds.

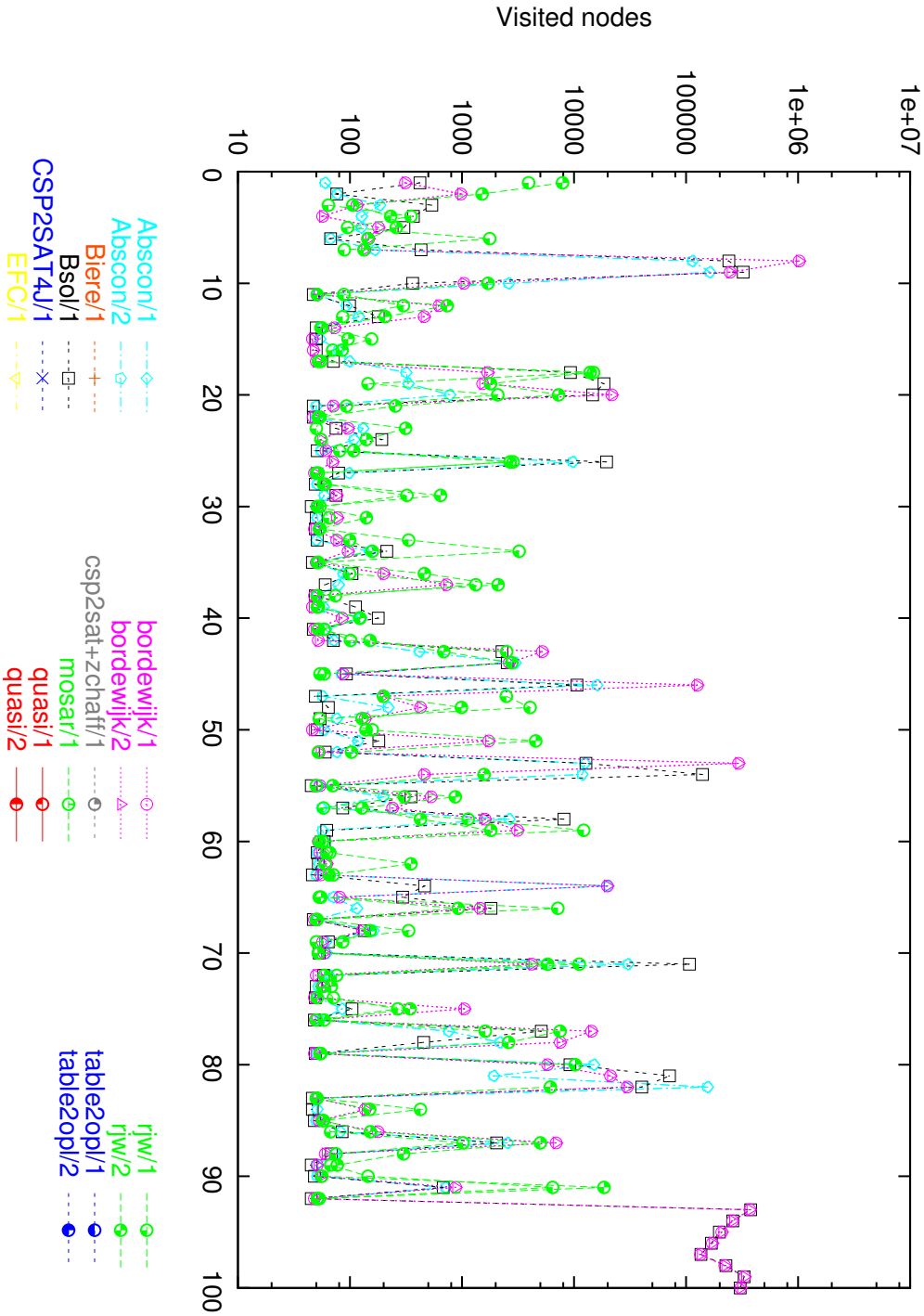

Fig. 797. Visited nodes required for solving instances from class geom. The maximum solution time was set to 600 seconds.

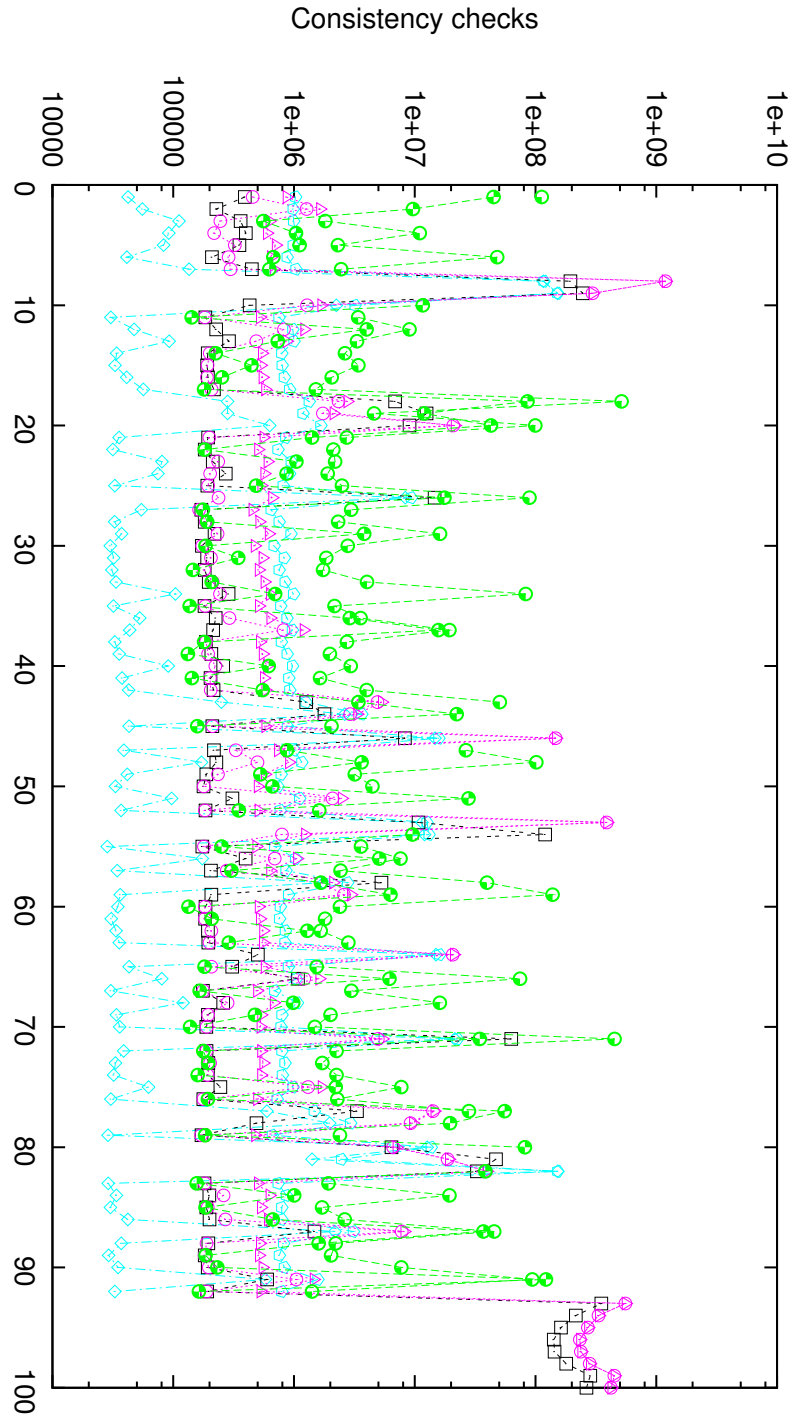

Fig. 798. Consistency checks required for solving instances from class `geom`. The maximum solution time was set to 600 seconds.

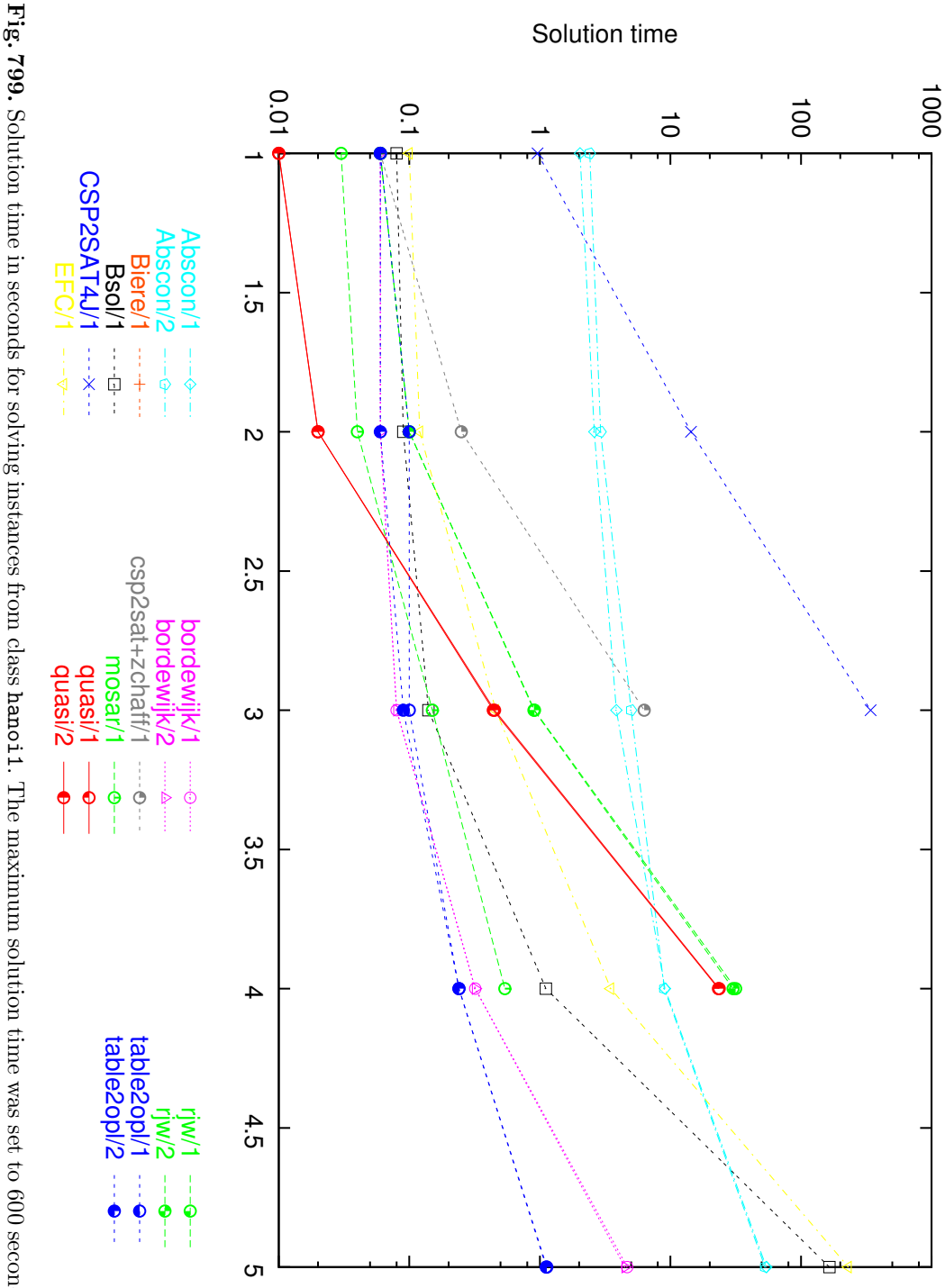

Fig. 799. Solution time in seconds for solving instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

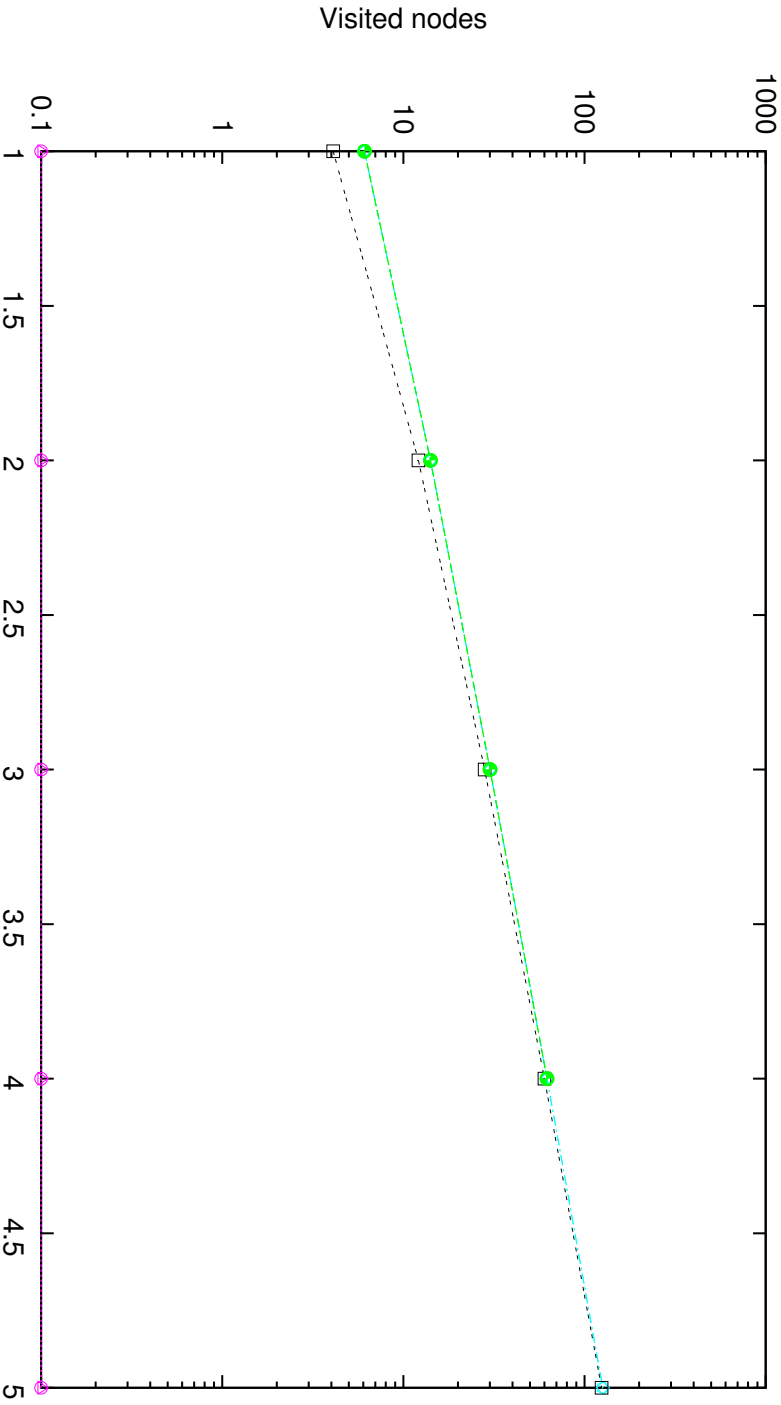

Fig. 800. Visited nodes required for solving instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

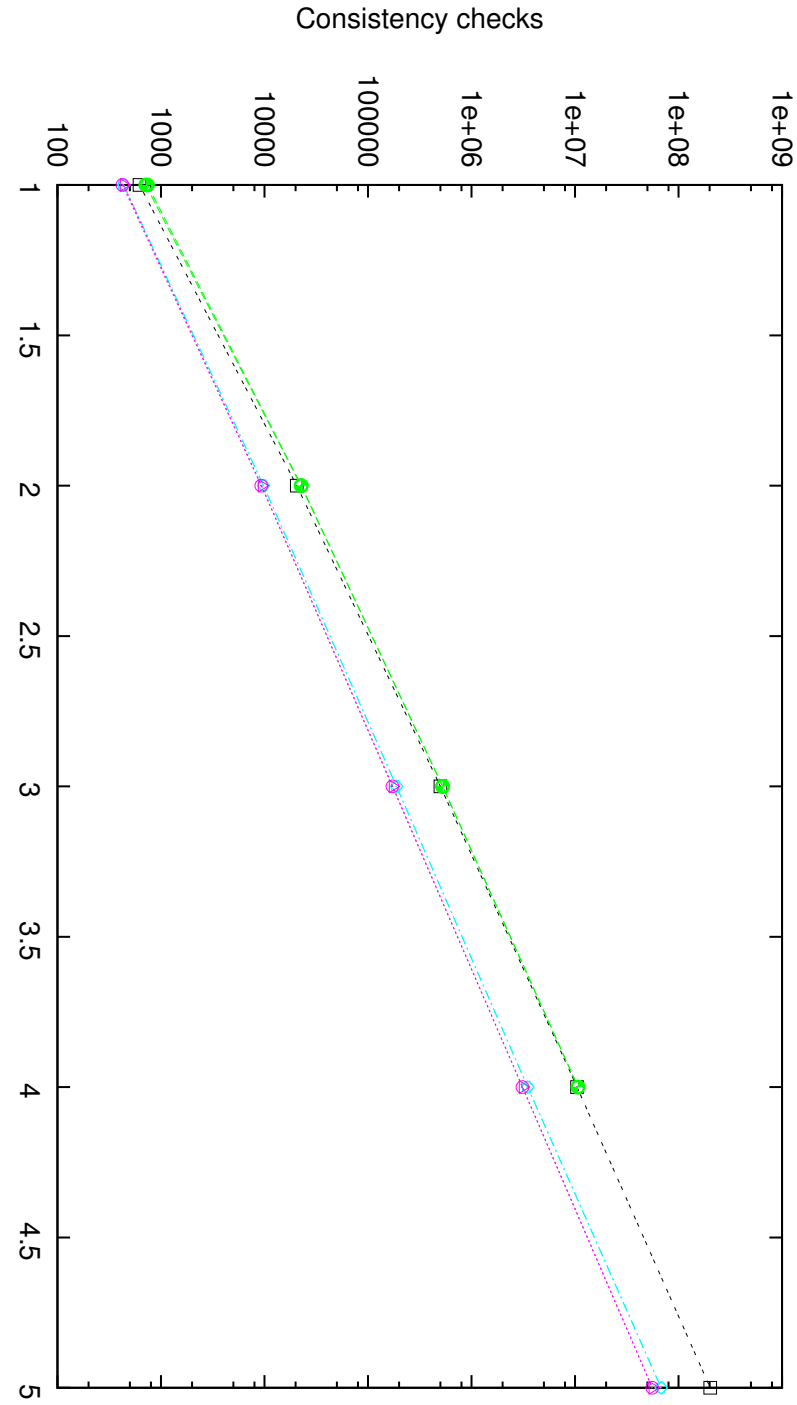

Fig. 801. Consistency checks required for solving instances from class `hanoi1`. The maximum solution time was set to 600 seconds.

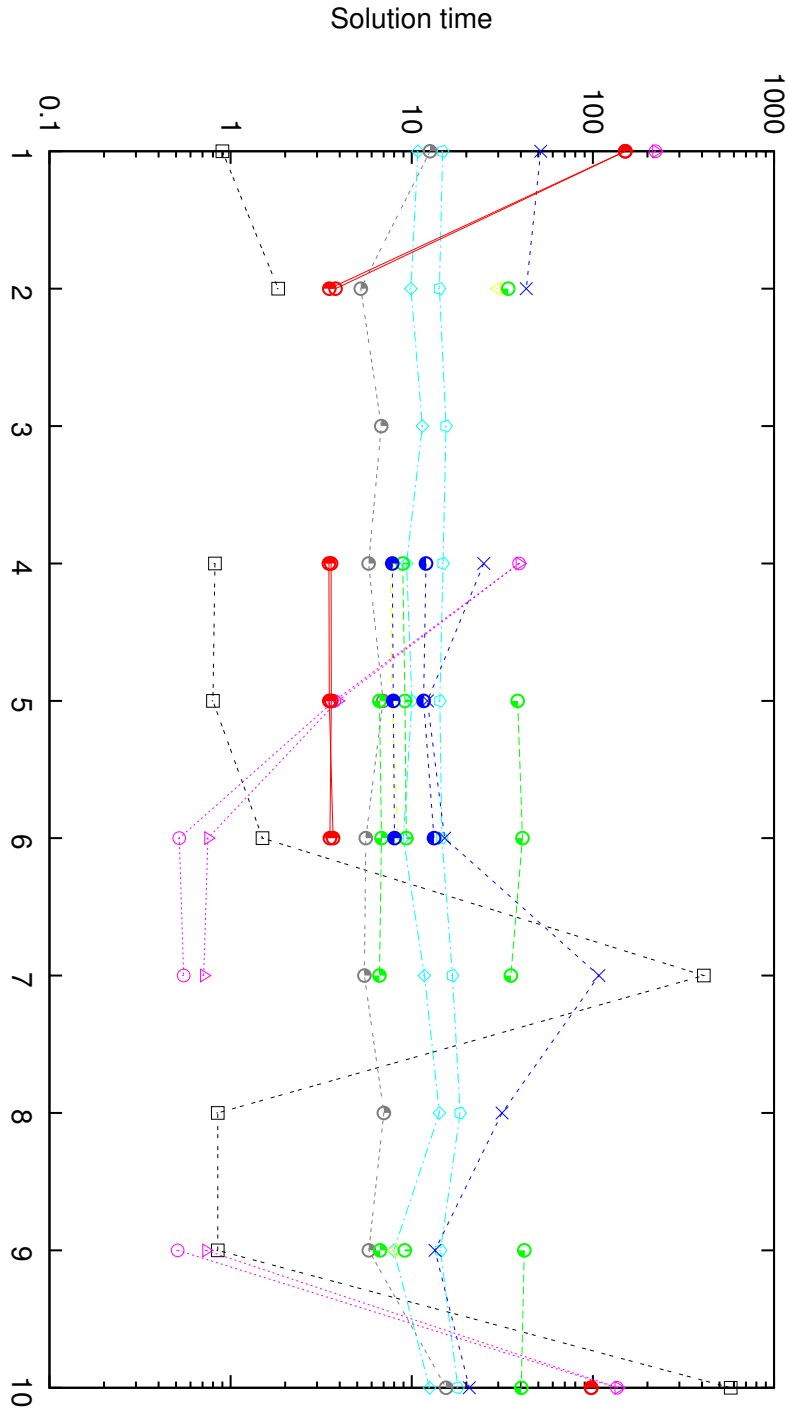

Fig. 802. Solution time in seconds for solving instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

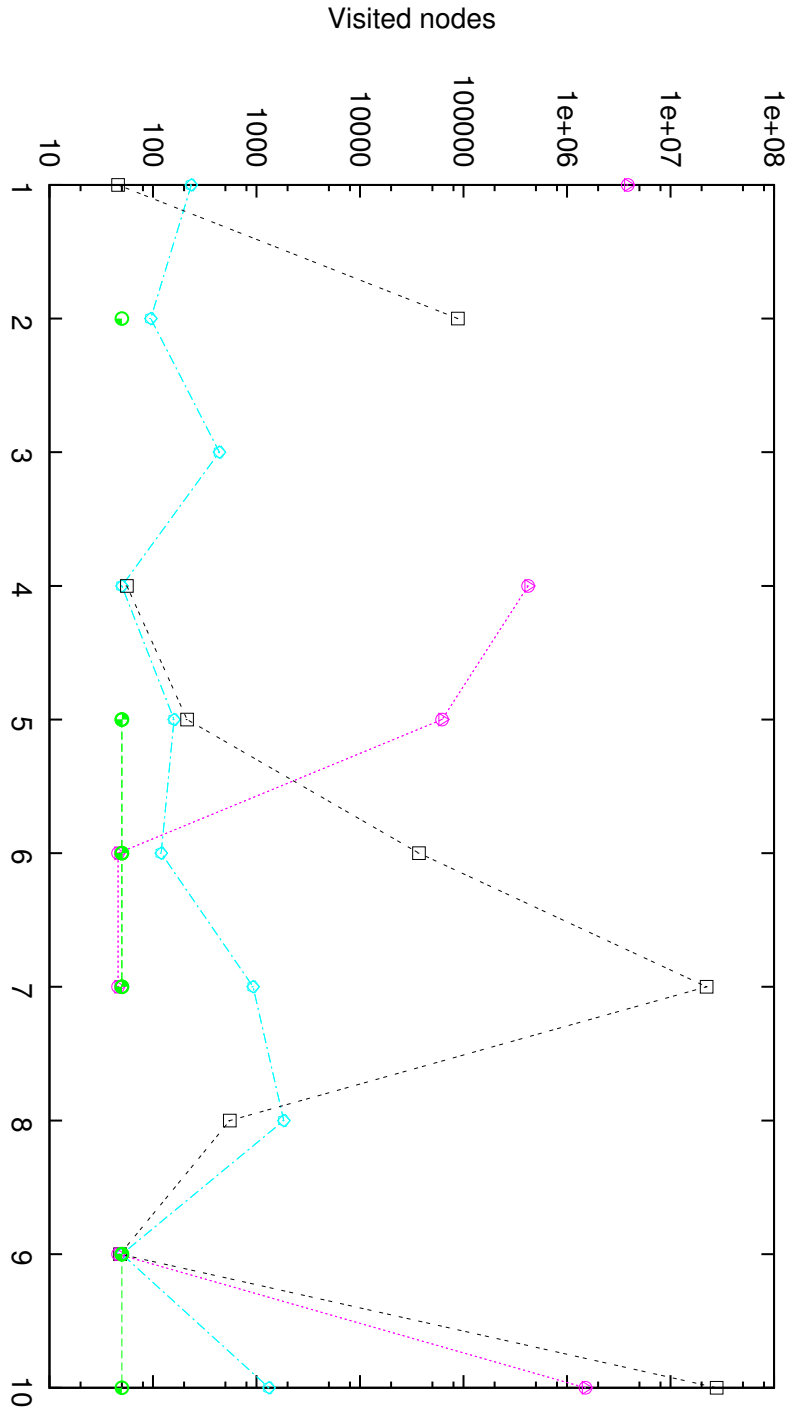

Fig. 803. Visited nodes required for solving instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

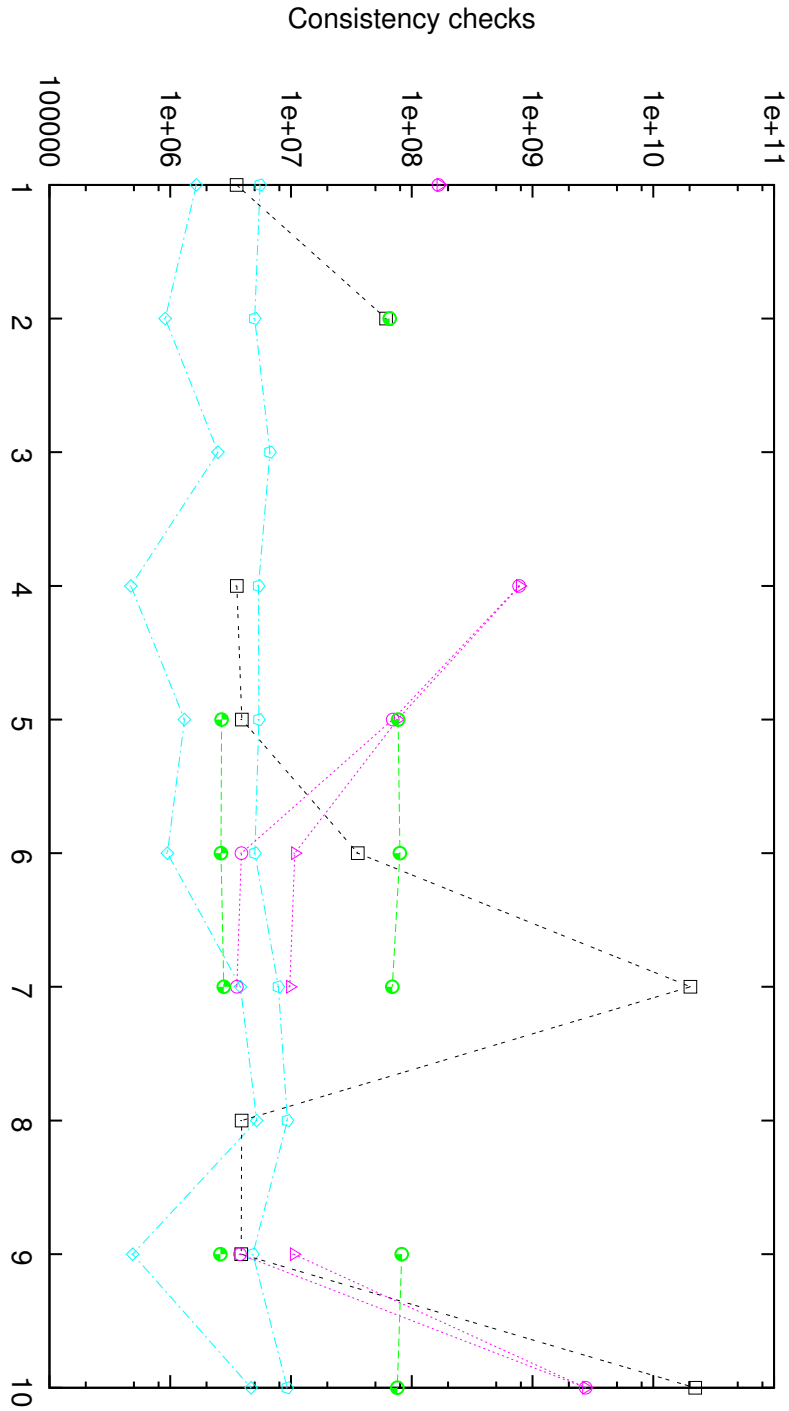

Fig. 804. Consistency checks required for solving instances from class `js-e0ddr1`. The maximum solution time was set to 600 seconds.

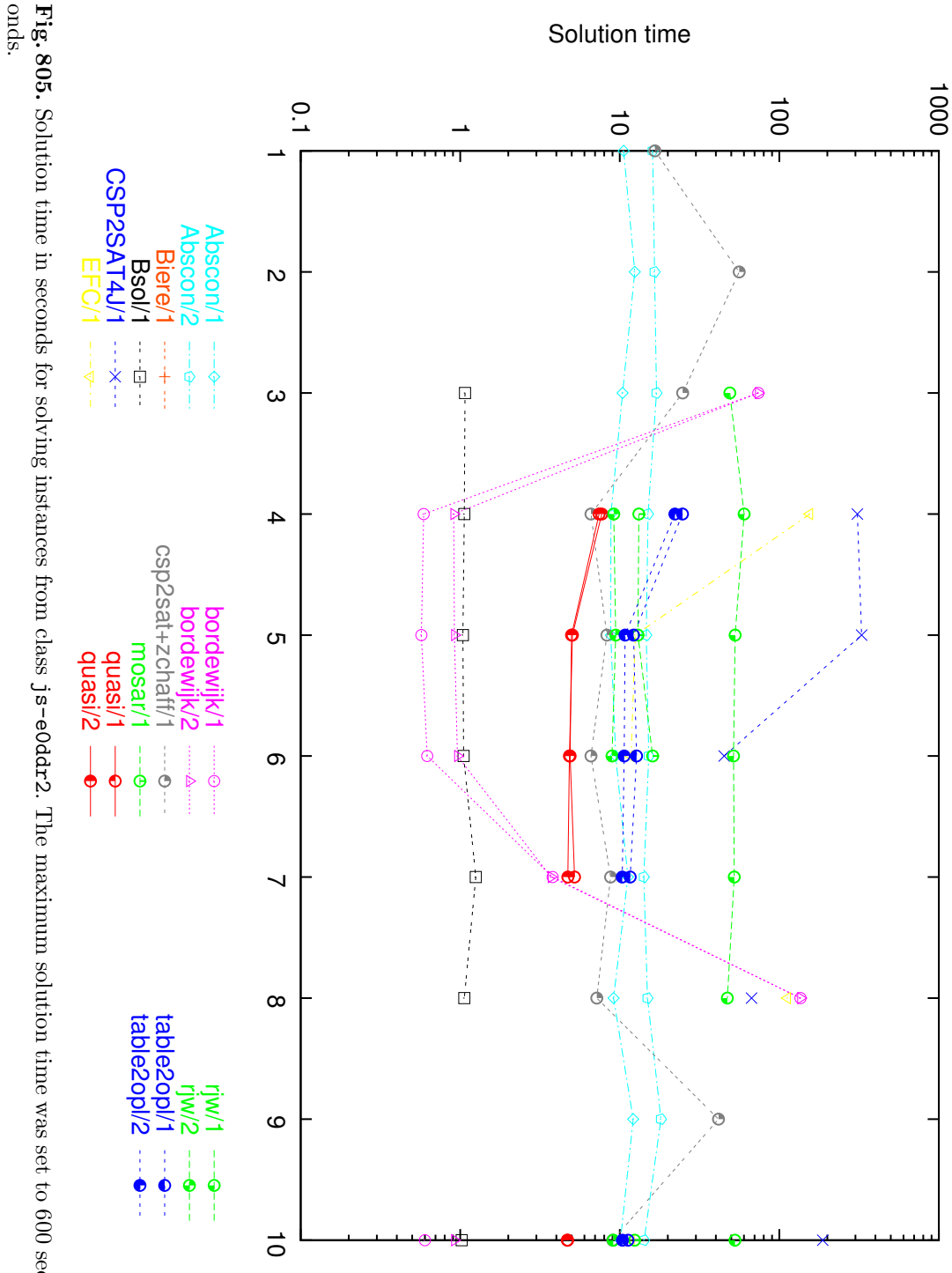

Fig. 805. Solution time in seconds for solving instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

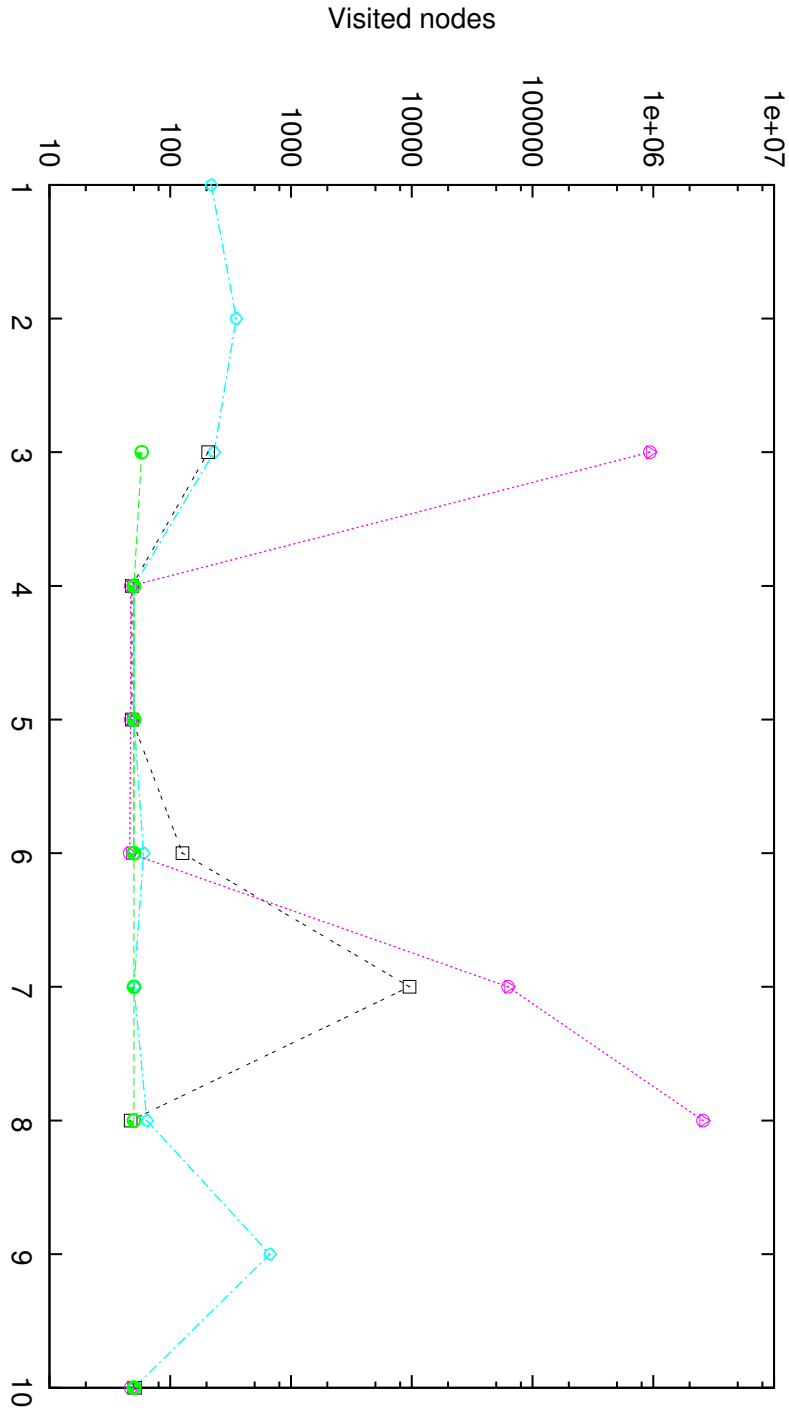

Fig. 806. Visited nodes required for solving instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

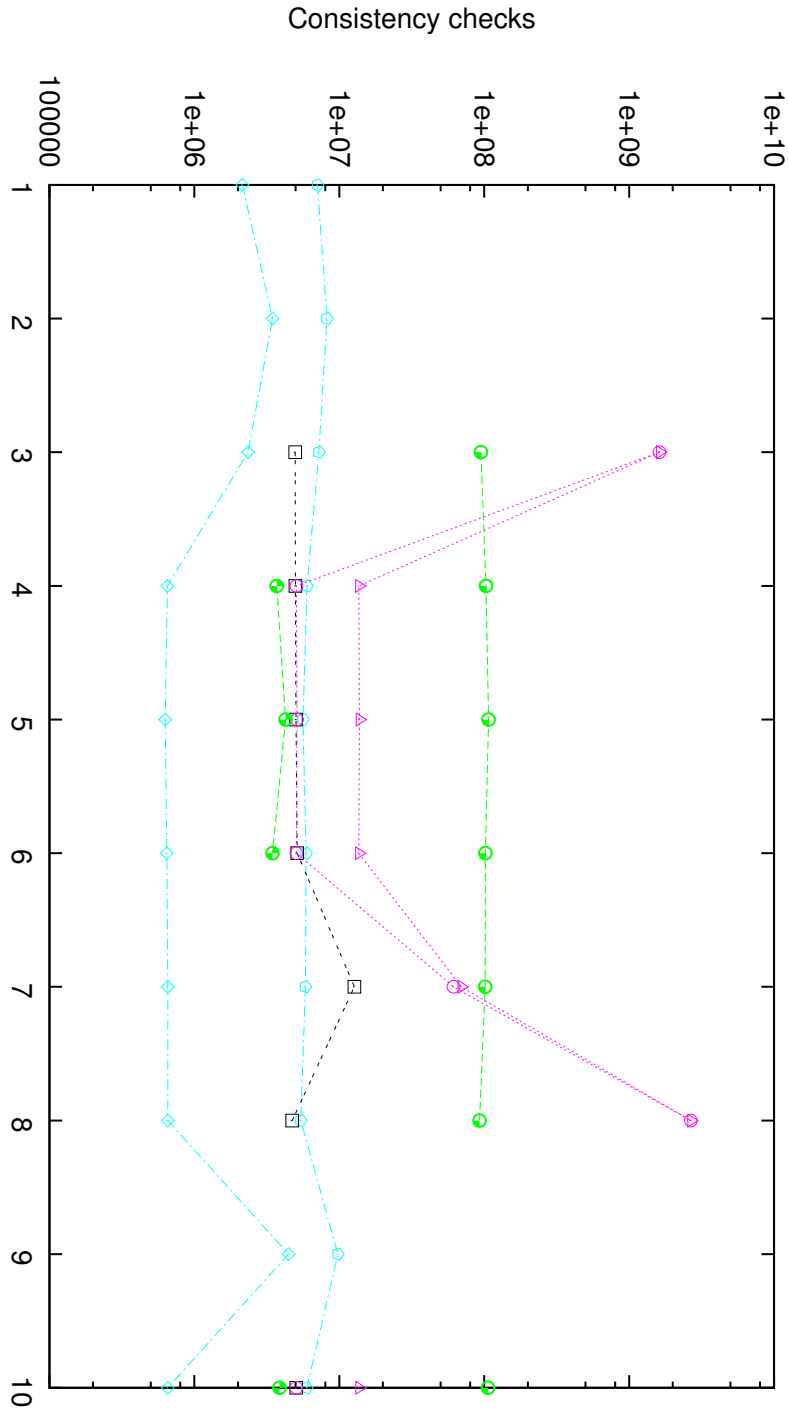

Fig. 807. Consistency checks required for solving instances from class `js-e0ddr2`. The maximum solution time was set to 600 seconds.

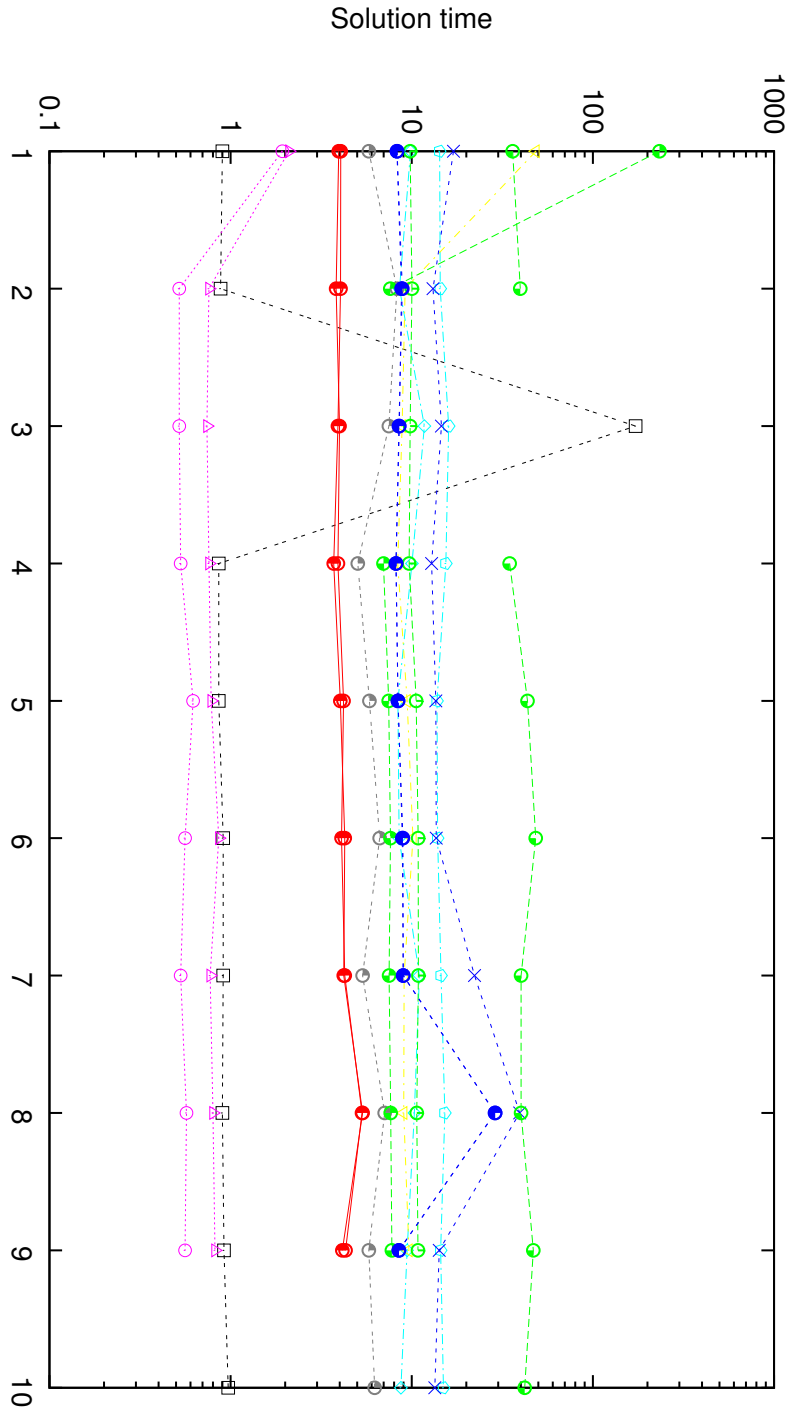

Fig. 808. Solution time in seconds for solving instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

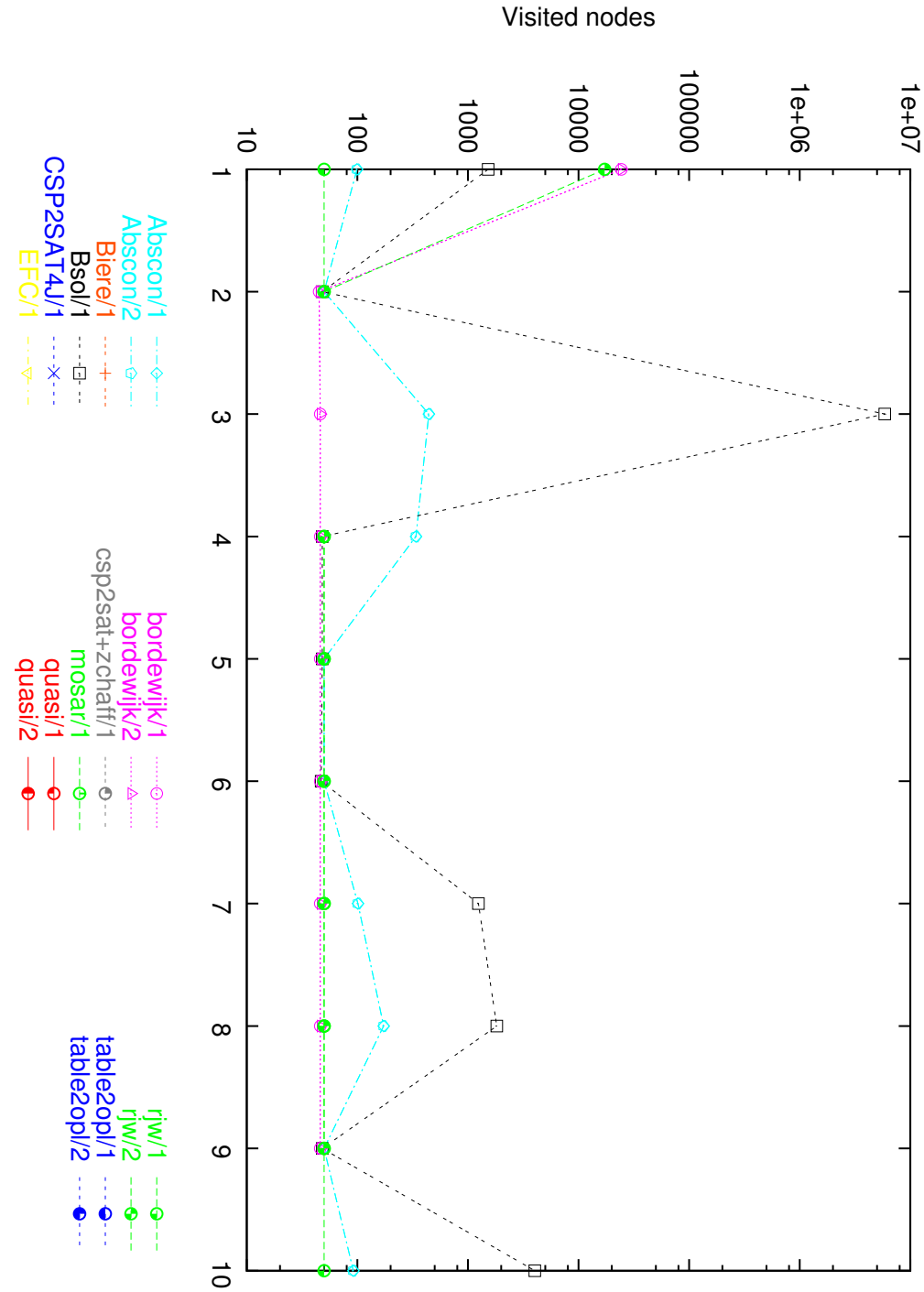

Fig. 809. Visited nodes required for solving instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

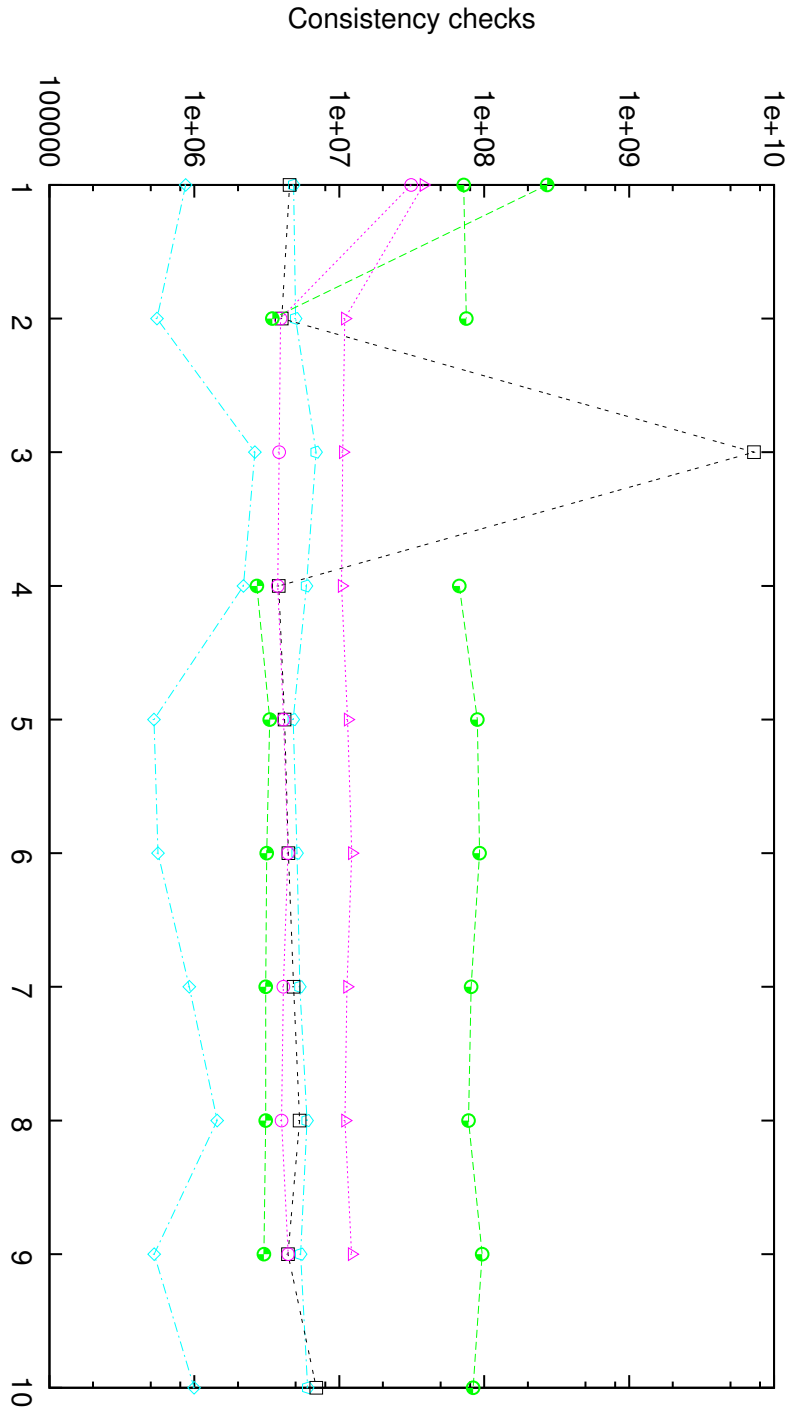

Fig. 810. Consistency checks required for solving instances from class `js-enddr1`. The maximum solution time was set to 600 seconds.

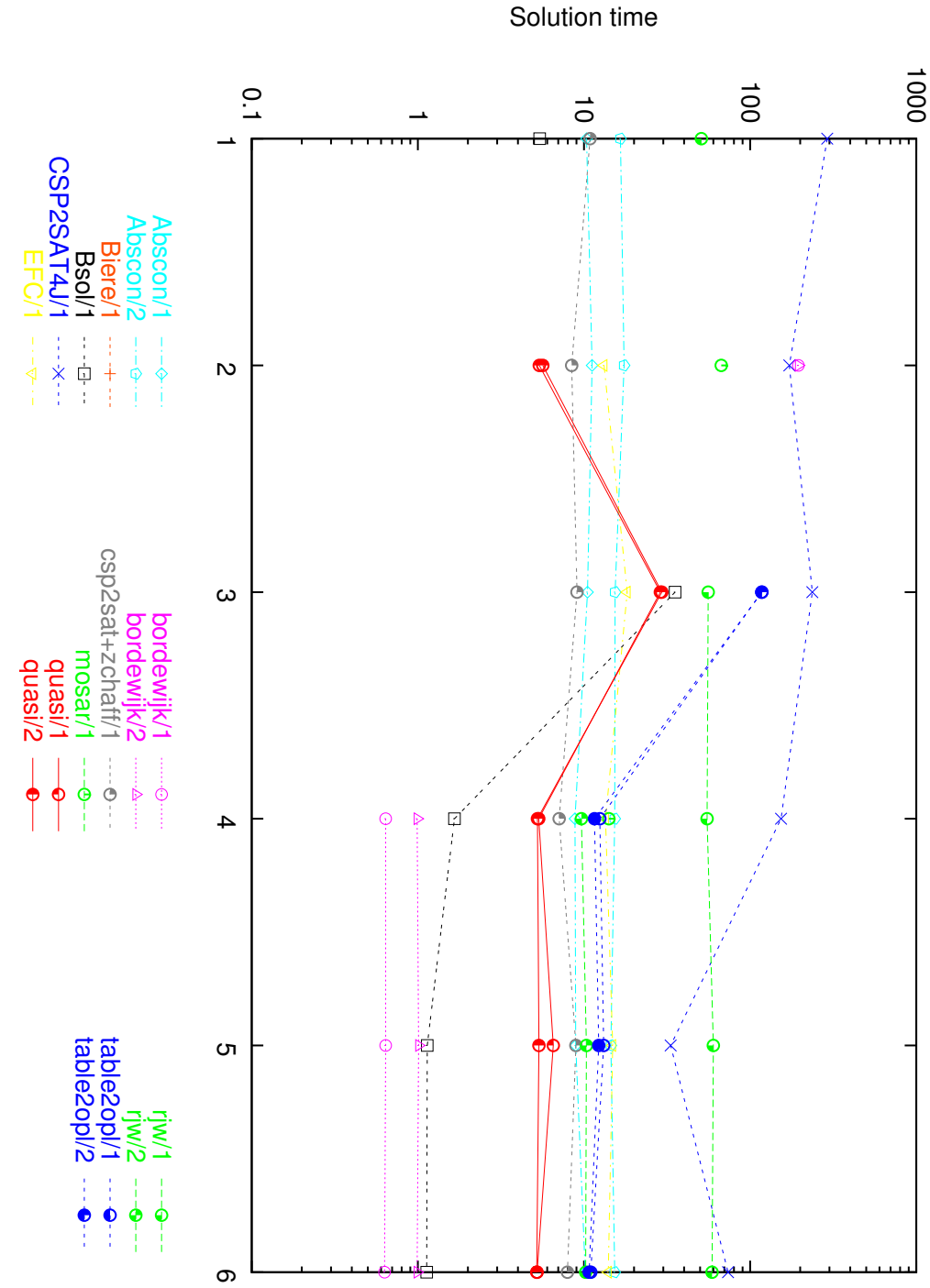

Fig. 811. Solution time in seconds for solving instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

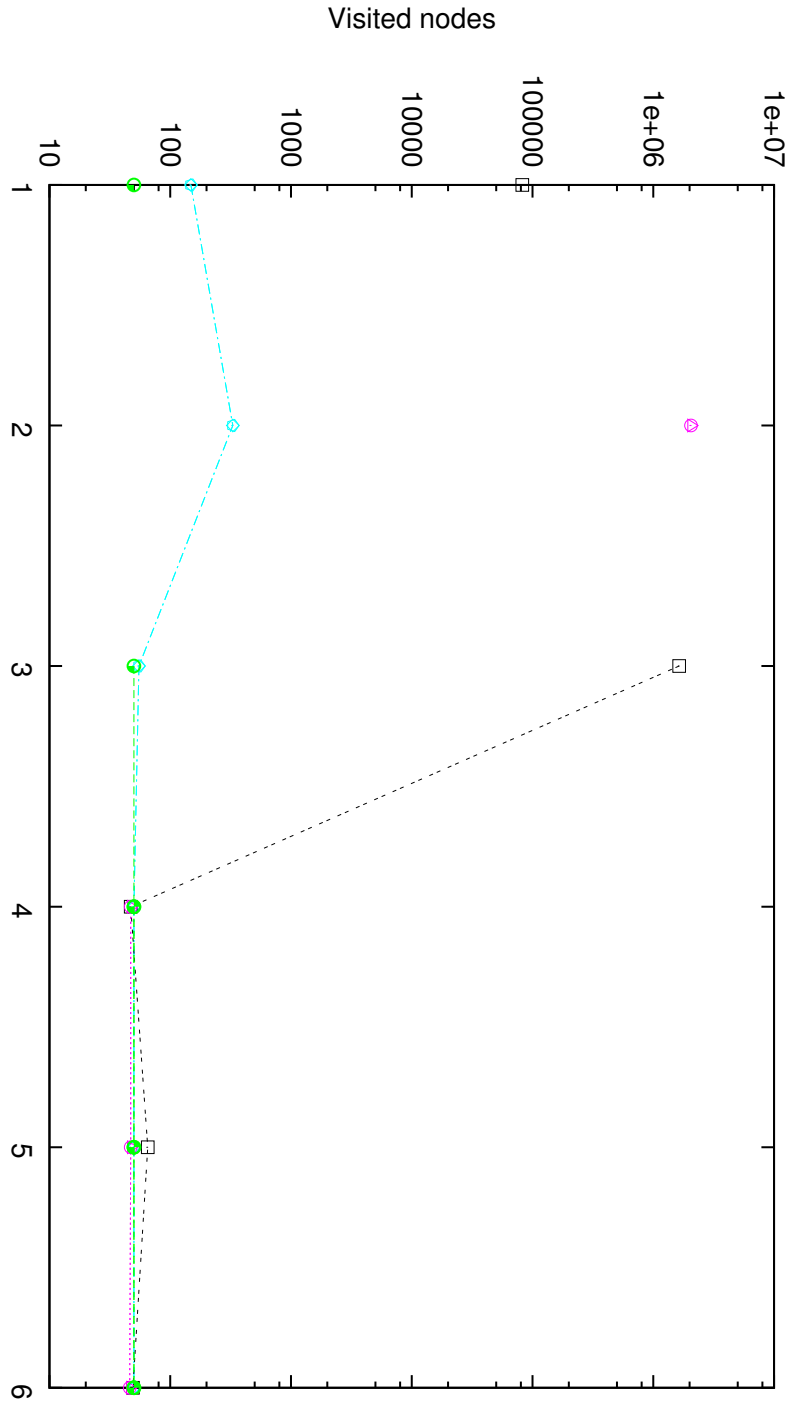

Fig. 812. Visited nodes required for solving instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

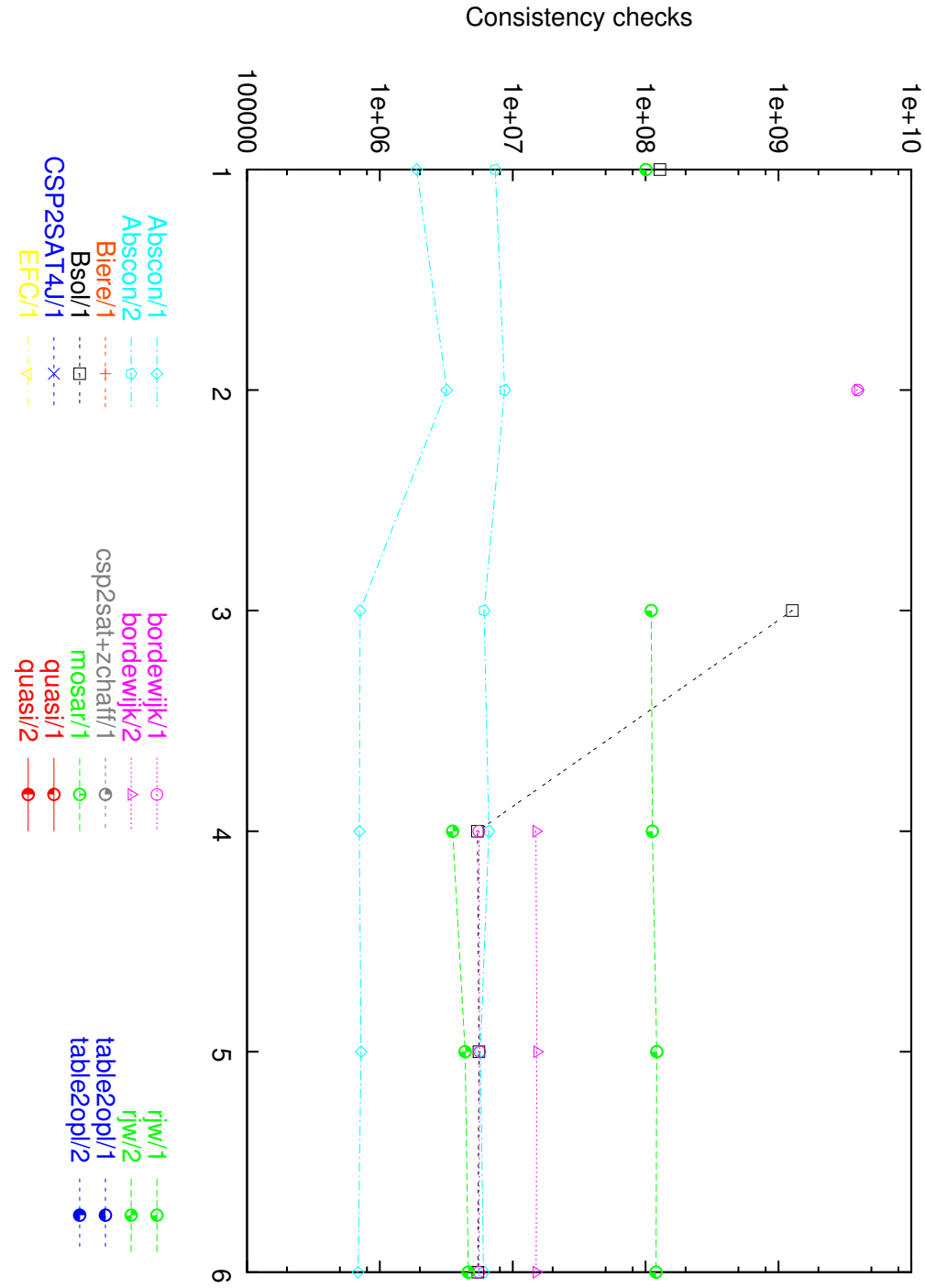

Fig. 813. Consistency checks required for solving instances from class `js-enddr2`. The maximum solution time was set to 600 seconds.

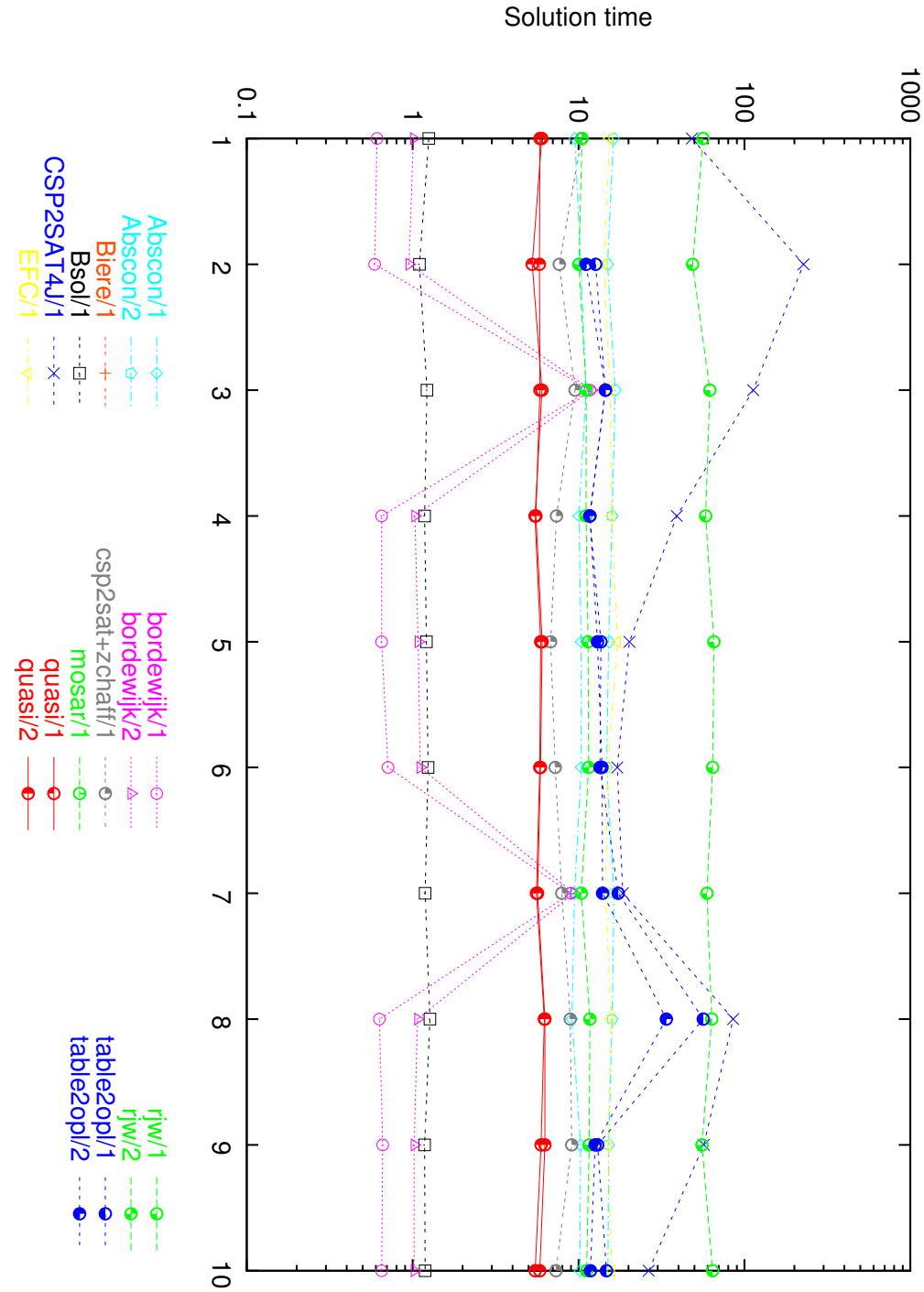

Fig. 814. Solution time in seconds for solving instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

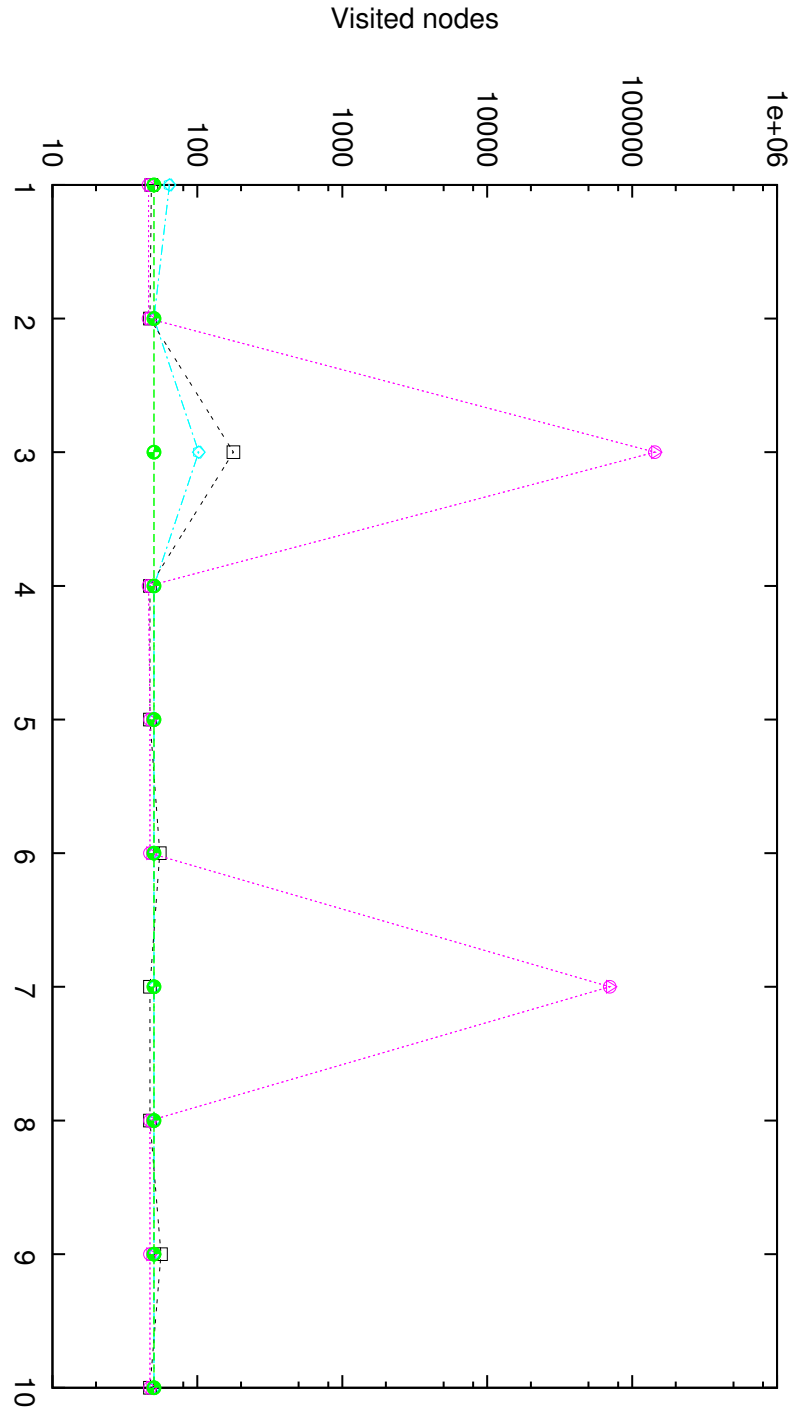

Fig. 815. Visited nodes required for solving instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

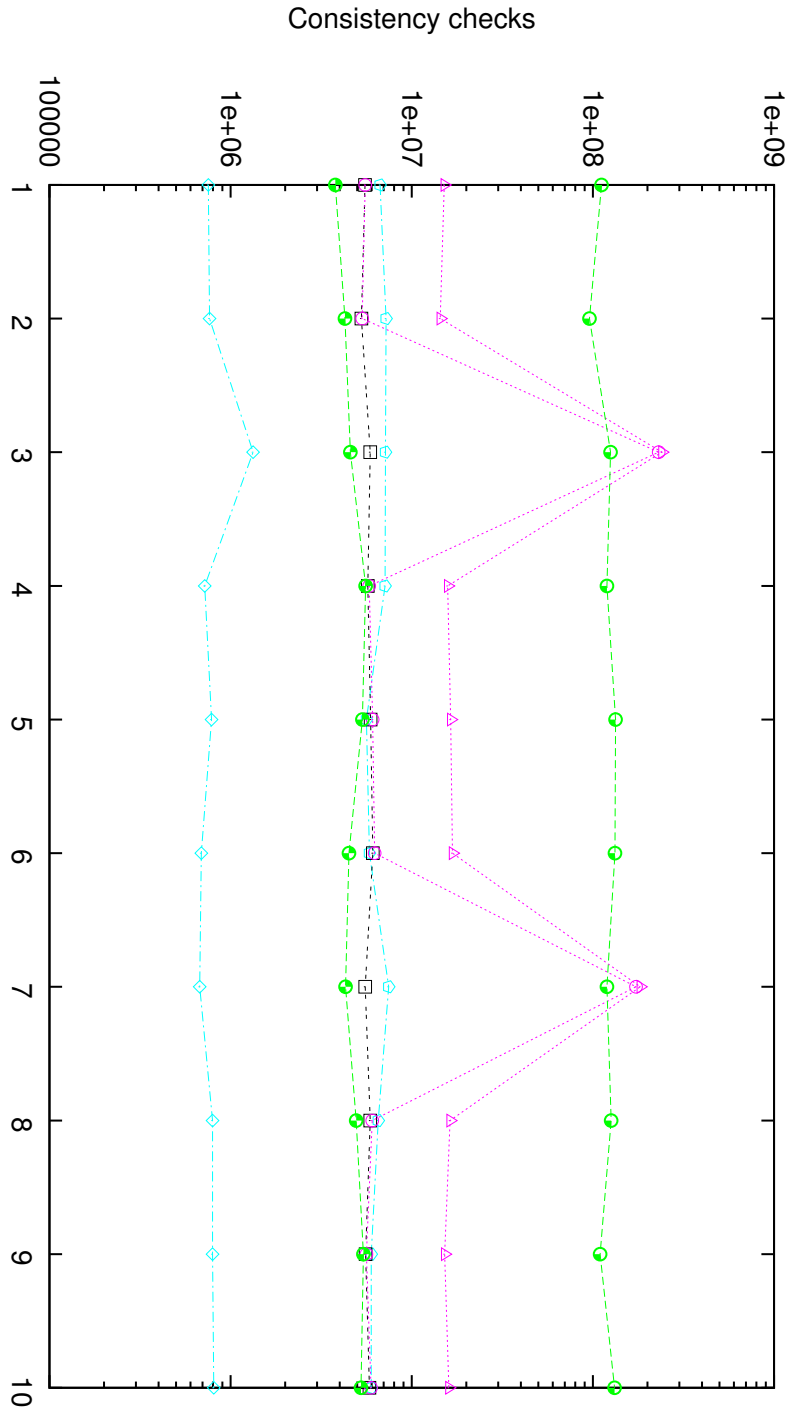

Fig. 816. Consistency checks required for solving instances from class `js-ewddr2`. The maximum solution time was set to 600 seconds.

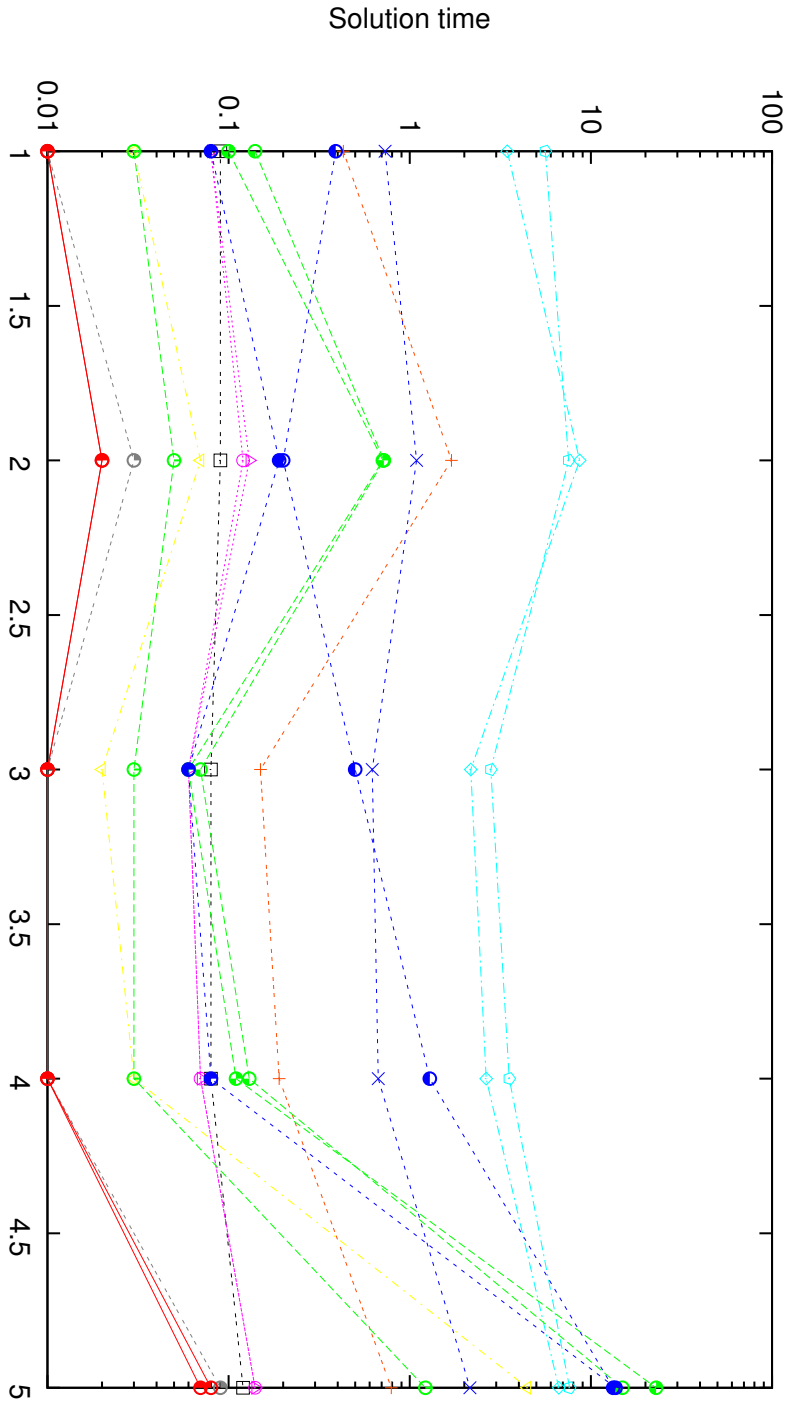

Fig. 817. Solution time in seconds for solving instances from class `1sq-dg1`. The maximum solution time was set to 600 seconds.

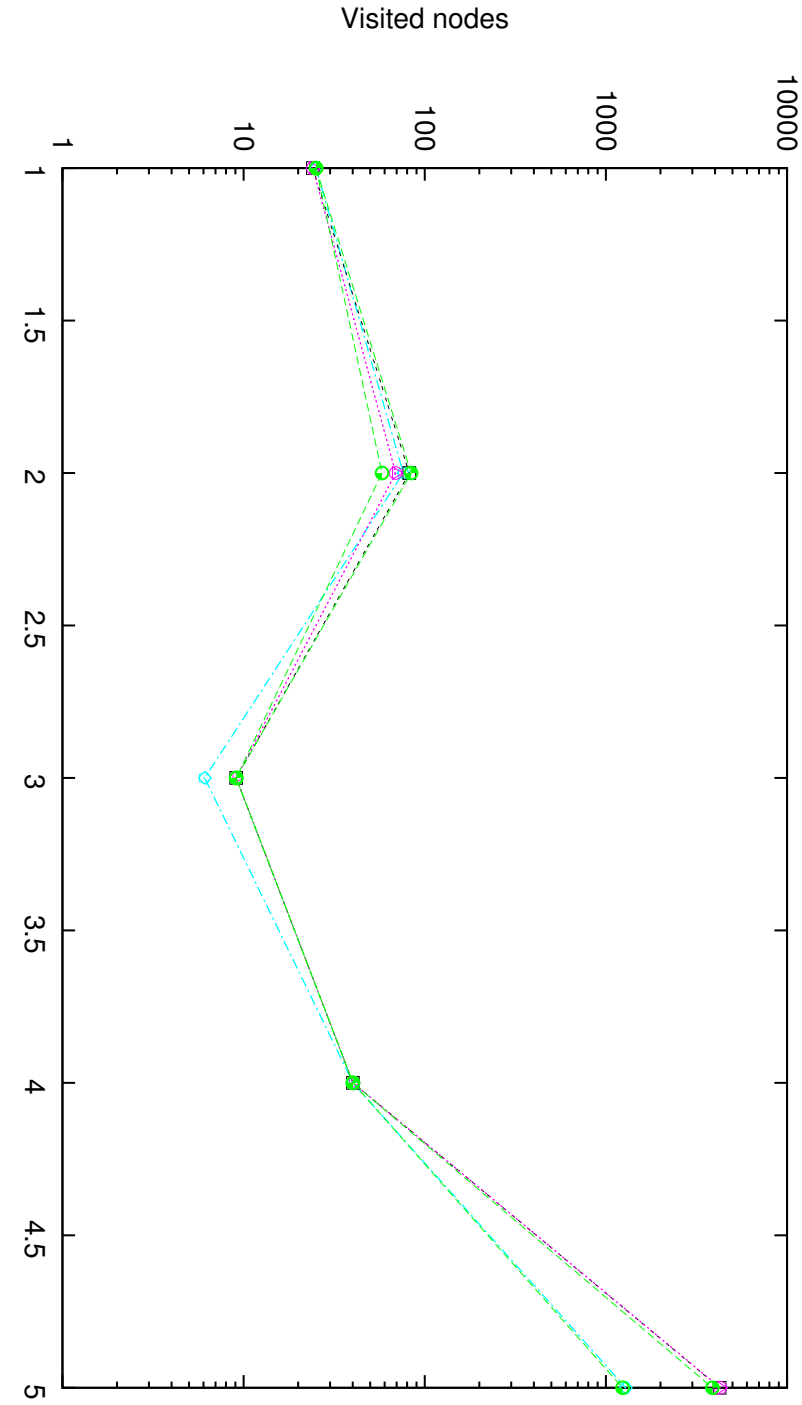

Fig. 818. Visited nodes required for solving instances from class `lsq-dg1`. The maximum solution time was set to 600 seconds.

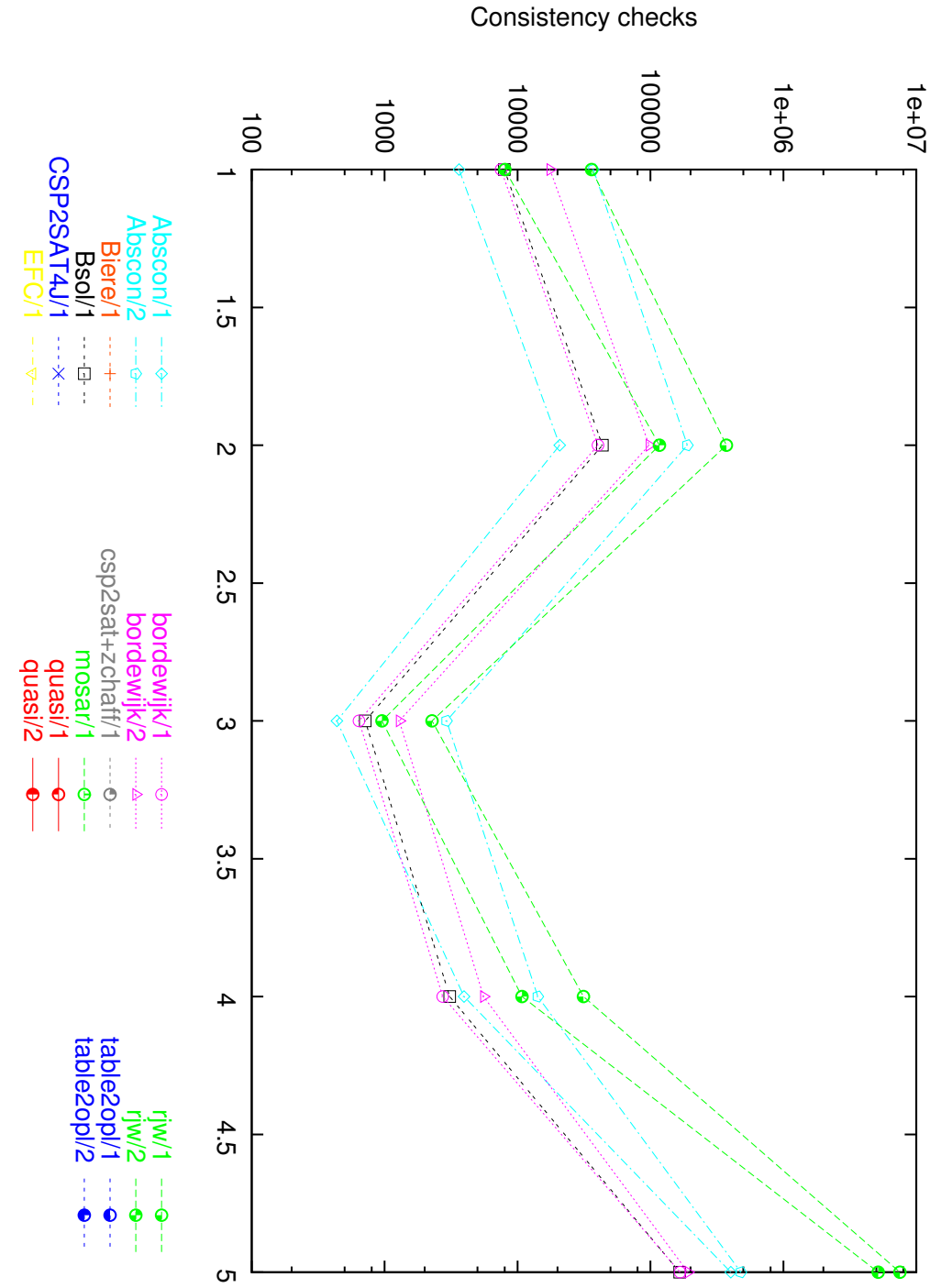

Fig. 819. Consistency checks required for solving instances from class `lsq-dg1`. The maximum solution time was set to 600 seconds.

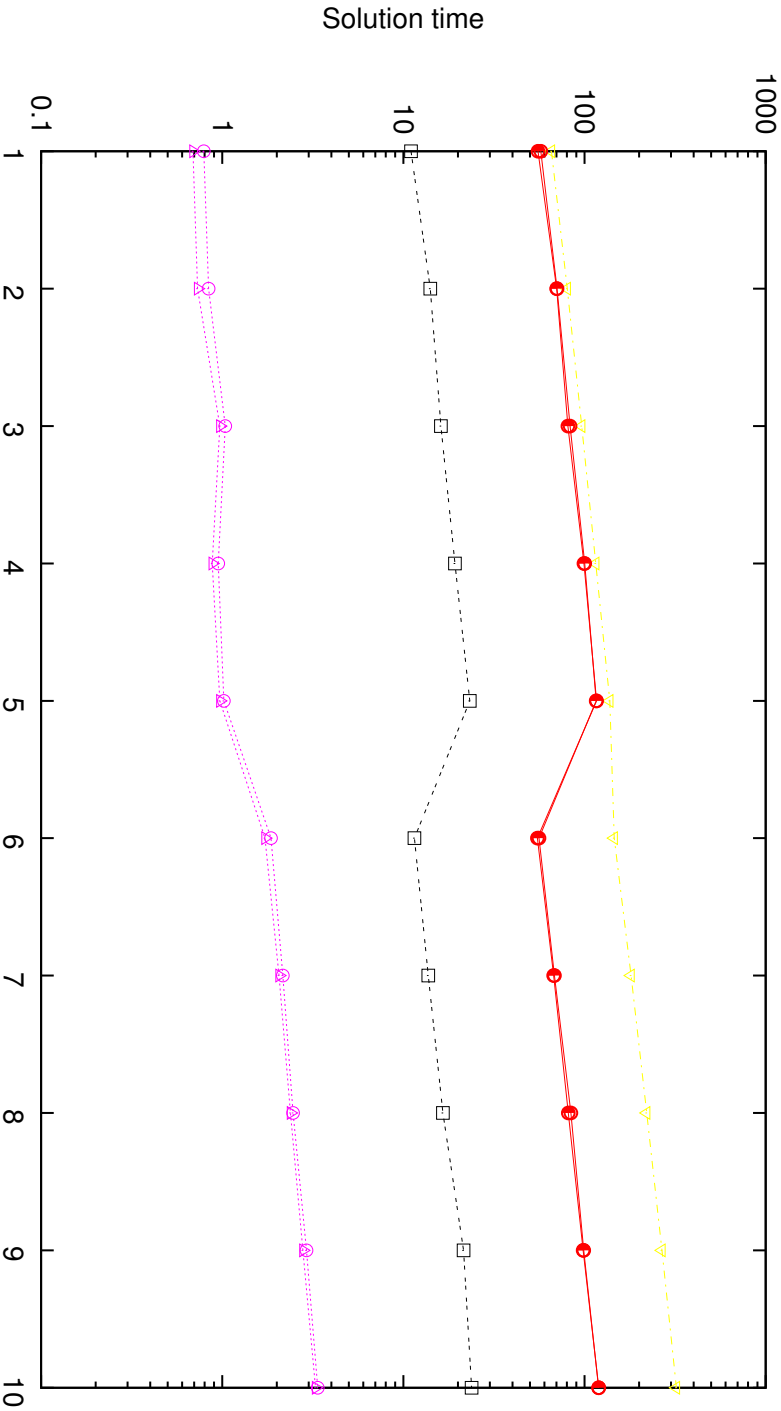

Fig. 820. Solution time in seconds for solving instances from class marc. The maximum solution time was set to 600 seconds.

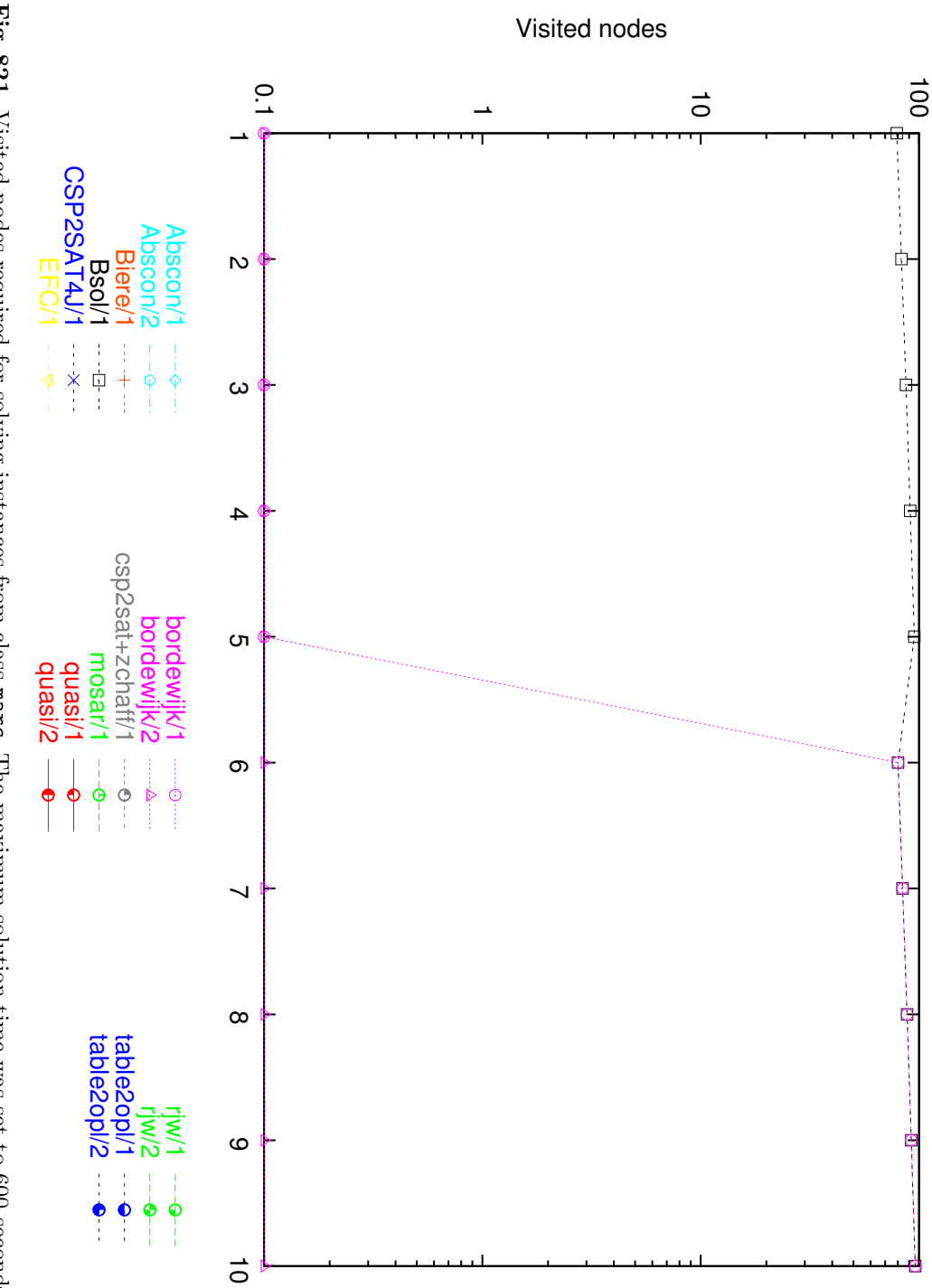

Fig. 821. Visited nodes required for solving instances from class `marc`. The maximum solution time was set to 600 seconds.

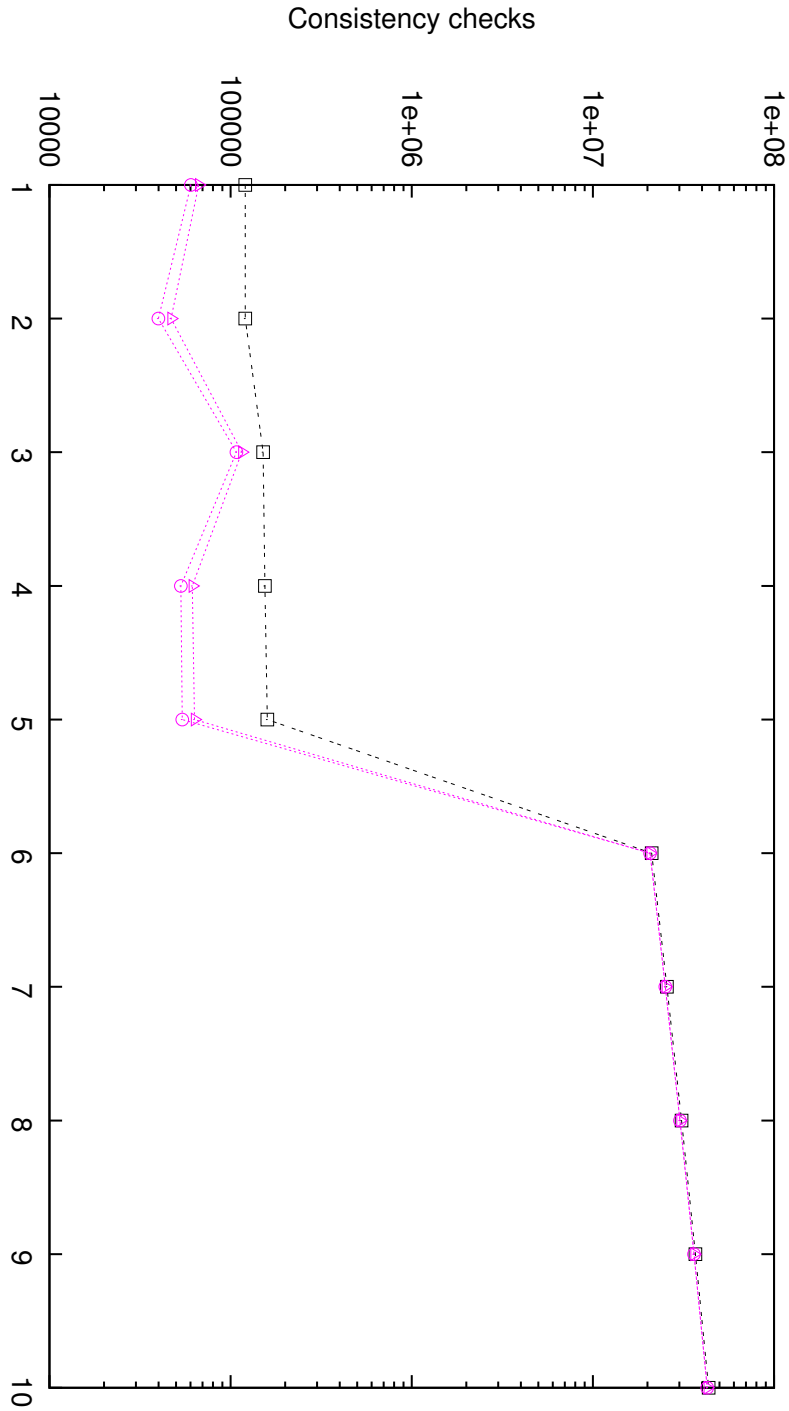

Fig. 822. Consistency checks required for solving instances from class `marc`. The maximum solution time was set to 600 seconds.

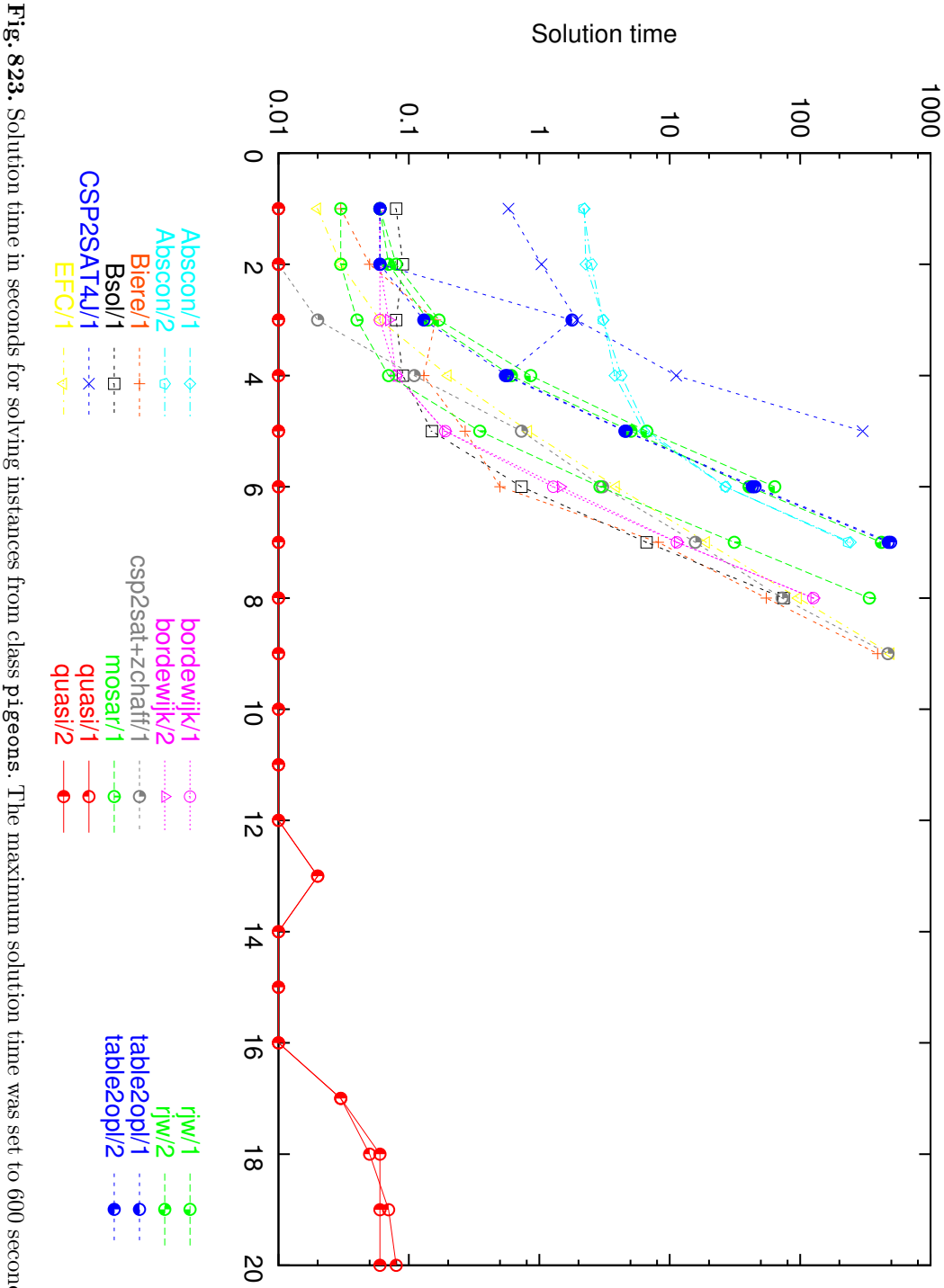

Fig. 823. Solution time in seconds for solving instances from class `pigeons`. The maximum solution time was set to 600 seconds.

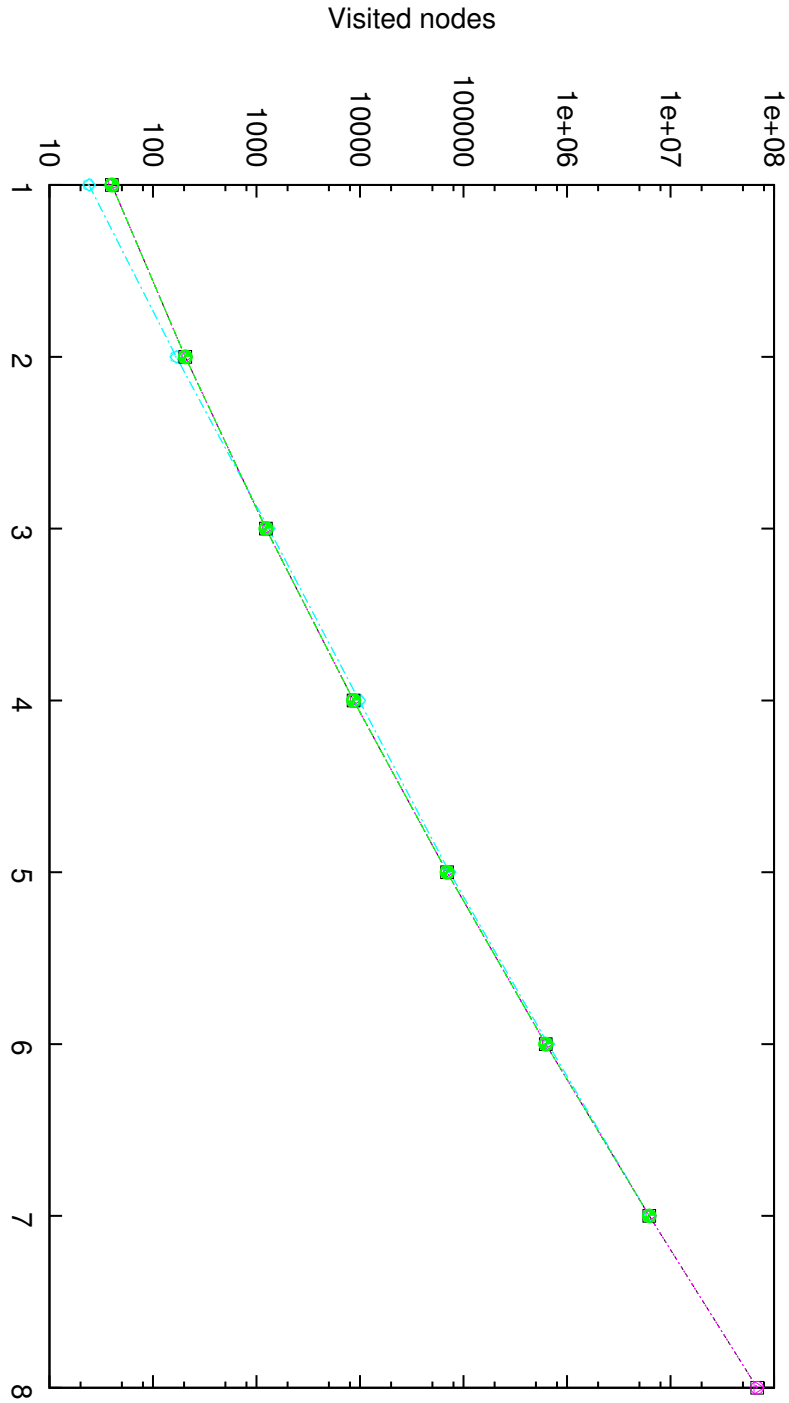

Fig. 824. Visited nodes required for solving instances from class **pigeons**. The maximum solution time was set to 600 seconds.

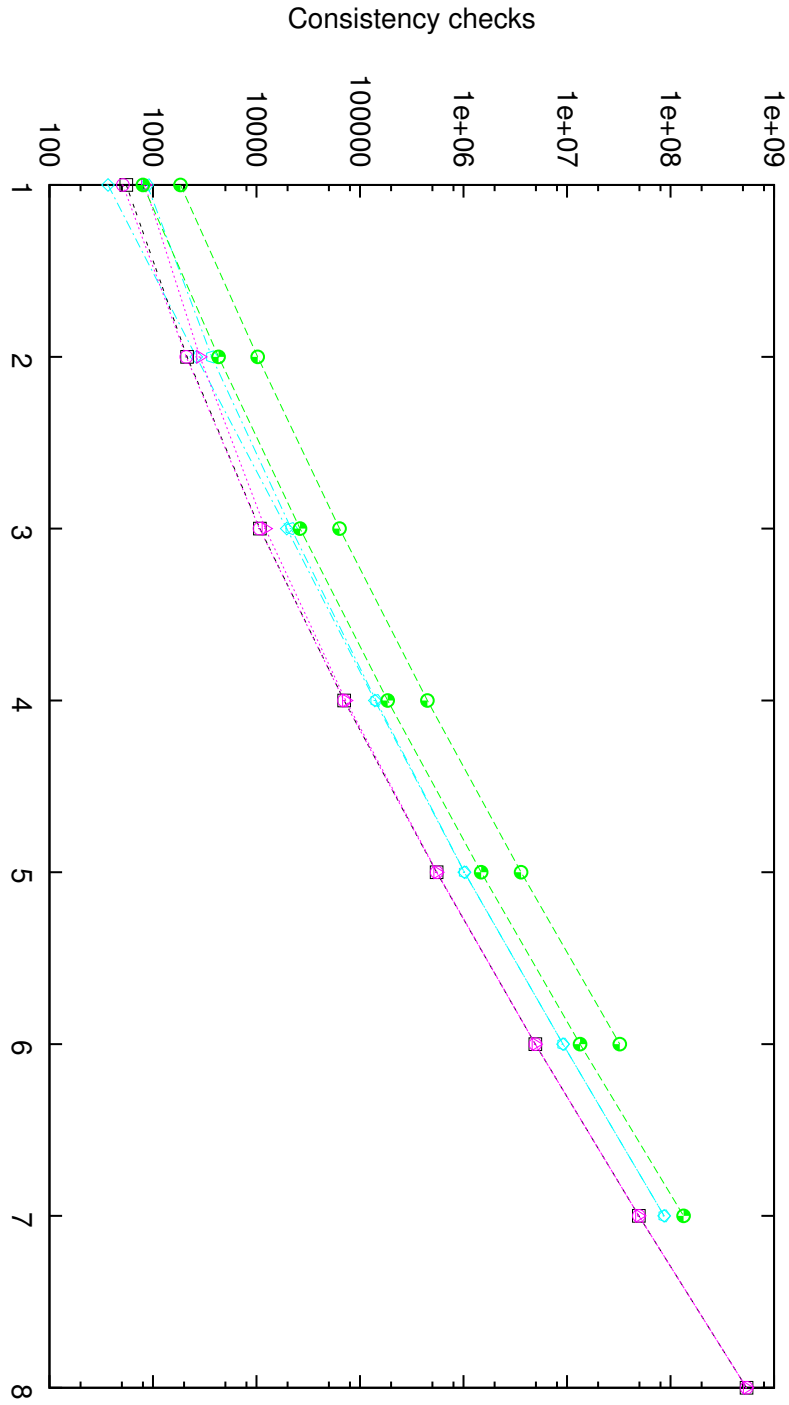

Fig. 825. Consistency checks required for solving instances from class `pigeons`. The maximum solution time was set to 600 seconds.

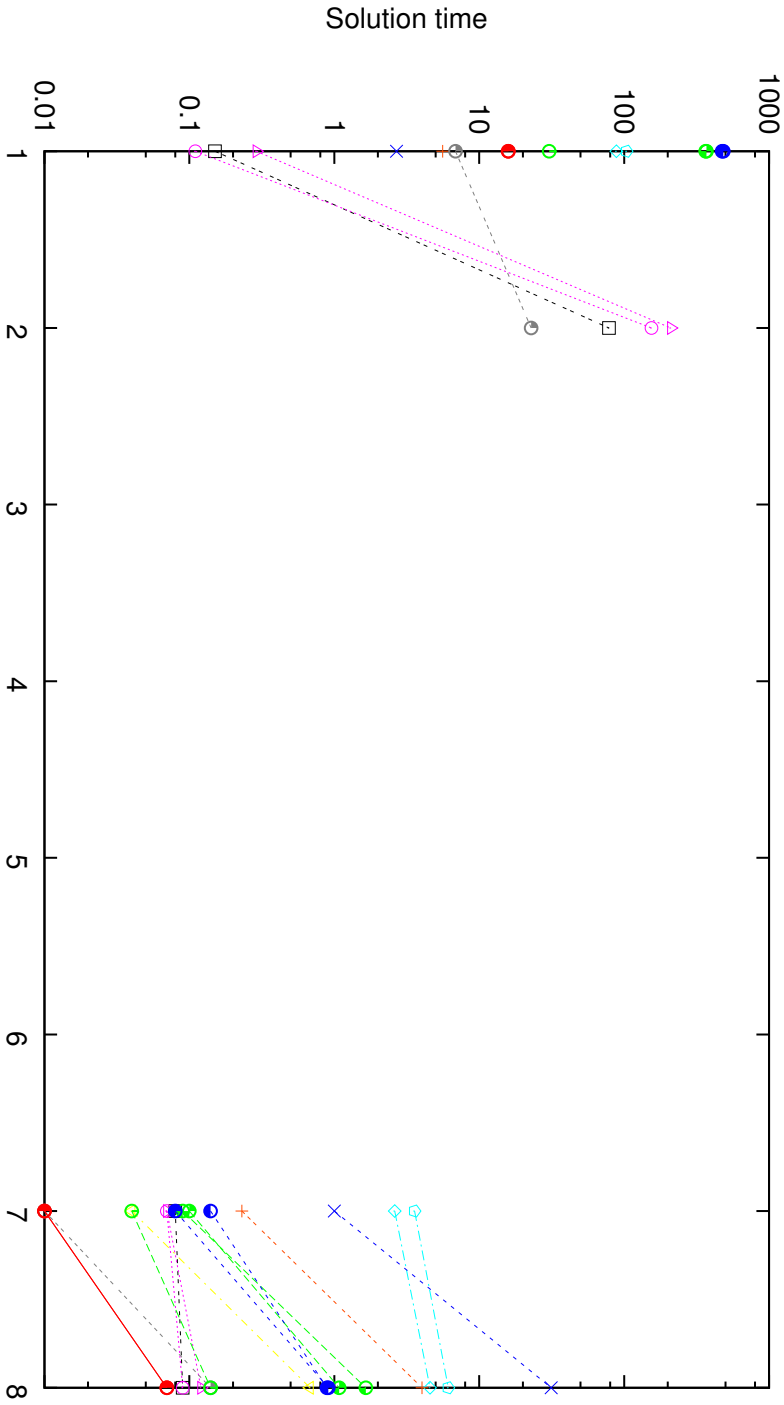

Fig. 826. Solution time in seconds for solving instances from class qa1. The maximum solution time was set to 600 seconds.

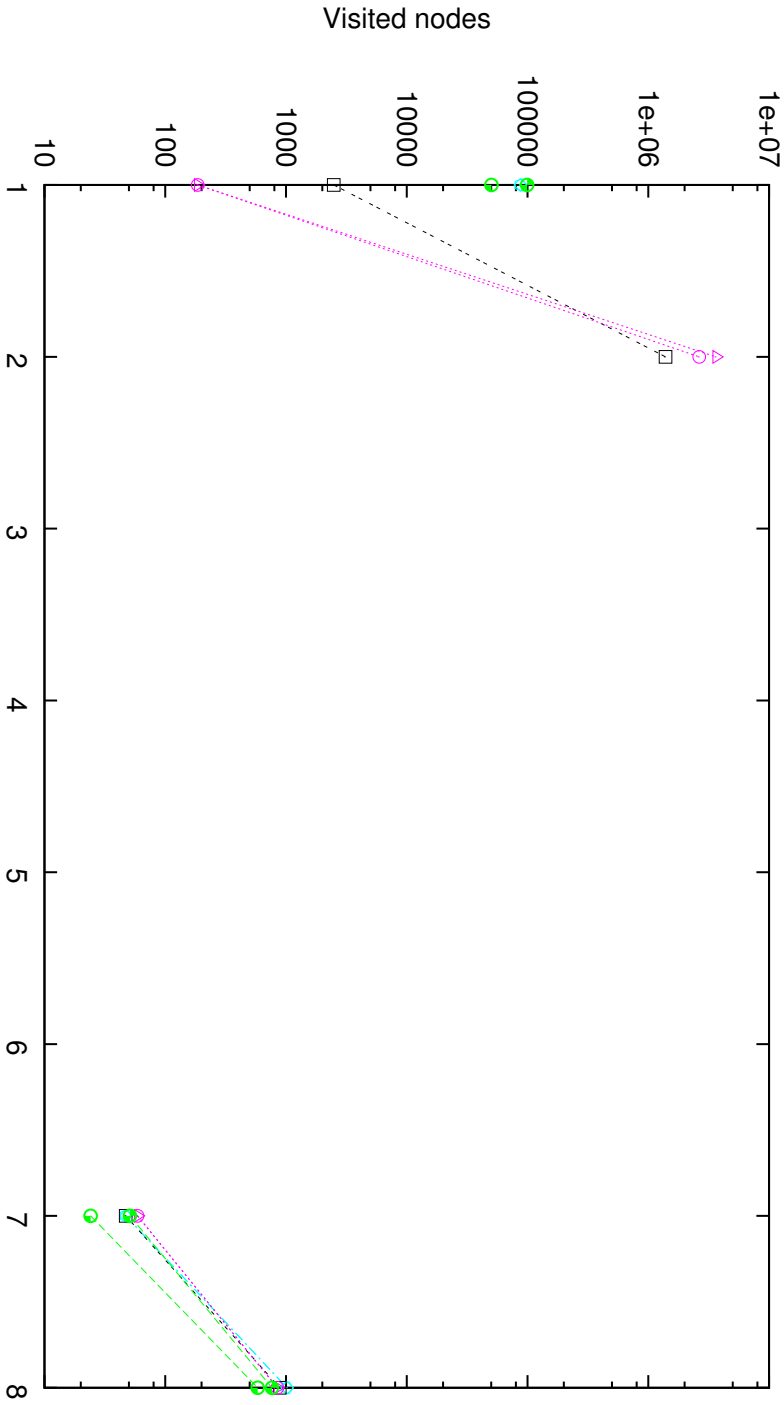

Fig. 827. Visited nodes required for solving instances from class qa1. The maximum solution time was set to 600 seconds.

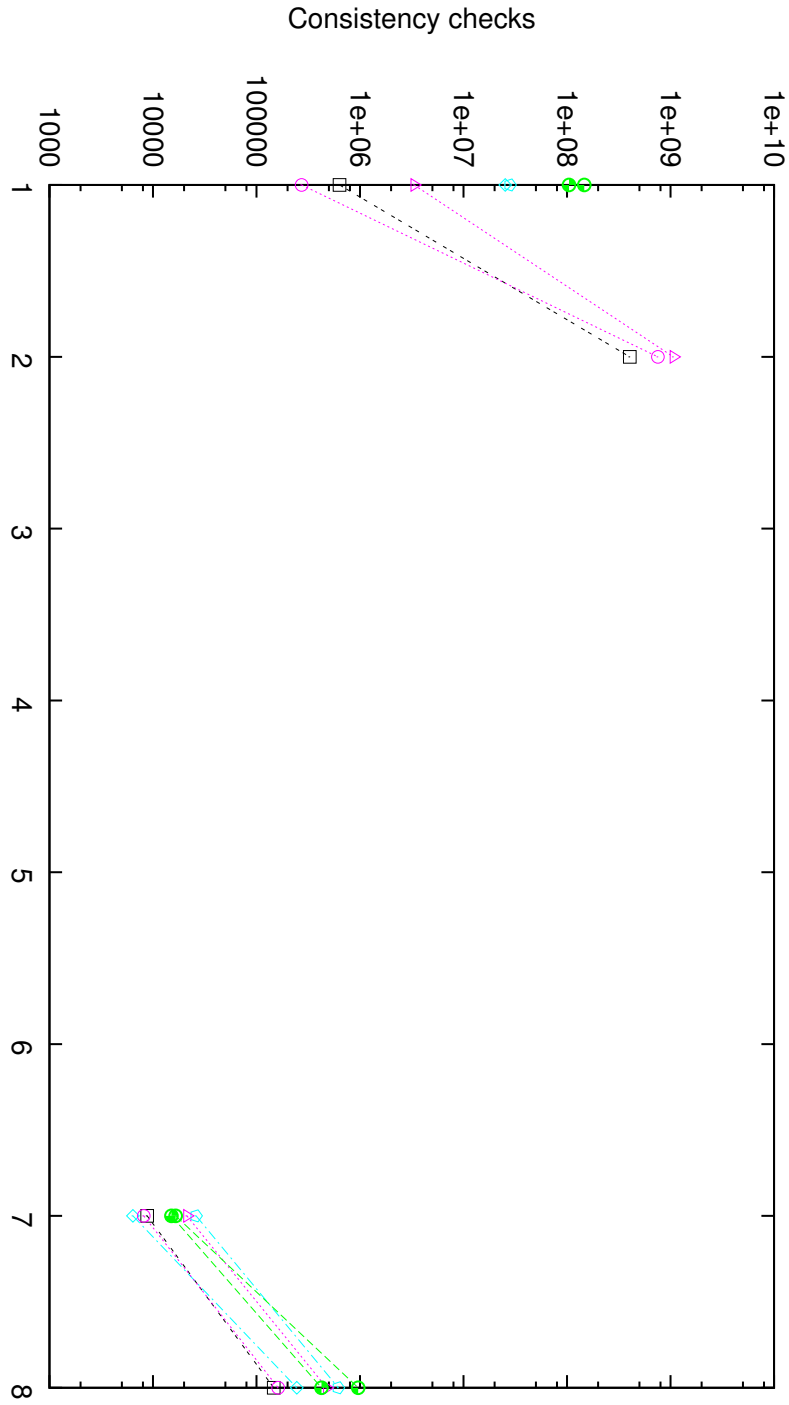

Fig. 828. Consistency checks required for solving instances from class qa1. The maximum solution time was set to 600 seconds.

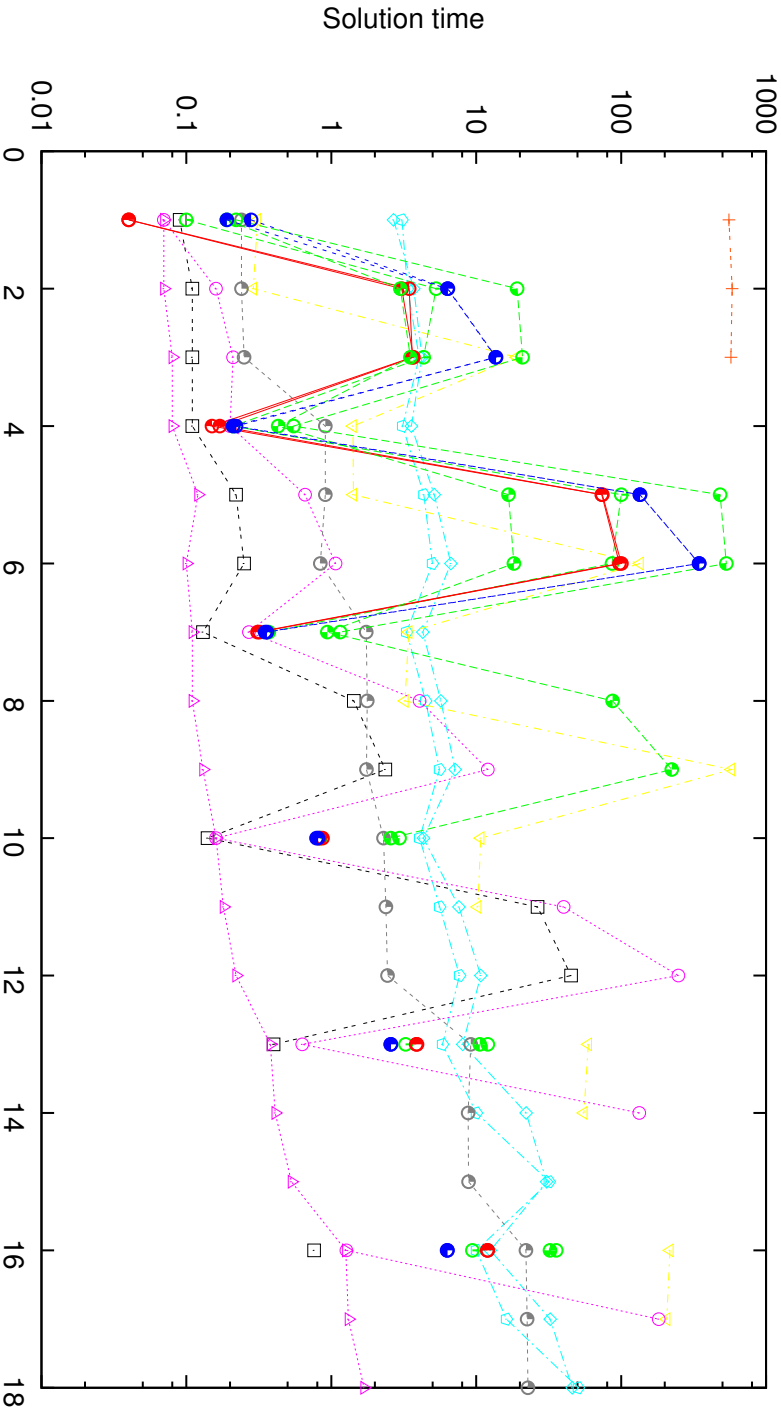

Fig. 829. Solution time in seconds for solving instances from class qk1. The maximum solution time was set to 600 seconds.

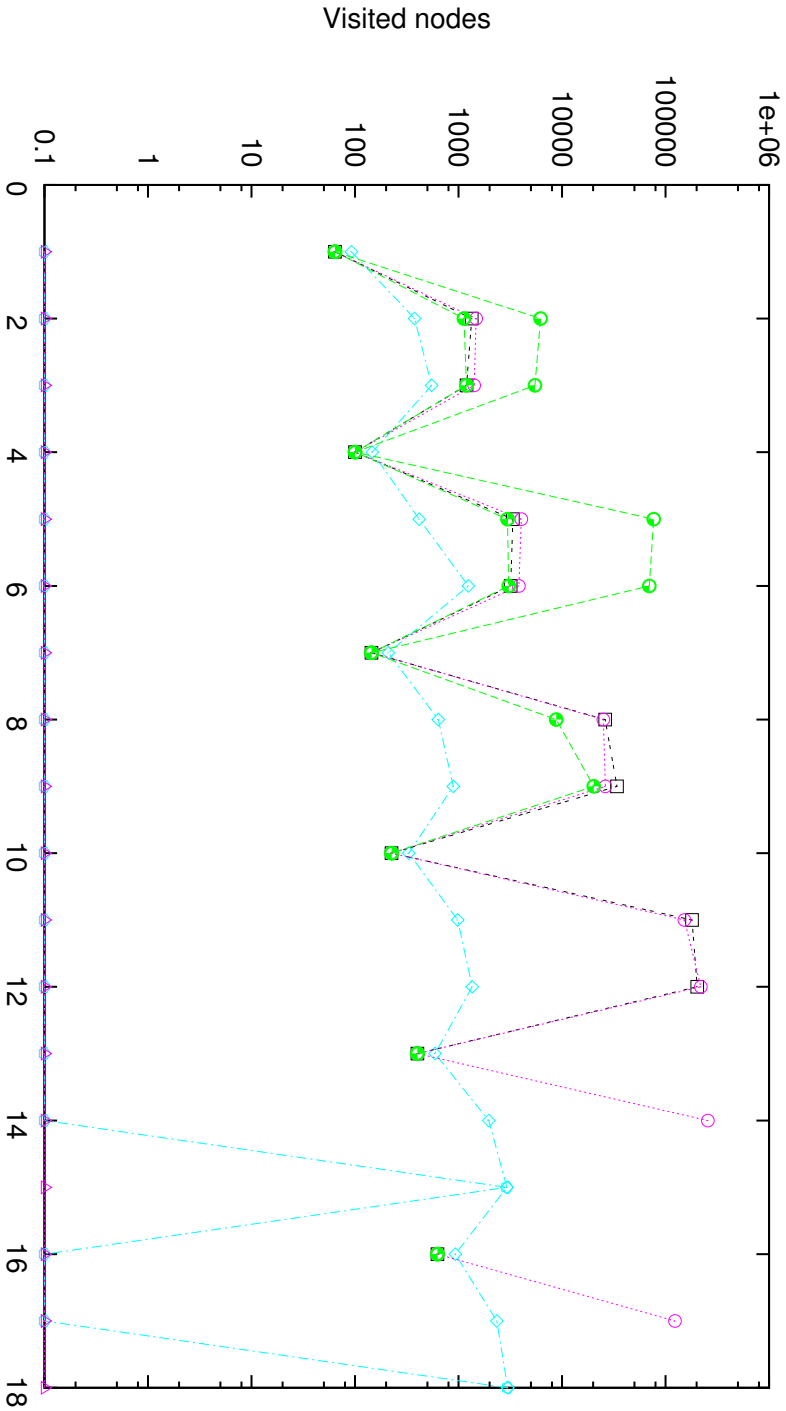

Fig. 830. Visited nodes required for solving instances from class qk1. The maximum solution time was set to 600 seconds.

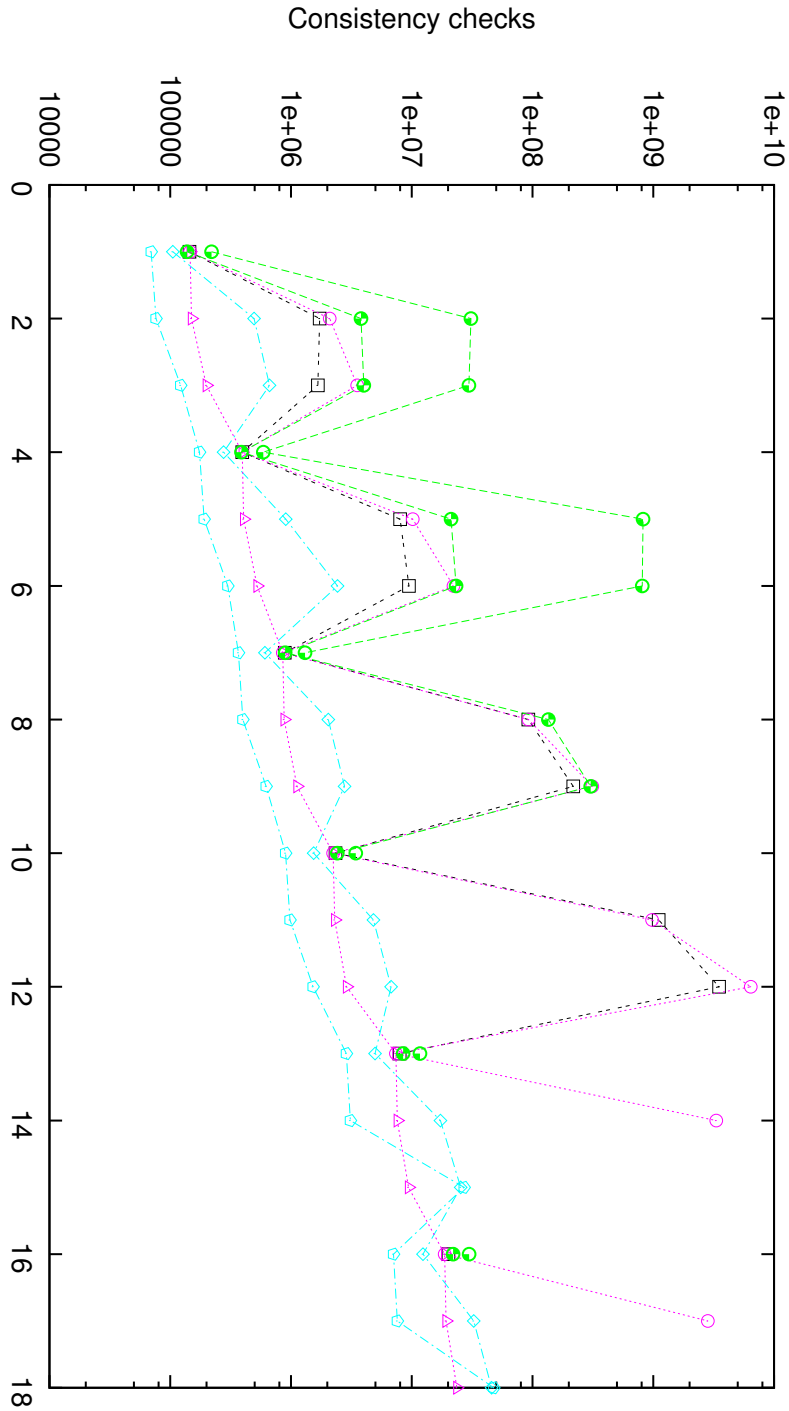

Fig. 831. Consistency checks required for solving instances from class qk1. The maximum solution time was set to 600 seconds.

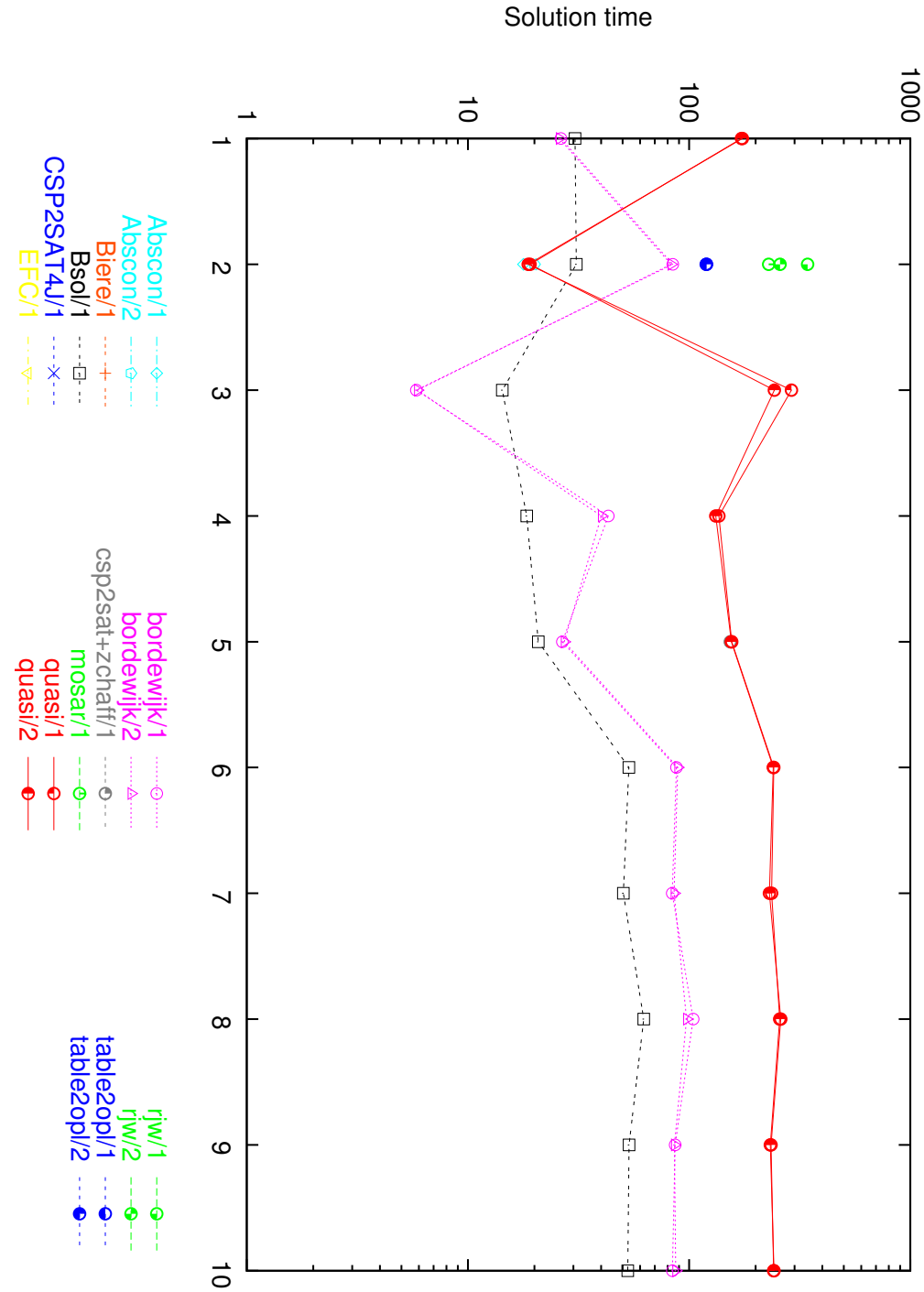

Fig. 832. Solution time in seconds for solving instances from class random-23-23-253. The maximum solution time was set to 600 seconds.

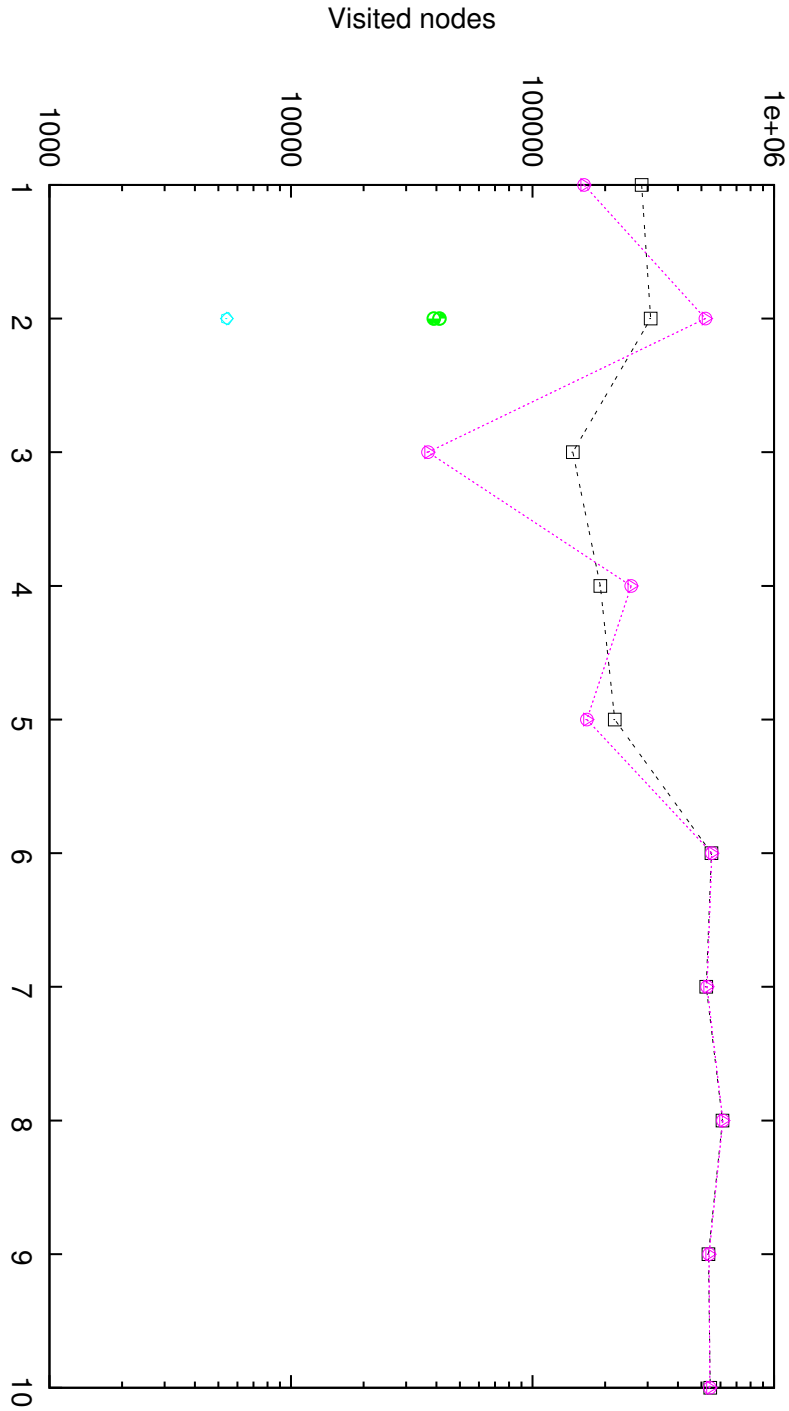

Fig. 833. Visited nodes required for solving instances from class `random-23-23-253`. The maximum solution time was set to 600 seconds.

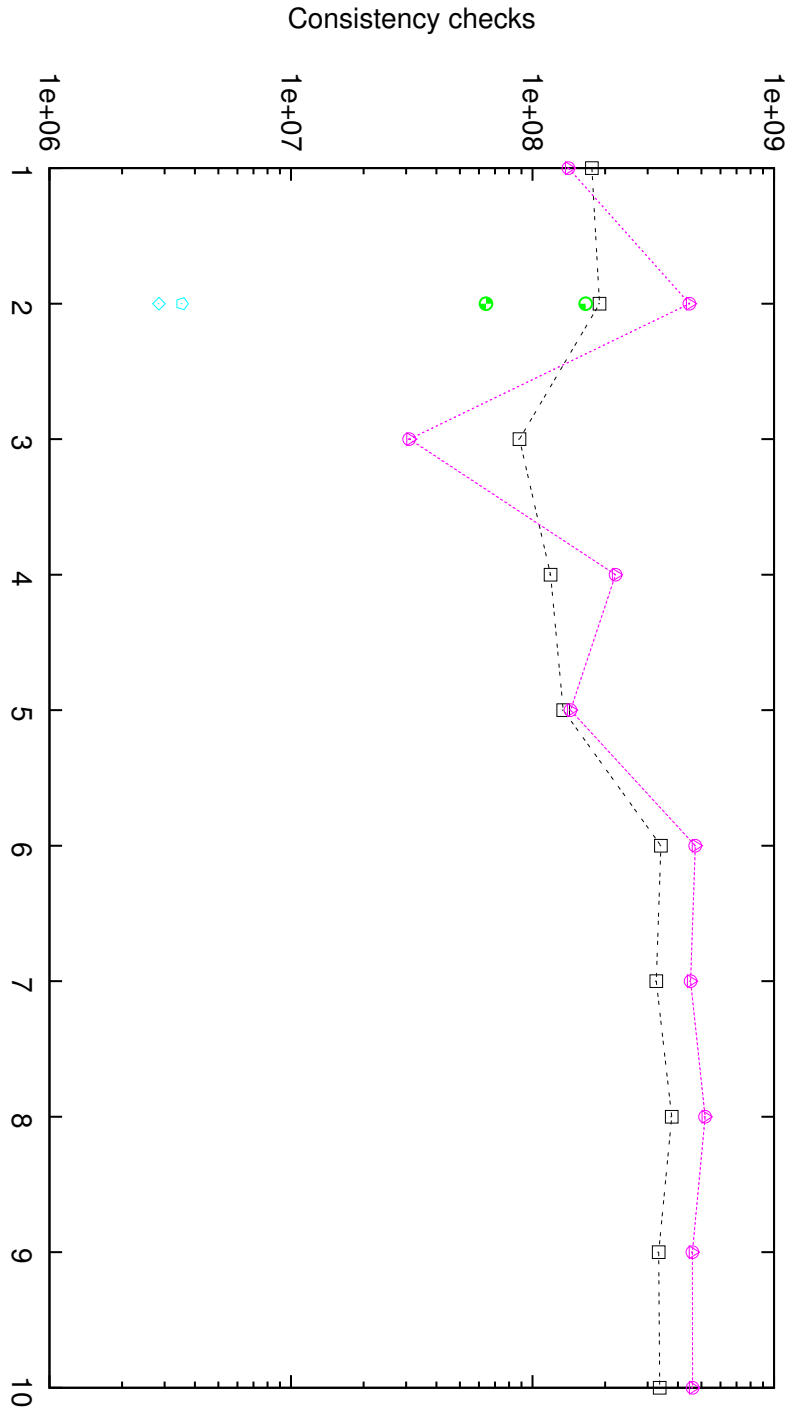

Fig. 834. Consistency checks required for solving instances from class `random-23-23-253`. The maximum solution time was set to 600 seconds.

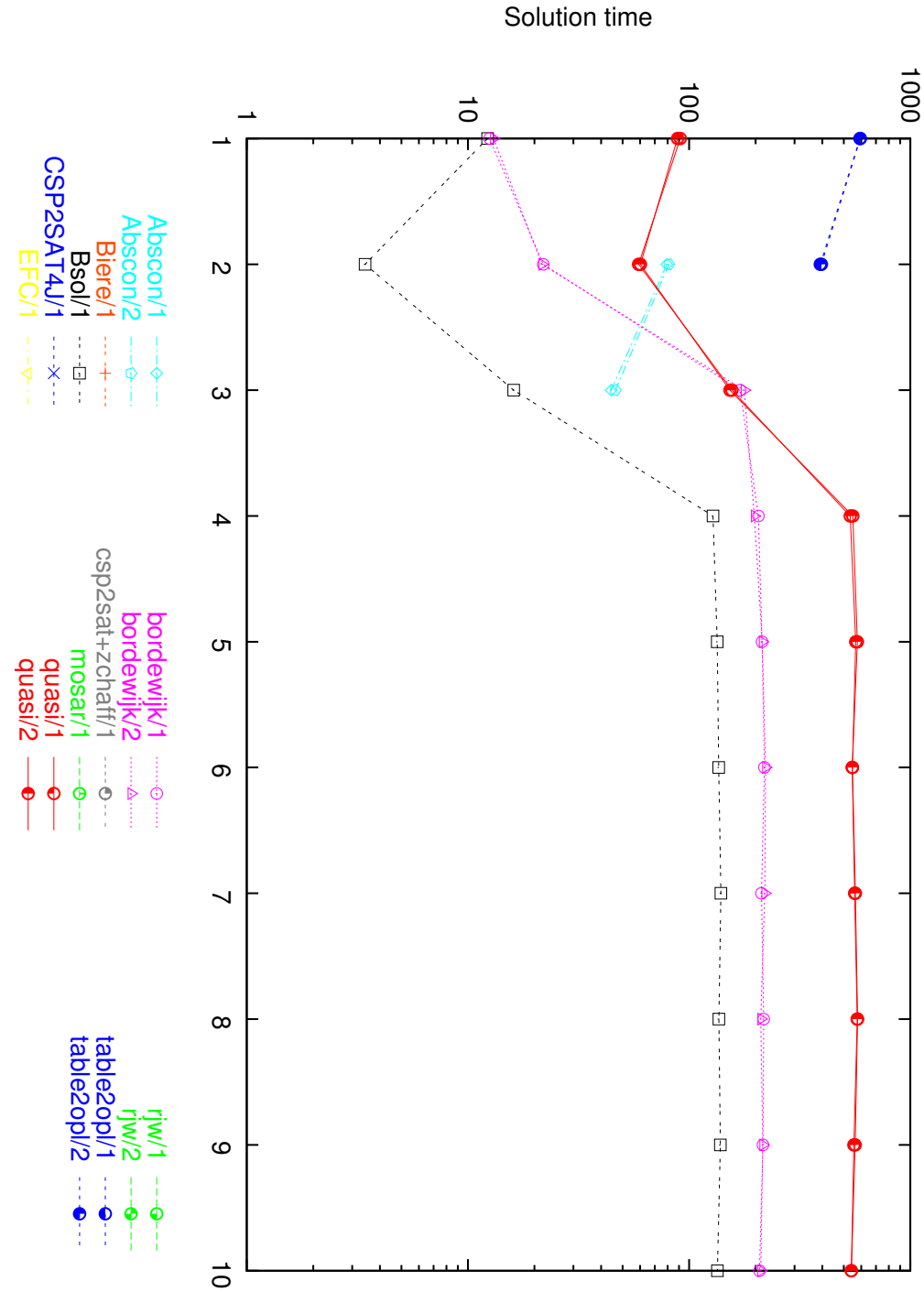

Fig. 835. Solution time in seconds for solving instances from class random−24−24−276. The maximum solution time was set to 600 seconds.

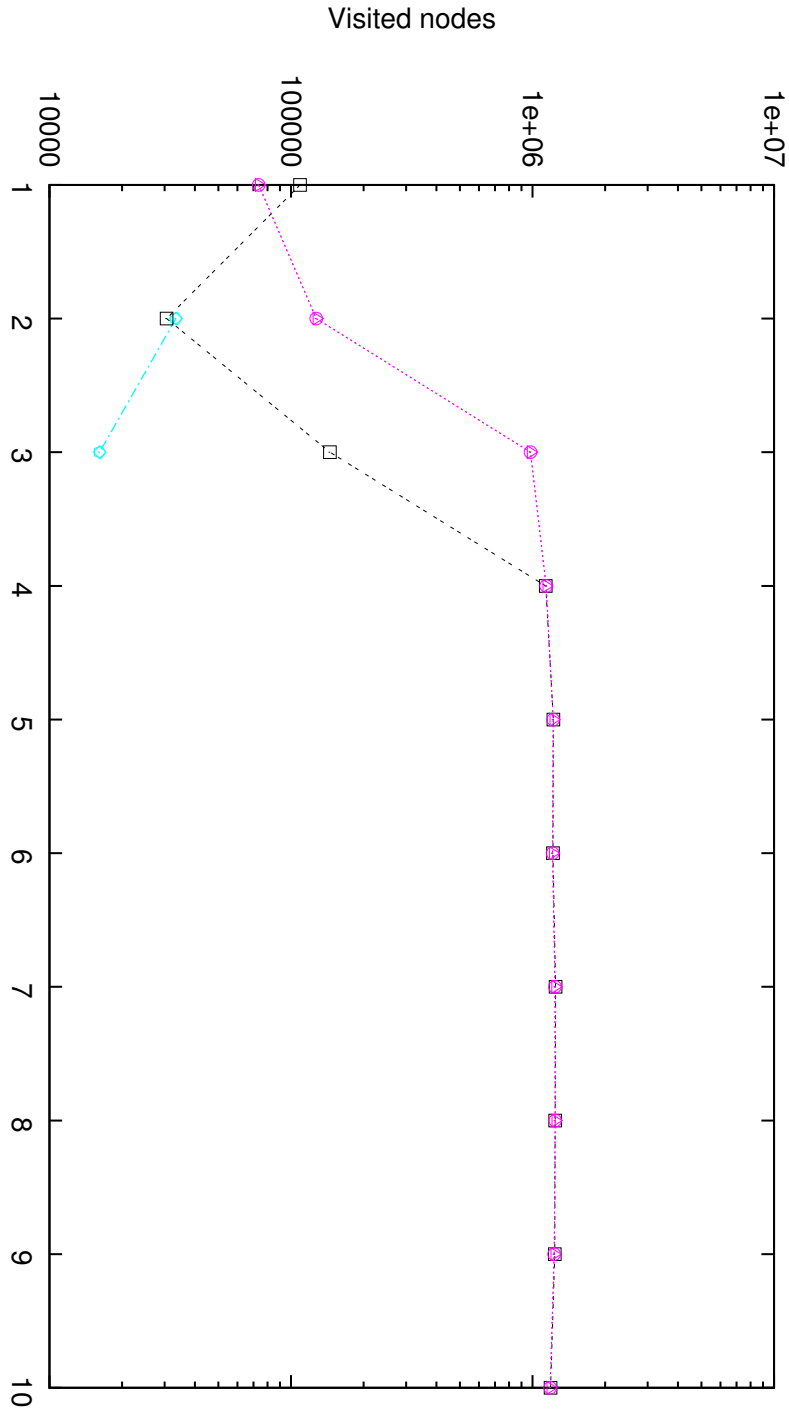

Fig. 836. Visited nodes required for solving instances from class `random-24-24-276`. The maximum solution time was set to 600 seconds.

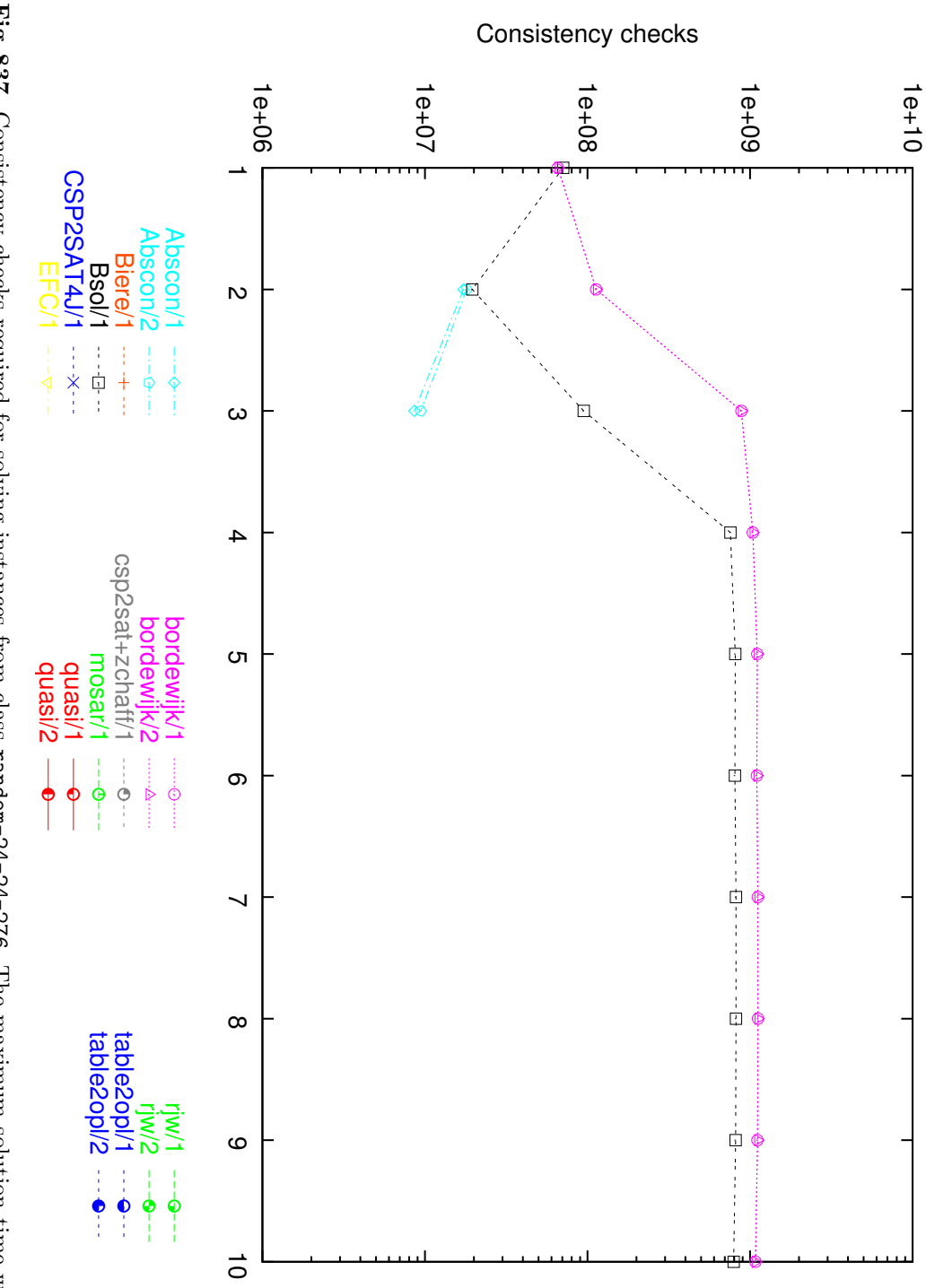

Fig. 837. Consistency checks required for solving instances from class `random-24-24-276`. The maximum solution time was set to 600 seconds.

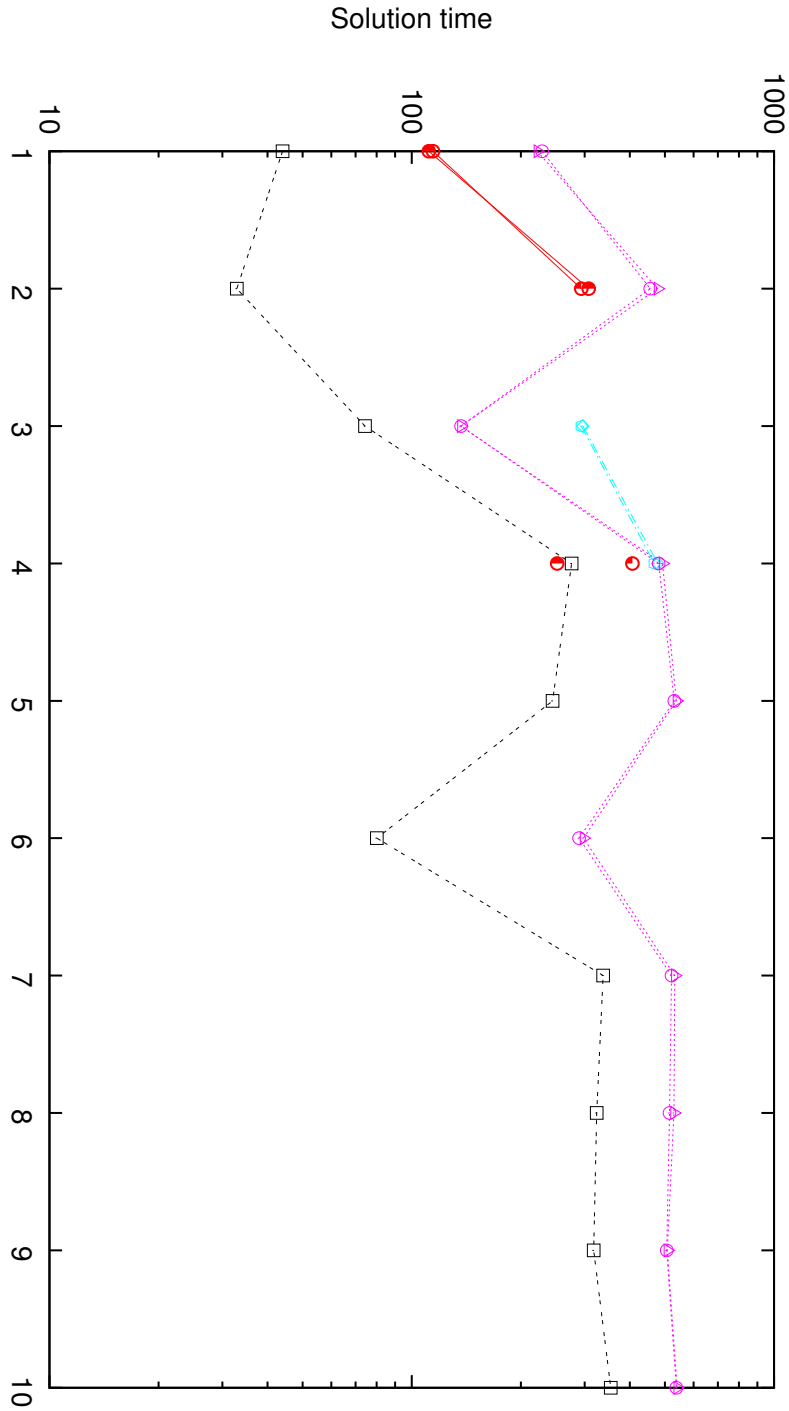

Fig. 838. Solution time in seconds for solving instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

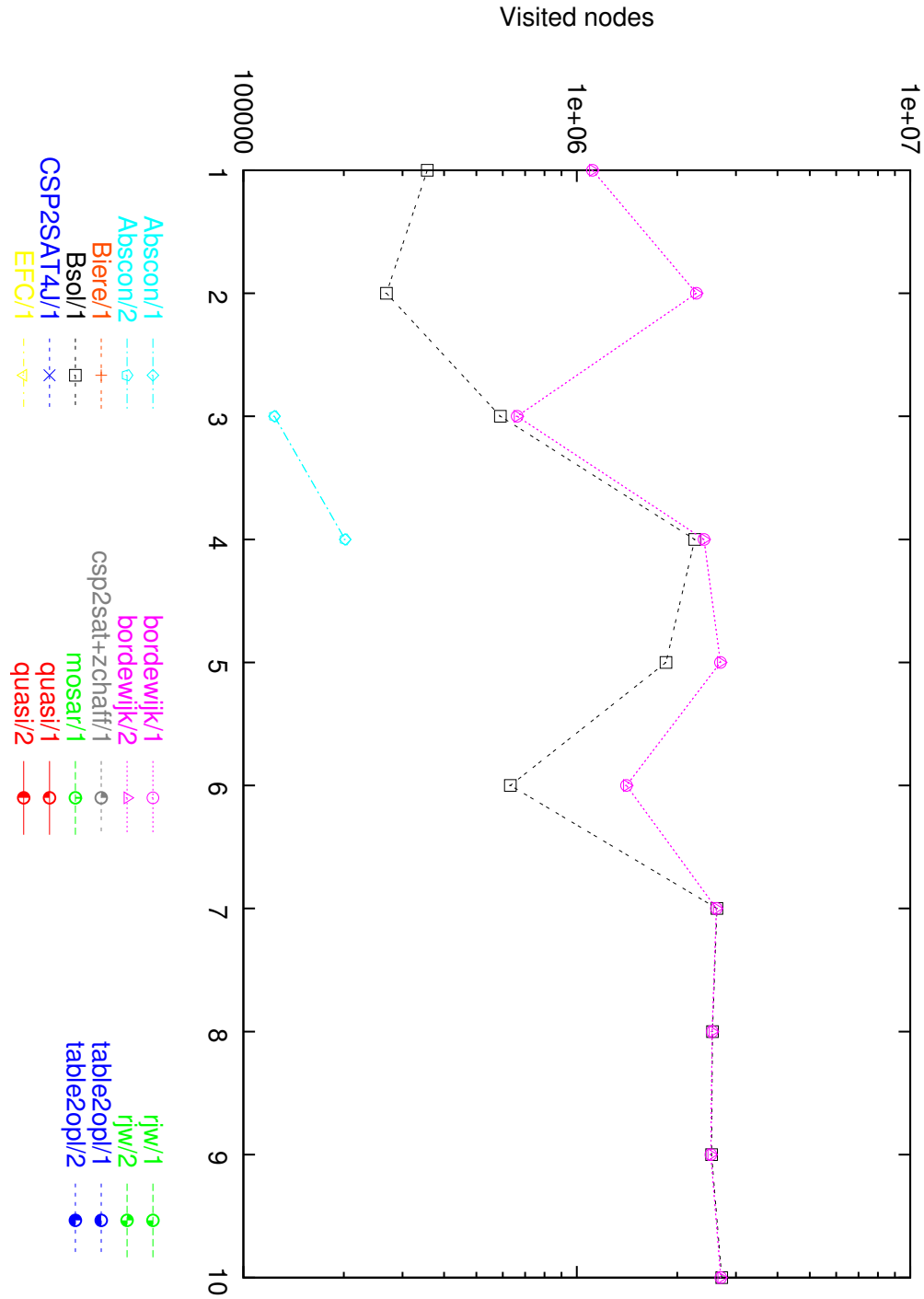

Fig. 839. Visited nodes required for solving instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

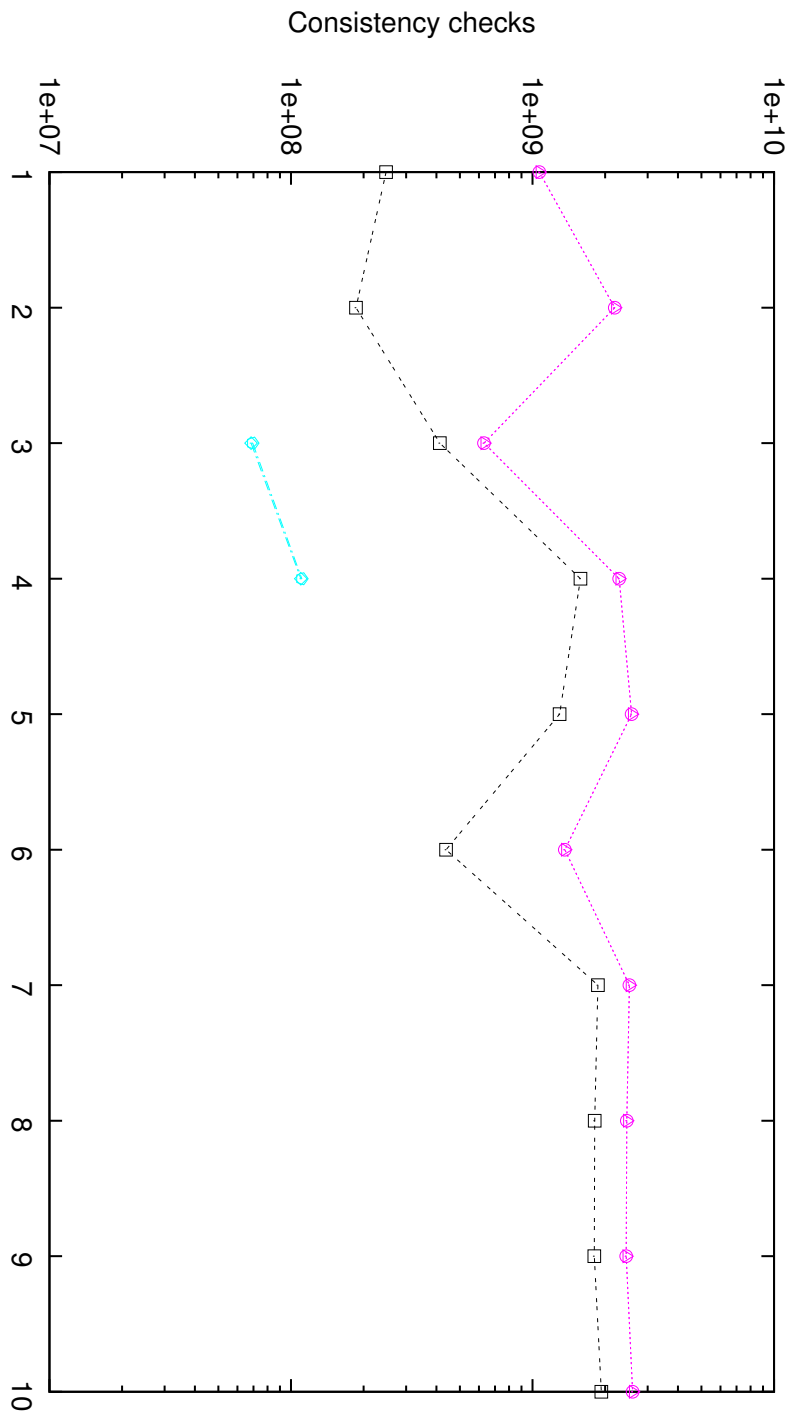

Fig. 840. Consistency checks required for solving instances from class `random-25-25-300`. The maximum solution time was set to 600 seconds.

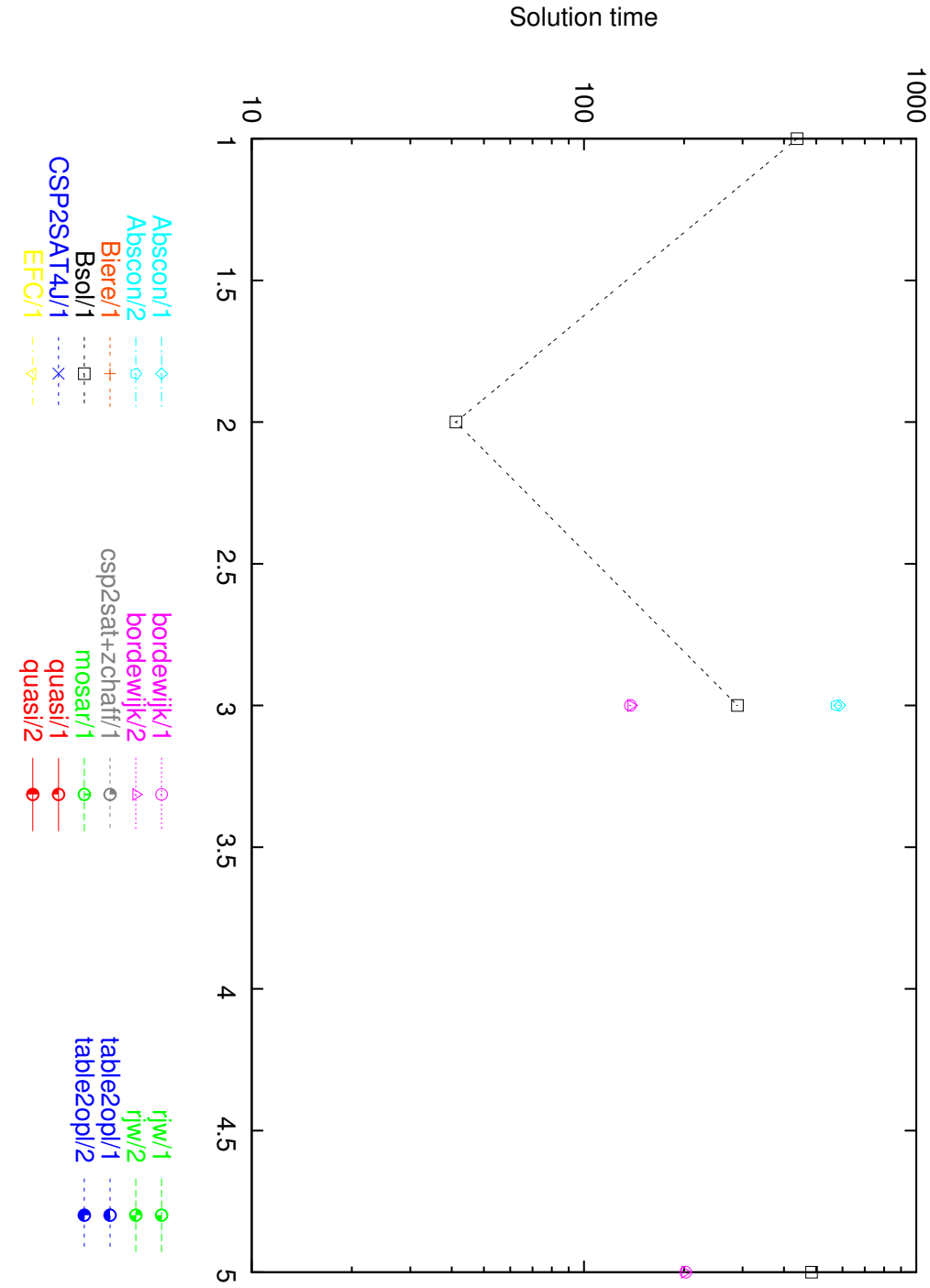

Fig. 841. Solution time in seconds for solving instances from class random-26-26-325. The maximum solution time was set to 600 seconds.

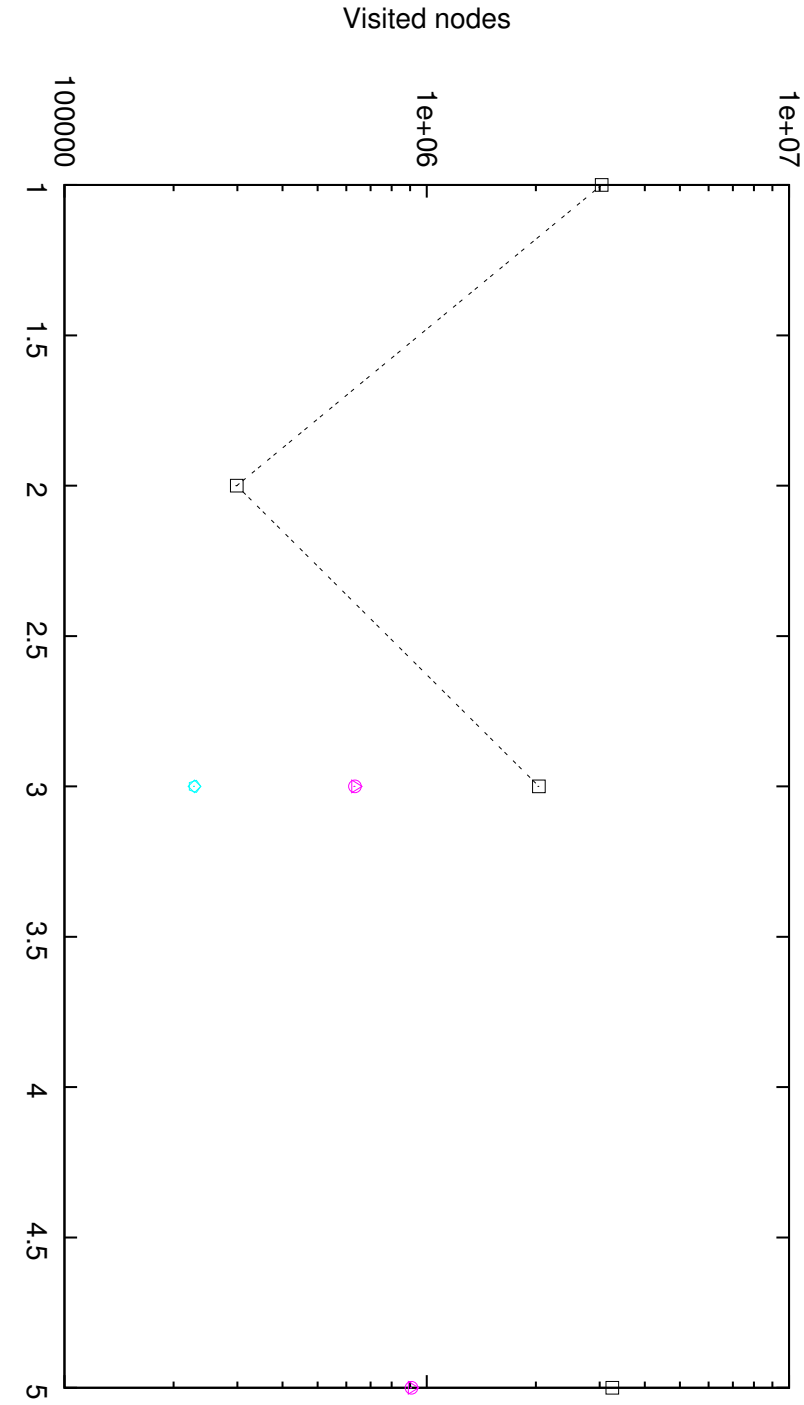

Fig. 842. Visited nodes required for solving instances from class `random-26-26-325`. The maximum solution time was set to 600 seconds.

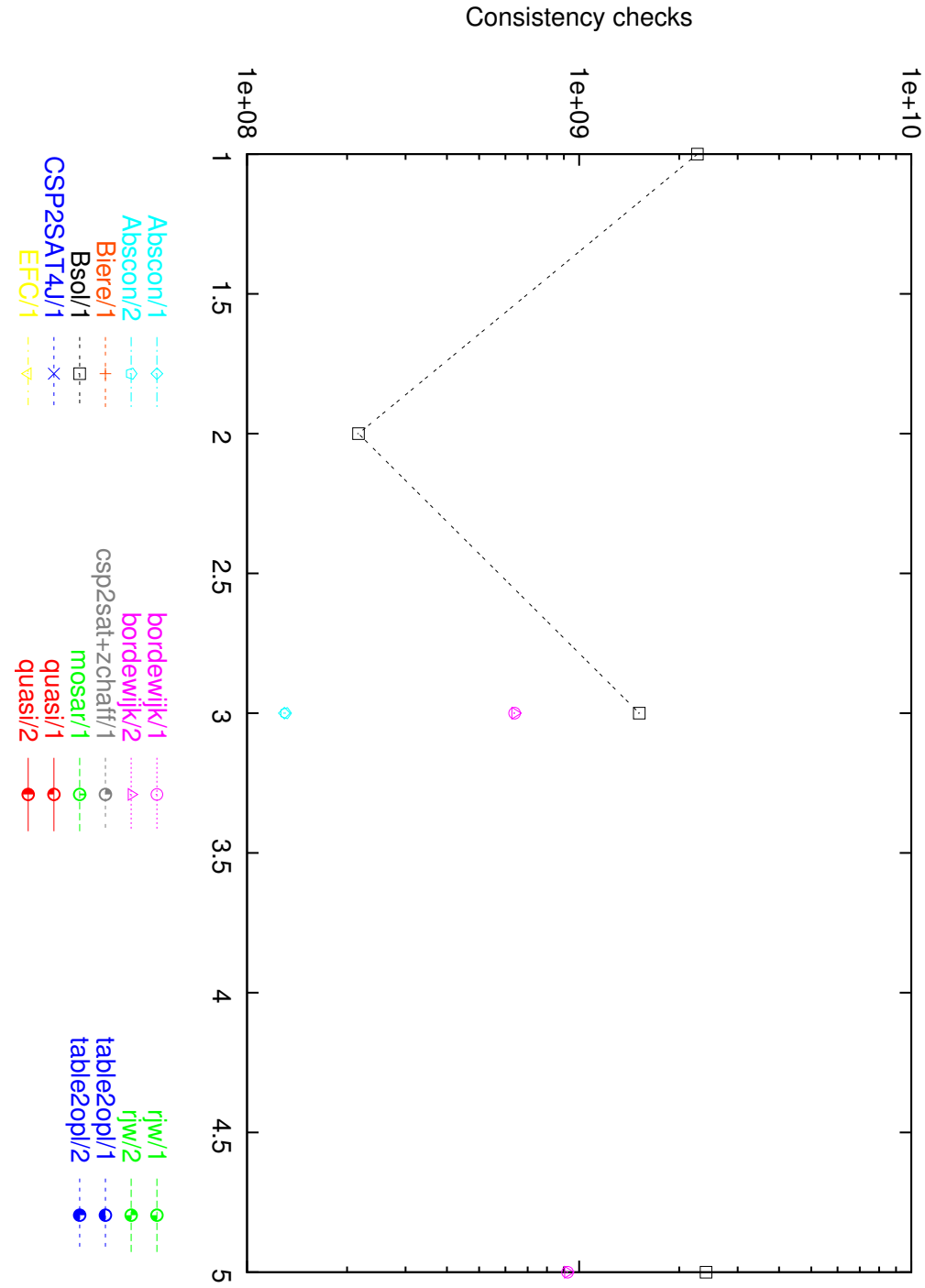

Fig. 843. Consistency checks required for solving instances from class `random-26-26-325`. The maximum solution time was set to 600 seconds.

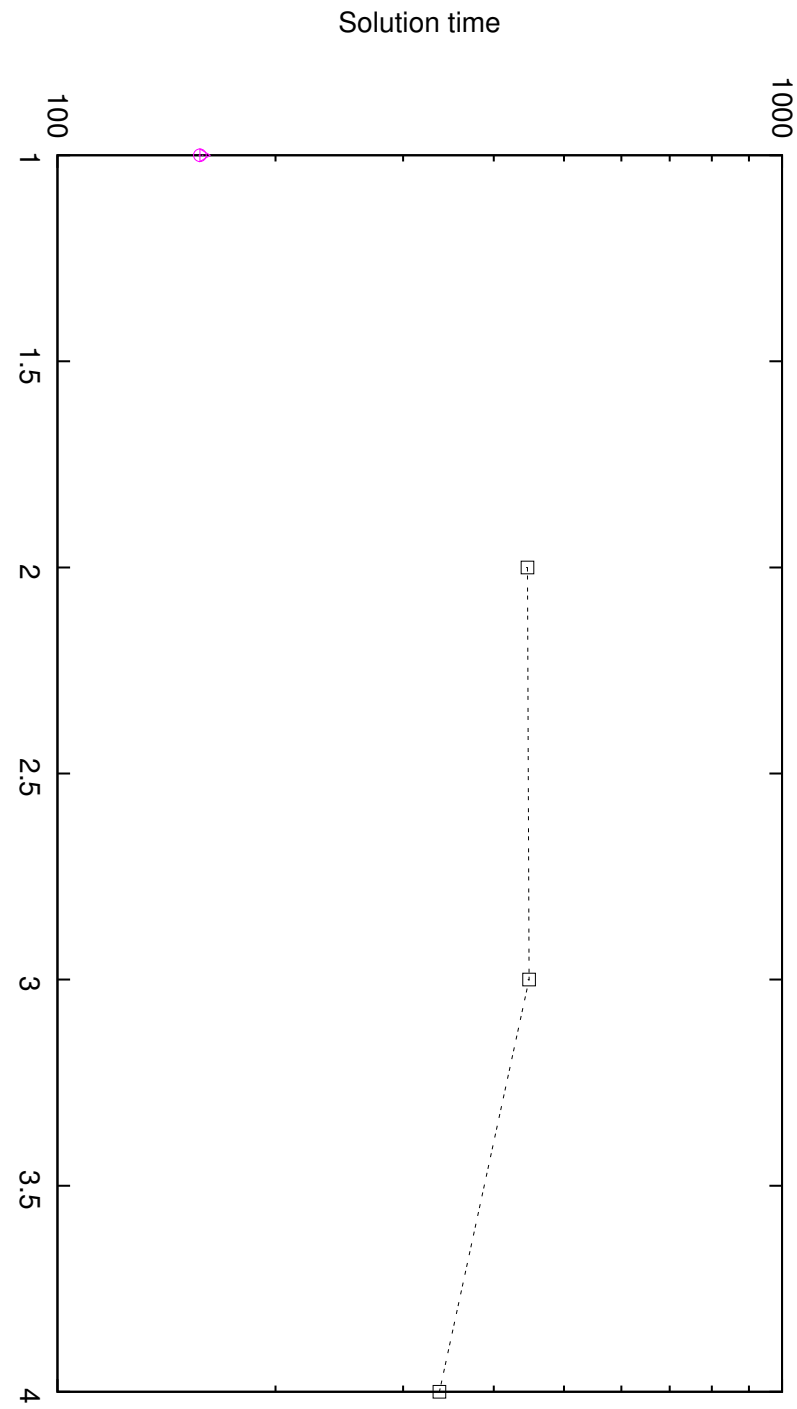

Fig. 844. Solution time in seconds for solving instances from class random-27-27-351. The maximum solution time was set to 600 seconds.

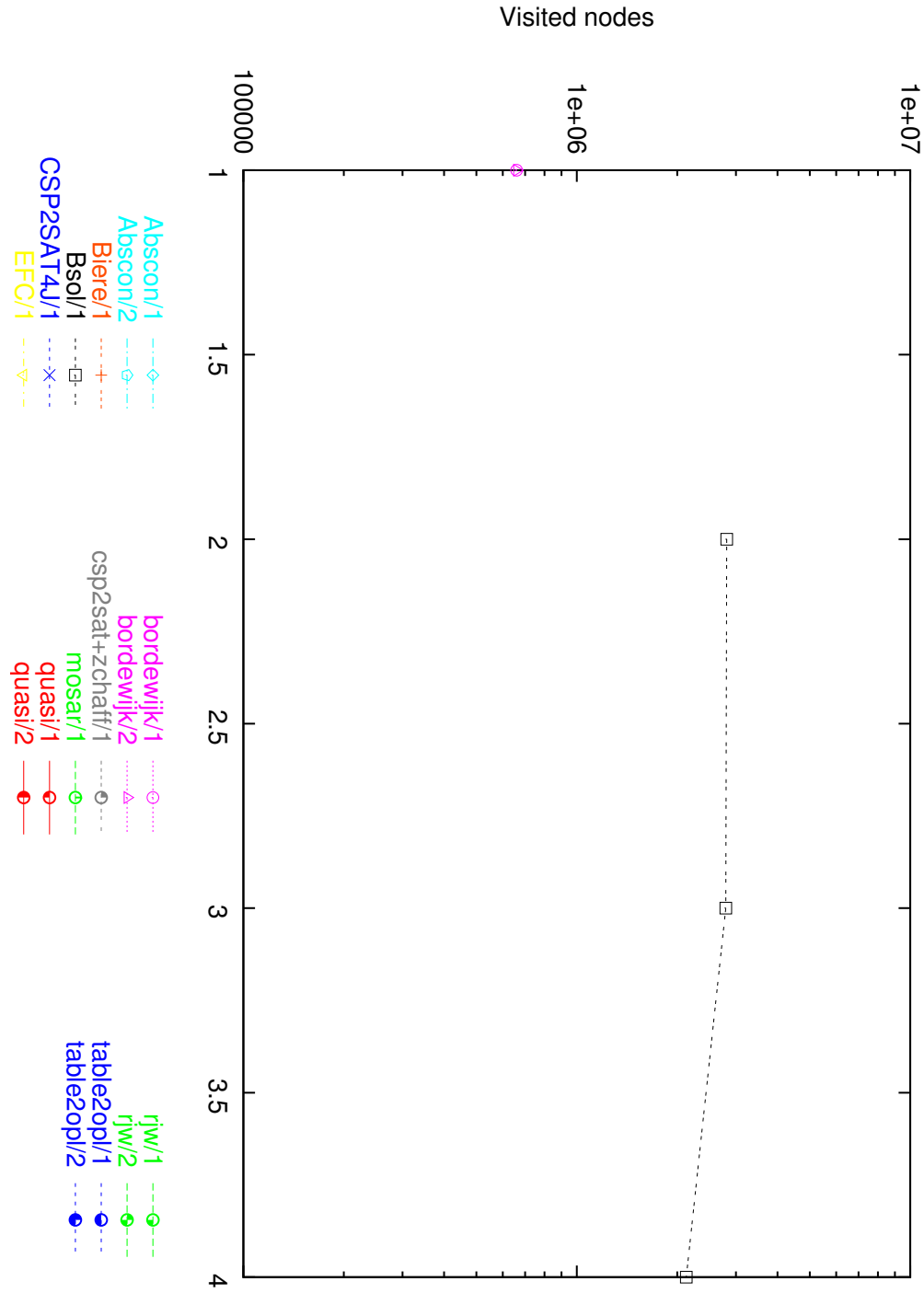

Fig. 845. Visited nodes required for solving instances from class `random-27-27-351`. The maximum solution time was set to 600 seconds.

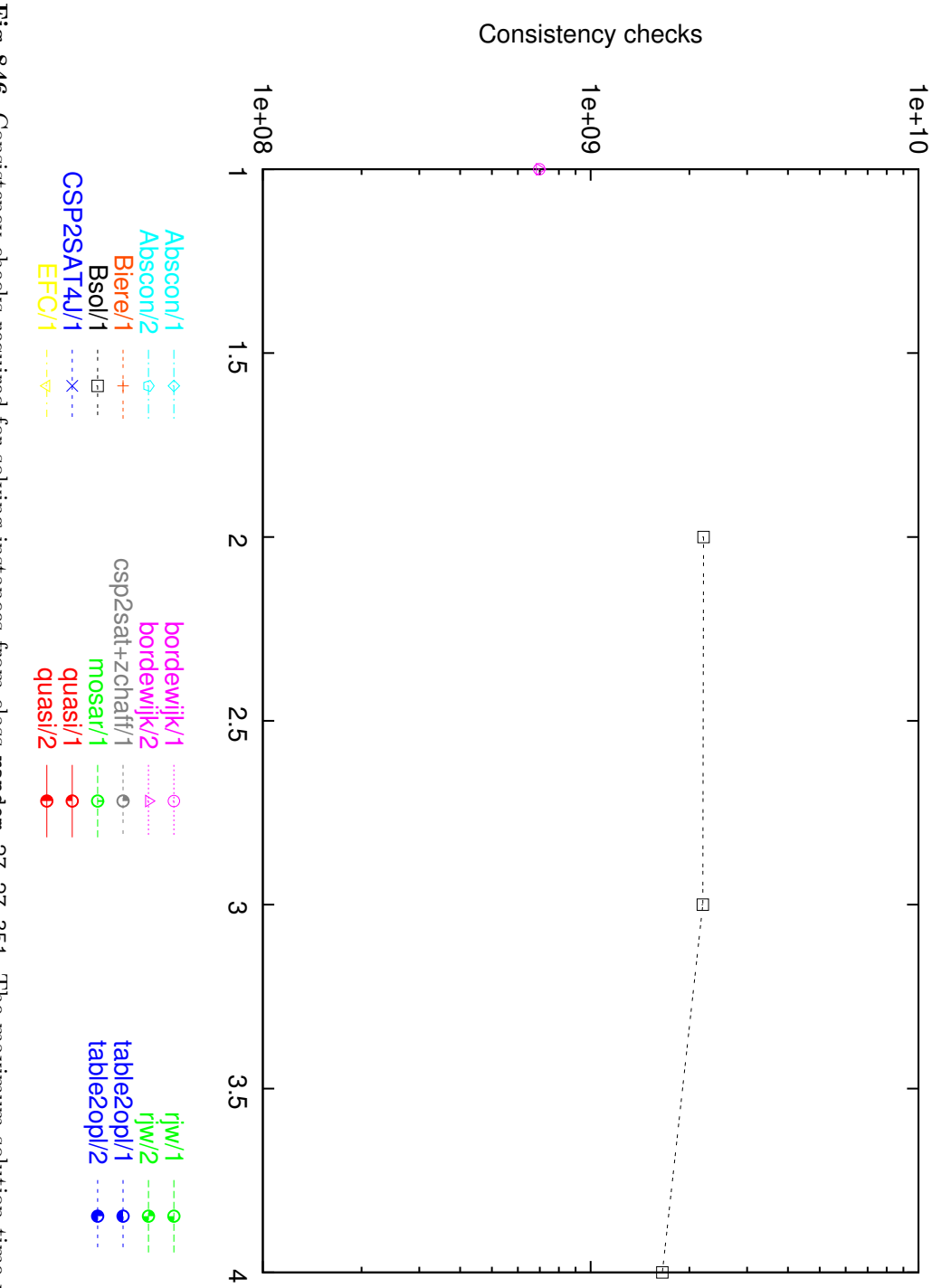

Fig. 846. Consistency checks required for solving instances from class `random-27-27-351`. The maximum solution time was set to 600 seconds.

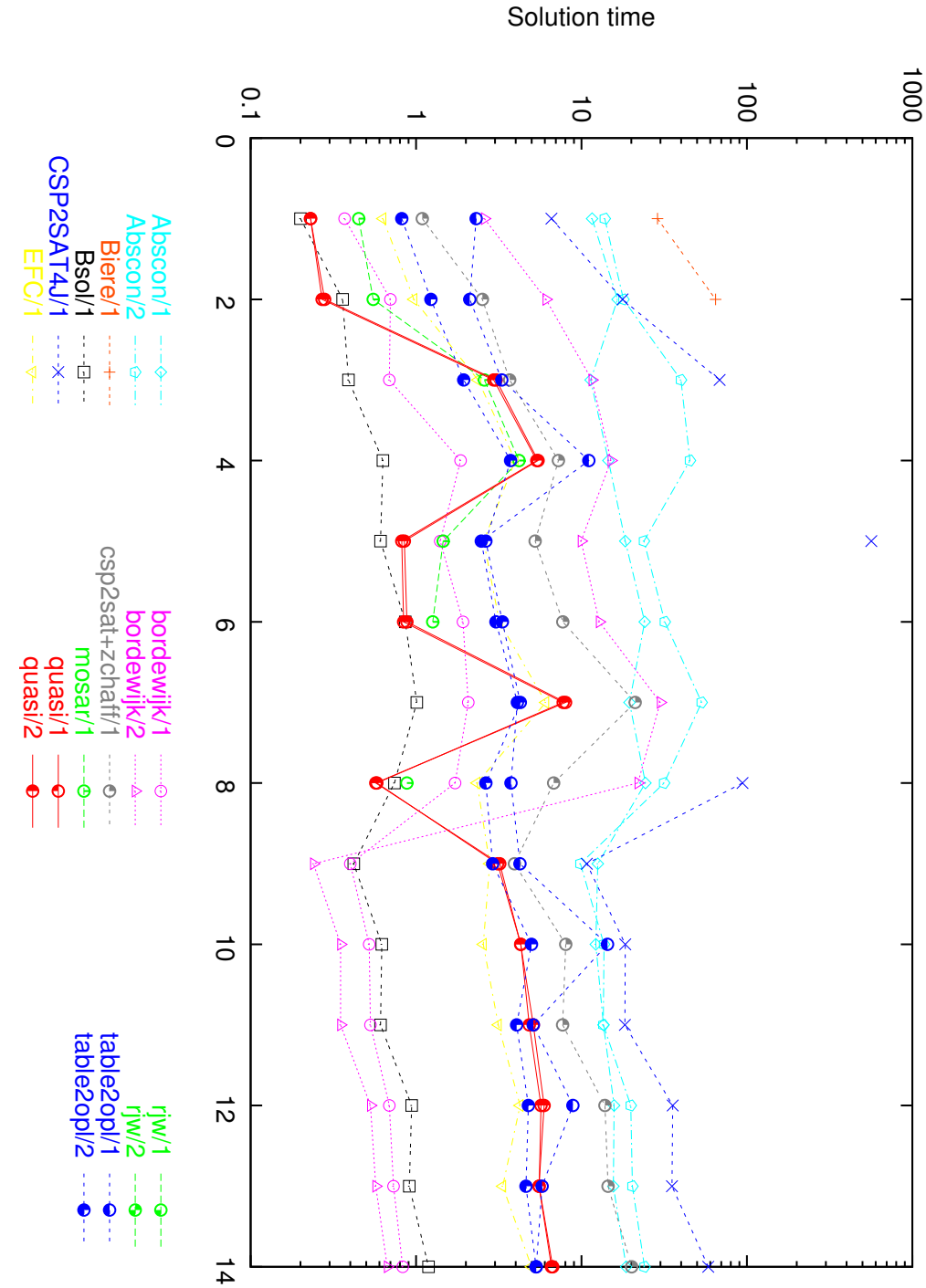

Fig. 847. Solution time in seconds for solving instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

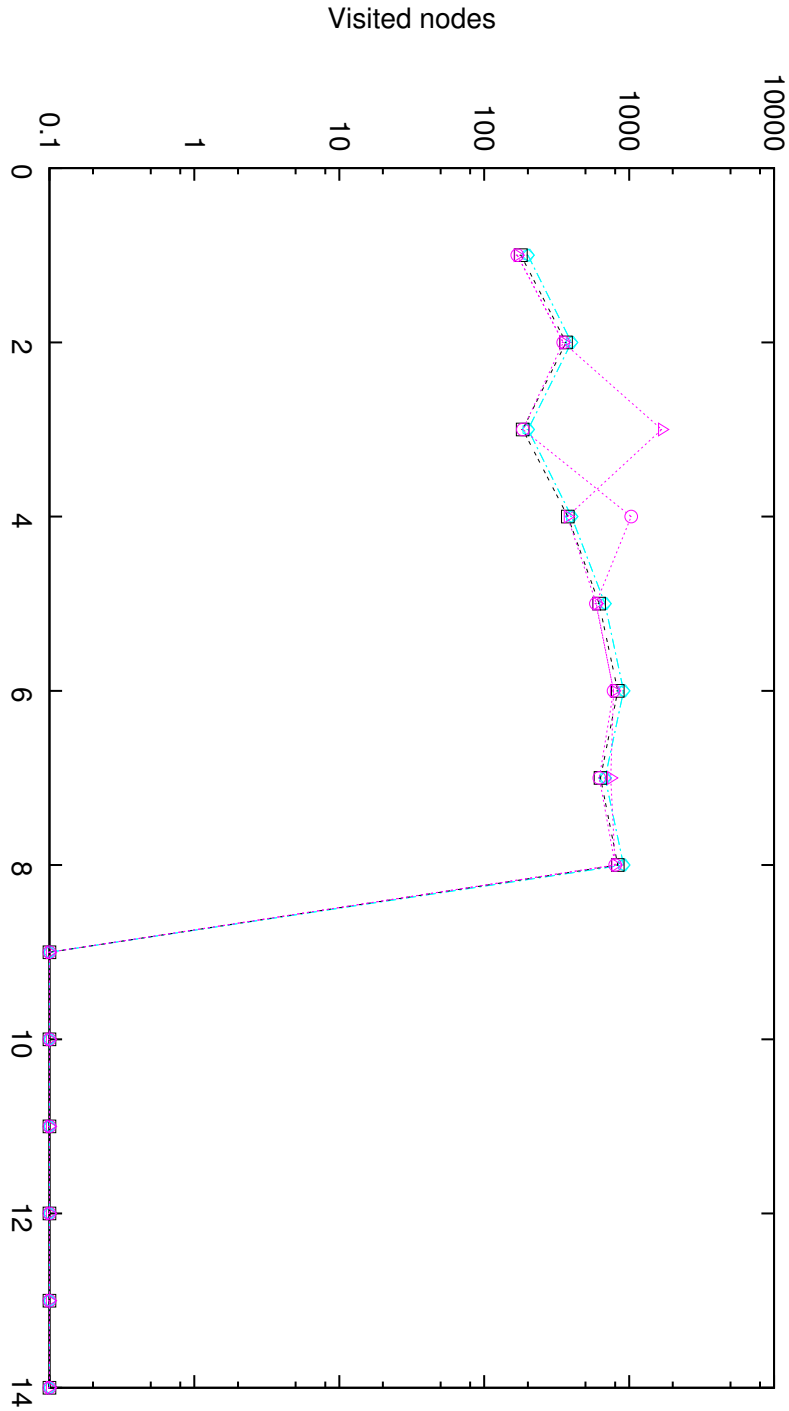

Fig. 848. Visited nodes required for solving instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

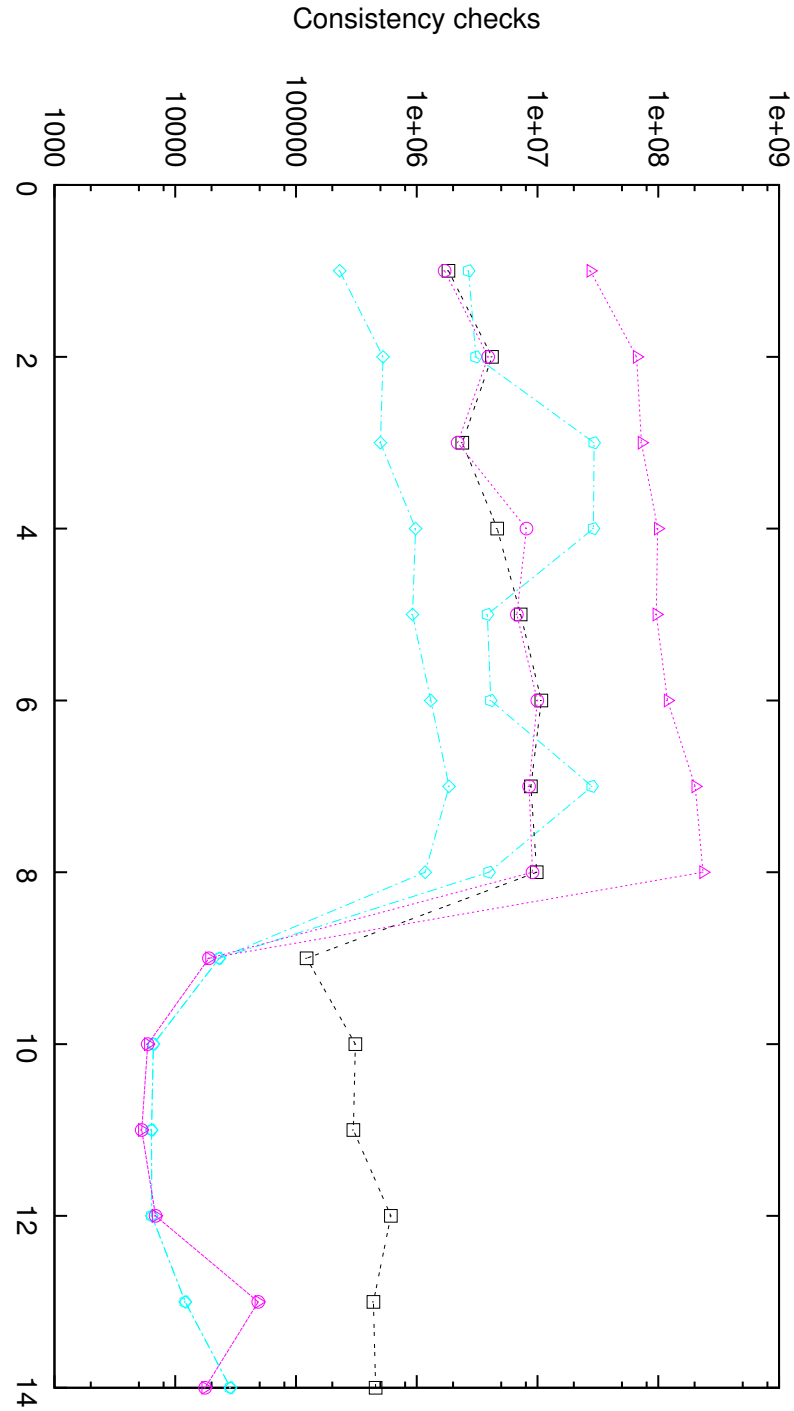

Fig. 849. Consistency checks required for solving instances from class `rlfapGraphs`. The maximum solution time was set to 600 seconds.

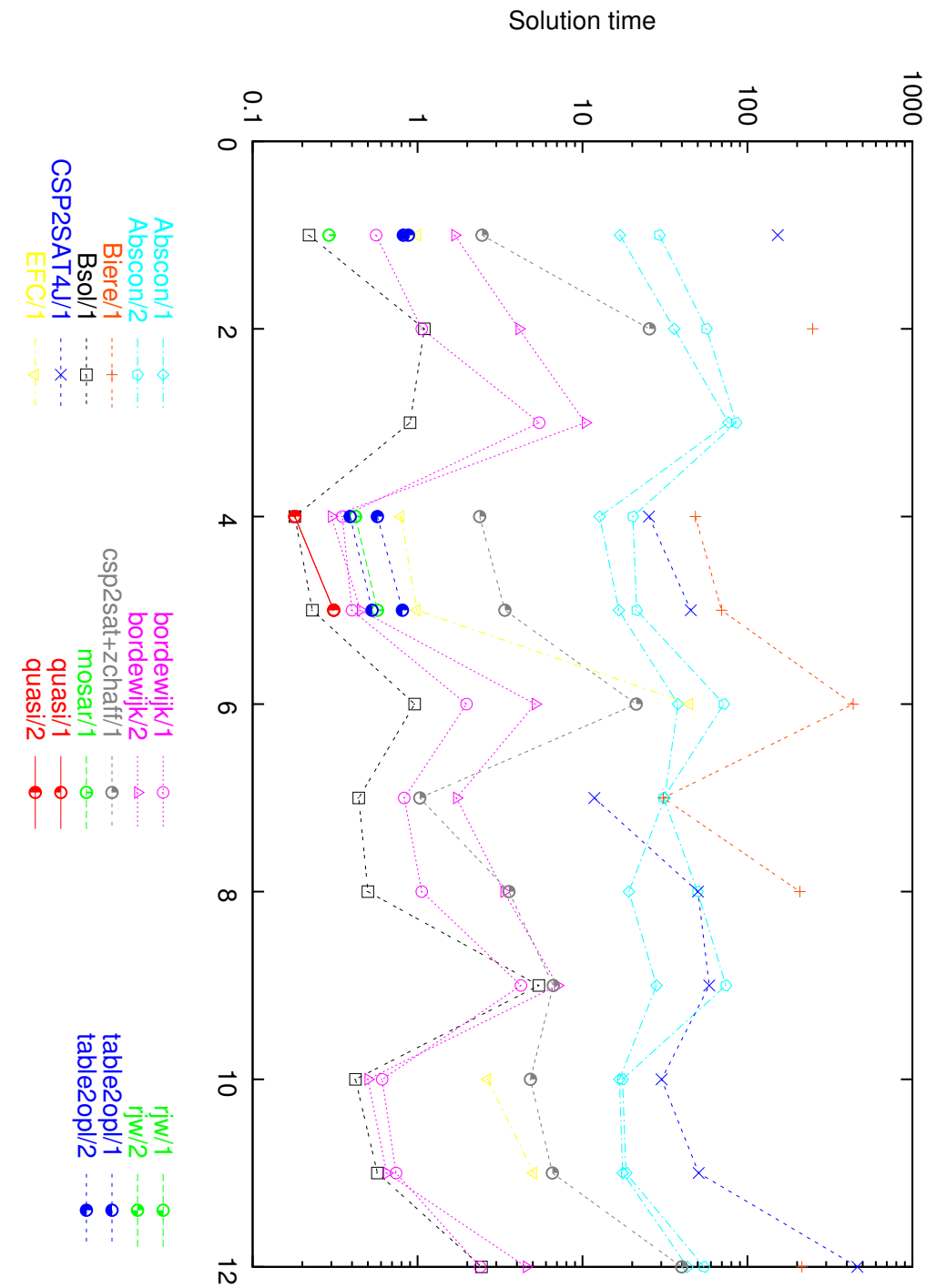

Fig. 850. Solution time in seconds for solving instances from class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

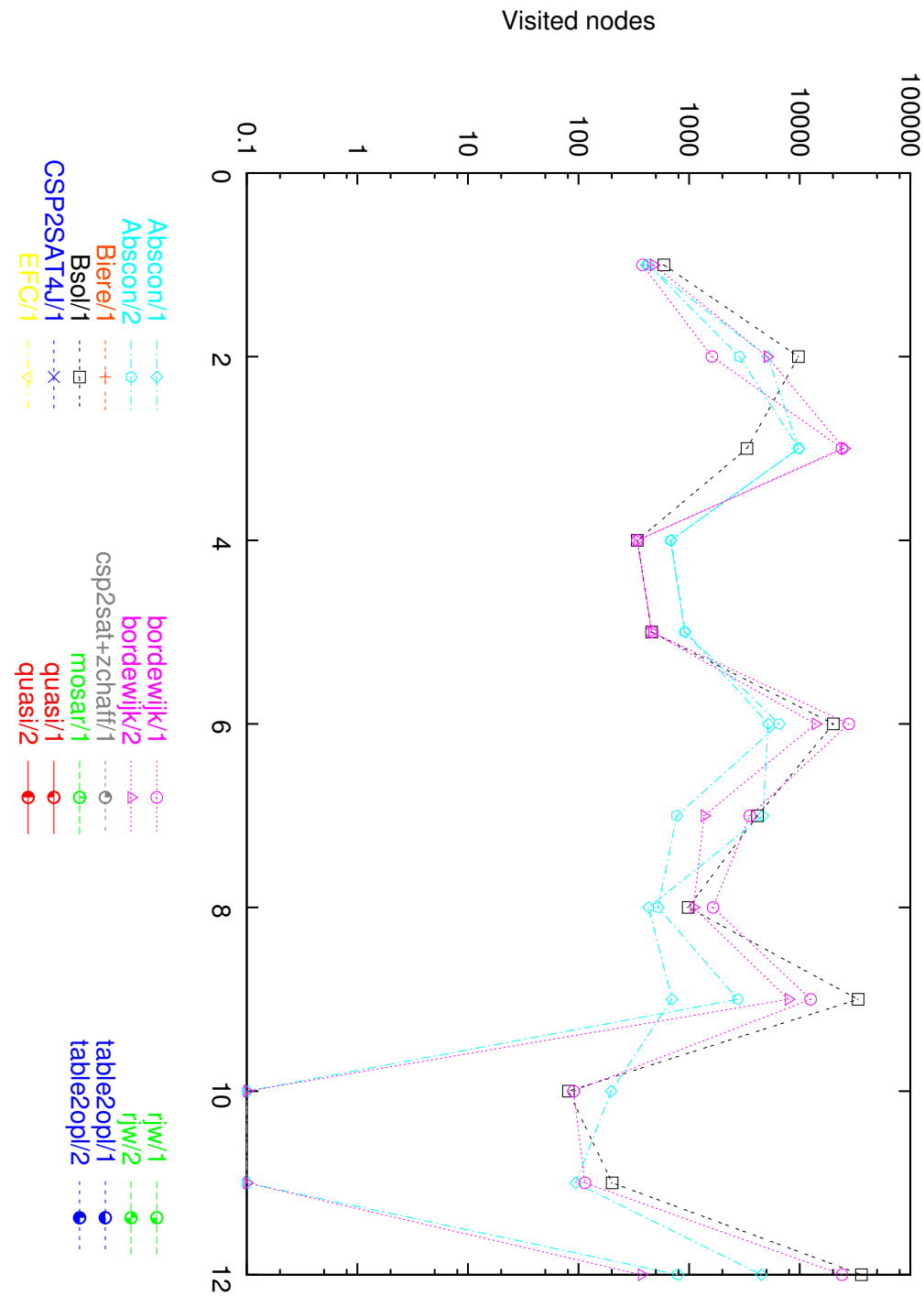

Fig. 851. Visited nodes required for solving instances from class `r1fapModGraphs`. The maximum solution time was set to 600 seconds.

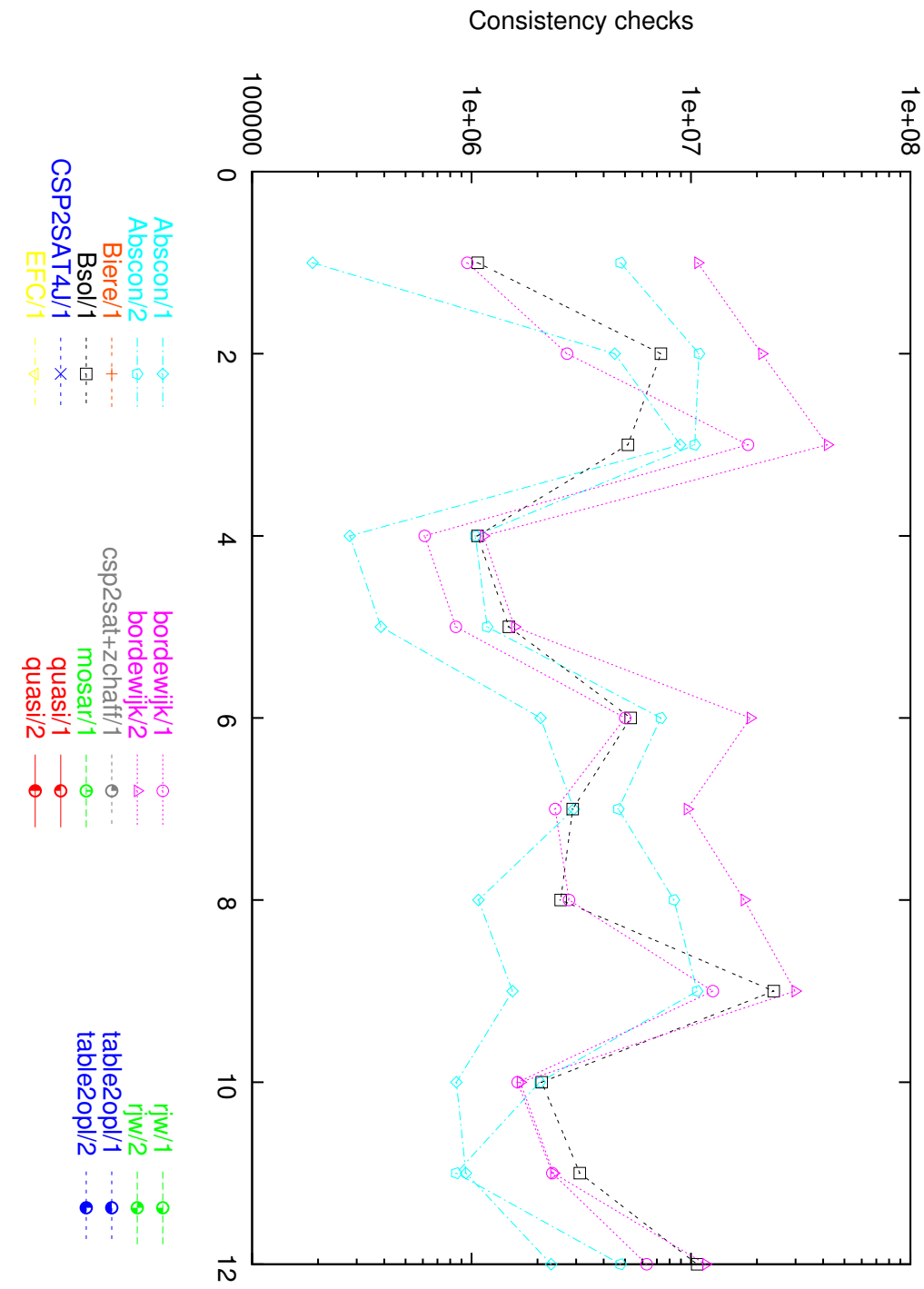

Fig. 852. Consistency checks required for solving instances from class `rlfapModGraphs`. The maximum solution time was set to 600 seconds.

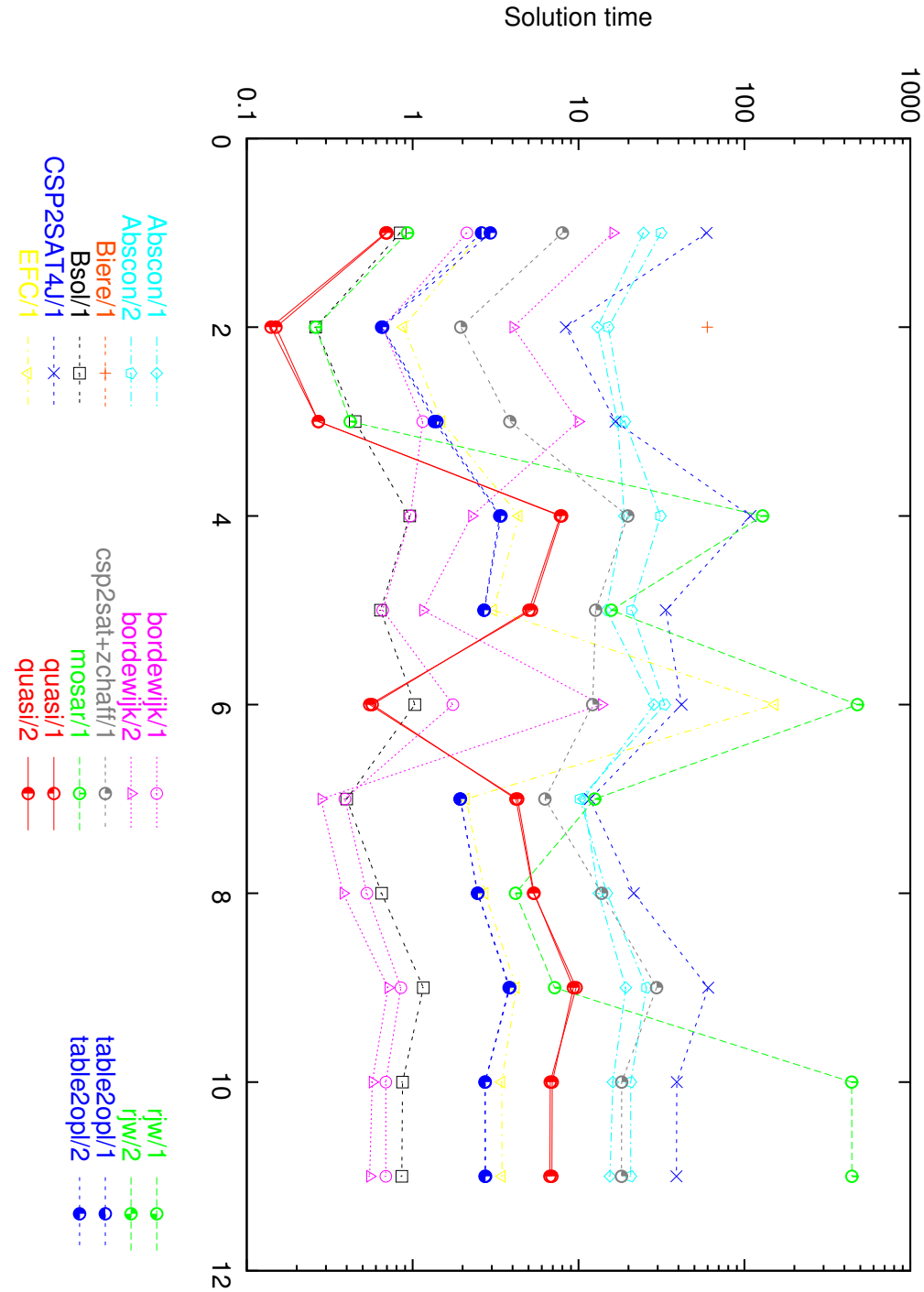

Fig. 853. Solution time in seconds for solving instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

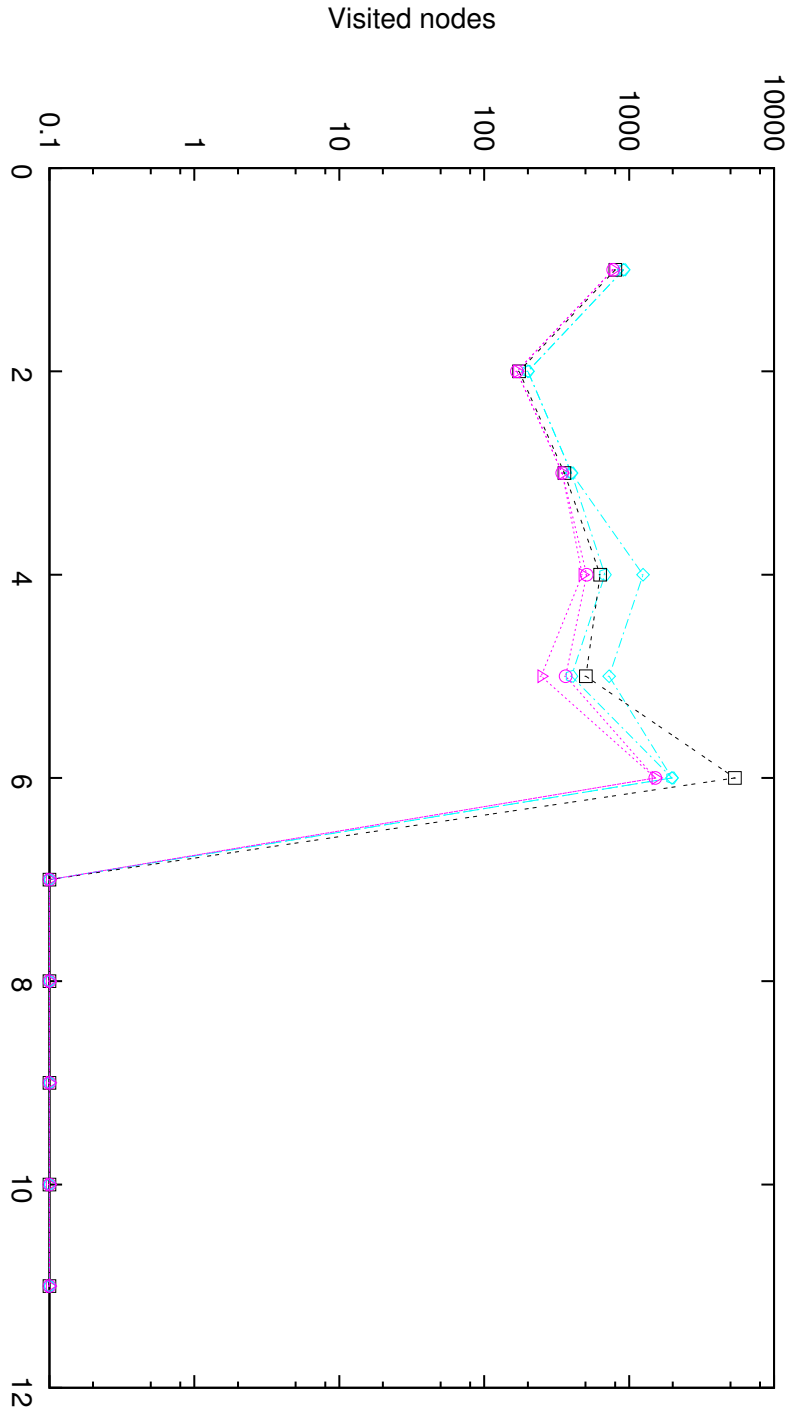

Fig. 854. Visited nodes required for solving instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

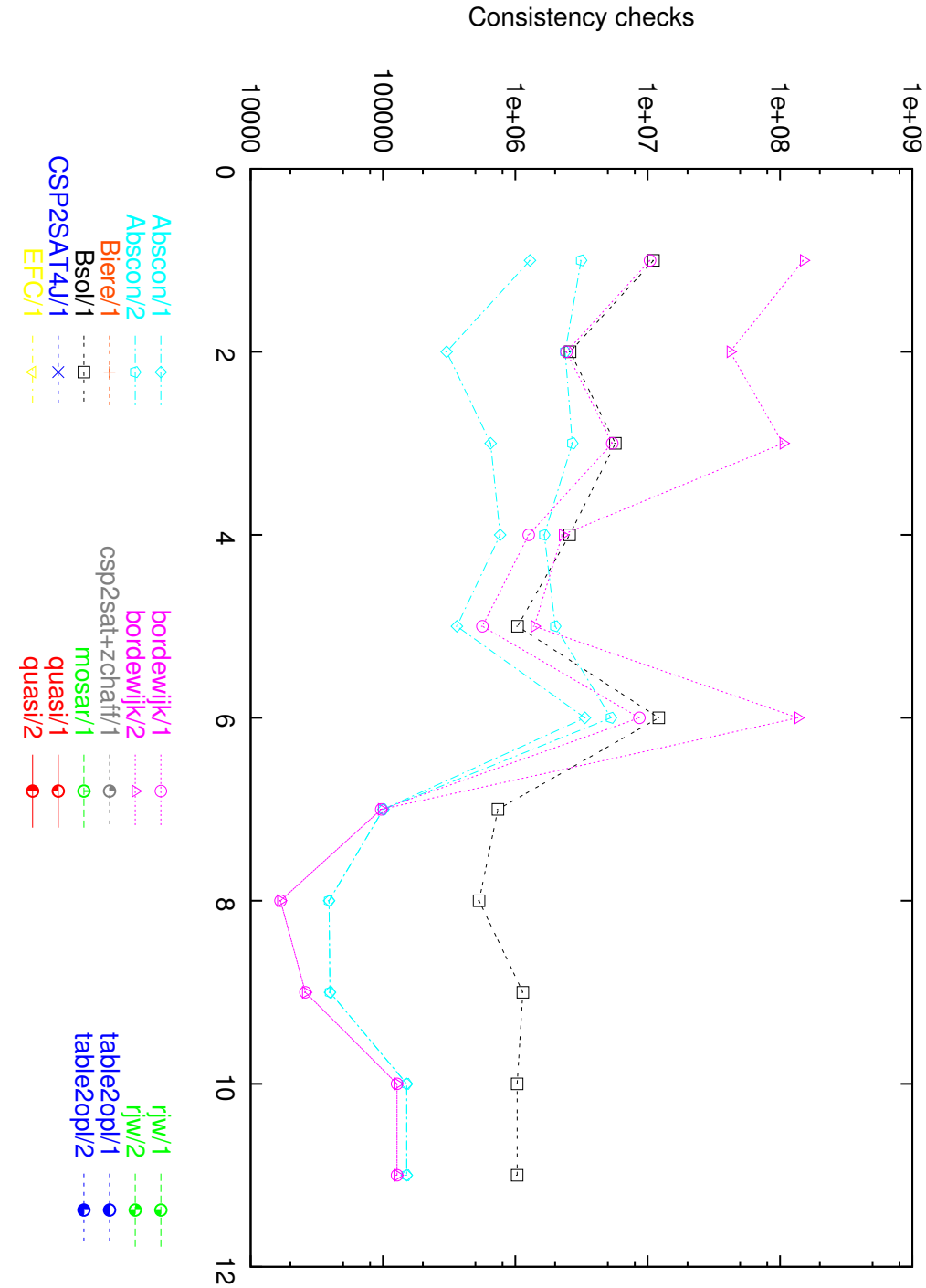

Fig. 855. Consistency checks required for solving instances from class `rlfapScens`. The maximum solution time was set to 600 seconds.

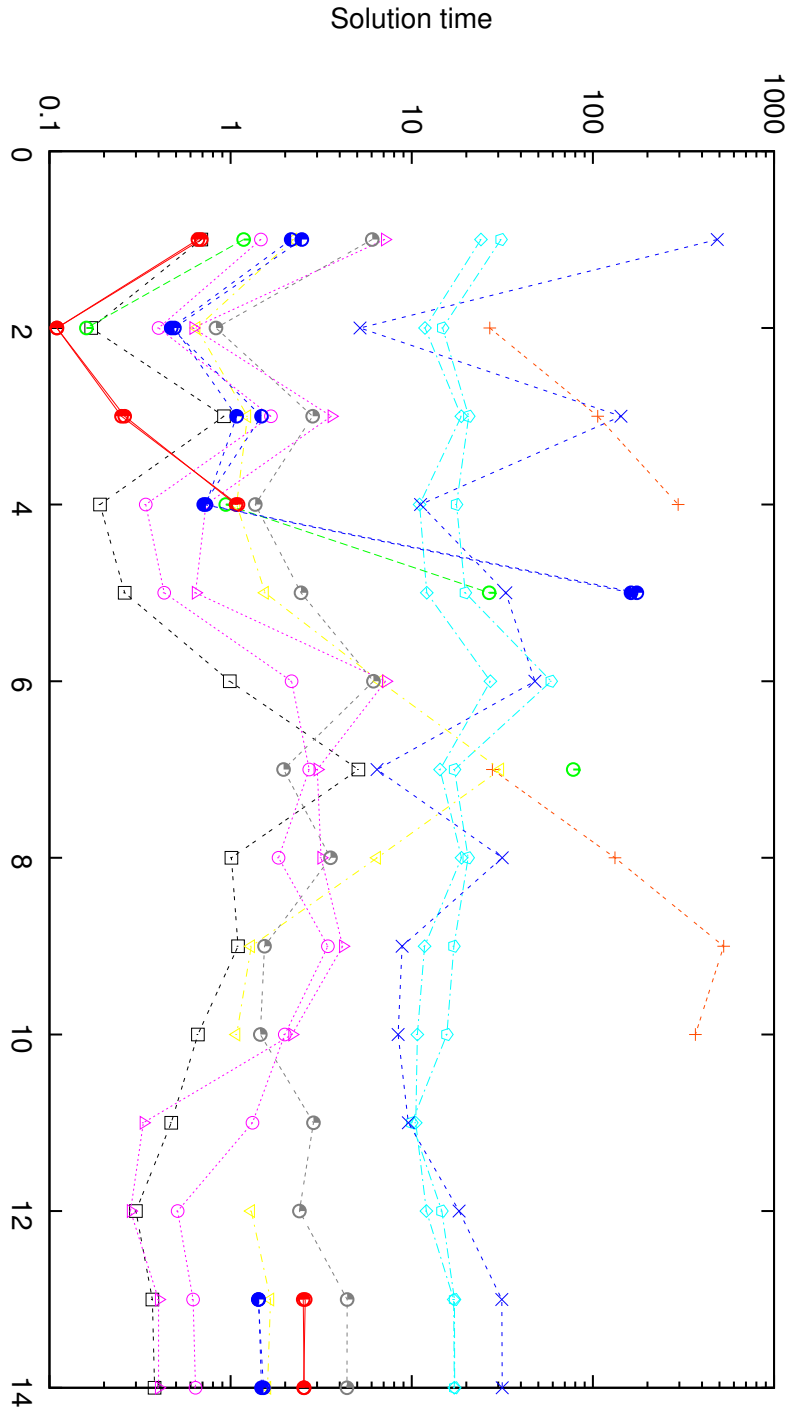

Fig. 856. Solution time in seconds for solving instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

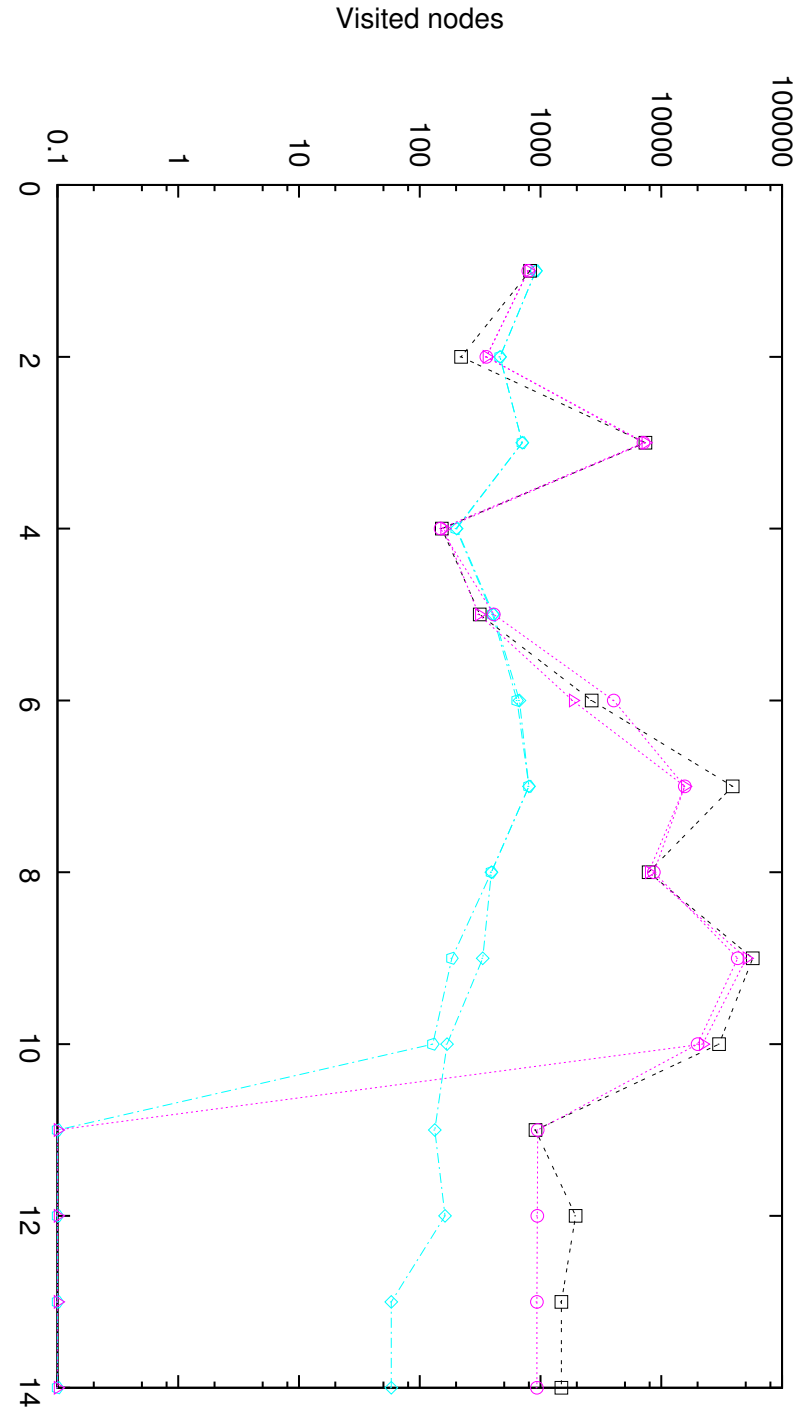

Fig. 857. Visited nodes required for solving instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

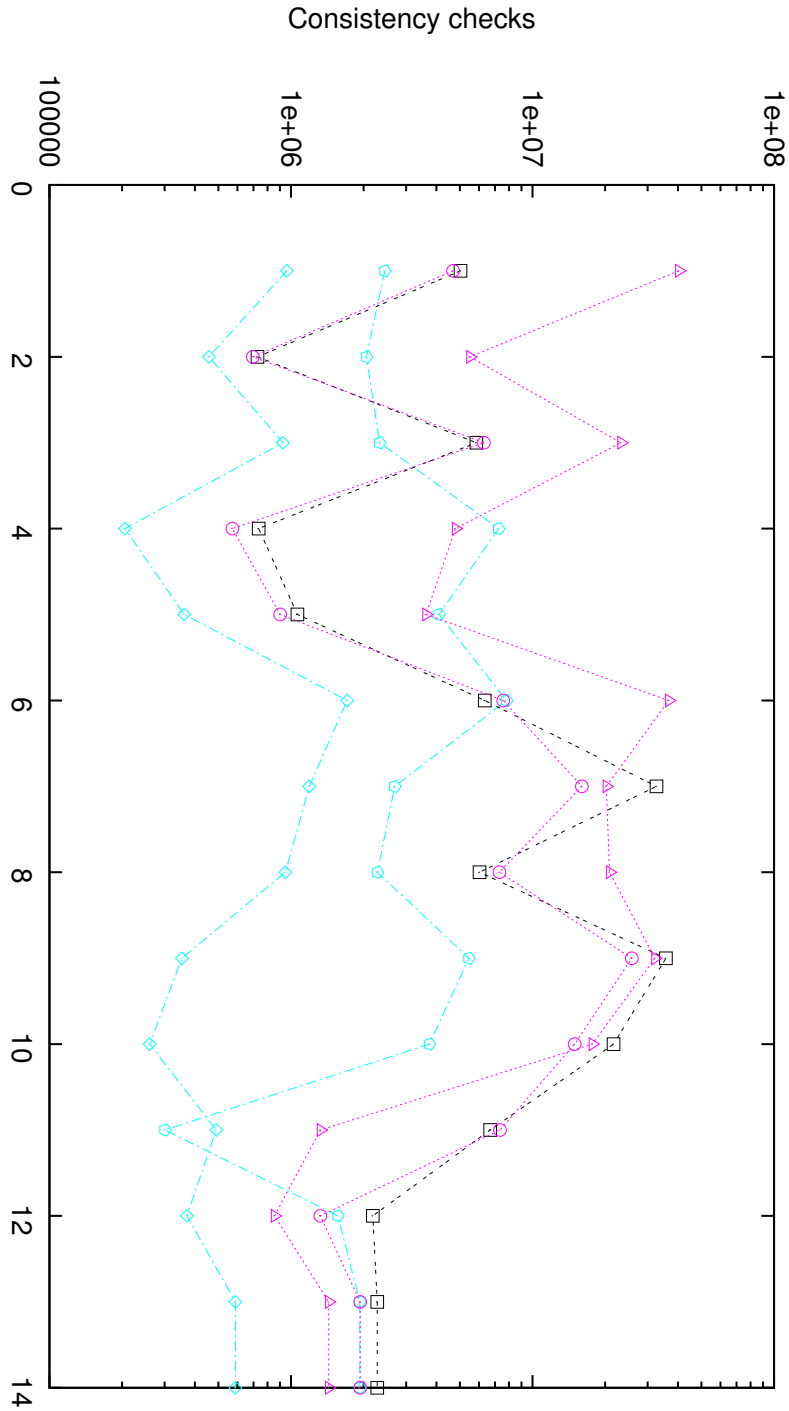

Fig. 858. Consistency checks required for solving instances from class `rlfapModScens`. The maximum solution time was set to 600 seconds.

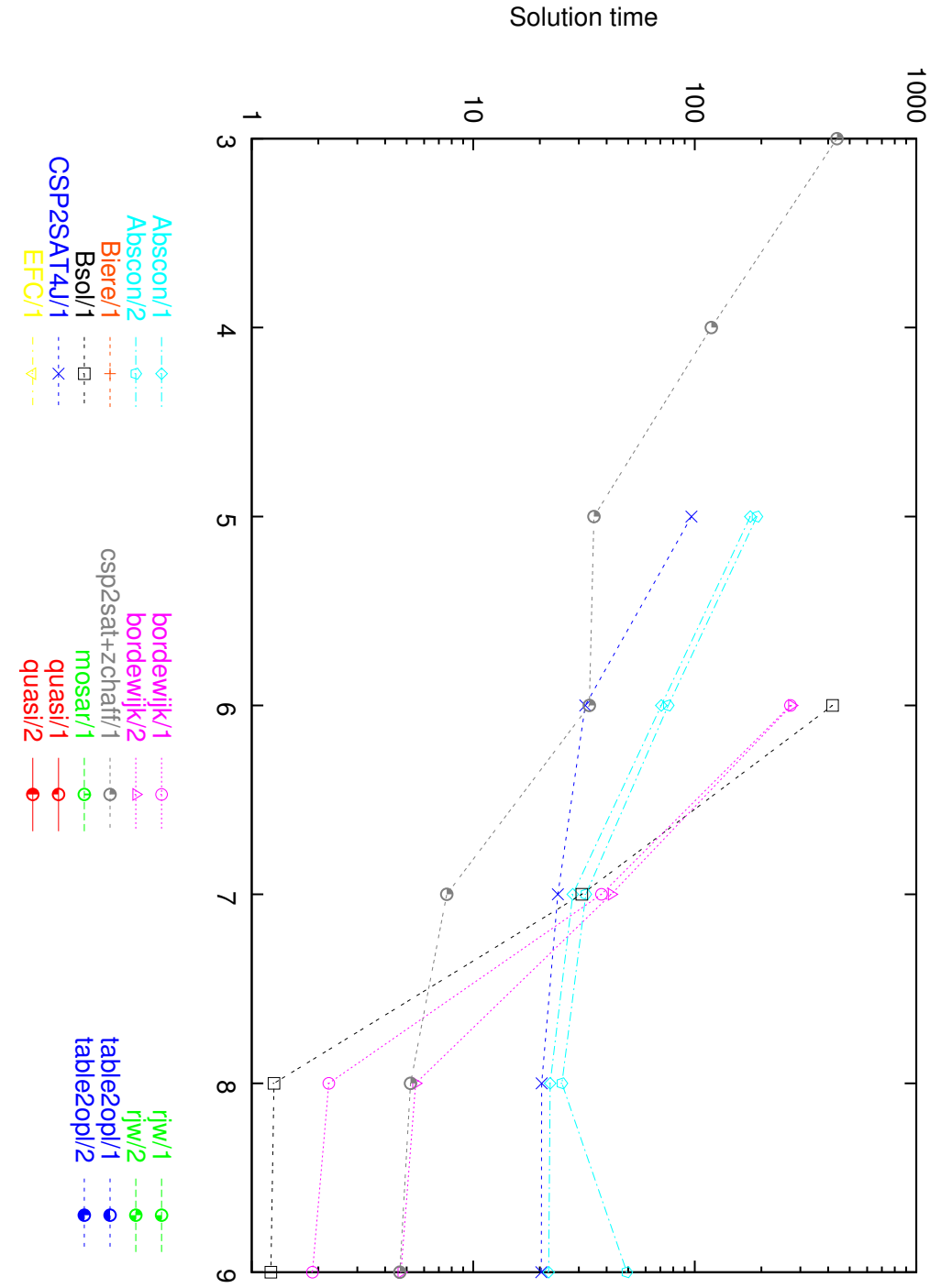

Fig. 859. Solution time in seconds for solving instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.

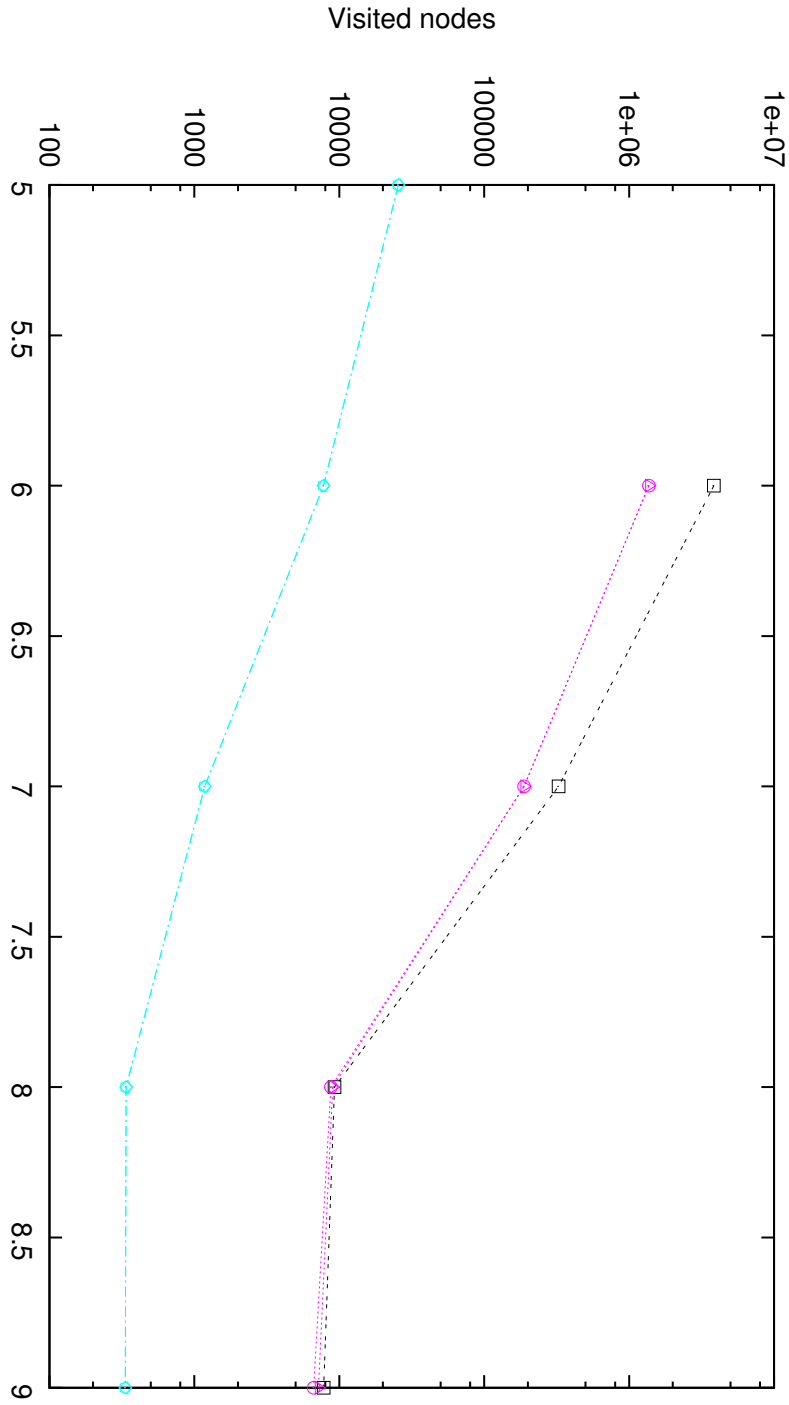

Fig. 860. Visited nodes required for solving instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.

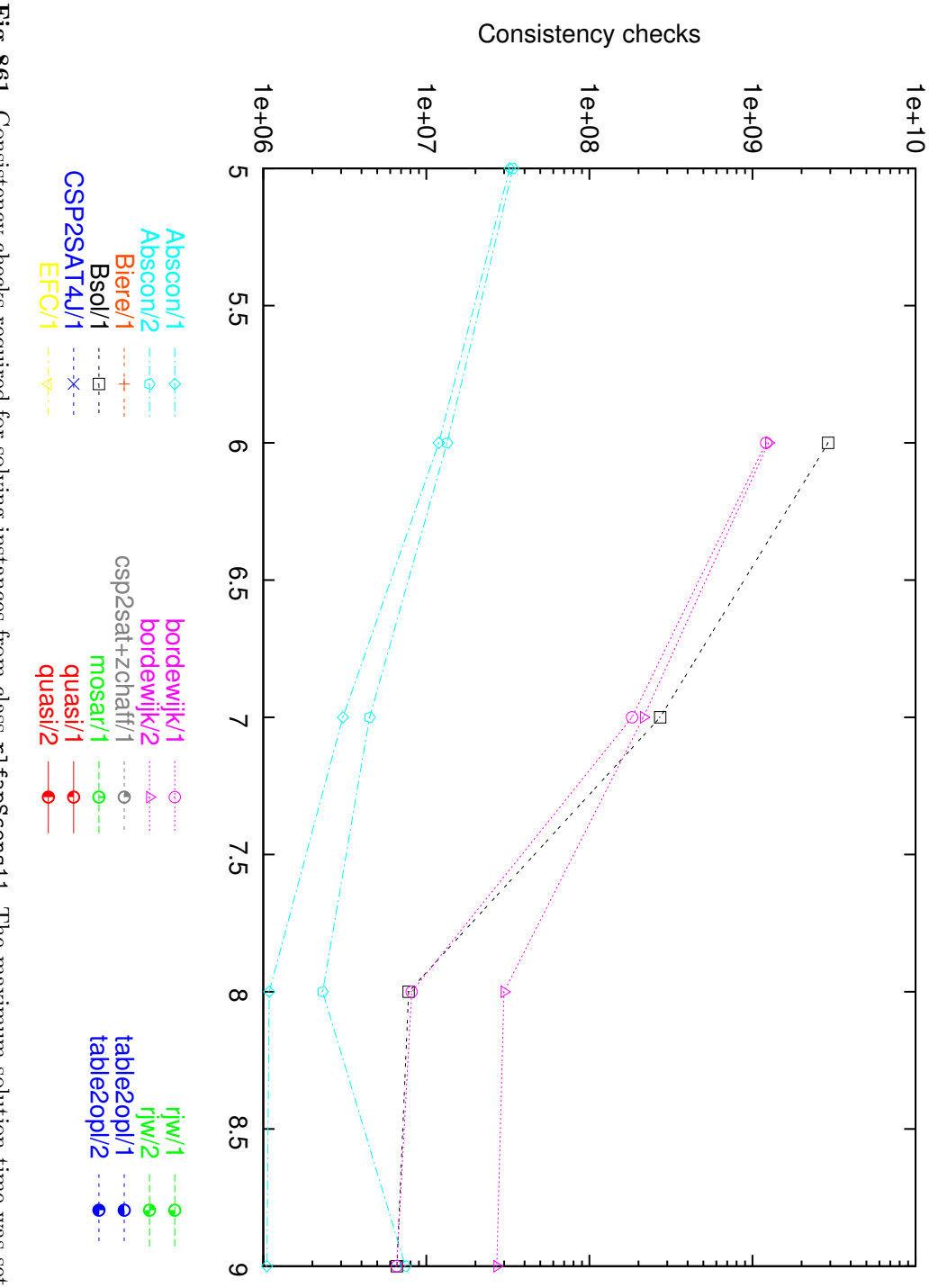

Fig. 861. Consistency checks required for solving instances from class `rlfapScens11`. The maximum solution time was set to 600 seconds.