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Conflict Driven Diving for Mixed Integer Programming

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Conflict Driven Diving for Mixed Integer Programming

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Abstract

The analysis of infeasibility plays an important role in solving satisfiability problems (SAT) and mixed integer programs (MIPs). In mixed integer programming, this procedure is called conflict analysis. So far, modern MIP solvers use conflict analysis only for propagation and improving the dual bound, i.e., fathoming nodes that cannot contain feasible solutions. In this short paper, we present a new approach which uses conflict information to improve the primal bound during a MIP solve. To derive new improving primal solutions we use a conflict driven diving heuristic called *conflict diving* that uses the information obtained by conflict analysis. Conflict diving pursues a twofold strategy. By using conflict information the new diving approach is guided into parts of the search space that are usually not explored by other diving heuristics. At the same time, conflict diving has a fail-fast-strategy to reduce the time spent if it cannot find a new primal solution. As a byproduct, additional valid conflict constraints can be derived, from which a MIP solver can gain benefit to improve the dual bound as well. To show the added-value of conflict diving within a MIP solver, conflict diving has been implemented within the non-commercial MIP solver SCIP. Experiments are carried out on general MIP instances from standard public test sets, like MIPLIB2010 or COR@L.

1 Introduction

In this paper *mixed integer programs (MIPs)* of the form

$$c^* = \min\{c^T x \mid Ax \geq b, \ell \leq x \leq u, x_i \in \mathcal{I}\}, \quad (1)$$

with objective coefficient vector $c \in \mathbb{R}^n$, constraint coefficient matrix $A \in \mathbb{R}^{m \times n}$, constraint right-hand side $b \in \mathbb{R}^m$, and variable bounds $\ell, u \in \overline{\mathbb{R}}^n$, where $\overline{\mathbb{R}} :=$

$\mathbb{R} \cup \{\pm\infty\}$, are considered. Furthermore, let $\mathcal{I} \subseteq \mathcal{N} = \{1, \dots, n\}$ be the index set of variables that are restricted to integer values.

The most commonly used method to solve MIPs is the LP-based branch-and-bound algorithm [12, 20]. In modern MIP solvers this procedure is accelerated by various extensions. Branch-and-bound is a divide-and-conquer method which splits the search space sequentially into smaller subproblems that are (hopefully) easier to solve. During this branching steps a lower bound on each local subproblem is computed. Therefore, the integrality requirements are omitted and the obtained *linear programming (LP)* relaxation

$$c_{LP}^* = \min\{c^t x \mid Ax \geq b, \ell \leq x \leq u, x \in \mathbb{R}^n\} \quad (2)$$

of (1) is solved.

On the other hand, an upper bound on the global problem is given by the objective value of the incumbent solution, i.e., the best solution found so far. During this procedure subproblems are regularly fathomed, either due to bounding or infeasibility. In the first case, subproblems whose lower bound exceeds the global upper bound are disregarded because they cannot contain an improving solution. In the second case, the infeasibility of a subproblem is either proven by contradicting variable bound changes or by an infeasible LP relaxation. However, both cases are equivalent and any subproblem that got fathomed due to exceeding the global upper bound can be treated as infeasible, i.e., by adding a inequality constraint parallel to the objective function and side equal to the incumbent solution value.

It is evident that the branch-and-bound algorithm benefits directly from finding good solutions as early as possible. These solutions either originate directly from the LP relaxation, i.e., all variables fulfill the integrality conditions, or get constructed by so-called primal heuristics. A primal heuristic is an incomplete method without any success guarantee. If a node gets fathomed due to infeasibility modern MIP solvers try to 'learn' from those subproblems. A subproblem can be infeasible due to contradicting implications, e.g., derived by domain propagation, or by an infeasible LP relaxation. This learning is called conflict analysis. Conflict analysis has its origin in solving satisfiability problems (SAT) and goes back to [23]. Similar ideas are used in constraint programming (see, e.g., [15, 17, 25]) and mixed-integer programming (see, e.g., [13]). The main idea of conflict analysis is to derive additional and more information about the infeasibility.

One method to derive these information is to construct the so-called conflict graph which represents the logic of how the set of branching decisions led to the detection of infeasibility. The conflict graph is directed and acyclic. All vertices represent bound changes of variables and the arcs correspond to bound changes implied by propagation. In addition to these inner vertices which represent the bound changes from domain propagation, the graph features source vertices for the bound changes that correspond to branching decisions and an artificial sink vertex representing the infeasibility. Then, each cut that separates the branching decisions from the artificial infeasibility vertex gives rise to a valid *conflict constraint*.

The information obtained by conflict analysis can be used for variable selection in branching or to tentatively generate conflicts before branching [3, 18]. Moreover, it is used to analyze infeasibility detected in primal heuristics [9, 10]. On the other hand, there are approaches that do not start with an infeasible subproblem. These approaches try to generate valid conflict constraints either by a sophisticated random sampling approach [14] or a combination of CP and MIP search [8]. In the latter case, the CP search is used to explore a few thousand nodes in a fraction of time a MIP solver would need. All information derived during the CP search, e.g., valid conflict constraints, global bound deductions, are valid for the MIP search. Moreover, the so-called *variable state independent decaying sum* [24] can be used to initialize a hybrid branching rule [3].

This short paper presents a new approach to use conflict information for improving the primal bound within a MIP solver. At the same time, additional valid conflict constraints can be derived which have impact on improving the dual bound. *Conflict diving* is motivated by general diving heuristics like coefficient diving [6] and conflict sampling approaches like rapid learning [8]. Thus, conflict diving contributes to the bounding step of the LP-based branch-and-bound-algorithm by generating new primal solutions and to the fathoming of infeasible subproblems by generating conflict constraints. In Section 2 we briefly discuss the concept of variable locks, which is usually used for model constraints only. In Section 3 the concept of variable locks is transferred to conflict constraints, which are the basis of our new conflict driven diving approach. Finally, we present computational experiments in Section 4. For our experiments the academic MIP solver SCIP [22] was used.

2 Usage of Variable Locks in Diving Heuristics

Diving heuristics are widely used in many state-of-the-art MIP solvers [5]. This class of primal heuristics is motivated by the branch-and-bound-algorithm itself. Diving heuristics start with a feasible but fractional LP solution, branch on at least one variable by rounding (but consider only one resulting subproblem) and resolve the LP relaxation. An example of a diving heuristic is *coefficient diving* [5], which also motivates conflict diving. Coefficient diving selects a variable such that rounding the fractional LP solution up (or down) lead to the smallest number of potentially violated LP rows. Therefore, the heuristic considers the *up (and down) locks* [2] of a variable.

Definition 1 (Variable Lock) *Let x_i be a variable of a MIP of form (1). A constraint $A_j \cdot x \geq b$, up-locks (or down-locks) x_i if there exists a solution \bar{x} with $A_j \cdot \bar{x} \geq b$ and an $\varepsilon > 0$ such that $A_j \cdot \tilde{x} < b$ for $\tilde{x} = \bar{x} + \varepsilon e_i$ (or $\tilde{x} = \bar{x} - \varepsilon e_i$).*

The number of constraints up-locking (or down-locking) a variable x_i is called number of up-locks and down-locks which will be denoted by ζ_i^+ and ζ_i^- , respectively. In coefficient diving a variable gets rounded up (or down) if $\zeta_i^+ < \zeta_i^-$ (or $\zeta_i^+ > \zeta_i^-$). The heuristic (as it is implemented in SCIP) breaks all

ties by considering fractionality of the LP solution and finally decides randomly if the fractionality is $\frac{1}{2}$.

In general, variable locks are only counted for *model constraints*, i.e., constraints that are part of the original formulation. Counting variable locks for all other constraints, e.g., conflict constraints, too, would impact other parts of a MIP solver in a negative manner, e.g., by restricting dual node presolving or propagation steps [16].

3 Conflict Diving

The main idea of *conflict diving* is to exploit conflict information to derive new improving solutions. Therefore, the concept of variable locks is transferred to conflict constraints. The number of conflict constraints up-locking and down-locking a variable x_i will be denoted by ξ_i^+ and ξ_i^- , respectively. Since conflict locks are counted for conflict constraints only, the number of conflict up-locks (or conflict down-locks) represents the number of constraints raised from infeasibility that will be potentially violated when rounding upwards (or downwards). Thus, rounding a variable x_i with $\xi_i^- = 0$ downwards is potentially a save step, because x_i was never part of a conflict constraint or the contribution of x_i to an infeasibility proof is negligible, see, e.g., [1] for an heuristic to construct small infeasibility proofs. In the following, this special type of variable locks will be called *conflict locks*.

Note, the concept of conflict locks can be easily extended to other types of constraints that are not part of the original model, e.g., cutting planes.

At a first glance, the difference between conflict locks and VSIDS (variable state independent decaying sum) [24] seems to be quite small. The main difference between both decision scores is that for a fixed set of conflict constraint and variables the number of conflict locks does not change over time. In contrast to that, the VSIDS score of a variable gets periodically scaled by a predefined constant. The periodical decay of the contribution of conflict constraints to the VSIDS score makes perfectly sense within a SAT solver which solely performs a depth-first search. In this context, VSIDS can be interpreted as an aging scheme or a distance measure, i.e., the longer a conflict constraint is active the more apart is the current node from the origin of the conflict. Diving heuristics in a MIP solver mainly perform a single but long dive with backtracking of length at most one. Therefore, counting the contribution of conflict constraints evenly, regardless whether they were found early or shortly before on this long path, might be more appropriate than a decaying approach.

Conflict diving (cf. Algorithm 1) performs a depth-first search and resolves the LP relaxation depending on the number of domain changes found during domain propagation performed at the current local subproblem. Whenever the current subproblem is proven to be infeasible a backtrack of length one is performed. The procedure stops if no branching candidates is left or a feasible solution is found.

At every depth level conflict diving aims to exploit parts of the search space

that are usually not considered by other diving heuristics. On the same time, it follows a fail-fast-strategy. Therefore, the rounding direction of a variable x_i is determined as follows:

1. if x_i has conflict locks in only one direction the variable will be rounded into the opposite direction, i.e., round downwards if $\xi_i^+ = 0$,
2. if x_i has conflict locks in both rounding directions the variable will be rounded into the direction with the most conflict locks,
3. if x_i has no conflict locks the fractionality of the LP solution f_i is considered, i.e., round upwards if $f_i > \frac{1}{2}$.

If the number of conflict up-locks and conflict down-locks is equal, the variable will be rounded into the direction with most variable locks. In case of a tie the rounding direction is determined randomly. After the rounding direction of a variable x_i is determined a score s_i is calculated (cf. Algorithm 2). Among all potential variables to branch on the variable with the highest score will be selected to process next. The score s_i of each variable x_i that should be rounded upwards (or downwards) is defined by the number of conflict up-locks (or conflict down-locks). The fraction of variable up-locks (or down-locks) is added for tie breaking. By adding the fraction instead of the absolute number of variable locks we try to avoid overweighting variables that have both many up-locks and many down-locks. To have a potentially large impact when rounding a variable the scoring function penalizes variables whose LP solution value is not fractional enough. Moreover, non-binary variables are penalized, too.

In our computational experiments we carried out that executing conflict diving whenever

- at least one valid conflict constraint was already found and
- the current depth level is a multiple of depth 10 (except for the root node depth)

yields the best results. The first assumption is quite natural because without conflict constraints no conflict locks are present. The main difference in the configuration to other diving heuristics in SCIP is the frequency of resolving the LP relaxation. Our computational experiments indicate that it is best to resolve the LP whenever for at least 45% of all undecided variables domain propagation tightened at least one bound.

4 Computational Results

In our computational experiments, we compare the new conflict driven diving approach for generating additional conflict constraints to SCIP in its default configuration. We will refer to the default configuration of SCIP as `default` and SCIP extended by conflict diving as `confdiving`. All experiments were performed with the non-commercial MIP solver SCIP [22] (git hash 9fe7e67,

Algorithm 1: CONFLICTDIVING

Input : LP solution x^{LP}
Output: Solution x^{CD} or NULL

- 1 $x^{CD} \leftarrow \text{NULL}, \tilde{x} \leftarrow x^{LP}$
- 2 **while** $x^{CD} == \text{NULL}$ **do**
- 3 **forall** $x_i \in \mathcal{I}$ **do**
 1. Determine rounding direction $d_i \in \{\text{upwards}, \text{downwards}\}$ with most number of conflict locks.
 2. Determine LP fractionality: $f_i \leftarrow \tilde{x}_i - \lfloor \tilde{x}_i \rfloor$
 3. Calculate variable score: $s_i \leftarrow \text{VARIABLESCORE}(x_i, d_i, f_i)$ (Alg. 2)
- 4 Select candidate x_i with maximal score s_i
- 5 Tighten local bound of x_i to $\lceil \tilde{x}_i \rceil$ or $\lfloor \tilde{x}_i \rfloor$, respectively
- 6 Call propagation routine of SCIP
- 7 **if** *Infeasibility detected* **then**
- 8 Analyze infeasibility, add conflict constraints, perform 1-level backtrack, goto Line 5
- 9 Re-solve local LP relaxation, update \tilde{x}
- 10 **if** *Infeasibility detected* **then**
- 11 Analyze infeasibility, add conflict constraints, perform 1-level backtrack, goto Line 5
- 12 **if** $\tilde{x}_i \in \mathbb{Z} \forall i \in \mathcal{I}$ **then**
- 13 $x^{CD} \leftarrow \tilde{x}$
- 14 **return** x^{CD}

Algorithm 2: VARIABLESCORE

Input : Variable x_i , rounding direction d_i , fractional part of LP solution f_i
Output: Score s_i

- 1 **if** $d_i \sim \text{upwards}$ **then**
- 2 **if** $\xi_i^+ > 0$ **then**
- 3 $s_i \leftarrow \xi_i^+$
- 4 $s_i \leftarrow s_i + \varepsilon \cdot \frac{\zeta_i^+}{\zeta_i^+ + \zeta_i^-}$ // add portion of up-locks for tie-breaking
- 5 **else**
- 6 **if** $\xi_i^- > 0$ **then**
- 7 $s_i \leftarrow \xi_i^-$
- 8 $s_i \leftarrow s_i + \varepsilon \cdot \frac{\zeta_i^-}{\zeta_i^+ + \zeta_i^-}$ // add portion of down-locks for tie-breaking
- 9 **if** $f_i < 0.01$ **then**
- 10 $s_i \leftarrow 0.1 \cdot s_i$ // penalize too integral LP solutions
- 11 **if** x_i is not binary **then**
- 12 $s_i \leftarrow 0.1 \cdot s_i$ // prefer binary variables
- 13 **return** s_i

based on SCIP 4.0.1.3), using Soplex 3.0.1.2 (git hash 6d099e6) as LP solver. The experiments were run on a cluster of identical machines, each with an Intel Xeon E5-2690 with 2.6 GHz and 128 GB of RAM; a time limit of 7200 seconds was set. Since a random tie breaking is used whenever neither conflict locks nor variable locks lead to a decision, all experiments were performed with 6 different global random seeds. Changing the global random seeds of SCIP impacts all other parts using random numbers, too. Therefore, the final results with more than the default random seed give a much better base for estimating the impact of conflict diving. However, the experiments are still deterministic because all random numbers used in SCIP are deterministic.

As a test set we used a union of MIPLIB3 [11], MIPLIB2003 [4], MIPLIB2010 [19], and the COR@L [21] test set. Note that all 361 instances of MIPLIB2010 are part of the test set and not only the 87 benchmark instances. Moreover, we removed all duplicates and discarded all MIPLIB2010 instances that are known to be numerical unstable. Finally, the test set consists of 669 publicly available instances and we will refer to it as MMMC⁺.

Table 1 shows the aggregated computational results on MMMC⁺. An instance is counted as solved by a configuration if it was solved by all 6 random seeds. For every instance the number of solved branch-and-bound nodes, solving time, time until best solution, and primal integral [7] is the shifted geometric mean [2] of the respective measure taken over all 6 random seeds. A shift of 100, 1, 1, and 10, respectively, is used. In addition to the usual performance indicators like nodes and solving time, we use the time spent until the best solution was found and the primal integral to measure the impact of the conflict driven heuristic on the primal bound, e.g., solutions found by conflict diving. Moreover, Columns 5, 7, 9, and 11 give factors w.r.t. `default` which is used as a baseline.

On the complete test set (cf. group *all*¹ in Table 1) the `confdiving` setting is able to solve 7 instances more than SCIP with `default` settings and the time until the best solution is found can be slightly reduced by 3%. Since an instance is only called solved if it was solved by all used random seeds, those 7 instances are consistently solved by `confdiving`. Unfortunately, no overall speed up can be observed. Similar holds for the number of solved nodes and the primal integral. On the subset of instances that can be solved by exactly one solver, i.e., a subset of size 15 that contains the 7 instances mentioned before, `confdiving` reduces the solving time by 42% and the number of nodes by 44%.

Looking into more detailed subsets shows, that on instances that can be solved by at least one settings and where at least one setting needs more than 100 seconds (cf. group *[100,tilim]*) `confdiving` is able to reduce the number of solved nodes and solving time by 7% and 6%, respectively. Further, the primal integral can be reduced by 5%. On hard instances, i.e., one setting needs at least 1000 seconds and at least one setting could solve the instance (cf. group

¹For 6 instances at least one setting finished with slight numerical violations within $(1e-6, 1e-4]$. These instances are excluded.

Table 1: Performance evaluation of `confdiving` compared to SCIP with `default` settings on MMMC⁺. Columns show: number of instances of a particular group (**#**), instances solved by all 6 different random seeds (**solved**), generated nodes (**N**), solving time (**T**), time to best solution (**TtB**), and primal integral (**PI**). Ratio of nodes, time for solving and to best solution, and primal integral compared to `default` is shown in columns **N_Q**, **T_Q**, **TtB_Q**, and **PI_Q**.

| | # | solved | N | N _Q | T | T _Q | TtB | TtB _Q | PI | PI _Q |
|-------------------------|-----|--------|----------|----------------|---------|----------------|--------|------------------|---------|-----------------|
| all | | | | | | | | | | |
| <code>confdiving</code> | 663 | 352 | 5264.41 | 0.99 | 522.36 | 0.99 | 255.12 | 0.97 | 2970.26 | 0.99 |
| <code>default</code> | 663 | 345 | 5293.04 | – | 528.56 | – | 263.08 | – | 3013.03 | – |
| [100,tilim] | | | | | | | | | | |
| <code>confdiving</code> | 154 | 150 | 6562.55 | 0.93 | 547.40 | 0.94 | 294.62 | 1.00 | 3661.04 | 0.95 |
| <code>default</code> | 154 | 143 | 7062.97 | – | 583.05 | – | 293.48 | – | 3841.17 | – |
| [1000,tilim] | | | | | | | | | | |
| <code>confdiving</code> | 58 | 54 | 23537.48 | 0.82 | 1697.19 | 0.83 | 697.46 | 1.00 | 7549.09 | 0.96 |
| <code>default</code> | 58 | 47 | 28703.00 | – | 2039.15 | – | 698.44 | – | 7852.20 | – |
| MIPLIB2010 | | | | | | | | | | |
| <code>confdiving</code> | 87 | 72 | 8082.45 | 0.98 | 482.03 | 0.97 | 225.31 | 0.87 | 2623.76 | 0.91 |
| <code>default</code> | 87 | 70 | 8276.15 | – | 496.35 | – | 260.32 | – | 2884.47 | – |

[1000,tilim]), SCIP extended by `confdiving` needs 18% less nodes and 17% less solving time. In contrast to that, the primal integral only improves by 4%. Considering a measure that also takes the dual bound to account, i.e., the primal-dual integral [5] which improves by 10%, shows that conflict diving has a huge impact on the dual bound.

On the MIPLIB2010 benchmark set `confdiving` is able to solve 2 instances more than `default`, whereas no instance gets lost, i.e., cannot be solved with at least one seed. These instances are `ns1758913` and `pw-myciel4`. Over all seeds, `confdiving` needs 42% and 40% less solving time and the number of nodes can be reduced by 96% and 35%, respectively, on these two instances. Further, the average gap on these two instances can be reduced from 28.1% to 13.6%.

On this test set the time until the best solution was found and the primal integral can be improved by 13% and 9%, respectively. Unfortunately, this does not show up in the overall performance, which improved by 3% only. However, `confdiving` lead to a speed up of more than 1.10 on 22 instances and to a slowdown of factor 0.90 or worse on only 12 instances.

5 Conclusion and Outlook

In this short paper we presented a new approach called *conflict diving* that uses conflict information for improving the primal bound within a MIP solver. Our computational results indicate that conflict diving can improve the performance

of a MIP solver. Depending in the test set, the presented conflict driven diving approach improves, e.g., the solving time, primal integral or time until the best solution was found. On the MIPLIB2010 benchmark set the time until the best solution was found can be improved by 13% and the primal integral by 9%. On hard instances the solving time can improved by 17% when conflict diving is used.

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Table 2: Detailed computational results on MIPLIB3 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | | |
|------------|----------|------|--------|--------|------|-----|------------|-------------|------|-------------|--------|-------------|--------|-------------|------|-------------|-----|-------------|---|-------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I | |
| 10teams | 211 | 12 | 977 | 975 | 12 | 10 | 594 | <i>2.82</i> | 18 | <i>1.55</i> | 1155 | <i>1.18</i> | 1153 | <i>1.18</i> | 18 | <i>1.55</i> | 11 | <i>1.17</i> | | 107 | |
| air03 | 2 | 3 | 73 | 118 | 3 | < 1 | 2 | 0.83 | 3 | 0.85 | 62 | 0.85 | 110 | 0.93 | 2 | 0.81 | < 1 | 0.96 | | 6 | \checkmark |
| air04 | 112 | 47 | 753 | 782 | 45 | 7 | 84 | 0.75 | 49 | 1.03 | 766 | 1.02 | 795 | 1.02 | 47 | 1.03 | 7 | 1.01 | | 33 | |
| air05 | 472 | 39 | 335 | 411 | 37 | 1 | 368 | 0.78 | 37 | 0.95 | 347 | 1.04 | 425 | 1.03 | 34 | 0.94 | 1 | 1.01 | | 301 | |
| arki001 | 1238172 | 6781 | 1828 | 1849 | 2189 | 18 | 1278084 | 1.03 | 6293 | 0.93 | 2373 | <i>1.30</i> | 2388 | <i>1.29</i> | 2086 | 0.95 | 24 | <i>1.30</i> | | 980 | \checkmark |
| bell3a | 1008 | 1 | < 1 | 1 | < 1 | < 1 | 630 | 0.62 | 1 | 0.94 | < 1 | 0.84 | 1 | 0.96 | < 1 | 0.36 | < 1 | 1.00 | | 33 | |
| bell5 | 278 | 1 | < 1 | 2 | < 1 | < 1 | 245 | 0.88 | 1 | 1.00 | < 1 | 1.01 | 2 | 1.00 | < 1 | 0.67 | < 1 | 1.00 | | 77 | \checkmark |
| blend2 | 286 | 1 | 10 | 14 | < 1 | < 1 | 1388 | <i>4.85</i> | 1 | <i>2.69</i> | 47 | <i>4.71</i> | 52 | <i>3.84</i> | 1 | <i>9.86</i> | < 1 | <i>3.01</i> | | 42 | |
| cap6000 | 2050 | 4 | 28 | 29 | 3 | < 1 | 2267 | <i>1.11</i> | 5 | <i>1.20</i> | 27 | 0.98 | 29 | 1.01 | 5 | <i>1.37</i> | < 1 | 0.99 | | 2109 | \checkmark |
| dano3mip | 1190 | 7200 | 63114 | 169654 | 3839 | 1 | 1204 | 1.01 | 7200 | 1.00 | 65017 | 1.03 | 171273 | 1.01 | 2985 | 0.78 | 1 | 1.00 | | 28 | |
| danoint | 1177174 | 4398 | 986 | 12905 | 226 | 7 | 1155238 | 0.98 | 4281 | 0.97 | 1432 | <i>1.45</i> | 13887 | <i>1.08</i> | 834 | <i>3.69</i> | 7 | 0.93 | | 1012 | |
| dcmulti | 86 | 3 | 46 | 45 | 3 | < 1 | 76 | 0.89 | 2 | 0.75 | 14 | 0.31 | 13 | 0.28 | 2 | 0.75 | < 1 | 0.16 | | 68 | \checkmark |
| dsbmip | 14 | 2 | 47 | 47 | 2 | < 1 | 12 | 0.81 | 2 | 0.77 | 47 | 1.00 | 49 | <i>1.05</i> | 2 | 0.77 | < 1 | 0.95 | | 442 | \checkmark |
| egout | 1 | 1 | 0 | 1 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | < 1 | 0.64 | < 1 | 0.73 | < 1 | 1.00 | | 2 | \checkmark |
| enigma | 440 | 1 | 32 | 32 | < 1 | < 1 | 729 | <i>1.66</i> | 1 | 1.03 | 42 | <i>1.32</i> | 41 | <i>1.26</i> | < 1 | <i>1.26</i> | < 1 | <i>1.33</i> | | 22 | |
| fast0507 | 969 | 252 | 546 | 1067 | 165 | < 1 | 941 | 0.97 | 265 | <i>1.05</i> | 580 | <i>1.06</i> | 1111 | 1.04 | 180 | <i>1.09</i> | < 1 | 1.02 | | 361 | |
| fiber | 6 | 2 | 26 | 29 | 1 | < 1 | 6 | 0.97 | 3 | <i>1.20</i> | 25 | 0.98 | 31 | 1.04 | 1 | <i>1.10</i> | < 1 | <i>1.25</i> | | 268 | \checkmark |
| fixnet6 | 3 | 6 | 54 | 63 | 4 | < 1 | 2 | 0.67 | 5 | 0.83 | 55 | 1.02 | 63 | 1.01 | 4 | 1.01 | < 1 | 0.89 | | 88 | |
| flugpl | 7 | 1 | 0 | < 1 | < 1 | < 1 | 6 | 0.86 | 1 | 1.00 | 0 | 0.60 | < 1 | 0.82 | < 1 | 0.72 | < 1 | 1.00 | | 8 | \checkmark |
| gen | 1 | 1 | 0 | 2 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 1.00 | 2 | <i>1.10</i> | < 1 | <i>1.05</i> | < 1 | 1.00 | | 60 | \checkmark |
| gesa3 | 7 | 4 | 41 | 41 | 4 | < 1 | 8 | <i>1.28</i> | 7 | <i>1.85</i> | 9 | 0.23 | 7 | 0.17 | 7 | <i>1.82</i> | < 1 | 1.00 | | 433 | \checkmark |
| gesa3_o | 7 | 3 | 15 | 13 | 3 | < 1 | 8 | <i>1.07</i> | 6 | <i>1.83</i> | 11 | 0.75 | 9 | 0.73 | 6 | <i>1.82</i> | < 1 | <i>1.07</i> | | 343 | \checkmark |
| gt2 | 1 | 1 | 0 | 2 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | 2 | 0.89 | < 1 | 0.93 | < 1 | 1.00 | | 0 | |
| khh05250 | 6 | 1 | 1 | 3 | 1 | < 1 | 2 | 0.31 | 1 | 0.62 | 1 | 0.97 | 3 | 1.00 | < 1 | 0.48 | < 1 | 0.89 | | 1126 | \checkmark |
| l152lav | 38 | 2 | 33 | 34 | 2 | < 1 | 55 | <i>1.43</i> | 4 | <i>1.67</i> | 39 | <i>1.19</i> | 42 | <i>1.24</i> | 3 | <i>1.87</i> | < 1 | <i>1.20</i> | | 53 | \checkmark |
| lseu | 202 | 1 | 2 | 7 | < 1 | < 1 | 244 | <i>1.21</i> | 1 | <i>1.13</i> | 2 | <i>1.17</i> | 8 | <i>1.12</i> | 1 | <i>1.25</i> | < 1 | <i>1.13</i> | | 113 | \checkmark |
| markshare1 | 27206678 | 7200 | 625318 | 720010 | 2668 | < 1 | 29498915 | <i>1.08</i> | 7200 | 1.00 | 628679 | 1.01 | 720011 | 1.00 | 2906 | <i>1.09</i> | < 1 | 1.00 | | 34172 | |
| markshare2 | 6628319 | 7200 | 681328 | 720023 | 2937 | < 1 | 6397184 | 0.97 | 7200 | 1.00 | 681590 | 1.00 | 720024 | 1.00 | 3188 | <i>1.09</i> | < 1 | 1.00 | | 15791 | |
| mas74 | 5066734 | 1367 | 610 | 4891 | 605 | < 1 | 3954752 | 0.78 | 1123 | 0.82 | 423 | 0.69 | 3530 | 0.72 | 388 | 0.64 | < 1 | 1.00 | | 15376 | |

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Table 2: Detailed computational results on MIPLIB3 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------|---------|------|-------|--------|------|-----|------------|----------------|------|----------------|-------|-----------------|--------|------------------|------|------------------|-----|------------------|------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | \mathbf{N}_Q | T | \mathbf{T}_Q | PI | \mathbf{PI}_Q | PDI | \mathbf{PDI}_Q | TtB | \mathbf{TtB}_Q | TtF | \mathbf{TtF}_Q | C | I |
| mas76 | 250726 | 98 | 1 | 120 | < 1 | < 1 | 284959 | <i>1.14</i> | 106 | <i>1.09</i> | 1 | 1.00 | 135 | <i>1.13</i> | < 1 | 0.95 | < 1 | 1.00 | 3659 | |
| misc03 | 47 | 1 | 17 | 39 | < 1 | < 1 | 98 | <i>2.08</i> | 1 | <i>1.26</i> | 7 | 0.39 | 39 | 1.00 | < 1 | 0.74 | < 1 | 0.28 | 83 | \checkmark |
| misc06 | 4 | 1 | 5 | 7 | < 1 | < 1 | 4 | 0.85 | 1 | 1.03 | 8 | <i>1.65</i> | 8 | <i>1.14</i> | < 1 | <i>1.07</i> | < 1 | <i>1.15</i> | 670 | |
| misc07 | 23151 | 27 | 33 | 718 | 13 | < 1 | 21288 | 0.92 | 25 | 0.93 | 27 | 0.80 | 670 | 0.93 | 9 | 0.67 | < 1 | 0.32 | 110 | \checkmark |
| mitre | 1 | 13 | 1212 | 1216 | 13 | 12 | 1 | <i>1.17</i> | 13 | 1.01 | 1212 | 1.00 | 1215 | 1.00 | 13 | 1.01 | 12 | 1.00 | 67 | \checkmark |
| mod008 | 2 | 1 | < 1 | 2 | < 1 | < 1 | 3 | <i>1.23</i> | 1 | 0.99 | < 1 | 0.96 | 2 | 0.96 | < 1 | 0.97 | < 1 | 1.00 | 61 | |
| mod010 | 2 | 1 | 30 | 29 | < 1 | < 1 | 2 | 1.00 | 1 | <i>1.31</i> | 28 | 0.93 | 29 | 0.98 | 1 | <i>1.26</i> | < 1 | 0.95 | 161 | \checkmark |
| mod011 | 1281 | 291 | 1505 | 2198 | 238 | < 1 | 1306 | 1.02 | 298 | 1.03 | 1518 | 1.01 | 2227 | 1.01 | 240 | 1.01 | < 1 | 1.00 | 1 | |
| modglob | 2 | 1 | < 1 | 1 | < 1 | < 1 | 3 | <i>1.33</i> | 1 | <i>1.14</i> | < 1 | 0.98 | 1 | 1.00 | < 1 | 1.04 | < 1 | 1.00 | 1376 | \checkmark |
| noswot | 317847 | 100 | 5 | 471 | 41 | < 1 | 225645 | 0.71 | 71 | 0.71 | 0 | 0.00 | 328 | 0.70 | < 1 | 0.00 | < 1 | 0.86 | 996 | \checkmark |
| nw04 | 6 | 64 | 3420 | 3846 | 59 | 8 | 6 | <i>1.09</i> | 66 | 1.03 | 3398 | 0.99 | 3825 | 0.99 | 59 | 1.00 | 8 | 0.99 | 15 | |
| p0033 | 2 | 1 | < 1 | < 1 | < 1 | < 1 | 1 | 0.55 | 1 | 1.00 | 0 | 0.00 | < 1 | 1.03 | < 1 | 0.33 | < 1 | 1.00 | 59 | \checkmark |
| p0201 | 68 | 1 | 10 | 15 | 1 | < 1 | 13 | 0.19 | 1 | 0.86 | 8 | 0.81 | 13 | 0.87 | 1 | 0.87 | < 1 | <i>1.22</i> | 49 | \checkmark |
| p0282 | 2 | 1 | 1 | 3 | < 1 | < 1 | 2 | 0.92 | 1 | 1.00 | 1 | <i>1.07</i> | 3 | 0.90 | < 1 | 0.97 | < 1 | 1.00 | 4 | |
| p0548 | 1 | 1 | 7 | 8 | < 1 | < 1 | 1 | <i>1.17</i> | 1 | 1.00 | 8 | <i>1.16</i> | 8 | 1.04 | < 1 | <i>1.37</i> | < 1 | 0.88 | 67 | \checkmark |
| p2756 | 14 | 3 | 42 | 45 | 3 | < 1 | 13 | 0.92 | 4 | <i>1.21</i> | 40 | 0.95 | 45 | 0.98 | 4 | <i>1.21</i> | < 1 | 0.97 | 65 | \checkmark |
| pk1 | 333688 | 131 | 801 | 6871 | 33 | < 1 | 316674 | 0.95 | 127 | 0.98 | 683 | 0.85 | 6571 | 0.96 | 34 | 1.02 | < 1 | 1.00 | 535 | |
| pp08a | 282 | 2 | 38 | 40 | 2 | < 1 | 253 | 0.90 | 2 | 0.98 | 39 | 1.03 | 41 | 1.03 | 2 | 0.98 | < 1 | 1.00 | 60 | \checkmark |
| pp08aCUTS | 237 | 2 | 33 | 35 | 2 | < 1 | 220 | 0.93 | 2 | 0.97 | 33 | 1.00 | 35 | 0.99 | 2 | 0.96 | < 1 | 1.00 | 47 | |
| qiu | 10040 | 71 | 2198 | 4905 | 45 | < 1 | 11018 | <i>1.10</i> | 76 | <i>1.07</i> | 1898 | 0.86 | 5203 | <i>1.06</i> | 25 | 0.56 | < 1 | <i>1.08</i> | 23 | \checkmark |
| qnet1 | 21 | 4 | 88 | 92 | 4 | < 1 | 22 | <i>1.08</i> | 4 | 1.02 | 88 | 1.00 | 93 | 1.00 | 4 | 1.01 | < 1 | 1.00 | 4 | |
| qnet1_o | 9 | 2 | 41 | 46 | 2 | < 1 | 8 | 0.92 | 2 | 0.99 | 42 | 1.02 | 47 | 1.02 | 2 | 0.99 | < 1 | 1.00 | 1 | |
| rentacar | 3 | 2 | 84 | 89 | 2 | 1 | 5 | <i>1.50</i> | 2 | <i>1.10</i> | 86 | 1.02 | 90 | 1.01 | 2 | 0.90 | 1 | 1.00 | 6522 | \checkmark |
| rgn | 1 | 1 | 15 | 15 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 15 | 1.00 | 16 | 1.04 | < 1 | 1.04 | < 1 | 1.00 | 9 | |
| rout | 15735 | 69 | 214 | 482 | 27 | < 1 | 14451 | 0.92 | 62 | 0.90 | 195 | 0.91 | 479 | 0.99 | 28 | 1.03 | < 1 | <i>1.06</i> | 283 | \checkmark |
| set1ch | 1 | 1 | 11 | 13 | < 1 | < 1 | 2 | <i>1.50</i> | 1 | <i>1.28</i> | 12 | 1.03 | 14 | <i>1.06</i> | 1 | <i>1.23</i> | < 1 | <i>1.12</i> | 85 | \checkmark |
| seymour | 210806 | 7200 | 1715 | 12269 | 3555 | < 1 | 209922 | 1.00 | 7200 | 1.00 | 1743 | 1.02 | 12536 | 1.02 | 3889 | <i>1.09</i> | < 1 | 0.86 | 770 | |
| stein27 | 2681 | 1 | 0 | 23 | < 1 | < 1 | 2778 | 1.04 | 1 | 0.89 | 0 | 0.00 | 23 | 0.98 | < 1 | 0.93 | < 1 | 1.00 | 138 | |
| stein45 | 40030 | 16 | 6 | 247 | 2 | < 1 | 40763 | 1.02 | 16 | 0.99 | 7 | <i>1.23</i> | 249 | 1.01 | 2 | <i>1.23</i> | < 1 | 1.00 | 478 | \checkmark |
| swath | 919716 | 7200 | 24996 | 117779 | 5359 | < 1 | 865503 | 0.94 | 7200 | 1.00 | 19609 | 0.78 | 118284 | 1.00 | 5596 | 1.04 | < 1 | 0.93 | 4180 | |

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Table 2: Detailed computational results on MIPLIB3 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|----------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | |
| vpm1 | 1 | 1 | 0 | < 1 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | 1 | <i>1.90</i> | < 1 | 1.00 | < 1 | 1.00 | 0 | | |
| vpm2 | 162 | 2 | 14 | 23 | 1 | < 1 | 362 | <i>2.23</i> | 2 | <i>1.22</i> | 28 | <i>1.95</i> | 38 | <i>1.64</i> | 2 | <i>2.53</i> | < 1 | <i>1.14</i> | 29 | | |
| geom. | 202.49 | 8.32 | – | 88.58 | 3.21 | 0.06 | 204.43 | 1.01 | 8.70 | 1.04 | – | – | 87.12 | 0.98 | 2.91 | 0.90 | 0.06 | 0.97 | – | | |
| shgeom. | 1016.57 | 12.30 | 88.15 | 154.31 | 7.42 | 0.39 | 1049.29 | 1.03 | 12.68 | 1.03 | 86.38 | 0.98 | 153.27 | 0.99 | 7.29 | 0.98 | 0.39 | 1.01 | 146.49 | | |

Table 3: Detailed computational results on MIPLIB2003 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | C | I |
|------------|----------|------|--------|--------|------|-----|------------|----------------|------|----------------|--------|-----------------|--------|------------------|------|------------------|-----|------------------|--------------------|---|---|
| | N | T | PI | PDI | TtB | TtF | N | \mathbf{N}_Q | T | \mathbf{T}_Q | PI | \mathbf{PI}_Q | PDI | \mathbf{PDI}_Q | TtB | \mathbf{TtB}_Q | TtF | \mathbf{TtF}_Q | | | |
| 10teams | 211 | 12 | 977 | 975 | 12 | 10 | 594 | <i>2.82</i> | 18 | <i>1.55</i> | 1155 | <i>1.18</i> | 1153 | <i>1.18</i> | 18 | <i>1.55</i> | 11 | <i>1.17</i> | 107 | | |
| alc1s1 | 192312 | 7200 | 4920 | 32659 | 4101 | < 1 | 172966 | 0.90 | 7200 | 1.00 | 4726 | 0.96 | 32875 | 1.01 | 3893 | 0.95 | < 1 | 0.97 | 187 \checkmark | | |
| afLOW30a | 648 | 18 | 388 | 438 | 9 | < 1 | 714 | <i>1.10</i> | 21 | <i>1.13</i> | 147 | 0.38 | 216 | 0.49 | 14 | <i>1.63</i> | < 1 | 1.02 | 94 \checkmark | | |
| afLOW40b | 18333 | 712 | 3835 | 5934 | 462 | < 1 | 23098 | <i>1.26</i> | 659 | 0.93 | 3008 | 0.78 | 4928 | 0.83 | 442 | 0.96 | < 1 | 1.04 | 457 \checkmark | | |
| air04 | 112 | 47 | 753 | 782 | 45 | 7 | 84 | 0.75 | 49 | 1.03 | 766 | 1.02 | 795 | 1.02 | 47 | 1.03 | 7 | 1.01 | 33 | | |
| air05 | 472 | 39 | 335 | 411 | 37 | 1 | 368 | 0.78 | 37 | 0.95 | 347 | 1.04 | 425 | 1.03 | 34 | 0.94 | 1 | 1.01 | 301 | | |
| arki001 | 1238172 | 6781 | 1828 | 1849 | 2189 | 18 | 1278084 | 1.03 | 6293 | 0.93 | 2373 | <i>1.30</i> | 2388 | <i>1.29</i> | 2086 | 0.95 | 24 | <i>1.30</i> | 980 \checkmark | | |
| atlanta-ip | 12096 | 7200 | 63299 | 96097 | 5121 | 388 | 13128 | <i>1.09</i> | 7200 | 1.00 | 48837 | 0.77 | 76526 | 0.80 | 3853 | 0.75 | 239 | 0.62 | 1099 | | |
| cap6000 | 2050 | 4 | 28 | 29 | 3 | < 1 | 2267 | <i>1.11</i> | 5 | <i>1.20</i> | 27 | 0.98 | 29 | 1.01 | 5 | <i>1.37</i> | < 1 | 0.99 | 2109 \checkmark | | |
| dano3mip | 1190 | 7200 | 63114 | 169654 | 3839 | 1 | 1204 | 1.01 | 7200 | 1.00 | 65017 | 1.03 | 171273 | 1.01 | 2985 | 0.78 | 1 | 1.00 | 28 | | |
| danoint | 1177174 | 4398 | 986 | 12905 | 226 | 7 | 1155238 | 0.98 | 4281 | 0.97 | 1432 | <i>1.45</i> | 13887 | <i>1.08</i> | 834 | <i>3.69</i> | 7 | 0.93 | 1012 | | |
| disctom | 1 | 11 | 1125 | 1125 | 11 | 11 | 1 | 1.00 | 11 | 1.00 | 1127 | 1.00 | 1127 | 1.00 | 11 | 1.00 | 11 | 1.00 | 0 | | |
| ds | 860 | 7200 | 572866 | 628313 | 2879 | 4 | 837 | 0.97 | 7200 | 1.00 | 573237 | 1.00 | 628562 | 1.00 | 2954 | 1.03 | 5 | <i>1.05</i> | 0 | | |
| fast0507 | 969 | 252 | 546 | 1067 | 165 | < 1 | 941 | 0.97 | 265 | <i>1.05</i> | 580 | <i>1.06</i> | 1111 | 1.04 | 180 | <i>1.09</i> | < 1 | 1.02 | 361 | | |
| fiber | 6 | 2 | 26 | 29 | 1 | < 1 | 6 | 0.97 | 3 | <i>1.20</i> | 25 | 0.98 | 31 | 1.04 | 1 | <i>1.10</i> | < 1 | <i>1.25</i> | 268 \checkmark | | |
| fixnet6 | 3 | 6 | 54 | 63 | 4 | < 1 | 2 | 0.67 | 5 | 0.83 | 55 | 1.02 | 63 | 1.01 | 4 | 1.01 | < 1 | 0.89 | 88 | | |
| gesa2-o | 3 | 1 | 12 | 10 | < 1 | < 1 | 2 | 0.69 | 1 | 1.00 | 12 | 1.03 | 10 | <i>1.05</i> | < 1 | 1.04 | < 1 | 1.02 | 107 \checkmark | | |
| glass4 | 1400467 | 4558 | 109756 | 129350 | 4427 | < 1 | 1319902 | 0.94 | 4971 | <i>1.09</i> | 116911 | <i>1.07</i> | 138200 | <i>1.07</i> | 4847 | <i>1.09</i> | < 1 | <i>1.06</i> | 22999 \checkmark | | |
| liu | 999658 | 7200 | 58684 | 392849 | 5588 | < 1 | 801000 | 0.80 | 7200 | 1.00 | 53488 | 0.91 | 390277 | 0.99 | 4246 | 0.76 | < 1 | <i>1.35</i> | 1069 \checkmark | | |
| manna81 | 1 | 1 | 12 | 14 | 1 | < 1 | 1 | 1.00 | 1 | 0.99 | 10 | 0.88 | 13 | 0.97 | 1 | 0.99 | < 1 | 1.00 | 1 | | |
| markshare1 | 27206678 | 7200 | 625318 | 720010 | 2668 | < 1 | 29498915 | <i>1.08</i> | 7200 | 1.00 | 628679 | 1.01 | 720011 | 1.00 | 2906 | <i>1.09</i> | < 1 | 1.00 | 34172 | | |
| markshare2 | 6628319 | 7200 | 681328 | 720023 | 2937 | < 1 | 6397184 | 0.97 | 7200 | 1.00 | 681590 | 1.00 | 720024 | 1.00 | 3188 | <i>1.09</i> | < 1 | 1.00 | 15791 | | |
| mas74 | 5066734 | 1367 | 610 | 4891 | 605 | < 1 | 3954752 | 0.78 | 1123 | 0.82 | 423 | 0.69 | 3530 | 0.72 | 388 | 0.64 | < 1 | 1.00 | 15376 | | |
| mas76 | 250726 | 98 | 1 | 120 | < 1 | < 1 | 284959 | <i>1.14</i> | 106 | <i>1.09</i> | 1 | 1.00 | 135 | <i>1.13</i> | < 1 | 0.95 | < 1 | 1.00 | 3659 | | |
| misc07 | 23151 | 27 | 33 | 718 | 13 | < 1 | 21288 | 0.92 | 25 | 0.93 | 27 | 0.80 | 670 | 0.93 | 9 | 0.67 | < 1 | 0.32 | 110 \checkmark | | |
| mkc | 689644 | 7200 | 2596 | 3781 | 2352 | < 1 | 690327 | 1.00 | 7200 | 1.00 | 3250 | <i>1.25</i> | 4491 | <i>1.19</i> | 4244 | <i>1.80</i> | < 1 | 1.00 | 373 | | |
| mod011 | 1281 | 291 | 1505 | 2198 | 238 | < 1 | 1306 | 1.02 | 298 | 1.03 | 1518 | 1.01 | 2227 | 1.01 | 240 | 1.01 | < 1 | 1.00 | 1 | | |
| modglob | 2 | 1 | < 1 | 1 | < 1 | < 1 | 3 | <i>1.33</i> | 1 | <i>1.14</i> | < 1 | 0.98 | 1 | 1.00 | < 1 | 1.04 | < 1 | 1.00 | 1376 \checkmark | | |
| momentum1 | 136132 | 7200 | 53411 | 98553 | 4333 | 6 | 134785 | 0.99 | 7200 | 1.00 | 52621 | 0.99 | 92641 | 0.94 | 5780 | <i>1.33</i> | 6 | 0.99 | 1217 | | |

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Table 3: Detailed computational results on MIPLIB2003 test set. The table shows the absolute and relative numbers of nodes (N , N_Q), solving time (T , T_Q), primal integral (PI , PI_Q), primal-dual integral (PDI , PDI_Q), time to best (TtB , TtB_Q) and first solution (TtF , TtF_Q), and number of conflicts found by conflict diving (C). The right-most column (I) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|--------------|---------|--------|---------|---------|--------|------|------------|-------------|--------|-------------|--------|-------------|---------|-------------|--------|-------------|------|-------------|------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I |
| momentum3 | 390 | 7200 | 326157 | 562398 | 5612 | 206 | 330 | 0.84 | 7200 | 1.00 | 336598 | 1.03 | 566593 | 1.01 | 4459 | 0.79 | 225 | <i>1.09</i> | 252 | |
| msc98-ip | 7657 | 7200 | 79841 | 84199 | 5535 | 216 | 14749 | <i>1.93</i> | 6536 | 0.91 | 93202 | <i>1.17</i> | 96622 | <i>1.15</i> | 5048 | 0.91 | 531 | <i>2.46</i> | 1082 | |
| mzzv11 | 2138 | 366 | 11483 | 11647 | 294 | < 1 | 3350 | <i>1.57</i> | 525 | <i>1.44</i> | 12409 | <i>1.08</i> | 12670 | <i>1.09</i> | 417 | <i>1.42</i> | < 1 | 0.94 | 60 | \checkmark |
| mzzv42z | 317 | 201 | 9152 | 9239 | 190 | < 1 | 543 | <i>1.71</i> | 222 | <i>1.11</i> | 8885 | 0.97 | 9005 | 0.97 | 214 | <i>1.13</i> | < 1 | <i>1.18</i> | 68 | \checkmark |
| net12 | 2161 | 1479 | 15201 | 72698 | 402 | 93 | 2153 | 1.00 | 1464 | 0.99 | 14582 | 0.96 | 59822 | 0.82 | 254 | 0.63 | 112 | <i>1.20</i> | 497 | \checkmark |
| noswot | 317847 | 100 | 5 | 471 | 41 | < 1 | 225645 | 0.71 | 71 | 0.71 | 0 | 0.00 | 328 | 0.70 | < 1 | 0.00 | < 1 | 0.86 | 996 | \checkmark |
| nsrand-ipx | 34821 | 433 | 1722 | 2108 | 362 | 1 | 43136 | <i>1.24</i> | 474 | <i>1.09</i> | 1608 | 0.93 | 2032 | 0.96 | 400 | <i>1.10</i> | 1 | 1.00 | 122 | \checkmark |
| nw04 | 6 | 64 | 3420 | 3846 | 59 | 8 | 6 | <i>1.09</i> | 66 | 1.03 | 3398 | 0.99 | 3825 | 0.99 | 59 | 1.00 | 8 | 0.99 | 15 | |
| opt1217 | 1 | 1 | 1 | 4 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | < 1 | 0.21 | 5 | 1.04 | < 1 | 0.69 | < 1 | 1.00 | 36 | |
| p2756 | 14 | 3 | 42 | 45 | 3 | < 1 | 13 | 0.92 | 4 | <i>1.21</i> | 40 | 0.95 | 45 | 0.98 | 4 | <i>1.21</i> | < 1 | 0.97 | 65 | \checkmark |
| pk1 | 333688 | 131 | 801 | 6871 | 33 | < 1 | 316674 | 0.95 | 127 | 0.98 | 683 | 0.85 | 6571 | 0.96 | 34 | 1.02 | < 1 | 1.00 | 535 | |
| pp08a | 282 | 2 | 38 | 40 | 2 | < 1 | 253 | 0.90 | 2 | 0.98 | 39 | 1.03 | 41 | 1.03 | 2 | 0.98 | < 1 | 1.00 | 60 | \checkmark |
| pp08aCUTS | 237 | 2 | 33 | 35 | 2 | < 1 | 220 | 0.93 | 2 | 0.97 | 33 | 1.00 | 35 | 0.99 | 2 | 0.96 | < 1 | 1.00 | 47 | |
| protfold | 12280 | 7200 | 288197 | 360755 | 3721 | < 1 | 12028 | 0.98 | 7200 | 1.00 | 307512 | <i>1.07</i> | 377307 | <i>1.05</i> | 4595 | <i>1.23</i> | < 1 | 0.99 | 1381 | |
| qiu | 10040 | 71 | 2198 | 4905 | 45 | < 1 | 11018 | <i>1.10</i> | 76 | <i>1.07</i> | 1898 | 0.86 | 5203 | <i>1.06</i> | 25 | 0.56 | < 1 | <i>1.08</i> | 23 | \checkmark |
| rd-rplusc-21 | 315235 | 7200 | 94808 | 719622 | 3436 | 850 | 555499 | <i>1.76</i> | 7200 | 1.00 | 29323 | 0.31 | 719583 | 1.00 | 2535 | 0.74 | 243 | 0.29 | 286 | |
| roll3000 | 3357 | 69 | 597 | 703 | 59 | 4 | 3311 | 0.99 | 64 | 0.94 | 606 | 1.01 | 709 | 1.01 | 53 | 0.90 | 4 | <i>1.14</i> | 199 | |
| rout | 15735 | 69 | 214 | 482 | 27 | < 1 | 14451 | 0.92 | 62 | 0.90 | 195 | 0.91 | 479 | 0.99 | 28 | 1.03 | < 1 | <i>1.06</i> | 283 | \checkmark |
| set1ch | 1 | 1 | 11 | 13 | < 1 | < 1 | 2 | <i>1.50</i> | 1 | <i>1.28</i> | 12 | 1.03 | 14 | <i>1.06</i> | 1 | <i>1.23</i> | < 1 | <i>1.12</i> | 85 | \checkmark |
| seymour | 210806 | 7200 | 1715 | 12269 | 3555 | < 1 | 209922 | 1.00 | 7200 | 1.00 | 1743 | 1.02 | 12536 | 1.02 | 3889 | <i>1.09</i> | < 1 | 0.86 | 770 | |
| sp97ar | 21186 | 7200 | 118749 | 715977 | 6175 | 1 | 19648 | 0.93 | 7200 | 1.00 | 123306 | 1.04 | 716007 | 1.00 | 4965 | 0.80 | 1 | 0.97 | 317 | |
| stp3d | 21 | 7200 | 720166 | 720166 | 7200 | 7200 | 17 | 0.84 | 7200 | 1.00 | 721142 | 1.00 | 721142 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 105 | |
| swath | 919716 | 7200 | 24996 | 117779 | 5359 | < 1 | 865503 | 0.94 | 7200 | 1.00 | 19609 | 0.78 | 118284 | 1.00 | 5596 | 1.04 | < 1 | 0.93 | 4180 | |
| t1717 | 3536 | 7200 | 197784 | 301446 | 2859 | 5 | 3489 | 0.99 | 7200 | 1.00 | 195477 | 0.99 | 299533 | 0.99 | 2678 | 0.94 | 5 | 0.99 | 183 | |
| timtab1 | 58161 | 82 | 677 | 1478 | 57 | 3 | 51476 | 0.89 | 70 | 0.86 | 456 | 0.67 | 1242 | 0.84 | 47 | 0.82 | 2 | 0.72 | 248 | \checkmark |
| timtab2 | 2793595 | 7200 | 14581 | 41134 | 3729 | 18 | 2811514 | 1.01 | 7200 | 1.00 | 12726 | 0.87 | 34633 | 0.84 | 3098 | 0.83 | 20 | <i>1.12</i> | 3685 | |
| tr12-30 | 390234 | 672 | 46 | 103 | 154 | < 1 | 619085 | <i>1.59</i> | 1003 | <i>1.49</i> | 48 | 1.04 | 125 | <i>1.21</i> | 124 | 0.81 | < 1 | 0.94 | 698 | \checkmark |
| vpm2 | 162 | 2 | 14 | 23 | 1 | < 1 | 362 | <i>2.23</i> | 2 | <i>1.22</i> | 28 | <i>1.95</i> | 38 | <i>1.64</i> | 2 | <i>2.53</i> | < 1 | <i>1.14</i> | 29 | |
| geom. | 4051.59 | 223.42 | 1413.26 | 3261.25 | 114.43 | 0.33 | 4254.31 | 1.05 | 229.26 | 1.03 | - | - | 3238.03 | 0.99 | 100.97 | 0.88 | 0.32 | 0.98 | - | |

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Table 3: Detailed computational results on MIPLIB2003 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | \mathbf{C} | \mathbf{I} | | | |
|----------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|--------------|--------------|----------------|------------------|--|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | | | \mathbf{TtF} | \mathbf{TtF}_Q | |
| shgeom. | 8491.86 | 256.22 | 1851.12 | 3731.79 | 144.80 | 2.25 | 8911.00 | 1.05 | 261.10 | 1.02 | 1754.00 | 0.95 | 3692.46 | 0.99 | 137.75 | 0.95 | 2.23 | 0.99 | 287.70 | | |

Table 4: Detailed computational results on MIPLIB2010 benchmark set. The table shows the absolute and relative numbers of nodes (N , N_Q), solving time (T , T_Q), primal integral (PI , PI_Q), primal-dual integral (PDI , PDI_Q), time to best (TtB , TtB_Q) and first solution (TtF , TtF_Q), and number of conflicts found by conflict diving (C). The right-most column (I) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|---------|------|--------|--------|------|------|------------|-------------|------|-------------|--------|-------------|--------|-------------|------|-------------|------|-------------|-------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I |
| 30n20b8 | 1133 | 443 | 19130 | 30492 | 400 | 103 | 1721 | <i>1.52</i> | 359 | 0.81 | 16077 | 0.84 | 25307 | 0.83 | 315 | 0.79 | 83 | 0.80 | 106 | \checkmark |
| acc-tight5 | 421 | 94 | 9448 | 9449 | 94 | 85 | 356 | 0.84 | 90 | 0.95 | 8967 | 0.95 | 8981 | 0.95 | 90 | 0.95 | 90 | <i>1.05</i> | 144 | |
| aflow40b | 18333 | 712 | 3835 | 5934 | 462 | < 1 | 23098 | <i>1.26</i> | 659 | 0.93 | 3008 | 0.78 | 4928 | 0.83 | 442 | 0.96 | < 1 | 1.04 | 457 | \checkmark |
| air04 | 112 | 47 | 753 | 782 | 45 | 7 | 84 | 0.75 | 49 | 1.03 | 766 | 1.02 | 795 | 1.02 | 47 | 1.03 | 7 | 1.01 | 33 | |
| app1-2 | 79 | 764 | 32647 | 50714 | 666 | 157 | 34 | 0.43 | 707 | 0.93 | 31071 | 0.95 | 47359 | 0.93 | 526 | 0.79 | 151 | 0.97 | 99 | |
| ash608gpia-3col | 14 | 40 | 3951 | 720000 | 7200 | 7200 | 1 | 0.07 | 30 | 0.76 | 3003 | 0.76 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 37 | |
| bab5 | 65097 | 7200 | 16291 | 22852 | 4101 | 148 | 76156 | <i>1.17</i> | 7200 | 1.00 | 15750 | 0.97 | 21884 | 0.96 | 5277 | <i>1.29</i> | 145 | 0.98 | 1545 | |
| beasleyC3 | 524 | 59 | 411 | 493 | 58 | < 1 | 515 | 0.98 | 56 | 0.96 | 400 | 0.97 | 487 | 0.99 | 54 | 0.93 | < 1 | <i>1.20</i> | 300 | |
| biella1 | 7962 | 1262 | 4391 | 4502 | 1234 | 1 | 6312 | 0.79 | 1166 | 0.92 | 4290 | 0.98 | 4398 | 0.98 | 1130 | 0.92 | 1 | 1.04 | 765 | |
| bienst2 | 69421 | 637 | 1005 | 10700 | 259 | < 1 | 59356 | 0.86 | 511 | 0.80 | 453 | 0.45 | 9178 | 0.86 | 157 | 0.61 | < 1 | <i>1.29</i> | 257 | \checkmark |
| binkar10_1 | 2505 | 32 | 39 | 48 | 17 | < 1 | 3200 | <i>1.28</i> | 42 | <i>1.31</i> | 29 | 0.74 | 42 | 0.88 | 16 | 0.93 | < 1 | 0.80 | 3012 | \checkmark |
| bley_xll | 17 | 206 | 18289 | 18358 | 206 | 175 | 1 | 0.07 | 206 | 1.00 | 18743 | 1.02 | 18792 | 1.02 | 206 | 1.00 | 181 | 1.04 | 40 | \checkmark |
| bnatt350 | 7359 | 852 | 85217 | 85212 | 852 | 852 | 5971 | 0.81 | 708 | 0.83 | 70850 | 0.83 | 70823 | 0.83 | 708 | 0.83 | 708 | 0.83 | 1564 | |
| core2536-691 | 319 | 361 | 656 | 1119 | 361 | 1 | 354 | <i>1.11</i> | 370 | 1.03 | 696 | <i>1.06</i> | 1160 | 1.04 | 370 | 1.03 | 1 | 1.01 | 0 | |
| cov1075 | 2229092 | 5233 | 155 | 42458 | 104 | < 1 | 2134407 | 0.96 | 4881 | 0.93 | 110 | 0.71 | 39423 | 0.93 | 68 | 0.65 | < 1 | 1.00 | 1203 | |
| csched010 | 211937 | 3923 | 8121 | 26258 | 844 | 50 | 225756 | <i>1.07</i> | 4284 | <i>1.09</i> | 8189 | 1.01 | 29820 | <i>1.14</i> | 943 | <i>1.12</i> | 45 | 0.90 | 922 | |
| danoint | 1177174 | 4398 | 986 | 12905 | 226 | 7 | 1155238 | 0.98 | 4281 | 0.97 | 1432 | <i>1.45</i> | 13887 | <i>1.08</i> | 834 | <i>3.69</i> | 7 | 0.93 | 1012 | |
| dfn-gwin-UUM | 21127 | 107 | 466 | 960 | 25 | < 1 | 27429 | <i>1.30</i> | 125 | <i>1.16</i> | 317 | 0.68 | 878 | 0.91 | 28 | <i>1.13</i> | < 1 | <i>1.07</i> | 2338 | \checkmark |
| eil33-2 | 718 | 84 | 585 | 1415 | 75 | < 1 | 718 | 1.00 | 84 | 1.00 | 584 | 1.00 | 1415 | 1.00 | 75 | 1.00 | < 1 | 0.97 | 0 | |
| eilB101 | 32681 | 509 | 1838 | 4968 | 408 | < 1 | 22455 | 0.69 | 385 | 0.76 | 1241 | 0.68 | 3690 | 0.74 | 278 | 0.68 | < 1 | 1.02 | 9 | |
| enlight13 | 1 | 1 | 0 | 2 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | 1 | 0.64 | < 1 | 0.73 | < 1 | 0.73 | 0 | |
| enlight14 | 1 | 1 | 2 | 720000 | 7200 | 7200 | 1 | 1.00 | 1 | 1.00 | 2 | 0.83 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | |
| ex9 | 1 | 35 | 3457 | 3457 | 35 | 35 | 1 | 1.00 | 35 | 1.00 | 3475 | 1.01 | 3474 | 1.00 | 35 | 1.00 | 35 | 1.00 | 0 | |
| glass4 | 1400467 | 4558 | 109756 | 129350 | 4427 | < 1 | 1319902 | 0.94 | 4971 | <i>1.09</i> | 116911 | <i>1.07</i> | 138200 | <i>1.07</i> | 4847 | <i>1.09</i> | < 1 | <i>1.06</i> | 22999 | \checkmark |
| gmu-35-40 | 2194641 | 7200 | 200 | 249 | 2266 | < 1 | 2845684 | <i>1.30</i> | 7200 | 1.00 | 190 | 0.95 | 247 | 0.99 | 2792 | <i>1.23</i> | < 1 | 1.00 | 2193 | |
| iis-100-0-cov | 100588 | 717 | 199 | 11399 | 19 | < 1 | 99583 | 0.99 | 765 | <i>1.07</i> | 217 | <i>1.09</i> | 12224 | <i>1.07</i> | 19 | 1.02 | < 1 | 1.00 | 794 | |
| iis-bupa-cov | 175247 | 2496 | 503 | 24896 | 82 | < 1 | 178672 | 1.02 | 2528 | 1.01 | 543 | <i>1.08</i> | 25265 | 1.01 | 97 | <i>1.18</i> | < 1 | 1.00 | 288 | |
| iis-pima-cov | 8692 | 418 | 644 | 4809 | 132 | < 1 | 7914 | 0.91 | 402 | 0.96 | 578 | 0.90 | 4674 | 0.97 | 110 | 0.83 | < 1 | <i>1.14</i> | 13 | |
| lectsched-4-obj | 777 | 24 | 1960 | 1963 | 24 | 8 | 625 | 0.80 | 18 | 0.72 | 1316 | 0.67 | 1315 | 0.67 | 18 | 0.72 | 3 | 0.40 | 61 | \checkmark |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|---------|------|--------|--------|------|------|------------|-------------|------|-------------|--------|-------------|--------|-------------|------|-------------|-----|-------------|-------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I |
| m100n500k4r1 | 4915772 | 7200 | 28974 | 28982 | 36 | < 1 | 4818432 | 0.98 | 7200 | 1.00 | 28971 | 1.00 | 28979 | 1.00 | 35 | 0.98 | < 1 | 1.00 | 23 | |
| macrophage | 558206 | 6631 | 2168 | 49564 | 2150 | < 1 | 382837 | 0.69 | 6367 | 0.96 | 1640 | 0.76 | 45134 | 0.91 | 1328 | 0.62 | < 1 | 1.00 | 910 | |
| map18 | 262 | 306 | 1785 | 3522 | 55 | 2 | 281 | <i>1.08</i> | 280 | 0.91 | 1740 | 0.97 | 3374 | 0.96 | 75 | <i>1.37</i> | 2 | 1.00 | 14 | |
| map20 | 258 | 275 | 1080 | 2390 | 81 | 2 | 246 | 0.95 | 262 | 0.95 | 1085 | 1.00 | 2374 | 0.99 | 55 | 0.68 | 2 | 1.01 | 8 | |
| mcsched | 16226 | 356 | 151 | 2203 | 228 | < 1 | 16328 | 1.01 | 286 | 0.80 | 140 | 0.93 | 1750 | 0.79 | 161 | 0.70 | < 1 | 1.04 | 21 | \checkmark |
| mik-250-1-100-1 | 28660 | 87 | 37 | 188 | 1 | < 1 | 32272 | <i>1.13</i> | 96 | <i>1.10</i> | 34 | 0.92 | 202 | <i>1.08</i> | 1 | 0.99 | < 1 | 1.00 | 51 | |
| mine-166-5 | 2037 | 62 | 3067 | 3326 | 61 | < 1 | 2974 | <i>1.46</i> | 61 | 0.99 | 3045 | 0.99 | 3311 | 1.00 | 60 | 0.98 | < 1 | <i>1.33</i> | 435 | |
| mine-90-10 | 38761 | 365 | 2470 | 2690 | 307 | < 1 | 54451 | <i>1.40</i> | 587 | <i>1.61</i> | 3263 | <i>1.32</i> | 3567 | <i>1.33</i> | 496 | <i>1.62</i> | < 1 | 1.00 | 2806 | |
| msc98-ip | 7657 | 7200 | 79841 | 84199 | 5535 | 216 | 14749 | <i>1.93</i> | 6536 | 0.91 | 93202 | <i>1.17</i> | 96622 | <i>1.15</i> | 5048 | 0.91 | 531 | <i>2.46</i> | 1082 | |
| mspp16 | 54 | 2272 | 72169 | 81463 | 1444 | 721 | 85 | <i>1.57</i> | 2465 | <i>1.09</i> | 73235 | 1.01 | 83073 | 1.02 | 1730 | <i>1.20</i> | 731 | 1.01 | 5 | |
| mzzv11 | 2138 | 366 | 11483 | 11647 | 294 | < 1 | 3350 | <i>1.57</i> | 525 | <i>1.44</i> | 12409 | <i>1.08</i> | 12670 | <i>1.09</i> | 417 | <i>1.42</i> | < 1 | 0.94 | 60 | \checkmark |
| n3div36 | 212580 | 7200 | 6230 | 31991 | 748 | 1 | 205746 | 0.97 | 7200 | 1.00 | 6659 | <i>1.07</i> | 32529 | 1.02 | 2320 | <i>3.10</i> | 1 | 1.03 | 593 | |
| n3seq24 | 798 | 7200 | 281752 | 284494 | 5738 | 18 | 756 | 0.95 | 7200 | 1.00 | 292996 | 1.04 | 295759 | 1.04 | 5922 | 1.03 | 19 | <i>1.08</i> | 4357 | |
| n4-3 | 2965 | 189 | 1008 | 2019 | 108 | < 1 | 3401 | <i>1.15</i> | 205 | <i>1.09</i> | 1085 | <i>1.08</i> | 2344 | <i>1.16</i> | 109 | 1.02 | < 1 | 0.98 | 1610 | \checkmark |
| neos-1109824 | 6851 | 101 | 615 | 1082 | 19 | 5 | 5825 | 0.85 | 79 | 0.78 | 333 | 0.54 | 668 | 0.62 | 13 | 0.71 | 2 | 0.32 | 252 | \checkmark |
| neos-1337307 | 547670 | 7200 | 8981 | 9618 | 1068 | 90 | 562102 | 1.03 | 7200 | 1.00 | 8220 | 0.92 | 8704 | 0.90 | 222 | 0.21 | 82 | 0.91 | 2853 | |
| neos-1396125 | 40507 | 349 | 3562 | 9858 | 164 | 29 | 49225 | <i>1.22</i> | 360 | 1.03 | 2451 | 0.69 | 8666 | 0.88 | 177 | <i>1.08</i> | 24 | 0.81 | 309 | \checkmark |
| neos-1601936 | 10958 | 5705 | 466880 | 466878 | 4302 | 615 | 16363 | <i>1.49</i> | 6081 | <i>1.07</i> | 453103 | 0.97 | 453113 | 0.97 | 5706 | <i>1.33</i> | 438 | 0.71 | 3388 | |
| neos-476283 | 517 | 177 | 1454 | 3932 | 148 | 14 | 671 | <i>1.30</i> | 181 | 1.02 | 1454 | 1.00 | 3933 | 1.00 | 164 | <i>1.11</i> | 14 | 1.01 | 11249 | \checkmark |
| neos-686190 | 8949 | 127 | 1817 | 2923 | 114 | 4 | 6792 | 0.76 | 111 | 0.87 | 1579 | 0.87 | 2654 | 0.91 | 91 | 0.79 | < 1 | 0.04 | 650 | |
| neos-849702 | 19129 | 457 | 45692 | 45680 | 457 | 457 | 24138 | <i>1.26</i> | 554 | <i>1.21</i> | 55383 | <i>1.21</i> | 55392 | <i>1.21</i> | 554 | <i>1.21</i> | 554 | <i>1.21</i> | 453 | |
| neos-916792 | 119285 | 971 | 2478 | 7968 | 290 | 13 | 147959 | <i>1.24</i> | 1193 | <i>1.23</i> | 2588 | 1.04 | 10161 | <i>1.28</i> | 392 | <i>1.35</i> | 13 | 0.98 | 99 | |
| neos-934278 | 1254 | 7200 | 348201 | 348917 | 4801 | < 1 | 661 | 0.53 | 7200 | 1.00 | 405372 | <i>1.16</i> | 405996 | <i>1.16</i> | 2940 | 0.61 | < 1 | 0.89 | 141 | |
| neos13 | 18492 | 339 | 3134 | 7756 | 280 | 1 | 54026 | <i>2.92</i> | 826 | <i>2.44</i> | 3194 | 1.02 | 16541 | <i>2.13</i> | 701 | <i>2.50</i> | 1 | 1.00 | 178 | \checkmark |
| neos18 | 1338 | 29 | 120 | 485 | 9 | < 1 | 1090 | 0.81 | 24 | 0.82 | 124 | 1.04 | 429 | 0.88 | 11 | <i>1.18</i> | < 1 | <i>1.16</i> | 253 | \checkmark |
| net12 | 2161 | 1479 | 15201 | 72698 | 402 | 93 | 2153 | 1.00 | 1464 | 0.99 | 14582 | 0.96 | 59822 | 0.82 | 254 | 0.63 | 112 | <i>1.20</i> | 497 | \checkmark |
| netdiversion | 76 | 1890 | 94015 | 96955 | 1601 | 41 | 84 | <i>1.11</i> | 1317 | 0.70 | 76615 | 0.81 | 78371 | 0.81 | 1026 | 0.64 | 41 | 0.98 | 191 | |
| newdano | 1307144 | 6819 | 5482 | 130091 | 2922 | < 1 | 1390208 | <i>1.06</i> | 6909 | 1.01 | 6164 | <i>1.12</i> | 144565 | <i>1.11</i> | 3718 | <i>1.27</i> | < 1 | <i>1.29</i> | 859 | \checkmark |
| noswot | 317847 | 100 | 5 | 471 | 41 | < 1 | 225645 | 0.71 | 71 | 0.71 | 0 | 0.00 | 328 | 0.70 | < 1 | 0.00 | < 1 | 0.86 | 996 | \checkmark |
| ns1208400 | 2631 | 1404 | 139067 | 140445 | 1391 | 1391 | 3481 | <i>1.32</i> | 916 | 0.65 | 89933 | 0.65 | 91579 | 0.65 | 899 | 0.65 | 899 | 0.65 | 783 | |

cont. on next page

Table 4: Detailed computational results on MIPLIB2010 benchmark set. The table shows the absolute and relative numbers of nodes (N , N_Q), solving time (T , T_Q), primal integral (PI , PI_Q), primal-dual integral (PDI , PDI_Q), time to best (TtB , TtB_Q) and first solution (TtF , TtF_Q), and number of conflicts found by conflict diving (C). The right-most column (I) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|------------------|----------|--------|--------|---------|--------|------|------------|-------------|--------|-------------|--------|-------------|---------|-------------|--------|-------------|------|-------------|------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I |
| ns1688347 | 3898 | 188 | 7748 | 9152 | 149 | 67 | 2143 | 0.55 | 148 | 0.79 | 6035 | 0.78 | 7177 | 0.78 | 127 | 0.85 | 52 | 0.77 | 624 | |
| ns1758913 | 24 | 2499 | 175606 | 176583 | 1321 | 121 | 1 | 0.04 | 1459 | 0.58 | 104102 | 0.59 | 105036 | 0.59 | 1459 | <i>1.10</i> | 123 | 1.02 | 48 | \checkmark |
| ns1766074 | 992681 | 2365 | 236514 | 720000 | 7200 | 7200 | 1000176 | 1.01 | 2301 | 0.97 | 230129 | 0.97 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 729 | |
| ns1830653 | 9104 | 182 | 4765 | 8184 | 103 | 31 | 9846 | <i>1.08</i> | 178 | 0.98 | 4994 | <i>1.05</i> | 8515 | 1.04 | 135 | <i>1.32</i> | 27 | 0.88 | 1840 | \checkmark |
| opm2-z7-s2 | 3332 | 406 | 3614 | 7487 | 383 | < 1 | 2437 | 0.73 | 348 | 0.86 | 4288 | <i>1.19</i> | 8071 | <i>1.08</i> | 318 | 0.83 | < 1 | <i>1.11</i> | 215 | \checkmark |
| pg5_34 | 145643 | 1556 | 257 | 753 | 997 | < 1 | 190791 | <i>1.31</i> | 2926 | <i>1.88</i> | 399 | <i>1.55</i> | 492 | 0.65 | 1295 | <i>1.30</i> | < 1 | 1.00 | 111 | \checkmark |
| pigeon-10 | 15282073 | 5847 | 178 | 58632 | 825 | < 1 | 8278432 | 0.54 | 4000 | 0.68 | 25 | 0.14 | 40022 | 0.68 | < 1 | 0.00 | < 1 | 1.00 | 2126 | \checkmark |
| pw-myciel4 | 637908 | 6456 | 1814 | 231779 | 51 | 1 | 412894 | 0.65 | 3847 | 0.60 | 1393 | 0.77 | 91348 | 0.39 | 52 | 1.01 | 1 | 0.93 | 9471 | \checkmark |
| qiu | 10040 | 71 | 2198 | 4905 | 45 | < 1 | 11018 | <i>1.10</i> | 76 | <i>1.07</i> | 1898 | 0.86 | 5203 | <i>1.06</i> | 25 | 0.56 | < 1 | <i>1.08</i> | 23 | \checkmark |
| rail507 | 875 | 237 | 599 | 1085 | 148 | 3 | 936 | <i>1.07</i> | 247 | 1.04 | 604 | 1.01 | 1095 | 1.01 | 165 | <i>1.11</i> | 3 | 0.98 | 1 | |
| ran16x16 | 11379 | 85 | 145 | 422 | 59 | < 1 | 14450 | <i>1.27</i> | 88 | 1.03 | 119 | 0.82 | 396 | 0.94 | 51 | 0.87 | < 1 | 0.86 | 22 | |
| reblock67 | 55518 | 239 | 1449 | 1897 | 143 | < 1 | 54433 | 0.98 | 323 | <i>1.35</i> | 1303 | 0.90 | 1738 | 0.92 | 153 | <i>1.07</i> | < 1 | 1.00 | 3575 | |
| rmatr100-p10 | 800 | 186 | 823 | 2340 | 93 | < 1 | 807 | 1.01 | 187 | 1.01 | 837 | 1.02 | 2362 | 1.01 | 98 | <i>1.05</i> | < 1 | 0.99 | 40 | |
| rmatr100-p5 | 398 | 286 | 716 | 4551 | 32 | < 1 | 403 | 1.01 | 291 | 1.01 | 712 | 0.99 | 4603 | 1.01 | 32 | 0.99 | < 1 | 0.92 | 69 | |
| rmine6 | 88906 | 944 | 910 | 1104 | 649 | < 1 | 103842 | <i>1.17</i> | 1078 | <i>1.14</i> | 808 | 0.89 | 1022 | 0.93 | 702 | <i>1.08</i> | < 1 | 1.00 | 261 | |
| rocII-4-11 | 7514 | 2022 | 57922 | 91613 | 1795 | 141 | 10725 | <i>1.43</i> | 2112 | 1.04 | 50871 | 0.88 | 85683 | 0.94 | 1795 | 1.00 | 103 | 0.73 | 858 | \checkmark |
| rococoC10-001000 | 64603 | 1178 | 1242 | 6020 | 696 | < 1 | 73925 | <i>1.14</i> | 1437 | <i>1.22</i> | 1504 | <i>1.21</i> | 6694 | <i>1.11</i> | 723 | 1.04 | < 1 | 0.97 | 670 | \checkmark |
| roll3000 | 3357 | 69 | 597 | 703 | 59 | 4 | 3311 | 0.99 | 64 | 0.94 | 606 | 1.01 | 709 | 1.01 | 53 | 0.90 | 4 | <i>1.14</i> | 199 | |
| satellites1-25 | 1121 | 811 | 67687 | 76836 | 699 | 56 | 161 | 0.14 | 702 | 0.87 | 33850 | 0.50 | 60370 | 0.79 | 530 | 0.76 | 56 | 1.00 | 529 | \checkmark |
| sp98ic | 47572 | 7200 | 22132 | 30460 | 6050 | 1 | 55434 | <i>1.17</i> | 7200 | 1.00 | 19883 | 0.90 | 28943 | 0.95 | 4513 | 0.75 | 1 | 1.00 | 6444 | \checkmark |
| sp98ir | 4915 | 80 | 271 | 345 | 56 | 1 | 6741 | <i>1.37</i> | 101 | <i>1.27</i> | 295 | <i>1.09</i> | 385 | <i>1.12</i> | 68 | <i>1.21</i> | 1 | 0.96 | 308 | |
| tanglegram1 | 53 | 433 | 1378 | 26392 | 338 | < 1 | 47 | 0.90 | 397 | 0.92 | 1148 | 0.83 | 24341 | 0.92 | 301 | 0.89 | < 1 | <i>1.05</i> | < 1 | |
| tanglegram2 | 3 | 4 | 23 | 418 | 4 | < 1 | 3 | 1.00 | 4 | 1.00 | 23 | 1.00 | 419 | 1.00 | 4 | 1.00 | < 1 | 0.78 | 84 | |
| timtab1 | 58161 | 82 | 677 | 1478 | 57 | 3 | 51476 | 0.89 | 70 | 0.86 | 456 | 0.67 | 1242 | 0.84 | 47 | 0.82 | 2 | 0.72 | 248 | \checkmark |
| triptim1 | 180 | 1655 | 38918 | 38914 | 931 | 367 | 33 | 0.18 | 820 | 0.50 | 42019 | <i>1.08</i> | 42008 | <i>1.08</i> | 689 | 0.74 | 389 | <i>1.06</i> | 73 | |
| unitcal_7 | 274 | 399 | 12613 | 12627 | 345 | 126 | 46 | 0.17 | 295 | 0.74 | 10562 | 0.84 | 10577 | 0.84 | 291 | 0.84 | 105 | 0.83 | 9144 | \checkmark |
| vpphard | 10716 | 7200 | 474562 | 719616 | 4700 | 581 | 5296 | 0.49 | 7200 | 1.00 | 556158 | <i>1.17</i> | 720001 | 1.00 | 4617 | 0.98 | 624 | <i>1.07</i> | 1109 | |
| zib54-UUE | 59368 | 1798 | 2188 | 19591 | 169 | < 1 | 55417 | 0.93 | 1791 | 1.00 | 2445 | <i>1.12</i> | 17378 | 0.89 | 160 | 0.95 | < 1 | 0.92 | 237 | \checkmark |
| geom. | 5839.92 | 481.29 | – | 9009.52 | 244.59 | 1.49 | 5044.32 | 0.86 | 467.26 | 0.97 | – | – | 8470.17 | 0.94 | 196.38 | 0.80 | 1.36 | 0.92 | – | |

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Table 4: Detailed computational results on MIPLIB2010 benchmark set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | \mathbf{C} | \mathbf{I} | | |
|----------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|--------------|--------------|------------------|--|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | | | \mathbf{TtF}_Q | |
| shgeom. | 8276.15 | 496.35 | 2884.47 | 9258.53 | 260.33 | 7.23 | 8082.45 | 0.98 | 482.02 | 0.97 | 2623.77 | 0.91 | 8747.80 | 0.94 | 225.28 | 0.87 | 6.84 | 0.95 | 270.43 | | |

Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|-----------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|-------|--------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | | |
| 30n20b8 | 1133 | 443 | 19130 | 30492 | 400 | 103 | 1721 | <i>1.52</i> | 359 | 0.81 | 16077 | 0.84 | 25307 | 0.83 | 315 | 0.79 | 83 | 0.80 | 106 | \checkmark | | |
| 50v-10 | 698652 | 7200 | 3020 | 3515 | 3204 | < 1 | 676713 | 0.97 | 7200 | 1.00 | 2559 | 0.85 | 2815 | 0.80 | 3744 | <i>1.17</i> | < 1 | <i>1.17</i> | 283 | | | |
| alc1s1 | 192312 | 7200 | 4920 | 32659 | 4101 | < 1 | 172966 | 0.90 | 7200 | 1.00 | 4726 | 0.96 | 32875 | 1.01 | 3893 | 0.95 | < 1 | 0.97 | 187 | \checkmark | | |
| acc-tight4 | 657 | 333 | 33311 | 33289 | 333 | 333 | 464 | 0.71 | 307 | 0.92 | 30755 | 0.92 | 30739 | 0.92 | 307 | 0.92 | 307 | 0.92 | 588 | \checkmark | | |
| acc-tight5 | 421 | 94 | 9448 | 9449 | 94 | 85 | 356 | 0.84 | 90 | 0.95 | 8967 | 0.95 | 8981 | 0.95 | 90 | 0.95 | 90 | <i>1.05</i> | 144 | | | |
| acc-tight6 | 447 | 89 | 8937 | 8930 | 89 | 89 | 182 | 0.41 | 59 | 0.66 | 5884 | 0.66 | 5878 | 0.66 | 59 | 0.66 | 59 | 0.66 | 113 | | | |
| aflow40b | 18333 | 712 | 3835 | 5934 | 462 | < 1 | 23098 | <i>1.26</i> | 659 | 0.93 | 3008 | 0.78 | 4928 | 0.83 | 442 | 0.96 | < 1 | 1.04 | 457 | \checkmark | | |
| air04 | 112 | 47 | 753 | 782 | 45 | 7 | 84 | 0.75 | 49 | 1.03 | 766 | 1.02 | 795 | 1.02 | 47 | 1.03 | 7 | 1.01 | 33 | | | |
| app1-2 | 79 | 764 | 32647 | 50714 | 666 | 157 | 34 | 0.43 | 707 | 0.93 | 31071 | 0.95 | 47359 | 0.93 | 526 | 0.79 | 151 | 0.97 | 99 | | | |
| ash608gpia-3col | 14 | 40 | 3951 | 720000 | 7200 | 7200 | 1 | 0.07 | 30 | 0.76 | 3003 | 0.76 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 37 | | | |
| atlanta-ip | 12096 | 7200 | 63299 | 96097 | 5121 | 388 | 13128 | <i>1.09</i> | 7200 | 1.00 | 48837 | 0.77 | 76526 | 0.80 | 3853 | 0.75 | 239 | 0.62 | 1099 | | | |
| atm20-100 | 142947 | 7200 | 720001 | 720001 | 7200 | 7200 | 155103 | <i>1.09</i> | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 154 | | | |
| b2c1s1 | 26212 | 7200 | 73318 | 177576 | 5834 | < 1 | 22778 | 0.87 | 7200 | 1.00 | 62174 | 0.85 | 165229 | 0.93 | 6818 | <i>1.17</i> | < 1 | 1.04 | 332 | | | |
| bab1 | 165129 | 7200 | 11292 | 31975 | 5156 | 89 | 196638 | <i>1.19</i> | 7200 | 1.00 | 9081 | 0.80 | 27515 | 0.86 | 4984 | 0.97 | 70 | 0.79 | 1403 | | | |
| bab3 | 31 | 7200 | 720003 | 720003 | 7200 | 7200 | 30 | 0.97 | 7200 | 1.00 | 720003 | 1.00 | 720003 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 223 | | | |
| bab5 | 65097 | 7200 | 16291 | 22852 | 4101 | 148 | 76156 | <i>1.17</i> | 7200 | 1.00 | 15750 | 0.97 | 21884 | 0.96 | 5277 | <i>1.29</i> | 145 | 0.98 | 1545 | | | |
| beasleyC3 | 524 | 59 | 411 | 493 | 58 | < 1 | 515 | 0.98 | 56 | 0.96 | 400 | 0.97 | 487 | 0.99 | 54 | 0.93 | < 1 | <i>1.20</i> | 300 | | | |
| berlin_5_8_0 | 1229934 | 7200 | 261 | 5890 | 87 | < 1 | 1226329 | 1.00 | 7200 | 1.00 | 223 | 0.85 | 22489 | <i>3.82</i> | 75 | 0.87 | < 1 | <i>1.05</i> | 89460 | \checkmark | | |
| bg512142 | 825872 | 7200 | 39718 | 32413 | 5939 | < 1 | 884617 | <i>1.07</i> | 7200 | 1.00 | 46481 | <i>1.17</i> | 45164 | <i>1.39</i> | 5335 | 0.90 | < 1 | 0.88 | 2625 | \checkmark | | |
| biella1 | 7962 | 1262 | 4391 | 4502 | 1234 | 1 | 6312 | 0.79 | 1166 | 0.92 | 4290 | 0.98 | 4398 | 0.98 | 1130 | 0.92 | 1 | 1.04 | 765 | | | |
| bienst2 | 69421 | 637 | 1005 | 10700 | 259 | < 1 | 59356 | 0.86 | 511 | 0.80 | 453 | 0.45 | 9178 | 0.86 | 157 | 0.61 | < 1 | <i>1.29</i> | 257 | \checkmark | | |
| binkar10_1 | 2505 | 32 | 39 | 48 | 17 | < 1 | 3200 | <i>1.28</i> | 42 | <i>1.31</i> | 29 | 0.74 | 42 | 0.88 | 16 | 0.93 | < 1 | 0.80 | 3012 | \checkmark | | |
| bley_x11 | 17 | 206 | 18289 | 18358 | 206 | 175 | 1 | 0.07 | 206 | 1.00 | 18743 | 1.02 | 18792 | 1.02 | 206 | 1.00 | 181 | 1.04 | 40 | \checkmark | | |
| blp-ar98 | 215993 | 7200 | 720001 | 18573 | 5497 | 87 | 218336 | 1.01 | 7200 | 1.00 | 720000 | 1.00 | 18015 | 0.97 | 6291 | <i>1.14</i> | 82 | 0.94 | 7370 | \checkmark | | |
| blp-ic97 | 355766 | 7200 | 10248 | 18603 | 5897 | 2 | 348635 | 0.98 | 7200 | 1.00 | 11205 | <i>1.09</i> | 19821 | <i>1.07</i> | 5778 | 0.98 | 2 | <i>1.05</i> | 2388 | \checkmark | | |
| bnatt350 | 7359 | 852 | 85217 | 85212 | 852 | 852 | 5971 | 0.81 | 708 | 0.83 | 70850 | 0.83 | 70823 | 0.83 | 708 | 0.83 | 708 | 0.83 | 1564 | | | |
| bnatt400 | 6506 | 1223 | 93833 | 122254 | 938 | 938 | 6941 | <i>1.07</i> | 1171 | 0.96 | 94633 | 1.01 | 117052 | 0.96 | 946 | 1.01 | 946 | 1.01 | 2060 | | | |
| buildingenergy | 73 | 7200 | 41216 | 76362 | 2204 | 5 | 73 | 1.01 | 7200 | 1.00 | 41036 | 1.00 | 75792 | 0.99 | 2199 | 1.00 | 5 | 1.01 | 470 | | | |
| circ10-3 | 1049 | 7200 | 720000 | 720000 | 7200 | 7200 | 948 | 0.90 | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 640 | | | |

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Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | | \mathbf{I} |
|---------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | | |
| co-100 | 23763 | 7200 | 89325 | 321766 | 6399 | 16 | 46979 | <i>1.98</i> | 7200 | 1.00 | 70275 | 0.79 | 180388 | 0.56 | 5527 | 0.86 | 18 | <i>1.06</i> | 19865 | \checkmark | |
| core2536-691 | 319 | 361 | 656 | 1119 | 361 | 1 | 354 | <i>1.11</i> | 370 | 1.03 | 696 | <i>1.06</i> | 1160 | 1.04 | 370 | 1.03 | 1 | 1.01 | 0 | | |
| core4872-1529 | 829 | 7200 | 27315 | 38659 | 5553 | 42 | 791 | 0.95 | 7200 | 1.00 | 28769 | <i>1.05</i> | 40067 | 1.04 | 5551 | 1.00 | 42 | 1.01 | 45 | | |
| cov1075 | 2229092 | 5233 | 155 | 42458 | 104 | < 1 | 2134407 | 0.96 | 4881 | 0.93 | 110 | 0.71 | 39423 | 0.93 | 68 | 0.65 | < 1 | 1.00 | 1203 | | |
| csched007 | 323204 | 4706 | 470592 | 36170 | 1839 | 82 | 221186 | 0.68 | 3390 | 0.72 | 339041 | 0.72 | 24865 | 0.69 | 1305 | 0.71 | 60 | 0.73 | 830 | | |
| csched008 | 246241 | 2749 | 274937 | 13039 | 2137 | 84 | 226694 | 0.92 | 2364 | 0.86 | 236449 | 0.86 | 7157 | 0.55 | 1653 | 0.77 | 30 | 0.35 | 9434 | | |
| csched010 | 211937 | 3923 | 8121 | 26258 | 844 | 50 | 225756 | <i>1.07</i> | 4284 | <i>1.09</i> | 8189 | 1.01 | 29820 | <i>1.14</i> | 943 | <i>1.12</i> | 45 | 0.90 | 922 | | |
| d10200 | 760704 | 7200 | 1325 | 1501 | 3991 | < 1 | 835075 | <i>1.10</i> | 7200 | 1.00 | 1268 | 0.96 | 1444 | 0.96 | 4601 | <i>1.15</i> | < 1 | 1.03 | 4810 | | |
| d20200 | 98799 | 7200 | 2910 | 7109 | 773 | 1 | 105436 | <i>1.07</i> | 7200 | 1.00 | 3498 | <i>1.20</i> | 7696 | <i>1.08</i> | 602 | 0.78 | 1 | 1.01 | 1461 | | |
| dano3mip | 1190 | 7200 | 63114 | 169654 | 3839 | 1 | 1204 | 1.01 | 7200 | 1.00 | 65017 | <i>1.03</i> | 171273 | 1.01 | 2985 | 0.78 | 1 | 1.00 | 28 | | |
| danoint | 1177174 | 4398 | 986 | 12905 | 226 | 7 | 1155238 | 0.98 | 4281 | 0.97 | 1432 | <i>1.45</i> | 13887 | <i>1.08</i> | 834 | <i>3.69</i> | 7 | 0.93 | 1012 | | |
| datt256 | 1 | 7200 | 720035 | 720035 | 7200 | 7200 | 1 | 1.00 | 7200 | 1.00 | 720058 | 1.00 | 720058 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | | |
| dc1c | 9517 | 7200 | 28198 | 31056 | 5630 | 7 | 7243 | 0.76 | 7200 | 1.00 | 30260 | <i>1.07</i> | 33082 | <i>1.07</i> | 4350 | 0.77 | 7 | 1.00 | 2479 | | |
| dc1l | 1328 | 7200 | 50840 | 59971 | 5470 | 1 | 1268 | 0.95 | 7200 | 1.00 | 56238 | <i>1.11</i> | 65279 | <i>1.09</i> | 4022 | 0.74 | 1 | 1.01 | 1080 | | |
| dfn-gwin-UUM | 21127 | 107 | 466 | 960 | 25 | < 1 | 27429 | <i>1.30</i> | 125 | <i>1.16</i> | 317 | 0.68 | 878 | 0.91 | 28 | <i>1.13</i> | < 1 | <i>1.07</i> | 2338 | \checkmark | |
| dg012142 | 331307 | 7200 | 207925 | 462952 | 5262 | < 1 | 347504 | <i>1.05</i> | 7200 | 1.00 | 182325 | 0.88 | 446877 | 0.97 | 5135 | 0.98 | < 1 | 0.96 | 1454 | | |
| dolom1 | 1557 | 7200 | 593047 | 648750 | 3220 | 1 | 1412 | 0.91 | 7200 | 1.00 | 621258 | <i>1.05</i> | 664584 | 1.02 | 2483 | 0.77 | 1 | 0.99 | 1964 | | |
| ds-big | 2 | 7200 | 606433 | 713475 | 1801 | 26 | 2 | 0.92 | 7200 | 1.00 | 606532 | 1.00 | 714618 | 1.00 | 1824 | 1.01 | 25 | 0.96 | 0 | | |
| eil33-2 | 718 | 84 | 585 | 1415 | 75 | < 1 | 718 | 1.00 | 84 | 1.00 | 584 | 1.00 | 1415 | 1.00 | 75 | 1.00 | < 1 | 0.97 | 0 | | |
| eilA101-2 | 5915 | 7200 | 132060 | 186031 | 6134 | 7 | 5217 | 0.88 | 7200 | 1.00 | 136117 | 1.03 | 190941 | 1.03 | 4253 | 0.69 | 8 | <i>1.24</i> | 2 | | |
| eilB101 | 32681 | 509 | 1838 | 4968 | 408 | < 1 | 22455 | 0.69 | 385 | 0.76 | 1241 | 0.68 | 3690 | 0.74 | 278 | 0.68 | < 1 | 1.02 | 9 | | |
| enlight13 | 1 | 1 | 0 | 2 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | 1 | 0.64 | < 1 | 0.73 | < 1 | 0.73 | 0 | | |
| enlight14 | 1 | 1 | 2 | 720000 | 7200 | 7200 | 1 | 1.00 | 1 | 1.00 | 2 | 0.83 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | | |
| enlight15 | 1 | 1 | 0 | 2 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | 2 | 0.91 | < 1 | 0.91 | < 1 | 0.91 | 0 | | |
| enlight16 | 1 | 1 | 2 | 720000 | 7200 | 7200 | 1 | 1.00 | 1 | 1.00 | 2 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | | |
| enlight9 | 1 | 1 | < 1 | 720000 | 7200 | 7200 | 1 | 1.00 | 1 | 1.00 | 1 | <i>1.50</i> | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | | |
| ex10 | 1 | 625 | 62551 | 62542 | 625 | 625 | 1 | 1.00 | 581 | 0.93 | 58073 | 0.93 | 58064 | 0.93 | 581 | 0.93 | 581 | 0.93 | 0 | | |
| ex1010-pi | 3061 | 7200 | 30447 | 79628 | 1760 | < 1 | 4112 | <i>1.34</i> | 7200 | 1.00 | 28283 | 0.93 | 77476 | 0.97 | 3042 | <i>1.73</i> | < 1 | 1.04 | 106 | | |
| ex9 | 1 | 35 | 3457 | 3457 | 35 | 35 | 1 | 1.00 | 35 | 1.00 | 3475 | 1.01 | 3474 | 1.00 | 35 | 1.00 | 35 | 1.00 | 0 | | |
| f2000 | 550 | 7200 | 720001 | 720001 | 7200 | 7200 | 477 | 0.87 | 7200 | 1.00 | 720039 | 1.00 | 720039 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 335 | | |

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Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|---------|------|--------|--------|------|------|------------|--------------|------|-------------|--------|-------------|--------|-------------|------|-------------|------|-------------|--------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I |
| g200x740i | 164274 | 7200 | 56002 | 98860 | 4756 | < 1 | 220387 | <i>1.34</i> | 7200 | 1.00 | 38173 | 0.68 | 81550 | 0.82 | 5344 | <i>1.12</i> | < 1 | 0.72 | 4650 | |
| germanrr | 2329 | 7200 | 50605 | 58179 | 3747 | 435 | 2882 | <i>1.24</i> | 7200 | 1.00 | 54978 | <i>1.09</i> | 62585 | <i>1.08</i> | 3746 | 1.00 | 474 | <i>1.09</i> | 299 | |
| germany50-DBM | 36430 | 7200 | 11470 | 32964 | 3766 | 1 | 33063 | 0.91 | 7200 | 1.00 | 12100 | <i>1.05</i> | 33704 | 1.02 | 4531 | <i>1.20</i> | 1 | 1.03 | 2293 | |
| glass4 | 1400467 | 4558 | 109756 | 129350 | 4427 | < 1 | 1319902 | 0.94 | 4971 | <i>1.09</i> | 116911 | <i>1.07</i> | 138200 | <i>1.07</i> | 4847 | <i>1.09</i> | < 1 | <i>1.06</i> | 22999 | \checkmark |
| gmu-35-40 | 2194641 | 7200 | 200 | 249 | 2266 | < 1 | 2845684 | <i>1.30</i> | 7200 | 1.00 | 190 | 0.95 | 247 | 0.99 | 2792 | <i>1.23</i> | < 1 | 1.00 | 2193 | |
| gmu-35-50 | 1002146 | 7200 | 720017 | 445 | 2561 | < 1 | 1078543 | <i>1.08</i> | 7200 | 1.00 | 720004 | 1.00 | 479 | <i>1.08</i> | 3510 | <i>1.37</i> | < 1 | 1.00 | 2330 | \checkmark |
| gmut-75-50 | 128810 | 7200 | 4341 | 4893 | 1397 | < 1 | 126774 | 0.98 | 7200 | 1.00 | 4927 | <i>1.13</i> | 5509 | <i>1.13</i> | 1772 | <i>1.27</i> | < 1 | 0.95 | 21 | |
| gmut-77-40 | 231220 | 7200 | 3114 | 3311 | 968 | < 1 | 217323 | 0.94 | 7200 | 1.00 | 2916 | 0.94 | 3114 | 0.94 | 2094 | <i>2.16</i> | < 1 | 1.00 | 57 | |
| go19 | 1113664 | 7200 | 674 | 39570 | 327 | < 1 | 886386 | 0.80 | 7200 | 1.00 | 572 | 0.85 | 39705 | 1.00 | 211 | 0.64 | < 1 | 1.00 | 1247 | |
| hanoi5 | 31054 | 7200 | 720001 | 720001 | 7200 | 7200 | 32392 | 1.04 | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 4652 | |
| ic97_potential | 4257119 | 7200 | 549 | 8861 | 1657 | < 1 | 5392772 | <i>1.27</i> | 7200 | 1.00 | 454 | 0.83 | 5953 | 0.67 | 2716 | <i>1.64</i> | < 1 | 0.70 | 16912 | \checkmark |
| iis-100-0-cov | 100588 | 717 | 199 | 11399 | 19 | < 1 | 99583 | 0.99 | 765 | <i>1.07</i> | 217 | <i>1.09</i> | 12224 | <i>1.07</i> | 19 | 1.02 | < 1 | 1.00 | 794 | |
| iis-bupa-cov | 175247 | 2496 | 503 | 24896 | 82 | < 1 | 178672 | 1.02 | 2528 | 1.01 | 543 | <i>1.08</i> | 25265 | 1.01 | 97 | <i>1.18</i> | < 1 | 1.00 | 288 | |
| iis-pima-cov | 8692 | 418 | 644 | 4809 | 132 | < 1 | 7914 | 0.91 | 402 | 0.96 | 578 | 0.90 | 4674 | 0.97 | 110 | 0.83 | < 1 | <i>1.14</i> | 13 | |
| in | 1 | 7200 | 568412 | 712139 | 78 | 77 | 1 | 1.00 | 7200 | 1.00 | 568247 | 1.00 | 712129 | 1.00 | 70 | 0.90 | 69 | 0.90 | 0 | |
| ivu06-big | 1 | 7200 | 29189 | 720054 | 278 | 246 | 1 | 1.00 | 7200 | 1.00 | 29782 | 1.02 | 720053 | 1.00 | 284 | 1.02 | 251 | 1.02 | 0 | |
| ivu52 | 1 | 7200 | 572205 | 720000 | 346 | 22 | 1 | 1.00 | 7200 | 1.00 | 575845 | 1.01 | 720001 | 1.00 | 539 | <i>1.56</i> | 38 | <i>1.71</i> | 0 | |
| janos-us-DDM | 1813133 | 7200 | 254 | 356 | 5582 | < 1 | 1778148 | 0.98 | 6706 | 0.93 | 254 | 1.00 | 168 | 0.47 | 4955 | 0.89 | < 1 | 0.97 | 10594 | \checkmark |
| kl6x240 | 751754 | 1352 | 135155 | 5674 | 178 | < 1 | 675120 | 0.90 | 1396 | 1.03 | 139570 | 1.03 | 6049 | <i>1.07</i> | 151 | 0.85 | < 1 | 1.00 | 310 | |
| lectsched-1 | 17397 | 218 | 21800 | 21799 | 218 | 218 | 1789 | 0.10 | 146 | 0.67 | 14568 | 0.67 | 14564 | 0.67 | 146 | 0.67 | 146 | 0.67 | 89 | |
| lectsched-1-obj | 102069 | 7200 | 301234 | 493507 | 3592 | 1747 | 195283 | <i>1.91</i> | 7200 | 1.00 | 247325 | 0.82 | 480373 | 0.97 | 4574 | <i>1.27</i> | 1502 | 0.86 | 6650 | \checkmark |
| lectsched-2 | 224 | 37 | 3652 | 3650 | 36 | 36 | 307 | <i>1.37</i> | 44 | <i>1.19</i> | 4354 | <i>1.19</i> | 4353 | <i>1.19</i> | 44 | <i>1.19</i> | 44 | <i>1.19</i> | 30 | |
| lectsched-3 | 1117 | 150 | 15038 | 15023 | 150 | 150 | 16420 | <i>14.70</i> | 208 | <i>1.38</i> | 20805 | <i>1.38</i> | 20803 | <i>1.38</i> | 208 | <i>1.38</i> | 208 | <i>1.38</i> | 64 | \checkmark |
| lectsched-4-obj | 777 | 24 | 1960 | 1963 | 24 | 8 | 625 | 0.80 | 18 | 0.72 | 1316 | 0.67 | 1315 | 0.67 | 18 | 0.72 | 3 | 0.40 | 61 | \checkmark |
| leo1 | 81384 | 7200 | 28527 | 53482 | 4138 | < 1 | 66433 | 0.82 | 7200 | 1.00 | 23591 | 0.83 | 49235 | 0.92 | 5153 | <i>1.25</i> | < 1 | 0.97 | 103 | |
| leo2 | 93537 | 7200 | 79009 | 720000 | 3276 | 1 | 92595 | 0.99 | 7200 | 1.00 | 77495 | 0.98 | 720001 | 1.00 | 4430 | <i>1.35</i> | 1 | 0.97 | 1820 | |
| liu | 999658 | 7200 | 58684 | 392849 | 5588 | < 1 | 801000 | 0.80 | 7200 | 1.00 | 53488 | 0.91 | 390277 | 0.99 | 4246 | 0.76 | < 1 | <i>1.35</i> | 1069 | \checkmark |
| lotsize | 13137 | 7200 | 52283 | 58956 | 5395 | 298 | 17906 | <i>1.36</i> | 7200 | 1.00 | 63792 | <i>1.22</i> | 69505 | <i>1.18</i> | 6079 | <i>1.13</i> | 379 | <i>1.27</i> | 183 | |
| lrsa120 | 482080 | 7200 | 720001 | 720001 | 7200 | 7200 | 490809 | 1.02 | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 339288 | |
| m100n500k4r1 | 4915772 | 7200 | 28974 | 28982 | 36 | < 1 | 4818432 | 0.98 | 7200 | 1.00 | 28971 | 1.00 | 28979 | 1.00 | 35 | 0.98 | < 1 | 1.00 | 23 | |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | \mathbf{I} |
| macrophage | 558206 | 6631 | 2168 | 49564 | 2150 | < 1 | 382837 | 0.69 | 6367 | 0.96 | 1640 | 0.76 | 45134 | 0.91 | 1328 | 0.62 | < 1 | 1.00 | 910 | |
| map06 | 776 | 944 | 94439 | 30919 | 500 | 2 | 771 | 0.99 | 888 | 0.94 | 88814 | 0.94 | 28399 | 0.92 | 551 | <i>1.10</i> | 2 | 0.99 | 12 | |
| map10 | 1269 | 1006 | 100607 | 21500 | 843 | 2 | 1475 | <i>1.16</i> | 1020 | 1.01 | 101997 | 1.01 | 21129 | 0.98 | 864 | 1.02 | 2 | 0.98 | 19 | |
| map14 | 851 | 728 | 72817 | 10253 | 495 | 2 | 817 | 0.96 | 764 | <i>1.05</i> | 76433 | <i>1.05</i> | 10597 | 1.03 | 545 | <i>1.10</i> | 2 | 0.99 | 18 | |
| map18 | 262 | 306 | 1785 | 3522 | 55 | 2 | 281 | <i>1.08</i> | 280 | 0.91 | 1740 | 0.97 | 3374 | 0.96 | 75 | <i>1.37</i> | 2 | 1.00 | 14 | |
| map20 | 258 | 275 | 1080 | 2390 | 81 | 2 | 246 | 0.95 | 262 | 0.95 | 1085 | 1.00 | 2374 | 0.99 | 55 | 0.68 | 2 | 1.01 | 8 | |
| markshare_5_0 | 67148485 | 7200 | 302974 | 720000 | 3387 | < 1 | 79823973 | <i>1.19</i> | 7200 | 1.00 | 313487 | 1.03 | 720000 | 1.00 | 3670 | <i>1.08</i> | < 1 | 1.00 | 86924 | |
| maxgasflow | 888534 | 7200 | 7752 | 37311 | 4989 | 1 | 1053385 | <i>1.19</i> | 7200 | 1.00 | 8548 | <i>1.10</i> | 43704 | <i>1.17</i> | 5065 | 1.02 | 1 | 0.73 | 7552 | |
| mc11 | 19621 | 761 | 76112 | 1497 | 458 | < 1 | 19265 | 0.98 | 847 | <i>1.11</i> | 84712 | <i>1.11</i> | 1596 | <i>1.07</i> | 528 | <i>1.15</i> | < 1 | 0.96 | 620 | |
| mcsched | 16226 | 356 | 151 | 2203 | 228 | < 1 | 16328 | 1.01 | 286 | 0.80 | 140 | 0.93 | 1750 | 0.79 | 161 | 0.70 | < 1 | 1.04 | 21 | \checkmark |
| methanosarcina | 24748 | 7200 | 22307 | 414913 | 5924 | < 1 | 16874 | 0.68 | 7200 | 1.00 | 22177 | 0.99 | 422198 | 1.02 | 5542 | 0.94 | < 1 | <i>1.25</i> | 747 | |
| mik-250-1-100-1 | 28660 | 87 | 37 | 188 | 1 | < 1 | 32272 | <i>1.13</i> | 96 | <i>1.10</i> | 34 | 0.92 | 202 | <i>1.08</i> | 1 | 0.99 | < 1 | 1.00 | 51 | |
| mine-166-5 | 2037 | 62 | 3067 | 3326 | 61 | < 1 | 2974 | <i>1.46</i> | 61 | 0.99 | 3045 | 0.99 | 3311 | 1.00 | 60 | 0.98 | < 1 | <i>1.33</i> | 435 | |
| mine-90-10 | 38761 | 365 | 2470 | 2690 | 307 | < 1 | 54451 | <i>1.40</i> | 587 | <i>1.61</i> | 3263 | <i>1.32</i> | 3567 | <i>1.33</i> | 496 | <i>1.62</i> | < 1 | 1.00 | 2806 | |
| mining | 1 | 7200 | 720006 | 720006 | 165 | 134 | 1 | 1.00 | 7200 | 1.00 | 720006 | 1.00 | 720006 | 1.00 | 158 | 0.95 | 129 | 0.96 | 0 | |
| mkc | 689644 | 7200 | 2596 | 3781 | 2352 | < 1 | 690327 | 1.00 | 7200 | 1.00 | 3250 | <i>1.25</i> | 4491 | <i>1.19</i> | 4244 | <i>1.80</i> | < 1 | 1.00 | 373 | |
| momentum1 | 136132 | 7200 | 53411 | 98553 | 4333 | 6 | 134785 | 0.99 | 7200 | 1.00 | 52621 | 0.99 | 92641 | 0.94 | 5780 | <i>1.33</i> | 6 | 0.99 | 1217 | |
| momentum3 | 390 | 7200 | 326157 | 562398 | 5612 | 206 | 330 | 0.84 | 7200 | 1.00 | 336598 | 1.03 | 566593 | 1.01 | 4459 | 0.79 | 225 | <i>1.09</i> | 252 | |
| msc98-ip | 7657 | 7200 | 79841 | 84199 | 5535 | 216 | 14749 | <i>1.93</i> | 6536 | 0.91 | 93202 | <i>1.17</i> | 96622 | <i>1.15</i> | 5048 | 0.91 | 531 | <i>2.46</i> | 1082 | |
| mspp16 | 54 | 2272 | 72169 | 81463 | 1444 | 721 | 85 | <i>1.57</i> | 2465 | <i>1.09</i> | 73235 | 1.01 | 83073 | 1.02 | 1730 | <i>1.20</i> | 731 | 1.01 | 5 | |
| mzzv11 | 2138 | 366 | 11483 | 11647 | 294 | < 1 | 3350 | <i>1.57</i> | 525 | <i>1.44</i> | 12409 | <i>1.08</i> | 12670 | <i>1.09</i> | 417 | <i>1.42</i> | < 1 | 0.94 | 60 | \checkmark |
| n15-3 | 9 | 7200 | 285690 | 407873 | 5412 | 127 | 1 | 0.11 | 7200 | 1.00 | 327723 | <i>1.15</i> | 433269 | <i>1.06</i> | 2012 | 0.37 | 100 | 0.79 | 2 | \checkmark |
| n3-3 | 10674 | 7200 | 28482 | 105067 | 5801 | 1 | 6714 | 0.63 | 7200 | 1.00 | 31683 | <i>1.11</i> | 109017 | 1.04 | 4406 | 0.76 | 1 | <i>1.23</i> | 150 | \checkmark |
| n3700 | 5805 | 7200 | 45622 | 158011 | 4513 | < 1 | 3914 | 0.67 | 7200 | 1.00 | 44770 | 0.98 | 157253 | 1.00 | 5464 | <i>1.21</i> | < 1 | 1.02 | 25 | |
| n3705 | 6559 | 7200 | 49886 | 162010 | 5689 | < 1 | 5641 | 0.86 | 7200 | 1.00 | 53573 | <i>1.07</i> | 164799 | 1.02 | 3860 | 0.68 | < 1 | <i>1.13</i> | 19 | |
| n370a | 4691 | 7200 | 45749 | 154562 | 5935 | < 1 | 4113 | 0.88 | 7200 | 1.00 | 46540 | 1.02 | 155066 | 1.00 | 5262 | 0.89 | < 1 | 0.89 | 42 | |
| n3div36 | 212580 | 7200 | 6230 | 31991 | 748 | 1 | 205746 | 0.97 | 7200 | 1.00 | 6659 | <i>1.07</i> | 32529 | 1.02 | 2320 | <i>3.10</i> | 1 | 1.03 | 593 | |
| n3seq24 | 798 | 7200 | 281752 | 284494 | 5738 | 18 | 756 | 0.95 | 7200 | 1.00 | 292996 | 1.04 | 295759 | 1.04 | 5922 | 1.03 | 19 | <i>1.08</i> | 4357 | |
| n4-3 | 2965 | 189 | 1008 | 2019 | 108 | < 1 | 3401 | <i>1.15</i> | 205 | <i>1.09</i> | 1085 | <i>1.08</i> | 2344 | <i>1.16</i> | 109 | 1.02 | < 1 | 0.98 | 1610 | \checkmark |
| n9-3 | 21333 | 7200 | 12339 | 61187 | 4096 | < 1 | 22017 | 1.03 | 7200 | 1.00 | 13268 | <i>1.08</i> | 62621 | 1.02 | 5345 | <i>1.30</i> | < 1 | 0.97 | 1067 | |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | C | I |
|--------------|----------|------|--------|--------|------|------|------------|-------------|------|-------------|--------|-------------|--------|-------------|------|--------------|------|-------------|--------|--------------|---|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | | | |
| nag | 52436 | 7200 | 237509 | 588866 | 5453 | 223 | 62161 | <i>1.19</i> | 7200 | 1.00 | 216375 | 0.91 | 584059 | 0.99 | 5417 | 0.99 | 158 | 0.71 | 3057 | \checkmark | |
| neos-1109824 | 6851 | 101 | 615 | 1082 | 19 | 5 | 5825 | 0.85 | 79 | 0.78 | 333 | 0.54 | 668 | 0.62 | 13 | 0.71 | 2 | 0.32 | 252 | \checkmark | |
| neos-1171692 | 665 | 576 | 529 | 538 | 576 | < 1 | 203 | 0.30 | 138 | 0.24 | 387 | 0.73 | 398 | 0.74 | 138 | 0.24 | < 1 | 0.86 | 4 | | |
| neos-1171737 | 4349 | 7200 | 10262 | 10269 | 1713 | < 1 | 4005 | 0.92 | 7200 | 1.00 | 11432 | <i>1.11</i> | 11437 | <i>1.11</i> | 774 | 0.45 | < 1 | 0.88 | 1 | | |
| neos-1224597 | 1 | 1 | 121 | 123 | 1 | 1 | 1 | 1.00 | 2 | <i>1.59</i> | 147 | <i>1.21</i> | 145 | <i>1.19</i> | 2 | <i>1.59</i> | 1 | <i>1.08</i> | 5 | | |
| neos-1311124 | 15287825 | 7200 | 20 | 3976 | 2926 | < 1 | 15720083 | 1.03 | 7200 | 1.00 | 20 | 0.98 | 3976 | 1.00 | 406 | 0.14 | < 1 | 1.00 | 1944 | | |
| neos-1337307 | 547670 | 7200 | 8981 | 9618 | 1068 | 90 | 562102 | 1.03 | 7200 | 1.00 | 8220 | 0.92 | 8704 | 0.90 | 222 | 0.21 | 82 | 0.91 | 2853 | | |
| neos-1396125 | 40507 | 349 | 3562 | 9858 | 164 | 29 | 49225 | <i>1.22</i> | 360 | 1.03 | 2451 | 0.69 | 8666 | 0.88 | 177 | <i>1.08</i> | 24 | 0.81 | 309 | \checkmark | |
| neos-1426635 | 7800036 | 7200 | 16 | 8107 | 3028 | < 1 | 8479862 | <i>1.09</i> | 7200 | 1.00 | 15 | 0.95 | 8107 | 1.00 | 1270 | 0.42 | < 1 | 1.00 | 158694 | | |
| neos-1426662 | 1971233 | 7200 | 67 | 76481 | 2826 | < 1 | 1772642 | 0.90 | 7200 | 1.00 | 68 | 1.00 | 75661 | 0.99 | 1318 | 0.47 | < 1 | 1.00 | 8312 | | |
| neos-1429212 | 1843 | 7200 | 720001 | 720001 | 7200 | 7200 | 3235 | <i>1.76</i> | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 493 | | |
| neos-1436709 | 2903018 | 7200 | 19 | 5600 | 137 | < 1 | 2877043 | 0.99 | 7200 | 1.00 | 21 | <i>1.06</i> | 5601 | 1.00 | 2200 | <i>16.02</i> | < 1 | 1.00 | 34354 | | |
| neos-1440225 | 3734 | 82 | 8218 | 8226 | 82 | 82 | 4476 | <i>1.20</i> | 105 | <i>1.27</i> | 10453 | <i>1.27</i> | 10456 | <i>1.27</i> | 105 | <i>1.27</i> | 105 | <i>1.27</i> | 66 | | |
| neos-1440460 | 6006292 | 7200 | 21 | 3020 | 2121 | < 1 | 5974018 | 0.99 | 7200 | 1.00 | 20 | 0.98 | 3019 | 1.00 | 737 | 0.35 | < 1 | 1.00 | 26334 | \checkmark | |
| neos-1442119 | 2189513 | 7200 | 18 | 3974 | 307 | < 1 | 2297826 | <i>1.05</i> | 7200 | 1.00 | 20 | <i>1.14</i> | 3975 | 1.00 | 1505 | <i>4.89</i> | < 1 | 1.00 | 20642 | | |
| neos-1442657 | 2858252 | 7200 | 21 | 6944 | 96 | < 1 | 2700168 | 0.94 | 7200 | 1.00 | 21 | 0.98 | 6942 | 1.00 | 947 | <i>9.91</i> | < 1 | 1.00 | 64330 | | |
| neos-1601936 | 10958 | 5705 | 466880 | 466878 | 4302 | 615 | 16363 | <i>1.49</i> | 6081 | <i>1.07</i> | 453103 | 0.97 | 453113 | 0.97 | 5706 | <i>1.33</i> | 438 | 0.71 | 3388 | | |
| neos-1605061 | 715 | 7200 | 719528 | 719788 | 7156 | 7156 | 1177 | <i>1.65</i> | 7200 | 1.00 | 713674 | 0.99 | 717213 | 1.00 | 6757 | 0.94 | 6757 | 0.94 | 630 | | |
| neos-1605075 | 3213 | 7200 | 664309 | 667362 | 5218 | 1122 | 4338 | <i>1.35</i> | 7200 | 1.00 | 598649 | 0.90 | 602697 | 0.90 | 6036 | <i>1.16</i> | 874 | 0.78 | 1105 | | |
| neos-1616732 | 2971128 | 5547 | 384 | 26113 | 452 | < 1 | 2992570 | 1.01 | 5559 | 1.00 | 413 | <i>1.08</i> | 26238 | 1.00 | 507 | <i>1.12</i> | < 1 | 1.00 | 203 | | |
| neos-1620770 | 1617989 | 7200 | 15 | 122579 | < 1 | < 1 | 1494478 | 0.92 | 7200 | 1.00 | 17 | <i>1.11</i> | 146959 | <i>1.20</i> | < 1 | 1.02 | < 1 | 1.03 | 335342 | | |
| neos-476283 | 517 | 177 | 1454 | 3932 | 148 | 14 | 671 | <i>1.30</i> | 181 | 1.02 | 1454 | 1.00 | 3933 | 1.00 | 164 | <i>1.11</i> | 14 | 1.01 | 11249 | \checkmark | |
| neos-506422 | 4763 | 52 | 5230 | 5232 | 52 | < 1 | 4707 | 0.99 | 51 | 0.98 | 5123 | 0.98 | 5123 | 0.98 | 51 | 0.98 | < 1 | 1.00 | 110 | \checkmark | |
| neos-506428 | 420 | 4300 | 269318 | 351030 | 3836 | 2376 | 452 | <i>1.07</i> | 4623 | <i>1.08</i> | 282185 | <i>1.05</i> | 367151 | <i>1.05</i> | 4416 | <i>1.15</i> | 2417 | 1.02 | 76 | | |
| neos-555424 | 465993 | 2660 | 5090 | 5096 | 2295 | < 1 | 154690 | 0.33 | 1216 | 0.46 | 5055 | 0.99 | 5062 | 0.99 | 1216 | 0.53 | < 1 | 0.97 | 2892 | | |
| neos-631710 | 3 | 7200 | 47192 | 189154 | 1113 | 82 | 2 | 0.63 | 7200 | 1.00 | 48026 | 1.02 | 191625 | 1.01 | 1229 | <i>1.10</i> | 84 | 1.03 | 21 | | |
| neos-686190 | 8949 | 127 | 1817 | 2923 | 114 | 4 | 6792 | 0.76 | 111 | 0.87 | 1579 | 0.87 | 2654 | 0.91 | 91 | 0.79 | < 1 | 0.04 | 650 | | |
| neos-693347 | 50294 | 5034 | 89808 | 89790 | 4422 | 814 | 33698 | 0.67 | 3578 | 0.71 | 34642 | 0.39 | 34640 | 0.39 | 3578 | 0.81 | 304 | 0.37 | 10124 | | |
| neos-738098 | 775 | 7200 | 720075 | 720075 | 7200 | 7200 | 1402 | <i>1.81</i> | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 201 | | |
| neos-777800 | 1 | 4 | 418 | 421 | 4 | 4 | 1 | 1.00 | 5 | <i>1.11</i> | 467 | <i>1.12</i> | 468 | <i>1.11</i> | 5 | <i>1.11</i> | 5 | <i>1.11</i> | 1 | | |

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Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-------------|---------|------|--------|--------|------|------|------------|----------------|------|----------------|--------|-----------------|--------|------------------|------|------------------|------|------------------|-------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | \mathbf{N}_Q | T | \mathbf{T}_Q | PI | \mathbf{PI}_Q | PDI | \mathbf{PDI}_Q | TtB | \mathbf{TtB}_Q | TtF | \mathbf{TtF}_Q | C | I |
| neos-785912 | 304 | 64 | 6394 | 720000 | 7200 | 7200 | 206 | 0.68 | 49 | 0.76 | 4889 | 0.76 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 89 | |
| neos-807456 | 88293 | 7200 | 720001 | 720001 | 7200 | 7200 | 79010 | 0.89 | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 226 | |
| neos-820146 | 1955429 | 7200 | 720000 | 720000 | 7200 | 7200 | 1985580 | 1.02 | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 54916 | |
| neos-820157 | 1343991 | 7200 | 720002 | 720002 | 7200 | 7200 | 1502156 | <i>1.12</i> | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 46349 | |
| neos-824661 | 81 | 1720 | 26267 | 26660 | 1720 | 2 | 26 | 0.32 | 947 | 0.55 | 19671 | 0.75 | 20061 | 0.75 | 947 | 0.55 | 2 | 0.98 | 69 | \checkmark |
| neos-824695 | 53 | 461 | 6529 | 6660 | 461 | 1 | 51 | 0.95 | 462 | 1.00 | 5858 | 0.90 | 5990 | 0.90 | 462 | 1.00 | 1 | 0.99 | 47 | \checkmark |
| neos-826650 | 29781 | 7200 | 413829 | 424387 | 4547 | 4036 | 38867 | <i>1.31</i> | 7200 | 1.00 | 219879 | 0.53 | 237116 | 0.56 | 3425 | 0.75 | 2024 | 0.50 | 3212 | |
| neos-826694 | 65 | 460 | 3088 | 3226 | 460 | 1 | 76 | <i>1.17</i> | 487 | <i>1.06</i> | 4247 | <i>1.38</i> | 4384 | <i>1.36</i> | 487 | <i>1.06</i> | 1 | 0.97 | 40 | |
| neos-826812 | 5 | 127 | 1767 | 1979 | 127 | < 1 | 4 | 0.87 | 102 | 0.80 | 1582 | 0.90 | 1793 | 0.91 | 102 | 0.80 | < 1 | 1.01 | 63 | |
| neos-826841 | 205677 | 7200 | 2636 | 27365 | 2430 | 19 | 209253 | 1.02 | 7200 | 1.00 | 5005 | <i>1.90</i> | 29655 | <i>1.08</i> | 1542 | 0.63 | 47 | <i>2.51</i> | 12812 | |
| neos-847302 | 258494 | 7200 | 2257 | 717454 | 2379 | 4 | 264049 | 1.02 | 7200 | 1.00 | 4044 | <i>1.79</i> | 718277 | 1.00 | 1703 | 0.72 | 5 | 1.02 | 18970 | |
| neos-849702 | 19129 | 457 | 45692 | 45680 | 457 | 457 | 24138 | <i>1.26</i> | 554 | <i>1.21</i> | 55383 | <i>1.21</i> | 55392 | <i>1.21</i> | 554 | <i>1.21</i> | 554 | <i>1.21</i> | 453 | |
| neos-859770 | 1 | 176 | 17636 | 720000 | 7200 | 7200 | 1 | 1.00 | 175 | 0.99 | 17505 | 0.99 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 6 | |
| neos-885086 | 371 | 6549 | 12278 | 12361 | 2980 | < 1 | 359 | 0.97 | 6557 | 1.00 | 12036 | 0.98 | 12113 | 0.98 | 2738 | 0.92 | < 1 | <i>1.06</i> | 0 | |
| neos-885524 | 1112 | 121 | 752 | 754 | 121 | 7 | 3580 | <i>3.22</i> | 925 | <i>7.64</i> | 2944 | <i>3.91</i> | 2944 | <i>3.90</i> | 925 | <i>7.64</i> | 29 | <i>3.86</i> | 197 | \checkmark |
| neos-911880 | 751773 | 7200 | 2234 | 11810 | 1068 | < 1 | 1163271 | <i>1.55</i> | 7200 | 1.00 | 2036 | 0.91 | 11867 | 1.00 | 1033 | 0.97 | < 1 | 0.92 | 1287 | \checkmark |
| neos-916792 | 119285 | 971 | 2478 | 7968 | 290 | 13 | 147959 | <i>1.24</i> | 1193 | <i>1.23</i> | 2588 | 1.04 | 10161 | <i>1.28</i> | 392 | <i>1.35</i> | 13 | 0.98 | 99 | |
| neos-932816 | 578 | 7200 | 155970 | 421024 | 5846 | < 1 | 543 | 0.94 | 7200 | 1.00 | 143847 | 0.92 | 420054 | 1.00 | 6360 | <i>1.09</i> | < 1 | 1.03 | 67 | |
| neos-933638 | 327 | 3609 | 88808 | 88810 | 3566 | < 1 | 417 | <i>1.28</i> | 3569 | 0.99 | 148946 | <i>1.68</i> | 148968 | <i>1.68</i> | 3072 | 0.86 | < 1 | <i>1.17</i> | 56 | |
| neos-933966 | 649 | 2723 | 136937 | 136946 | 2723 | < 1 | 447 | 0.69 | 1553 | 0.57 | 66945 | 0.49 | 66931 | 0.49 | 1553 | 0.57 | < 1 | 0.98 | 67 | |
| neos-934278 | 1254 | 7200 | 348201 | 348917 | 4801 | < 1 | 661 | 0.53 | 7200 | 1.00 | 405372 | <i>1.16</i> | 405996 | <i>1.16</i> | 2940 | 0.61 | < 1 | 0.89 | 141 | |
| neos-935627 | 1245 | 7121 | 76421 | 79168 | 5837 | 1 | 831 | 0.67 | 7200 | 1.01 | 61843 | 0.81 | 64761 | 0.82 | 6277 | <i>1.08</i> | 1 | <i>1.09</i> | 46 | |
| neos-935769 | 965 | 3723 | 35913 | 38726 | 3707 | 1 | 1487 | <i>1.54</i> | 5857 | <i>1.57</i> | 34843 | 0.97 | 37130 | 0.96 | 4782 | <i>1.29</i> | 1 | 1.02 | 96 | |
| neos-937511 | 442 | 5517 | 35226 | 36533 | 2510 | 1 | 691 | <i>1.56</i> | 5645 | 1.02 | 54094 | <i>1.54</i> | 55460 | <i>1.52</i> | 3689 | <i>1.47</i> | 1 | <i>1.08</i> | 32 | \checkmark |
| neos-937815 | 1040 | 7200 | 75221 | 78283 | 4920 | 1 | 2205 | <i>2.12</i> | 7200 | 1.00 | 85926 | <i>1.14</i> | 88746 | <i>1.13</i> | 4528 | 0.92 | 1 | 0.81 | 86 | \checkmark |
| neos-941262 | 1704 | 7200 | 87642 | 88289 | 3427 | 1 | 2150 | <i>1.26</i> | 7200 | 1.00 | 109596 | <i>1.25</i> | 110234 | <i>1.25</i> | 4471 | <i>1.30</i> | 1 | 1.00 | 94 | \checkmark |
| neos-941313 | 52 | 2303 | 18320 | 18320 | 1865 | 152 | 24 | 0.46 | 1418 | 0.62 | 17221 | 0.94 | 17216 | 0.94 | 1418 | 0.76 | 152 | 1.00 | 1028 | |
| neos-942830 | 658868 | 7200 | 1115 | 7834 | 30 | 4 | 416475 | 0.63 | 1272 | 0.66 | 1150 | 1.03 | 5906 | 0.75 | 41 | <i>1.38</i> | 5 | <i>1.23</i> | 1886 | |
| neos-948126 | 1733 | 1928 | 152485 | 154718 | 6094 | 1 | 1601 | 0.92 | 7200 | 1.00 | 181224 | <i>1.19</i> | 183454 | <i>1.19</i> | 5578 | 0.92 | 1 | 1.03 | 32 | \checkmark |
| neos-952987 | 14 | 7200 | 720002 | 720002 | 7200 | 7200 | 16 | <i>1.21</i> | 7200 | 1.00 | 720002 | 1.00 | 720002 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 40 | |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | \mathbf{I} |
| neos-957389 | 1 | 16 | 1615 | 1625 | 16 | 16 | 1 | 1.00 | 16 | 1.00 | 1615 | 1.00 | 1620 | 1.00 | 16 | 1.00 | 16 | 1.00 | | 0 |
| neos-984165 | 1456 | 7200 | 127659 | 132256 | 4399 | 1 | 1295 | 0.89 | 7200 | 1.00 | 178821 | <i>1.40</i> | 183123 | <i>1.38</i> | 5786 | <i>1.32</i> | 1 | 1.00 | 55 | \checkmark |
| neos13 | 18492 | 339 | 3134 | 7756 | 280 | 1 | 54026 | <i>2.92</i> | 826 | <i>2.44</i> | 3194 | 1.02 | 16541 | <i>2.13</i> | 701 | <i>2.50</i> | 1 | 1.00 | 178 | \checkmark |
| neos15 | 329950 | 1383 | 539 | 3942 | 211 | < 1 | 773215 | <i>2.34</i> | 3167 | <i>2.29</i> | 516 | 0.96 | 8865 | <i>2.25</i> | 324 | <i>1.54</i> | < 1 | <i>1.33</i> | 3488 | \checkmark |
| neos16 | 5685565 | 7200 | 2462 | 9628 | 87 | 24 | 6114146 | <i>1.08</i> | 7200 | 1.00 | 3141 | <i>1.28</i> | 17721 | <i>1.84</i> | 213 | <i>2.44</i> | 31 | <i>1.26</i> | 223938 | |
| neos18 | 1338 | 29 | 120 | 485 | 9 | < 1 | 1090 | 0.81 | 24 | 0.82 | 124 | 1.04 | 429 | 0.88 | 11 | <i>1.18</i> | < 1 | <i>1.16</i> | 253 | \checkmark |
| neos6 | 7533 | 538 | 5618 | 5618 | 538 | 35 | 3296 | 0.44 | 327 | 0.61 | 5416 | 0.96 | 5414 | 0.96 | 327 | 0.61 | 17 | 0.48 | 1188 | |
| neos788725 | 101543 | 310 | 30972 | 720000 | 7200 | 7200 | 120986 | <i>1.19</i> | 348 | <i>1.12</i> | 34810 | <i>1.12</i> | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 790 | |
| neos808444 | 386 | 1421 | 142050 | 142051 | 1421 | 1421 | 628 | <i>1.62</i> | 1944 | <i>1.37</i> | 194409 | <i>1.37</i> | 194414 | <i>1.37</i> | 1944 | <i>1.37</i> | 1944 | <i>1.37</i> | 236 | |
| neos858960 | 1009850 | 976 | 97629 | 720000 | 7200 | 7200 | 1515774 | <i>1.50</i> | 1469 | <i>1.51</i> | 146933 | <i>1.51</i> | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 2911 | |
| net12 | 2161 | 1479 | 15201 | 72698 | 402 | 93 | 2153 | 1.00 | 1464 | 0.99 | 14582 | 0.96 | 59822 | 0.82 | 254 | 0.63 | 112 | <i>1.20</i> | 497 | \checkmark |
| netdiversion | 76 | 1890 | 94015 | 96955 | 1601 | 41 | 84 | <i>1.11</i> | 1317 | 0.70 | 76615 | 0.81 | 78371 | 0.81 | 1026 | 0.64 | 41 | 0.98 | 191 | |
| newdano | 1307144 | 6819 | 5482 | 130091 | 2922 | < 1 | 1390208 | <i>1.06</i> | 6909 | 1.01 | 6164 | <i>1.12</i> | 144565 | <i>1.11</i> | 3718 | <i>1.27</i> | < 1 | <i>1.29</i> | 859 | \checkmark |
| nobel-eu-DBE | 982259 | 7200 | 720000 | 7314 | 2109 | < 1 | 930113 | 0.95 | 7200 | 1.00 | 720001 | 1.00 | 6228 | 0.85 | 1865 | 0.88 | 1 | <i>1.11</i> | 1863 | |
| noswot | 317847 | 100 | 5 | 471 | 41 | < 1 | 225645 | 0.71 | 71 | 0.71 | 0 | 0.00 | 328 | 0.70 | < 1 | 0.00 | < 1 | 0.86 | 996 | \checkmark |
| ns1111636 | 685 | 7200 | 79344 | 235499 | 1458 | 18 | 768 | <i>1.12</i> | 7200 | 1.00 | 64997 | 0.82 | 287175 | <i>1.22</i> | 1683 | <i>1.15</i> | 17 | 0.98 | 88 | |
| ns1116954 | 32 | 6292 | 629214 | 720001 | 7200 | 7200 | 75 | <i>2.34</i> | 7200 | <i>1.14</i> | 720003 | <i>1.14</i> | 720003 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 69 | |
| ns1158817 | 1 | 611 | 61061 | 720000 | 7200 | 7200 | 1 | 1.00 | 601 | 0.98 | 60102 | 0.98 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | |
| ns1208400 | 2631 | 1404 | 139067 | 140445 | 1391 | 1391 | 3481 | <i>1.32</i> | 916 | 0.65 | 89933 | 0.65 | 91579 | 0.65 | 899 | 0.65 | 899 | 0.65 | 783 | |
| ns1456591 | 164400 | 7200 | 313603 | 554683 | 4262 | 1791 | 176915 | <i>1.08</i> | 7200 | 1.00 | 294435 | 0.94 | 546861 | 0.99 | 3206 | 0.75 | 1512 | 0.84 | 15000 | |
| ns1606230 | 7286 | 6637 | 663697 | 396937 | 3966 | 488 | 3852 | 0.53 | 5977 | 0.90 | 597748 | 0.90 | 376522 | 0.95 | 3741 | 0.94 | 603 | <i>1.23</i> | 618 | |
| ns1631475 | 193 | 7200 | 364633 | 695598 | 3309 | 1 | 139 | 0.72 | 7200 | 1.00 | 344935 | 0.95 | 694587 | 1.00 | 2748 | 0.83 | 1 | 0.98 | 42 | |
| ns1644855 | 29 | 6610 | 661063 | 86840 | 1686 | 13 | 39 | <i>1.32</i> | 5955 | 0.90 | 595545 | 0.90 | 81585 | 0.94 | 3198 | <i>1.90</i> | 12 | 0.93 | 38 | |
| ns1663818 | 1 | 7200 | 720198 | 720198 | 7200 | 7200 | 1 | 1.00 | 7200 | 1.00 | 720274 | 1.00 | 720274 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 34 | |
| ns1685374 | 12 | 7200 | 720000 | 645708 | 4240 | 4240 | 19 | <i>1.53</i> | 7200 | 1.00 | 720002 | 1.00 | 642473 | 0.99 | 4144 | 0.98 | 4144 | 0.98 | 19 | |
| ns1686196 | 13 | 14 | 1380 | 720000 | 7200 | 7200 | 1 | 0.08 | 12 | 0.87 | 1198 | 0.87 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 32 | |
| ns1688347 | 3898 | 188 | 7748 | 9152 | 149 | 67 | 2143 | 0.55 | 148 | 0.79 | 6035 | 0.78 | 7177 | 0.78 | 127 | 0.85 | 52 | 0.77 | 624 | |
| ns1696083 | 25435 | 7200 | 579429 | 615171 | 6305 | 5526 | 23476 | 0.92 | 7200 | 1.00 | 500538 | 0.86 | 595131 | 0.97 | 5315 | 0.84 | 4663 | 0.84 | 6770 | |
| ns1702808 | 166455 | 205 | 20496 | 720000 | 7200 | 7200 | 157751 | 0.95 | 188 | 0.92 | 18769 | 0.92 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 204 | |
| ns1745726 | 2 | 16 | 1649 | 720000 | 7200 | 7200 | 1 | 0.50 | 16 | 0.94 | 1550 | 0.94 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 22 | |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | \mathbf{I} |
| ns1758913 | 24 | 2499 | 175606 | 176583 | 1321 | 121 | 1 | 0.04 | 1459 | 0.58 | 104102 | 0.59 | 105036 | 0.59 | 1459 | <i>1.10</i> | 123 | 1.02 | 48 | \checkmark |
| ns1766074 | 992681 | 2365 | 236514 | 720000 | 7200 | 7200 | 1000176 | 1.01 | 2301 | 0.97 | 230129 | 0.97 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 729 | |
| ns1769397 | 273 | 61 | 6075 | 720000 | 7200 | 7200 | 39 | 0.14 | 54 | 0.88 | 5356 | 0.88 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 298 | |
| ns1778858 | 1611 | 7200 | 720001 | 720001 | 7200 | 7200 | 2762 | <i>1.72</i> | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 99 | |
| ns1830653 | 9104 | 182 | 4765 | 8184 | 103 | 31 | 9846 | <i>1.08</i> | 178 | 0.98 | 4994 | <i>1.05</i> | 8515 | 1.04 | 135 | <i>1.32</i> | 27 | 0.88 | 1840 | \checkmark |
| ns1853823 | 1 | 7200 | 699477 | 718973 | 34 | 33 | 1 | 1.00 | 7200 | 1.00 | 702123 | 1.00 | 721723 | 1.00 | 34 | 1.01 | 34 | 1.01 | 0 | |
| ns1854840 | 1 | 7200 | 682991 | 712037 | 3606 | 11 | 1 | 1.00 | 7200 | 1.00 | 682991 | 1.00 | 710917 | 1.00 | 4804 | <i>1.33</i> | 11 | 0.96 | 30 | |
| ns1904248 | 46 | 7200 | 110033 | 722082 | 15 | 10 | 25 | 0.54 | 7200 | 1.00 | 109799 | 1.00 | 720923 | 1.00 | 14 | 0.99 | 9 | 0.92 | 220 | |
| ns1905797 | 10654 | 7200 | 720000 | 720000 | 7200 | 7200 | 5194 | 0.49 | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 976 | |
| ns1905800 | 342245 | 7200 | 720001 | 720001 | 7200 | 7200 | 456303 | <i>1.33</i> | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 161 | |
| ns1952667 | 11603 | 2024 | 202418 | 202404 | 2024 | 2024 | 20734 | <i>1.79</i> | 2969 | <i>1.47</i> | 296885 | <i>1.47</i> | 296854 | <i>1.47</i> | 2969 | <i>1.47</i> | 2969 | <i>1.47</i> | 464 | |
| ns2081729 | 4548963 | 7200 | 720007 | 194693 | 1925 | 2 | 4538425 | 1.00 | 7200 | 1.00 | 720004 | 1.00 | 133820 | 0.69 | 207 | 0.11 | 3 | <i>1.48</i> | 27906 | \checkmark |
| ns2118727 | 2 | 1488 | 148794 | 720000 | 7200 | 7200 | 1 | 0.50 | 495 | 0.33 | 49532 | 0.33 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | |
| ns2124243 | 7677 | 7200 | 83265 | 199883 | 2894 | 140 | 7467 | 0.97 | 7200 | 1.00 | 85057 | 1.02 | 193520 | 0.97 | 2845 | 0.98 | 138 | 0.98 | 166 | |
| ns2137859 | 5636 | 7200 | 276840 | 316954 | 3455 | 2 | 10965 | <i>1.95</i> | 7200 | 1.00 | 216032 | 0.78 | 261645 | 0.83 | 1451 | 0.42 | 2 | 0.99 | 1238 | |
| ns4-pr3 | 351879 | 7200 | 137 | 498 | 3541 | < 1 | 307564 | 0.87 | 7200 | 1.00 | 150 | <i>1.10</i> | 506 | 1.02 | 4582 | <i>1.29</i> | < 1 | <i>1.05</i> | 6015 | \checkmark |
| ns4-pr9 | 407986 | 7200 | 88 | 389 | 2726 | 1 | 430701 | <i>1.06</i> | 7200 | 1.00 | 85 | 0.97 | 359 | 0.92 | 458 | 0.17 | 1 | 1.01 | 4949 | \checkmark |
| ns894236 | 9137 | 7200 | 391552 | 468824 | 3966 | 3877 | 7596 | 0.83 | 7200 | 1.00 | 270419 | 0.69 | 365746 | 0.78 | 3466 | 0.87 | 2627 | 0.68 | 2217 | |
| ns894244 | 1377 | 7200 | 720001 | 657459 | 6533 | 6533 | 2494 | <i>1.81</i> | 6927 | 0.96 | 692653 | 0.96 | 552267 | 0.84 | 5745 | 0.88 | 5429 | 0.83 | 603 | |
| ns894786 | 692 | 7200 | 720000 | 720000 | 7200 | 7200 | 429 | 0.62 | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 491 | |
| ns894788 | 197986 | 5456 | 545650 | 545643 | 5456 | 5456 | 133380 | 0.67 | 3650 | 0.67 | 364991 | 0.67 | 364976 | 0.67 | 3650 | 0.67 | 3650 | 0.67 | 1209 | |
| ns903616 | 1059 | 7200 | 664372 | 673163 | 6800 | 6591 | 840 | 0.79 | 7200 | 1.00 | 720001 | <i>1.08</i> | 720001 | <i>1.07</i> | 7200 | <i>1.06</i> | 7200 | <i>1.09</i> | 525 | |
| ns930473 | 111 | 7200 | 258117 | 720000 | 2450 | 1725 | 60 | 0.54 | 7200 | 1.00 | 320948 | <i>1.24</i> | 720000 | 1.00 | 2450 | 1.00 | 2450 | <i>1.42</i> | 58 | |
| nsr8k | 64 | 7200 | 556442 | 562265 | 2122 | 9 | 78 | <i>1.20</i> | 7200 | 1.00 | 493327 | 0.89 | 501376 | 0.89 | 2936 | <i>1.38</i> | 8 | 0.91 | 39 | |
| nu120-pr3 | 29857 | 7200 | 69494 | 116785 | 5495 | 1 | 40840 | <i>1.37</i> | 7200 | 1.00 | 61703 | 0.89 | 110575 | 0.95 | 5236 | 0.95 | 1 | 1.02 | 476 | |
| nu60-pr9 | 76663 | 7200 | 6070 | 26522 | 3777 | 1 | 74736 | 0.97 | 7200 | 1.00 | 4983 | 0.82 | 24687 | 0.93 | 3562 | 0.94 | 1 | 0.98 | 767 | \checkmark |
| opm2-z11-s8 | 428 | 7200 | 90346 | 273124 | 5019 | < 1 | 353 | 0.83 | 7200 | 1.00 | 86975 | 0.96 | 271412 | 0.99 | 4802 | 0.96 | < 1 | 1.04 | 568 | |
| opm2-z12-s14 | 131 | 7200 | 182477 | 345977 | 5369 | < 1 | 79 | 0.60 | 7200 | 1.00 | 164540 | 0.90 | 334148 | 0.97 | 3444 | 0.64 | < 1 | 1.01 | 0 | |
| opm2-z12-s7 | 293 | 7200 | 179740 | 339469 | 4662 | < 1 | 89 | 0.30 | 7200 | 1.00 | 181263 | 1.01 | 336567 | 0.99 | 3402 | 0.73 | < 1 | 1.03 | 1729 | |
| opm2-z7-s2 | 3332 | 406 | 3614 | 7487 | 383 | < 1 | 2437 | 0.73 | 348 | 0.86 | 4288 | <i>1.19</i> | 8071 | <i>1.08</i> | 318 | 0.83 | < 1 | <i>1.11</i> | 215 | \checkmark |

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Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|----------|------|--------|--------|------|------|------------|----------------|------|----------------|--------|-----------------|--------|------------------|------|------------------|------|------------------|-------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | \mathbf{N}_Q | T | \mathbf{T}_Q | PI | \mathbf{PI}_Q | PDI | \mathbf{PDI}_Q | TtB | \mathbf{TtB}_Q | TtF | \mathbf{TtF}_Q | C | I |
| p100x588b | 481749 | 7200 | 12686 | 43220 | 1136 | < 1 | 521560 | <i>1.08</i> | 7200 | 1.00 | 16157 | <i>1.27</i> | 49039 | <i>1.13</i> | 3555 | <i>3.13</i> | < 1 | 0.88 | 2820 | |
| p2m2p1mlp0n100 | 57413493 | 7200 | 720000 | 720000 | 7200 | 7200 | 58852442 | 1.03 | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 7 | |
| p6b | 536562 | 7200 | 38900 | 197930 | 2785 | < 1 | 536070 | 1.00 | 7200 | 1.00 | 38901 | 1.00 | 197963 | 1.00 | 2783 | 1.00 | < 1 | 1.00 | 207 | |
| p80x400b | 1639027 | 7200 | 720008 | 32567 | 1926 | < 1 | 1749867 | <i>1.07</i> | 7200 | 1.00 | 720000 | 1.00 | 31625 | 0.97 | 1186 | 0.62 | < 1 | 1.00 | 4411 | |
| pb-simp-nonunif | 550 | 7200 | 376259 | 439168 | 3144 | 16 | 1622 | <i>2.95</i> | 7200 | 1.00 | 360748 | 0.96 | 423150 | 0.96 | 4413 | <i>1.40</i> | 17 | 1.04 | 1333 | |
| pg | 2946 | 653 | 1401 | 3859 | 564 | < 1 | 3437 | <i>1.17</i> | 546 | 0.84 | 1188 | 0.85 | 3418 | 0.89 | 484 | 0.86 | < 1 | <i>1.20</i> | 20 | |
| pg5_34 | 145643 | 1556 | 257 | 753 | 997 | < 1 | 190791 | <i>1.31</i> | 2926 | <i>1.88</i> | 399 | <i>1.55</i> | 492 | 0.65 | 1295 | <i>1.30</i> | < 1 | 1.00 | 111 | \checkmark |
| pigeon-10 | 15282073 | 5847 | 178 | 58632 | 825 | < 1 | 8278432 | 0.54 | 4000 | 0.68 | 25 | 0.14 | 40022 | 0.68 | < 1 | 0.00 | < 1 | 1.00 | 2126 | \checkmark |
| pigeon-11 | 9403959 | 7200 | 720000 | 65652 | 39 | < 1 | 7218390 | 0.77 | 7200 | 1.00 | 720000 | 1.00 | 65493 | 1.00 | 1 | 0.01 | < 1 | 1.00 | 2611 | \checkmark |
| pigeon-12 | 4192790 | 7200 | 192 | 60176 | 579 | < 1 | 8341419 | <i>1.99</i> | 7200 | 1.00 | 126 | 0.66 | 60115 | 1.00 | 2 | 0.00 | < 1 | 1.00 | 4041 | |
| pigeon-13 | 4505111 | 7200 | 366 | 55723 | 5 | < 1 | 6482402 | <i>1.44</i> | 7200 | 1.00 | 240 | 0.66 | 55606 | 1.00 | 8 | <i>1.59</i> | < 1 | 1.00 | 1864 | |
| pigeon-19 | 6163473 | 7200 | 1396 | 39217 | 16 | < 1 | 6412240 | 1.04 | 7200 | 1.00 | 958 | 0.69 | 38802 | 0.99 | 13 | 0.81 | < 1 | 1.00 | 1935 | \checkmark |
| probportfolio | 1994756 | 7200 | 44632 | 303724 | 2548 | < 1 | 2121779 | <i>1.06</i> | 7200 | 1.00 | 39311 | 0.88 | 299582 | 0.99 | 2832 | <i>1.11</i> | < 1 | 0.97 | 31793 | |
| protfold | 12280 | 7200 | 288197 | 360755 | 3721 | < 1 | 12028 | 0.98 | 7200 | 1.00 | 307512 | <i>1.07</i> | 377307 | <i>1.05</i> | 4595 | <i>1.23</i> | < 1 | 0.99 | 1381 | |
| pw-myciel4 | 637908 | 6456 | 1814 | 231779 | 51 | 1 | 412894 | 0.65 | 3847 | 0.60 | 1393 | 0.77 | 91348 | 0.39 | 52 | 1.01 | 1 | 0.93 | 9471 | \checkmark |
| qiu | 10040 | 71 | 2198 | 4905 | 45 | < 1 | 11018 | <i>1.10</i> | 76 | <i>1.07</i> | 1898 | 0.86 | 5203 | <i>1.06</i> | 25 | 0.56 | < 1 | <i>1.08</i> | 23 | \checkmark |
| queens-30 | 8881 | 7200 | 27163 | 325949 | 3775 | < 1 | 8650 | 0.97 | 7200 | 1.00 | 25965 | 0.96 | 325395 | 1.00 | 3580 | 0.95 | < 1 | 0.75 | 1 | |
| r80x800 | 475310 | 7200 | 771 | 10565 | 2938 | < 1 | 507299 | <i>1.07</i> | 7200 | 1.00 | 679 | 0.88 | 10383 | 0.98 | 2038 | 0.69 | < 1 | 0.89 | 363 | |
| rail01 | 45 | 7200 | 720001 | 679103 | 6770 | 6725 | 49 | <i>1.10</i> | 7200 | 1.00 | 720002 | 1.00 | 692616 | 1.02 | 7117 | <i>1.05</i> | 6893 | 1.03 | 32 | |
| rail02 | 1 | 7200 | 720005 | 720005 | 7200 | 7200 | 1 | 1.00 | 7200 | 1.00 | 720002 | 1.00 | 720002 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | |
| rail03 | 1 | 7200 | 720003 | 720003 | 7200 | 7200 | 1 | 1.00 | 7200 | 1.00 | 720004 | 1.00 | 720004 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 0 | |
| rail507 | 875 | 237 | 599 | 1085 | 148 | 3 | 936 | <i>1.07</i> | 247 | 1.04 | 604 | 1.01 | 1095 | 1.01 | 165 | <i>1.11</i> | 3 | 0.98 | 1 | |
| ramos3 | 33 | 7200 | 116043 | 290943 | < 1 | < 1 | 33 | 1.02 | 7200 | 1.00 | 116043 | 1.00 | 290543 | 1.00 | < 1 | 0.97 | < 1 | 1.00 | 0 | |
| ran14x18 | 715043 | 2282 | 228182 | 6229 | 1267 | < 1 | 801021 | <i>1.12</i> | 2554 | <i>1.12</i> | 255441 | <i>1.12</i> | 7032 | <i>1.13</i> | 1665 | <i>1.31</i> | < 1 | 1.00 | 567 | |
| ran14x18-disj-8 | 510977 | 2232 | 223177 | 5595 | 1000 | < 1 | 447088 | 0.87 | 1954 | 0.88 | 195351 | 0.88 | 5268 | 0.94 | 860 | 0.86 | < 1 | <i>1.29</i> | 215 | |
| ran16x16 | 11379 | 85 | 145 | 422 | 59 | < 1 | 14450 | <i>1.27</i> | 88 | 1.03 | 119 | 0.82 | 396 | 0.94 | 51 | 0.87 | < 1 | 0.86 | 22 | |
| reblock166 | 627704 | 6973 | 697346 | 21964 | 4813 | < 1 | 522439 | 0.83 | 6910 | 0.99 | 690980 | 0.99 | 23143 | <i>1.05</i> | 3866 | 0.80 | < 1 | 1.00 | 11400 | \checkmark |
| reblock354 | 355336 | 7200 | 4756 | 6875 | 4568 | < 1 | 351233 | 0.99 | 7200 | 1.00 | 5558 | <i>1.17</i> | 7895 | <i>1.15</i> | 4827 | <i>1.06</i> | < 1 | <i>1.27</i> | 17525 | |
| reblock420 | 157942 | 7200 | 33027 | 43654 | 6582 | < 1 | 125861 | 0.80 | 7200 | 1.00 | 41006 | <i>1.24</i> | 57314 | <i>1.31</i> | 6051 | 0.92 | < 1 | 1.04 | 10944 | \checkmark |
| reblock67 | 55518 | 239 | 1449 | 1897 | 143 | < 1 | 54433 | 0.98 | 323 | <i>1.35</i> | 1303 | 0.90 | 1738 | 0.92 | 153 | <i>1.07</i> | < 1 | 1.00 | 3575 | |

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Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-------------------|---------|------|--------|--------|------|------|------------|-------------|------|-------------|--------|-------------|--------|-------------|------|--------------|------|-------------|------|--------------|
| | N | T | PI | PDI | TtB | TtF | N | N_Q | T | T_Q | PI | PI_Q | PDI | PDI_Q | TtB | TtB_Q | TtF | TtF_Q | C | I |
| rmatr100-p10 | 800 | 186 | 823 | 2340 | 93 | < 1 | 807 | 1.01 | 187 | 1.01 | 837 | 1.02 | 2362 | 1.01 | 98 | <i>1.05</i> | < 1 | 0.99 | 40 | |
| rmatr100-p5 | 398 | 286 | 716 | 4551 | 32 | < 1 | 403 | 1.01 | 291 | 1.01 | 712 | 0.99 | 4603 | 1.01 | 32 | 0.99 | < 1 | 0.92 | 69 | |
| rmatr200-p10 | 338 | 7200 | 58795 | 181663 | 4778 | 3 | 342 | 1.01 | 7200 | 1.00 | 60003 | 1.02 | 184014 | 1.01 | 5236 | <i>1.10</i> | 4 | 1.03 | 3 | |
| rmatr200-p20 | 2832 | 7200 | 14256 | 97123 | 4146 | 3 | 2689 | 0.95 | 7200 | 1.00 | 13936 | 0.98 | 97913 | 1.01 | 1139 | 0.27 | 3 | 0.99 | 155 | |
| rmatr200-p5 | 344 | 7200 | 34982 | 185486 | 5014 | 5 | 334 | 0.97 | 7200 | 1.00 | 35337 | 1.01 | 185415 | 1.00 | 6061 | <i>1.21</i> | 5 | 1.01 | 1 | |
| rmine10 | 28374 | 7200 | 28521 | 30778 | 2516 | < 1 | 37455 | <i>1.32</i> | 7200 | 1.00 | 24727 | 0.87 | 27301 | 0.89 | 1427 | 0.57 | < 1 | 0.98 | 2992 | \checkmark |
| rmine14 | 8 | 7200 | 608142 | 613075 | 88 | < 1 | 8 | <i>1.07</i> | 7200 | 1.00 | 600056 | 0.99 | 605052 | 0.99 | 1207 | <i>13.71</i> | < 1 | 1.03 | 244 | |
| rmine21 | 1 | 7200 | 366647 | 673774 | 556 | 2 | 1 | 1.00 | 7200 | 1.00 | 367763 | 1.00 | 673934 | 1.00 | 577 | 1.04 | 2 | 0.99 | 0 | |
| rmine25 | 1 | 7200 | 673877 | 685881 | 1196 | 5 | 1 | 1.00 | 7200 | 1.00 | 673835 | 1.00 | 685850 | 1.00 | 1191 | 1.00 | 5 | 1.01 | 0 | |
| rmine6 | 88906 | 944 | 910 | 1104 | 649 | < 1 | 103842 | <i>1.17</i> | 1078 | <i>1.14</i> | 808 | 0.89 | 1022 | 0.93 | 702 | <i>1.08</i> | < 1 | 1.00 | 261 | |
| rocII-4-11 | 7514 | 2022 | 57922 | 91613 | 1795 | 141 | 10725 | <i>1.43</i> | 2112 | 1.04 | 50871 | 0.88 | 85683 | 0.94 | 1795 | 1.00 | 103 | 0.73 | 858 | \checkmark |
| rocII-7-11 | 1126 | 7200 | 549159 | 623554 | 4159 | 3693 | 1295 | <i>1.15</i> | 7200 | 1.00 | 515261 | 0.94 | 604415 | 0.97 | 5076 | <i>1.22</i> | 2381 | 0.64 | 151 | |
| rocII-9-11 | 636 | 7200 | 600967 | 663050 | 4901 | 4693 | 705 | <i>1.11</i> | 7200 | 1.00 | 688394 | <i>1.15</i> | 704878 | <i>1.06</i> | 6616 | <i>1.35</i> | 6210 | <i>1.32</i> | 176 | |
| rococoB10-011000 | 126998 | 7200 | 18428 | 136207 | 3721 | < 1 | 126061 | 0.99 | 7200 | 1.00 | 16208 | 0.88 | 134770 | 0.99 | 3049 | 0.82 | < 1 | 0.93 | 1526 | |
| rococoC10-001000 | 64603 | 1178 | 1242 | 6020 | 696 | < 1 | 73925 | <i>1.14</i> | 1437 | <i>1.22</i> | 1504 | <i>1.21</i> | 6694 | <i>1.11</i> | 723 | 1.04 | < 1 | 0.97 | 670 | \checkmark |
| rococoC11-011100 | 36599 | 7200 | 39398 | 157326 | 4982 | < 1 | 32214 | 0.88 | 7200 | 1.00 | 41572 | <i>1.06</i> | 166723 | <i>1.06</i> | 5030 | 1.01 | < 1 | 0.99 | 258 | |
| rococoC12-111000 | 13127 | 7200 | 76117 | 143098 | 1863 | < 1 | 12330 | 0.94 | 7200 | 1.00 | 88979 | <i>1.17</i> | 153846 | <i>1.08</i> | 2926 | <i>1.57</i> | < 1 | <i>1.11</i> | 1855 | |
| roll3000 | 3357 | 69 | 597 | 703 | 59 | 4 | 3311 | 0.99 | 64 | 0.94 | 606 | 1.01 | 709 | 1.01 | 53 | 0.90 | 4 | <i>1.14</i> | 199 | |
| rvb-sub | 48155 | 7200 | 350237 | 566019 | 4105 | 4 | 47525 | 0.99 | 7200 | 1.00 | 266167 | 0.76 | 531109 | 0.94 | 4196 | 1.02 | 4 | 1.02 | < 1 | |
| satellites1-25 | 1121 | 811 | 67687 | 76836 | 699 | 56 | 161 | 0.14 | 702 | 0.87 | 33850 | 0.50 | 60370 | 0.79 | 530 | 0.76 | 56 | 1.00 | 529 | \checkmark |
| satellites2-60-fs | 46 | 7200 | 720000 | 700690 | 2811 | 111 | 6 | 0.13 | 7200 | 1.00 | 720001 | 1.00 | 710409 | 1.01 | 3465 | <i>1.23</i> | 116 | <i>1.05</i> | 1577 | \checkmark |
| sct1 | 2867 | 7200 | 106076 | 186709 | 3359 | 1 | 3134 | <i>1.09</i> | 7200 | 1.00 | 102015 | 0.96 | 182053 | 0.98 | 2662 | 0.79 | 1 | 0.99 | 14 | |
| sct32 | 121419 | 7200 | 336363 | 413174 | 4999 | 61 | 107228 | 0.88 | 7200 | 1.00 | 366727 | <i>1.09</i> | 437076 | <i>1.06</i> | 3568 | 0.71 | 65 | <i>1.06</i> | 1294 | |
| sct5 | 12718 | 7200 | 64358 | 64591 | 3821 | 6 | 20141 | <i>1.58</i> | 7200 | 1.00 | 51421 | 0.80 | 51659 | 0.80 | 5059 | <i>1.32</i> | 6 | 1.02 | 267 | |
| set3-10 | 190247 | 7200 | 95089 | 415454 | 6032 | < 1 | 148319 | 0.78 | 7200 | 1.00 | 107262 | <i>1.13</i> | 422212 | 1.02 | 5674 | 0.94 | < 1 | 1.00 | 721 | \checkmark |
| set3-15 | 220584 | 7200 | 134545 | 427471 | 6029 | < 1 | 207964 | 0.94 | 7200 | 1.00 | 144219 | <i>1.07</i> | 438534 | 1.03 | 6271 | 1.04 | < 1 | 0.93 | 850 | |
| set3-20 | 182234 | 7200 | 76720 | 404179 | 6122 | < 1 | 184747 | 1.01 | 7200 | 1.00 | 95488 | <i>1.24</i> | 410509 | 1.02 | 5033 | 0.82 | < 1 | 1.01 | 880 | |
| seymour | 210806 | 7200 | 1715 | 12269 | 3555 | < 1 | 209922 | 1.00 | 7200 | 1.00 | 1743 | 1.02 | 12536 | 1.02 | 3889 | <i>1.09</i> | < 1 | 0.86 | 770 | |
| seymour-disj-10 | 97420 | 7200 | 2025 | 13136 | 2992 | < 1 | 97507 | 1.00 | 7200 | 1.00 | 1492 | 0.74 | 12452 | 0.95 | 1980 | 0.66 | < 1 | 0.88 | 702 | |
| shipsched | 548252 | 7200 | 172165 | 460302 | 5477 | 44 | 591187 | <i>1.08</i> | 7200 | 1.00 | 131956 | 0.77 | 450015 | 0.98 | 5426 | 0.99 | 42 | 0.96 | 1671 | |

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Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | \mathbf{I} |
| shs1023 | 13 | 7200 | 710294 | 710876 | 7093 | 7093 | 12 | 0.90 | 7200 | 1.00 | 721468 | 1.02 | 721468 | 1.01 | 7200 | 1.02 | 7200 | 1.02 | 4 | |
| siena1 | 1074 | 7200 | 590538 | 610757 | 5336 | 48 | 1008 | 0.94 | 7200 | 1.00 | 570771 | 0.97 | 594079 | 0.97 | 5663 | <i>1.06</i> | 47 | 0.99 | 873 | |
| sing161 | 6 | 7200 | 503159 | 508104 | 4065 | 3676 | 4 | 0.55 | 7200 | 1.00 | 496150 | 0.99 | 501243 | 0.99 | 4119 | 1.01 | 3552 | 0.97 | 138 | |
| sing2 | 3373 | 7200 | 55051 | 60556 | 4357 | 4 | 3753 | <i>1.11</i> | 7200 | 1.00 | 46711 | 0.85 | 52213 | 0.86 | 4155 | 0.95 | 5 | <i>1.10</i> | 646 | |
| sing245 | 2 | 7200 | 265581 | 272084 | 6788 | 439 | 2 | <i>1.18</i> | 7200 | 1.00 | 266290 | 1.00 | 272845 | 1.00 | 4522 | 0.67 | 440 | 1.00 | 1270 | |
| sing359 | 5 | 7200 | 387221 | 391941 | 5004 | 2946 | 4 | 0.89 | 7200 | 1.00 | 431358 | <i>1.11</i> | 435538 | <i>1.11</i> | 5835 | <i>1.17</i> | 3182 | <i>1.08</i> | 411 | |
| sp97ar | 21186 | 7200 | 118749 | 715977 | 6175 | 1 | 19648 | 0.93 | 7200 | 1.00 | 123306 | 1.04 | 716007 | 1.00 | 4965 | 0.80 | 1 | 0.97 | 317 | |
| sp98ic | 47572 | 7200 | 22132 | 30460 | 6050 | 1 | 55434 | <i>1.17</i> | 7200 | 1.00 | 19883 | 0.90 | 28943 | 0.95 | 4513 | 0.75 | 1 | 1.00 | 6444 | \checkmark |
| sp98ir | 4915 | 80 | 271 | 345 | 56 | 1 | 6741 | <i>1.37</i> | 101 | <i>1.27</i> | 295 | <i>1.09</i> | 385 | <i>1.12</i> | 68 | <i>1.21</i> | 1 | 0.96 | 308 | |
| stockholm | 6554 | 7200 | 45257 | 646955 | 1148 | 14 | 6684 | 1.02 | 7200 | 1.00 | 42496 | 0.94 | 639119 | 0.99 | 1607 | <i>1.40</i> | 14 | 1.00 | 213 | |
| stp3d | 21 | 7200 | 720166 | 720166 | 7200 | 7200 | 17 | 0.84 | 7200 | 1.00 | 721142 | 1.00 | 721142 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 105 | |
| sts405 | 61247 | 7200 | 16338 | 322026 | 2839 | < 1 | 61413 | 1.00 | 7200 | 1.00 | 16342 | 1.00 | 322088 | 1.00 | 2852 | 1.00 | < 1 | 0.86 | 60 | |
| sts729 | 373 | 7200 | 7419 | 428216 | 2658 | < 1 | 334 | 0.90 | 7200 | 1.00 | 7441 | 1.00 | 428296 | 1.00 | 2727 | 1.03 | < 1 | 0.98 | 5 | |
| swath | 919716 | 7200 | 24996 | 117779 | 5359 | < 1 | 865503 | 0.94 | 7200 | 1.00 | 19609 | 0.78 | 118284 | 1.00 | 5596 | 1.04 | < 1 | 0.93 | 4180 | |
| t1717 | 3536 | 7200 | 197784 | 301446 | 2859 | 5 | 3489 | 0.99 | 7200 | 1.00 | 195477 | 0.99 | 299533 | 0.99 | 2678 | 0.94 | 5 | 0.99 | 183 | |
| t1722 | 20166 | 7200 | 100790 | 186720 | 3743 | 1 | 17601 | 0.87 | 7200 | 1.00 | 112212 | <i>1.11</i> | 197081 | <i>1.06</i> | 2696 | 0.72 | 1 | 0.98 | 2827 | |
| tanglegram1 | 53 | 433 | 1378 | 26392 | 338 | < 1 | 47 | 0.90 | 397 | 0.92 | 1148 | 0.83 | 24341 | 0.92 | 301 | 0.89 | < 1 | <i>1.05</i> | < 1 | |
| tanglegram2 | 3 | 4 | 23 | 418 | 4 | < 1 | 3 | 1.00 | 4 | 1.00 | 23 | 1.00 | 419 | 1.00 | 4 | 1.00 | < 1 | 0.78 | 84 | |
| timtab1 | 58161 | 82 | 677 | 1478 | 57 | 3 | 51476 | 0.89 | 70 | 0.86 | 456 | 0.67 | 1242 | 0.84 | 47 | 0.82 | 2 | 0.72 | 248 | \checkmark |
| toll-like | 197463 | 7200 | 9717 | 184379 | 4725 | < 1 | 185164 | 0.94 | 7200 | 1.00 | 7446 | 0.77 | 177164 | 0.96 | 5348 | <i>1.13</i> | < 1 | 1.00 | 706 | |
| triptim1 | 180 | 1655 | 38918 | 38914 | 931 | 367 | 33 | 0.18 | 820 | 0.50 | 42019 | <i>1.08</i> | 42008 | <i>1.08</i> | 689 | 0.74 | 389 | <i>1.06</i> | 73 | |
| triptim2 | 58 | 7200 | 361958 | 364474 | 4311 | 2252 | 53 | 0.91 | 7200 | 1.00 | 318792 | 0.88 | 334104 | 0.92 | 3575 | 0.83 | 1950 | 0.87 | 115 | |
| triptim3 | 141 | 7200 | 279277 | 279520 | 3957 | 2789 | 95 | 0.67 | 7200 | 1.00 | 236926 | 0.85 | 237331 | 0.85 | 3362 | 0.85 | 2285 | 0.82 | 392 | |
| tw-myciel4 | 97963 | 7200 | 975 | 363920 | 55 | < 1 | 101694 | 1.04 | 7200 | 1.00 | 902 | 0.93 | 365797 | 1.01 | 65 | <i>1.19</i> | < 1 | 1.03 | 12167 | \checkmark |
| uc-case11 | 3533 | 7200 | 11982 | 22904 | 3773 | 4 | 3560 | 1.01 | 7200 | 1.00 | 13969 | <i>1.17</i> | 24849 | <i>1.08</i> | 2787 | 0.74 | 4 | 1.03 | 21 | |
| uc-case3 | 810 | 7200 | 12130 | 14056 | 4895 | 6 | 5111 | <i>6.31</i> | 7200 | 1.00 | 13714 | <i>1.13</i> | 15587 | <i>1.11</i> | 5368 | <i>1.10</i> | 6 | 1.02 | 637 | |
| uct-subprob | 337922 | 7200 | 2192 | 38567 | 1210 | < 1 | 320685 | 0.95 | 7108 | 0.99 | 2402 | <i>1.10</i> | 38245 | 0.99 | 1485 | <i>1.23</i> | < 1 | 0.83 | 2864 | |
| umts | 1109536 | 4530 | 453035 | 1900 | 3907 | < 1 | 913596 | 0.82 | 3796 | 0.84 | 379612 | 0.84 | 1445 | 0.76 | 3290 | 0.84 | < 1 | 1.01 | 1114 | |
| unitcal_7 | 274 | 399 | 12613 | 12627 | 345 | 126 | 46 | 0.17 | 295 | 0.74 | 10562 | 0.84 | 10577 | 0.84 | 291 | 0.84 | 105 | 0.83 | 9144 | \checkmark |
| usAbbrv-8-25_70 | 495346 | 7200 | 10015 | 75526 | 2663 | < 1 | 614117 | <i>1.24</i> | 7200 | 1.00 | 7808 | 0.78 | 71908 | 0.95 | 2746 | 1.03 | < 1 | <i>1.08</i> | 79097 | \checkmark |

cont. on next page

Table 5: Detailed computational results on MIPLIB2010 test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|------------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | \mathbf{I} |
| van | 2017 | 7200 | 60428 | 333458 | 1742 | 1 | 2355 | <i>1.17</i> | 7200 | 1.00 | 57324 | 0.95 | 327362 | 0.98 | 2041 | <i>1.17</i> | 1 | 1.01 | 127 | \checkmark |
| vpphard | 10716 | 7200 | 474562 | 719616 | 4700 | 581 | 5296 | 0.49 | 7200 | 1.00 | 556158 | <i>1.17</i> | 720001 | 1.00 | 4617 | 0.98 | 624 | <i>1.07</i> | 1109 | |
| vpphard2 | 4519 | 7200 | 540696 | 713490 | 4469 | 601 | 4317 | 0.96 | 7200 | 1.00 | 570384 | <i>1.05</i> | 714510 | 1.00 | 5243 | <i>1.17</i> | 565 | 0.94 | 464 | |
| wachplan | 294588 | 3579 | 357878 | 41079 | 15 | 15 | 236908 | 0.80 | 2976 | 0.83 | 297558 | 0.83 | 33667 | 0.82 | 7 | 0.46 | 7 | 0.46 | 10037 | |
| wnq-n100-mw99-14 | 183 | 7200 | 651801 | 662305 | 5963 | 4608 | 453 | <i>2.48</i> | 7200 | 1.00 | 582378 | 0.89 | 602466 | 0.91 | 6082 | 1.02 | 4421 | 0.96 | 583 | |
| zib54-UUE | 59368 | 1798 | 2188 | 19591 | 169 | < 1 | 55417 | 0.93 | 1791 | 1.00 | 2445 | <i>1.12</i> | 17378 | 0.89 | 160 | 0.95 | < 1 | 0.92 | 237 | \checkmark |
| geom. | 5422.28 | 2128.28 | – | 49550.95 | 1072.26 | 4.64 | 5087.18 | 0.94 | 2088.87 | 0.98 | – | – | 48595.88 | 0.98 | 974.41 | 0.91 | 4.49 | 0.97 | – | |
| shgeom. | 9717.20 | 2174.16 | 19987.46 | 50237.30 | 1123.48 | 17.15 | 9745.33 | 1.00 | 2133.03 | 0.98 | 19221.20 | 0.96 | 49346.95 | 0.98 | 1045.67 | 0.93 | 16.76 | 0.98 | 346.53 | |

Table 6: Detailed computational results on COR@L test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|-------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | |
| 22433 | 4 | 3 | 26 | 26 | 3 | < 1 | 4 | 0.96 | 3 | 0.99 | 36 | <i>1.39</i> | 36 | <i>1.39</i> | 3 | 0.98 | < 1 | <i>1.44</i> | 1146 | | |
| 23588 | 687 | 5 | 82 | 94 | 4 | 1 | 515 | 0.75 | 4 | 0.89 | 84 | 1.03 | 96 | 1.02 | 4 | 0.89 | 1 | <i>1.05</i> | 140 | | |
| Test3 | 2 | 6 | 190 | 196 | 5 | 2 | 2 | 1.00 | 6 | 0.98 | 193 | 1.01 | 198 | 1.01 | 5 | 1.02 | 2 | 1.00 | 2581 | \checkmark | |
| aligninq | 928 | 20 | 418 | 439 | 7 | 4 | 1321 | <i>1.42</i> | 25 | <i>1.22</i> | 583 | <i>1.39</i> | 607 | <i>1.38</i> | 9 | <i>1.16</i> | 6 | <i>1.40</i> | 1044 | | |
| bc | 15435 | 1024 | 7062 | 27579 | 85 | 3 | 13962 | 0.90 | 1859 | <i>1.82</i> | 15413 | <i>2.18</i> | 51748 | <i>1.88</i> | 163 | <i>1.91</i> | 3 | 1.00 | 43 | | |
| bc1 | 3249 | 208 | 5661 | 7799 | 200 | 2 | 3687 | <i>1.13</i> | 209 | 1.00 | 3172 | 0.56 | 5800 | 0.74 | 195 | 0.98 | 2 | 0.99 | 21 | \checkmark | |
| bienst1 | 11358 | 123 | 372 | 1759 | 25 | < 1 | 10563 | 0.93 | 117 | 0.96 | 221 | 0.59 | 1721 | 0.98 | 30 | <i>1.18</i> | < 1 | 0.90 | 278 | \checkmark | |
| bienst2 | 69421 | 637 | 1005 | 10700 | 259 | < 1 | 59356 | 0.86 | 511 | 0.80 | 453 | 0.45 | 9178 | 0.86 | 157 | 0.61 | < 1 | <i>1.29</i> | 257 | \checkmark | |
| binkar10_1 | 2505 | 32 | 39 | 48 | 17 | < 1 | 3200 | <i>1.28</i> | 42 | <i>1.31</i> | 29 | 0.74 | 42 | 0.88 | 16 | 0.93 | < 1 | 0.80 | 3012 | \checkmark | |
| d10200 | 760704 | 7200 | 1325 | 1501 | 3991 | < 1 | 835075 | <i>1.10</i> | 7200 | 1.00 | 1268 | 0.96 | 1444 | 0.96 | 4601 | <i>1.15</i> | < 1 | 1.03 | 4810 | | |
| d20200 | 98799 | 7200 | 2910 | 7109 | 773 | 1 | 105436 | <i>1.07</i> | 7200 | 1.00 | 3498 | <i>1.20</i> | 7696 | <i>1.08</i> | 602 | 0.78 | 1 | 1.01 | 1461 | | |
| dano3_3 | 10 | 155 | 1515 | 3059 | 135 | 15 | 10 | 0.93 | 161 | 1.04 | 1528 | 1.01 | 3105 | 1.01 | 142 | <i>1.05</i> | 15 | 1.01 | 6568 | | |
| dano3_4 | 8 | 186 | 1238 | 3047 | 81 | 12 | 8 | <i>1.09</i> | 189 | 1.02 | 1237 | 1.00 | 3040 | 1.00 | 100 | <i>1.25</i> | 12 | 1.00 | 10386 | | |
| dano3_5 | 194 | 430 | 1430 | 3360 | 383 | 12 | 177 | 0.91 | 451 | <i>1.05</i> | 1427 | 1.00 | 3388 | 1.01 | 403 | <i>1.05</i> | 12 | 1.00 | 4 | \checkmark | |
| fiball | 11540 | 947 | 2705 | 2874 | 947 | 1 | 6147 | 0.53 | 642 | 0.68 | 2033 | 0.75 | 2198 | 0.76 | 642 | 0.68 | 1 | 1.00 | 313 | | |
| germanrr | 2329 | 7200 | 50605 | 58179 | 3747 | 435 | 2882 | <i>1.24</i> | 7200 | 1.00 | 54978 | <i>1.09</i> | 62585 | <i>1.08</i> | 3746 | 1.00 | 474 | <i>1.09</i> | 299 | | |
| haprp | 1 | 1 | 4 | 7 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 2 | 0.54 | 6 | 0.78 | < 1 | <i>1.14</i> | < 1 | 0.95 | 23 | \checkmark | |
| leo1 | 81384 | 7200 | 28527 | 53482 | 4138 | < 1 | 66433 | 0.82 | 7200 | 1.00 | 23591 | 0.83 | 49235 | 0.92 | 5153 | <i>1.25</i> | < 1 | 0.97 | 103 | | |
| leo2 | 93537 | 7200 | 79009 | 720000 | 3276 | 1 | 92595 | 0.99 | 7200 | 1.00 | 77495 | 0.98 | 720001 | 1.00 | 4430 | <i>1.35</i> | 1 | 0.97 | 1820 | | |
| lrn | 2129 | 7200 | 226196 | 226298 | 6489 | 2 | 2684 | <i>1.26</i> | 7200 | 1.00 | 128781 | 0.57 | 129070 | 0.57 | 6549 | 1.01 | 2 | 0.97 | 690 | | |
| mcf2 | 1177174 | 4389 | 977 | 12896 | 227 | 7 | 1155238 | 0.98 | 4252 | 0.97 | 1437 | <i>1.47</i> | 13826 | <i>1.07</i> | 834 | <i>3.68</i> | 7 | 0.94 | 1012 | | |
| mcsched | 16226 | 356 | 151 | 2203 | 228 | < 1 | 16328 | 1.01 | 286 | 0.80 | 140 | 0.93 | 1750 | 0.79 | 161 | 0.70 | < 1 | 1.04 | 21 | \checkmark | |
| mkc1 | 613835 | 1115 | 60 | 66 | 487 | < 1 | 57540 | 0.09 | 200 | 0.18 | 57 | 0.95 | 62 | 0.94 | 59 | 0.12 | < 1 | <i>1.17</i> | 15 | \checkmark | |
| nag | 52436 | 7200 | 237509 | 588866 | 5453 | 223 | 62161 | <i>1.19</i> | 7200 | 1.00 | 216375 | 0.91 | 584059 | 0.99 | 5417 | 0.99 | 158 | 0.71 | 3057 | \checkmark | |
| neos-1053234 | 578678 | 6176 | 21 | 52514 | 2708 | < 1 | 1063447 | <i>1.84</i> | 6296 | 1.02 | 22 | 1.01 | 55254 | <i>1.05</i> | 2913 | <i>1.08</i> | < 1 | 0.97 | 765 | | |
| neos-1053591 | 4525 | 6 | 12 | 14 | 2 | < 1 | 3264 | 0.72 | 4 | 0.77 | 11 | 0.99 | 15 | <i>1.10</i> | 2 | 0.85 | < 1 | 0.96 | 32 | \checkmark | |
| neos-1056905 | 7754399 | 5801 | 13089 | 50502 | 1143 | < 1 | 5910080 | 0.76 | 5142 | 0.89 | 19136 | <i>1.46</i> | 51309 | 1.02 | 3081 | <i>2.70</i> | < 1 | 1.00 | 15828 | \checkmark | |
| neos-1061020 | 2746 | 550 | 10526 | 11042 | 465 | 99 | 4187 | <i>1.52</i> | 723 | <i>1.31</i> | 14484 | <i>1.38</i> | 15013 | <i>1.36</i> | 460 | 0.99 | 138 | <i>1.39</i> | 195 | | |
| neos-1062641 | 1 | 1 | 10 | 9 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 10 | 1.00 | 8 | 0.92 | < 1 | 0.92 | < 1 | 0.90 | 0 | | |

cont. on next page

Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | |
| neos-1067731 | 180780 | 7200 | 830 | 217890 | 2185 | < 1 | 184254 | 1.02 | 7200 | 1.00 | 1036 | <i>1.25</i> | 214547 | 0.98 | 1943 | 0.89 | < 1 | 1.00 | 588 | \checkmark |
| neos-1096528 | 23559 | 7200 | 31412 | 73026 | 1217 | 245 | 24332 | 1.03 | 7200 | 1.00 | 29369 | 0.93 | 70204 | 0.96 | 1153 | 0.95 | 215 | 0.87 | 483 | \checkmark |
| neos-1109824 | 6851 | 101 | 615 | 1082 | 19 | 5 | 5825 | 0.85 | 79 | 0.78 | 333 | 0.54 | 668 | 0.62 | 13 | 0.71 | 2 | 0.32 | 252 | \checkmark |
| neos-1120495 | 18 | 9 | 260 | 290 | 8 | 1 | 18 | 1.00 | 12 | <i>1.35</i> | 246 | 0.95 | 284 | 0.98 | 11 | <i>1.34</i> | < 1 | 0.62 | 34 | \checkmark |
| neos-1121679 | 27499670 | 7200 | 344297 | 720013 | 1608 | < 1 | 28832486 | <i>1.05</i> | 7200 | 1.00 | 355771 | 1.03 | 720003 | 1.00 | 2977 | <i>1.85</i> | < 1 | 1.00 | 33736 | |
| neos-1122047 | 1 | 4 | 435 | 436 | 4 | 4 | 1 | 1.00 | 5 | 1.04 | 455 | <i>1.05</i> | 455 | 1.04 | 5 | 1.04 | 5 | 1.04 | 0 | |
| neos-1126860 | 4183 | 697 | 1464 | 17149 | 23 | 11 | 4343 | 1.04 | 727 | 1.04 | 1456 | 0.99 | 14854 | 0.87 | 104 | <i>4.52</i> | 11 | 0.97 | 29 | |
| neos-1151496 | 713 | 52 | 2956 | 4173 | 36 | 27 | 726 | 1.02 | 55 | <i>1.07</i> | 3250 | <i>1.10</i> | 4526 | <i>1.08</i> | 39 | <i>1.09</i> | 30 | <i>1.11</i> | 102 | |
| neos-1171448 | 127 | 1138 | 824 | 907 | 1138 | < 1 | 174 | <i>1.37</i> | 1873 | <i>1.65</i> | 889 | <i>1.08</i> | 972 | <i>1.07</i> | 1152 | 1.01 | < 1 | <i>1.24</i> | 0 | |
| neos-1171692 | 665 | 576 | 529 | 538 | 576 | < 1 | 203 | 0.30 | 138 | 0.24 | 387 | 0.73 | 398 | 0.74 | 138 | 0.24 | < 1 | 0.86 | 4 | |
| neos-1171737 | 4349 | 7200 | 10262 | 10269 | 1713 | < 1 | 4005 | 0.92 | 7200 | 1.00 | 11432 | <i>1.11</i> | 11437 | <i>1.11</i> | 774 | 0.45 | < 1 | 0.88 | 1 | |
| neos-1173026 | 1 | 1 | 18 | 18 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 19 | <i>1.05</i> | 19 | 1.01 | < 1 | 1.01 | < 1 | <i>1.06</i> | 0 | |
| neos-1200887 | 22628 | 37 | 41 | 161 | 4 | < 1 | 28067 | <i>1.24</i> | 41 | <i>1.13</i> | 40 | 0.96 | 170 | <i>1.06</i> | 3 | 0.81 | < 1 | 1.00 | 108 | |
| neos-1208069 | 2642 | 101 | 9369 | 9514 | 101 | 82 | 1245 | 0.47 | 109 | <i>1.08</i> | 10713 | <i>1.14</i> | 10714 | <i>1.13</i> | 109 | <i>1.08</i> | 105 | <i>1.29</i> | 218 | |
| neos-1208135 | 2339 | 231 | 17591 | 21219 | 228 | 98 | 5430 | <i>2.32</i> | 465 | <i>2.01</i> | 37406 | <i>2.13</i> | 45797 | <i>2.16</i> | 464 | <i>2.04</i> | 236 | <i>2.42</i> | 1489 | |
| neos-1211578 | 184819 | 66 | 9 | 94 | 1 | < 1 | 176834 | 0.96 | 66 | 0.99 | 10 | <i>1.06</i> | 93 | 0.99 | 1 | 1.01 | < 1 | 1.00 | 882 | |
| neos-1215259 | 1973 | 77 | 2955 | 3972 | 49 | 26 | 3174 | <i>1.61</i> | 99 | <i>1.29</i> | 2732 | 0.92 | 4371 | <i>1.10</i> | 62 | <i>1.28</i> | 19 | 0.73 | 348 | |
| neos-1215891 | 4407 | 633 | 1773 | 1822 | 87 | 18 | 4947 | <i>1.12</i> | 520 | 0.82 | 1182 | 0.67 | 1224 | 0.67 | 67 | 0.77 | 12 | 0.66 | 145 | |
| neos-1223462 | 284 | 165 | 16450 | 16456 | 165 | 165 | 281 | 0.99 | 163 | 0.99 | 16300 | 0.99 | 16298 | 0.99 | 163 | 0.99 | 163 | 0.99 | 33 | |
| neos-1224597 | 1 | 1 | 121 | 123 | 1 | 1 | 1 | 1.00 | 2 | <i>1.59</i> | 147 | <i>1.21</i> | 145 | <i>1.19</i> | 2 | <i>1.59</i> | 1 | <i>1.08</i> | 5 | |
| neos-1228986 | 123904 | 57 | 9 | 212 | 18 | < 1 | 174959 | <i>1.41</i> | 69 | <i>1.20</i> | 3 | 0.39 | 189 | 0.89 | 4 | 0.20 | < 1 | 1.00 | 1062 | \checkmark |
| neos-1281048 | 218 | 10 | 546 | 568 | 8 | 4 | 327 | <i>1.50</i> | 11 | <i>1.16</i> | 735 | <i>1.35</i> | 755 | <i>1.33</i> | 10 | <i>1.19</i> | 5 | <i>1.22</i> | 203 | |
| neos-1311124 | 15287825 | 7200 | 20 | 3976 | 2926 | < 1 | 15720083 | 1.03 | 7200 | 1.00 | 20 | 0.98 | 3976 | 1.00 | 406 | 0.14 | < 1 | 1.00 | 1944 | |
| neos-1324574 | 99838 | 7200 | 10 | 217293 | 2095 | < 1 | 127864 | <i>1.28</i> | 7200 | 1.00 | 10 | 1.00 | 205507 | 0.95 | 3853 | <i>1.84</i> | < 1 | 1.00 | 4078 | |
| neos-1330346 | 238656 | 5850 | 10 | 143676 | 307 | < 1 | 234937 | 0.98 | 5496 | 0.94 | 10 | 1.00 | 134008 | 0.93 | 1457 | <i>4.75</i> | < 1 | <i>1.06</i> | 1078 | |
| neos-1330635 | 1 | 1 | 12 | 16 | < 1 | < 1 | 1 | 1.00 | 1 | 1.01 | 18 | <i>1.49</i> | 31 | <i>1.93</i> | < 1 | <i>2.27</i> | < 1 | 1.02 | 42 | \checkmark |
| neos-1337307 | 547670 | 7200 | 8981 | 9618 | 1068 | 90 | 562102 | 1.03 | 7200 | 1.00 | 8220 | 0.92 | 8704 | 0.90 | 222 | 0.21 | 82 | 0.91 | 2853 | |
| neos-1337489 | 184819 | 66 | 10 | 94 | 1 | < 1 | 176834 | 0.96 | 66 | 1.00 | 9 | 0.90 | 94 | 1.00 | 1 | 1.00 | < 1 | 1.00 | 882 | |
| neos-1346382 | 7765465 | 7200 | 16 | 8108 | 3107 | < 1 | 8433384 | <i>1.09</i> | 7200 | 1.00 | 15 | 0.94 | 8107 | 1.00 | 1283 | 0.41 | < 1 | 1.00 | 159390 | |
| neos-1354092 | 636 | 7200 | 720000 | 720000 | 7200 | 7200 | 489 | 0.77 | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 29 | |

cont. on next page

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | |
| neos-1367061 | 1 | 31 | 1381 | 2432 | 31 | 1 | 1 | 1.00 | 31 | 1.01 | 1396 | 1.01 | 2462 | 1.01 | 31 | 1.01 | 1 | 1.00 | 0 | | |
| neos-1396125 | 40507 | 349 | 3562 | 9858 | 164 | 29 | 49225 | <i>1.22</i> | 360 | 1.03 | 2451 | 0.69 | 8666 | 0.88 | 177 | <i>1.08</i> | 24 | 0.81 | 309 \checkmark | | |
| neos-1407044 | 59 | 7200 | 720000 | 720000 | 7200 | 7200 | 98 | <i>1.65</i> | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 13 | | |
| neos-1413153 | 2 | 4 | 172 | 225 | 4 | < 1 | 2 | 0.75 | 4 | 1.01 | 151 | 0.88 | 210 | 0.93 | 4 | 1.02 | < 1 | 0.98 | 33 \checkmark | | |
| neos-1415183 | 2 | 7 | 432 | 476 | 7 | < 1 | 2 | <i>1.20</i> | 8 | <i>1.16</i> | 423 | 0.98 | 496 | 1.04 | 8 | <i>1.16</i> | < 1 | 0.89 | 123 \checkmark | | |
| neos-1417043 | 1 | 1207 | 120733 | 120733 | 1207 | 1207 | 1 | 1.00 | 1205 | 1.00 | 120517 | 1.00 | 120517 | 1.00 | 1205 | 1.00 | 1205 | 1.00 | 0 | | |
| neos-1420205 | 11093 | 6 | 7 | 146 | < 1 | < 1 | 2500 | 0.23 | 3 | 0.49 | 7 | 1.02 | 103 | 0.70 | < 1 | <i>1.72</i> | < 1 | 0.82 | 37 \checkmark | | |
| neos-1420546 | 1509 | 7200 | 4474 | 36995 | 3844 | < 1 | 1514 | 1.00 | 7200 | 1.00 | 4482 | 1.00 | 37021 | 1.00 | 3844 | 1.00 | < 1 | 1.00 | < 1 | | |
| neos-1420790 | 103191 | 7200 | 5964 | 47472 | 3754 | < 1 | 132819 | <i>1.29</i> | 7200 | 1.00 | 7239 | <i>1.21</i> | 48544 | 1.02 | 4382 | <i>1.17</i> | < 1 | 1.00 | 15541 | | |
| neos-1423785 | 32621 | 7200 | 189078 | 428911 | 5518 | 4 | 45184 | <i>1.39</i> | 7200 | 1.00 | 187735 | 0.99 | 432168 | 1.01 | 6264 | <i>1.14</i> | 4 | 0.98 | 254 \checkmark | | |
| neos-1425699 | 1 | 1 | 0 | < 1 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 1.00 | < 1 | <i>2.00</i> | < 1 | 1.00 | < 1 | 1.00 | 0 \checkmark | | |
| neos-1426635 | 7800036 | 7200 | 16 | 8107 | 3028 | < 1 | 8479862 | <i>1.09</i> | 7200 | 1.00 | 15 | 0.95 | 8107 | 1.00 | 1270 | 0.42 | < 1 | 1.00 | 158694 | | |
| neos-1426662 | 1971233 | 7200 | 67 | 76481 | 2826 | < 1 | 1772642 | 0.90 | 7200 | 1.00 | 68 | 1.00 | 75661 | 0.99 | 1318 | 0.47 | < 1 | 1.00 | 8312 | | |
| neos-1427181 | 2255980 | 7200 | 20 | 13277 | 361 | < 1 | 3086138 | <i>1.37</i> | 7200 | 1.00 | 21 | 1.03 | 13434 | 1.01 | 950 | <i>2.63</i> | < 1 | 1.00 | 19036 | | |
| neos-1427261 | 686789 | 7200 | 63 | 15296 | 79 | < 1 | 634996 | 0.92 | 7200 | 1.00 | 116 | <i>1.82</i> | 15348 | 1.00 | 357 | <i>4.51</i> | < 1 | 1.00 | 11229 | | |
| neos-1429185 | 3395806 | 7200 | 32 | 17593 | 869 | < 1 | 3236979 | 0.95 | 7200 | 1.00 | 33 | 1.04 | 16551 | 0.94 | 103 | 0.12 | < 1 | 1.00 | 75685 | | |
| neos-1429212 | 1843 | 7200 | 720001 | 720001 | 7200 | 7200 | 3235 | <i>1.76</i> | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 493 | | |
| neos-1429461 | 5134809 | 7200 | 21 | 5314 | 107 | < 1 | 5296876 | 1.03 | 7200 | 1.00 | 20 | 0.96 | 5312 | 1.00 | 320 | <i>3.00</i> | < 1 | 1.00 | 56247 | | |
| neos-1430701 | 730149 | 423 | 14 | 453 | 2 | < 1 | 543069 | 0.74 | 336 | 0.79 | 13 | 0.88 | 354 | 0.78 | 5 | <i>2.14</i> | < 1 | 1.00 | 2126 \checkmark | | |
| neos-1430811 | 788 | 7200 | 477701 | 719999 | 5130 | 11 | 687 | 0.87 | 7200 | 1.00 | 487276 | 1.02 | 719999 | 1.00 | 4137 | 0.81 | 11 | 0.98 | 399 | | |
| neos-1436709 | 2903018 | 7200 | 19 | 5600 | 137 | < 1 | 2877043 | 0.99 | 7200 | 1.00 | 21 | <i>1.06</i> | 5601 | 1.00 | 2200 | <i>16.02</i> | < 1 | 1.00 | 34354 | | |
| neos-1436713 | 481839 | 7200 | 46 | 16203 | 140 | < 1 | 371260 | 0.77 | 7200 | 1.00 | 45 | 0.99 | 16201 | 1.00 | 40 | 0.28 | < 1 | 1.00 | 5358 | | |
| neos-1437164 | 1 | 1 | 60 | 63 | 1 | 1 | 1 | 1.00 | 1 | 1.00 | 60 | 1.00 | 63 | 1.00 | 1 | 0.99 | 1 | 0.99 | 0 | | |
| neos-1439395 | 11803298 | 7200 | 16 | 4739 | 161 | < 1 | 12521497 | <i>1.06</i> | 7200 | 1.00 | 16 | 1.00 | 4306 | 0.91 | 25 | 0.15 | < 1 | 1.00 | 27757 | | |
| neos-1440225 | 3734 | 82 | 8218 | 8226 | 82 | 82 | 4476 | <i>1.20</i> | 105 | <i>1.27</i> | 10453 | <i>1.27</i> | 10456 | <i>1.27</i> | 105 | <i>1.27</i> | 105 | <i>1.27</i> | 66 | | |
| neos-1440447 | 74326 | 58 | 9 | 110 | 1 | < 1 | 63921 | 0.86 | 52 | 0.89 | 9 | 1.01 | 101 | 0.91 | 1 | <i>1.31</i> | < 1 | 1.00 | 580 | | |
| neos-1440457 | 3105583 | 7200 | 23 | 3027 | 1965 | < 1 | 3163092 | 1.02 | 7200 | 1.00 | 23 | 1.01 | 3027 | 1.00 | 880 | 0.45 | < 1 | 1.00 | 24005 | | |
| neos-1440460 | 6006292 | 7200 | 21 | 3020 | 2121 | < 1 | 5974018 | 0.99 | 7200 | 1.00 | 20 | 0.98 | 3019 | 1.00 | 737 | 0.35 | < 1 | 1.00 | 26334 \checkmark | | |
| neos-1441553 | 6 | 3 | 225 | 226 | 3 | 2 | 1 | 0.18 | 1 | 0.48 | 108 | 0.48 | 110 | 0.49 | 1 | 0.48 | 1 | 0.65 | 59 \checkmark | | |
| neos-1442119 | 2189513 | 7200 | 18 | 3974 | 307 | < 1 | 2297826 | <i>1.05</i> | 7200 | 1.00 | 20 | <i>1.14</i> | 3975 | 1.00 | 1505 | <i>4.89</i> | < 1 | 1.00 | 20642 | | |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | |
| neos-1442657 | 2858252 | 7200 | 21 | 6944 | 96 | < 1 | 2700168 | 0.94 | 7200 | 1.00 | 21 | 0.98 | 6942 | 1.00 | 947 | <i>9.91</i> | < 1 | 1.00 | 64330 | | |
| neos-1445532 | 4644 | 7200 | 24607 | 93955 | 4198 | < 1 | 4297 | 0.93 | 7200 | 1.00 | 32981 | <i>1.34</i> | 106818 | <i>1.14</i> | 5095 | <i>1.21</i> | < 1 | <i>1.29</i> | 1432 \checkmark | | |
| neos-1445738 | 65453 | 7200 | 103149 | 238544 | 4228 | < 1 | 48652 | 0.74 | 7200 | 1.00 | 142941 | <i>1.39</i> | 262013 | <i>1.10</i> | 5720 | <i>1.35</i> | < 1 | 0.93 | 701 \checkmark | | |
| neos-1445743 | 156 | 50 | 2608 | 2681 | 47 | < 1 | 156 | 1.00 | 50 | 1.00 | 2610 | 1.00 | 2684 | 1.00 | 47 | 1.00 | < 1 | 0.88 | 0 | | |
| neos-1445755 | 170 | 53 | 2822 | 2894 | 49 | < 1 | 171 | 1.00 | 53 | 0.99 | 2847 | 1.01 | 2918 | 1.01 | 49 | 1.00 | < 1 | <i>1.33</i> | 1 | | |
| neos-1445765 | 148 | 52 | 2662 | 2754 | 39 | < 1 | 148 | 1.00 | 52 | 1.01 | 2689 | 1.01 | 2780 | 1.01 | 39 | 1.01 | < 1 | <i>1.12</i> | 12 | | |
| neos-1451294 | 21836 | 4730 | 122347 | 207542 | 2913 | 176 | 18051 | 0.83 | 4315 | 0.91 | 125664 | 1.03 | 197439 | 0.95 | 2064 | 0.71 | 131 | 0.74 | 1706 | | |
| neos-1456979 | 182212 | 6719 | 11492 | 50055 | 2391 | 62 | 129116 | 0.71 | 6410 | 0.95 | 12664 | <i>1.10</i> | 48524 | 0.97 | 2559 | <i>1.07</i> | 46 | 0.75 | 1865 | | |
| neos-1460246 | 2426992 | 7200 | 19 | 709 | 883 | < 1 | 2453927 | 1.01 | 7200 | 1.00 | 23 | <i>1.16</i> | 719 | 1.01 | 1111 | <i>1.26</i> | < 1 | <i>1.24</i> | 147001 | | |
| neos-1460265 | 200 | 6 | 101 | 103 | 6 | 1 | 228 | <i>1.14</i> | 6 | 0.95 | 73 | 0.72 | 75 | 0.73 | 6 | 0.95 | 1 | 0.70 | 32 | | |
| neos-1460543 | 20892 | 7200 | 12403 | 42150 | 4411 | < 1 | 23806 | <i>1.14</i> | 7200 | 1.00 | 13499 | <i>1.09</i> | 44385 | <i>1.05</i> | 1751 | 0.40 | < 1 | <i>1.05</i> | 580 | | |
| neos-1460641 | 638303 | 7200 | 125 | 330 | 3297 | < 1 | 611593 | 0.96 | 7200 | 1.00 | 144 | <i>1.15</i> | 348 | <i>1.06</i> | 3461 | <i>1.05</i> | < 1 | 1.02 | 21830 | | |
| neos-1461051 | 5013 | 48 | 4844 | 720000 | 7200 | 7200 | 3415 | 0.68 | 36 | 0.74 | 3571 | 0.74 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 115 | | |
| neos-1464762 | 475870 | 7200 | 274 | 478 | 1099 | 2 | 513692 | <i>1.08</i> | 7200 | 1.00 | 292 | <i>1.06</i> | 494 | 1.03 | 3037 | <i>2.76</i> | 2 | <i>1.16</i> | 39927 \checkmark | | |
| neos-1467067 | 12039087 | 7200 | 27 | 6951 | 951 | < 1 | 12078230 | 1.00 | 7200 | 1.00 | 27 | 1.01 | 6950 | 1.00 | 1946 | <i>2.05</i> | < 1 | 1.00 | 6756 | | |
| neos-1467371 | 451872 | 7200 | 1947 | 14339 | 1594 | 1 | 815347 | <i>1.80</i> | 7200 | 1.00 | 2390 | <i>1.23</i> | 12960 | 0.90 | 3463 | <i>2.17</i> | 1 | 1.02 | 25411 \checkmark | | |
| neos-1467467 | 61226 | 7200 | 4328 | 17071 | 225 | 1 | 199795 | <i>3.26</i> | 7200 | 1.00 | 5798 | <i>1.34</i> | 17768 | 1.04 | 4138 | <i>18.35</i> | 1 | 1.00 | 20727 | | |
| neos-1480121 | 1029 | 10 | 151 | 694 | 9 | < 1 | 273 | 0.27 | 15 | <i>1.54</i> | 168 | <i>1.11</i> | 1057 | <i>1.52</i> | 12 | <i>1.27</i> | < 1 | 0.86 | 72 \checkmark | | |
| neos-1489999 | 31 | 3 | 21 | 67 | 2 | < 1 | 59 | <i>1.90</i> | 4 | <i>1.17</i> | 24 | <i>1.13</i> | 80 | <i>1.19</i> | 3 | <i>1.34</i> | < 1 | 1.00 | 0 \checkmark | | |
| neos-1516309 | 1 | 1 | 16 | 18 | < 1 | < 1 | 1 | <i>1.17</i> | 1 | <i>1.08</i> | 21 | <i>1.31</i> | 20 | <i>1.10</i> | < 1 | <i>1.25</i> | < 1 | <i>1.08</i> | 14 \checkmark | | |
| neos-1582420 | 1099 | 47 | 1454 | 1499 | 46 | 13 | 1880 | <i>1.71</i> | 67 | <i>1.45</i> | 1920 | <i>1.32</i> | 2001 | <i>1.34</i> | 67 | <i>1.43</i> | 15 | <i>1.23</i> | 160 | | |
| neos-1593097 | 43753 | 7200 | 3507 | 113599 | 4513 | 30 | 53372 | <i>1.22</i> | 7200 | 1.00 | 2490 | 0.71 | 112740 | 0.99 | 3326 | 0.74 | 18 | 0.62 | 19243 \checkmark | | |
| neos-1595230 | 1094153 | 5076 | 75 | 93553 | 24 | < 1 | 1298264 | <i>1.19</i> | 7200 | <i>1.42</i> | 75 | 1.00 | 177974 | <i>1.90</i> | 7 | 0.30 | < 1 | <i>1.11</i> | 2479 | | |
| neos-1597104 | 20 | 289 | 22227 | 22223 | 289 | < 1 | 5 | 0.26 | 258 | 0.89 | 16127 | 0.73 | 16119 | 0.73 | 258 | 0.89 | < 1 | 1.03 | 60 \checkmark | | |
| neos-1599274 | 15 | 3 | 38 | 41 | 2 | < 1 | 7 | 0.48 | 1 | 0.50 | 31 | 0.81 | 32 | 0.79 | 1 | 0.48 | < 1 | 0.98 | 110 \checkmark | | |
| neos-1601936 | 10958 | 5705 | 466880 | 466878 | 4302 | 615 | 16363 | <i>1.49</i> | 6081 | <i>1.07</i> | 453103 | 0.97 | 453113 | 0.97 | 5706 | <i>1.33</i> | 438 | 0.71 | 3388 | | |
| neos-1603512 | 212 | 4 | 255 | 316 | 3 | 3 | 14 | 0.07 | 2 | 0.55 | 195 | 0.76 | 203 | 0.64 | 2 | 0.77 | 2 | 0.77 | 121 | | |
| neos-1603518 | 2225 | 21 | 1300 | 1623 | 13 | 13 | 830 | 0.37 | 14 | 0.65 | 923 | 0.71 | 1128 | 0.69 | 9 | 0.71 | 9 | 0.71 | 177 | | |
| neos-1603965 | 44657 | 7200 | 910 | 1992 | 2765 | 1 | 48950 | <i>1.10</i> | 7200 | 1.00 | 987 | <i>1.08</i> | 2078 | 1.04 | 1105 | 0.40 | 1 | 1.02 | 492 \checkmark | | |
| neos-1605061 | 715 | 7200 | 719528 | 719788 | 7156 | 7156 | 1177 | <i>1.65</i> | 7200 | 1.00 | 713674 | 0.99 | 717213 | 1.00 | 6757 | 0.94 | 6757 | 0.94 | 630 | | |

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|--------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | |
| neos-1605075 | 3213 | 7200 | 664309 | 667362 | 5218 | 1122 | 4338 | <i>1.35</i> | 7200 | 1.00 | 598649 | 0.90 | 602697 | 0.90 | 6036 | <i>1.16</i> | 874 | 0.78 | 1105 | | |
| neos-1616732 | 2971128 | 5547 | 384 | 26113 | 452 | < 1 | 2992570 | 1.01 | 5559 | 1.00 | 413 | <i>1.08</i> | 26238 | 1.00 | 507 | <i>1.12</i> | < 1 | 1.00 | 203 | | |
| neos-1620770 | 1617989 | 7200 | 15 | 122579 | < 1 | < 1 | 1494478 | 0.92 | 7200 | 1.00 | 17 | <i>1.11</i> | 146959 | <i>1.20</i> | < 1 | 1.02 | < 1 | 1.03 | 335342 | | |
| neos-1620807 | 1851610 | 1440 | 0 | 19867 | 55 | < 1 | 1523106 | 0.82 | 1241 | 0.86 | 0 | 0.00 | 21468 | <i>1.08</i> | 283 | <i>5.18</i> | < 1 | 1.00 | 101718 | | |
| neos-1622252 | 518004 | 7200 | 11 | 426677 | 235 | < 1 | 467819 | 0.90 | 7200 | 1.00 | 11 | 0.99 | 458033 | <i>1.07</i> | < 1 | 0.00 | < 1 | 1.02 | 405770 | | |
| neos-430149 | 26710 | 30 | 335 | 2530 | 14 | 1 | 23513 | 0.88 | 26 | 0.89 | 331 | 0.99 | 2244 | 0.89 | 8 | 0.61 | 1 | <i>1.21</i> | 250 \checkmark | | |
| neos-476283 | 517 | 177 | 1454 | 3932 | 148 | 14 | 671 | <i>1.30</i> | 181 | 1.02 | 1454 | 1.00 | 3933 | 1.00 | 164 | <i>1.11</i> | 14 | 1.01 | 11249 \checkmark | | |
| neos-480878 | 9355 | 41 | 24 | 102 | 24 | < 1 | 10594 | <i>1.13</i> | 45 | <i>1.11</i> | 25 | 1.02 | 109 | <i>1.07</i> | 29 | <i>1.21</i> | < 1 | 1.03 | 124 | | |
| neos-494568 | 10 | 26 | 292 | 331 | 26 | < 1 | 6 | 0.59 | 31 | <i>1.20</i> | 271 | 0.93 | 308 | 0.93 | 31 | <i>1.20</i> | < 1 | <i>1.05</i> | 45 \checkmark | | |
| neos-495307 | 163476 | 7200 | 19 | 8904 | 2416 | < 1 | 164420 | 1.01 | 7200 | 1.00 | 17 | 0.88 | 8901 | 1.00 | 1729 | 0.72 | < 1 | 0.86 | 83 | | |
| neos-498623 | 11 | 39 | 1589 | 1601 | 39 | 2 | 48 | <i>4.35</i> | 59 | <i>1.52</i> | 1813 | <i>1.14</i> | 1904 | <i>1.19</i> | 59 | <i>1.52</i> | 2 | 1.01 | 76 \checkmark | | |
| neos-501453 | 1 | 1 | 0 | 2 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | <i>1.21</i> | 3 | <i>1.21</i> | < 1 | <i>1.21</i> | < 1 | <i>1.21</i> | 0 | | |
| neos-501474 | 135 | 1 | 0 | 2 | < 1 | < 1 | 143 | <i>1.06</i> | 1 | 1.03 | 1 | <i>311.28</i> | 2 | 0.85 | < 1 | 0.44 | < 1 | 0.67 | 101 \checkmark | | |
| neos-503737 | 14639 | 439 | 3365 | 3380 | 439 | < 1 | 7034 | 0.48 | 269 | 0.61 | 2117 | 0.63 | 2134 | 0.63 | 269 | 0.61 | < 1 | <i>1.07</i> | 454 | | |
| neos-504674 | 7712 | 57 | 1407 | 2377 | 44 | < 1 | 8019 | 1.04 | 58 | 1.02 | 1150 | 0.82 | 2228 | 0.94 | 31 | 0.71 | < 1 | 0.95 | 119 \checkmark | | |
| neos-504815 | 2729 | 20 | 500 | 854 | 13 | < 1 | 2718 | 1.00 | 21 | <i>1.07</i> | 511 | 1.02 | 888 | 1.04 | 15 | <i>1.21</i> | < 1 | <i>1.17</i> | 72 \checkmark | | |
| neos-506422 | 4763 | 52 | 5230 | 5232 | 52 | < 1 | 4707 | 0.99 | 51 | 0.98 | 5123 | 0.98 | 5123 | 0.98 | 51 | 0.98 | < 1 | 1.00 | 110 \checkmark | | |
| neos-506428 | 420 | 4300 | 269318 | 351030 | 3836 | 2376 | 452 | <i>1.07</i> | 4623 | <i>1.08</i> | 282185 | <i>1.05</i> | 367151 | <i>1.05</i> | 4416 | <i>1.15</i> | 2417 | 1.02 | 76 | | |
| neos-512201 | 3123 | 31 | 1111 | 1599 | 24 | < 1 | 2791 | 0.89 | 28 | 0.88 | 964 | 0.87 | 1434 | 0.90 | 20 | 0.82 | < 1 | 0.85 | 64 \checkmark | | |
| neos-522351 | 1 | 2 | 101 | 103 | 2 | < 1 | 1 | 1.00 | 2 | 1.01 | 102 | 1.02 | 105 | 1.02 | 2 | 1.02 | < 1 | 0.86 | 165 \checkmark | | |
| neos-525149 | 15 | 5 | 205 | 206 | 5 | 1 | 1 | 0.09 | 2 | 0.43 | 176 | 0.86 | 176 | 0.85 | 2 | 0.40 | 1 | 1.00 | 14 \checkmark | | |
| neos-530627 | 1 | 1 | 0 | 0 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 0 | 0.00 | < 1 | <i>51.00</i> | < 1 | 1.00 | < 1 | 1.00 | 0 | | |
| neos-538867 | 37180 | 104 | 640 | 5230 | 70 | < 1 | 29021 | 0.78 | 83 | 0.80 | 541 | 0.85 | 4164 | 0.80 | 58 | 0.83 | < 1 | 0.86 | 505 \checkmark | | |
| neos-538916 | 21196 | 76 | 844 | 3909 | 39 | < 1 | 22941 | <i>1.08</i> | 83 | <i>1.09</i> | 985 | <i>1.17</i> | 4295 | <i>1.10</i> | 44 | <i>1.14</i> | < 1 | 0.72 | 548 | | |
| neos-544324 | 345308 | 4981 | 724 | 34711 | 1025 | 5 | 17804 | 0.05 | 368 | 0.07 | 645 | 0.89 | 3223 | 0.09 | 29 | 0.03 | 5 | 0.99 | 196 | | |
| neos-547911 | 357 | 27 | 343 | 437 | 27 | 1 | 474 | <i>1.33</i> | 32 | <i>1.18</i> | 379 | <i>1.11</i> | 491 | <i>1.12</i> | 32 | <i>1.18</i> | 1 | 0.99 | 37 | | |
| neos-548047 | 44815 | 7200 | 16176 | 332218 | 1288 | < 1 | 37546 | 0.84 | 7200 | 1.00 | 27030 | <i>1.67</i> | 330091 | 0.99 | 2071 | <i>1.61</i> | < 1 | 1.00 | 629 | | |
| neos-548251 | 1314128 | 7200 | 48222 | 459108 | 1388 | 20 | 1307038 | 0.99 | 7200 | 1.00 | 61116 | <i>1.27</i> | 465060 | 1.01 | 3810 | <i>2.75</i> | 14 | 0.72 | 112424 | | |
| neos-551991 | 1173 | 225 | 1789 | 6603 | 191 | < 1 | 1186 | 1.01 | 232 | 1.03 | 2042 | <i>1.14</i> | 6906 | <i>1.05</i> | 192 | 1.01 | < 1 | <i>1.06</i> | 261 \checkmark | | |
| neos-555001 | 57 | 2 | 132 | 134 | 2 | 1 | 4 | 0.08 | 1 | 0.71 | 120 | 0.91 | 121 | 0.90 | 1 | 0.71 | 1 | 0.90 | 17 \checkmark | | |

cont. on next page

Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|-------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | |
| neos-555298 | 1061 | 59 | 1046 | 1055 | 59 | < 1 | 1394 | <i>1.31</i> | 58 | 0.98 | 1190 | <i>1.14</i> | 1199 | <i>1.14</i> | 58 | 0.98 | < 1 | <i>1.07</i> | 111 | \checkmark |
| neos-555343 | 662286 | 4120 | 6064 | 6140 | 2662 | < 1 | 389886 | 0.59 | 2908 | 0.71 | 4352 | 0.72 | 4431 | 0.72 | 2013 | 0.76 | < 1 | 0.99 | 4279 | |
| neos-555424 | 465993 | 2660 | 5090 | 5096 | 2295 | < 1 | 154690 | 0.33 | 1216 | 0.46 | 5055 | 0.99 | 5062 | 0.99 | 1216 | 0.53 | < 1 | 0.97 | 2892 | |
| neos-555694 | 15 | 5 | 149 | 152 | 5 | < 1 | 3 | 0.22 | 4 | 0.67 | 61 | 0.41 | 65 | 0.43 | 4 | 0.67 | < 1 | 1.00 | 126 | \checkmark |
| neos-555771 | 12 | 4 | 107 | 113 | 4 | < 1 | 3 | 0.29 | 3 | 0.70 | 64 | 0.60 | 73 | 0.65 | 3 | 0.70 | < 1 | 0.99 | 285 | \checkmark |
| neos-555884 | 183751 | 7200 | 173714 | 223181 | 5110 | 1420 | 168077 | 0.91 | 7200 | 1.00 | 129827 | 0.75 | 184749 | 0.83 | 5973 | <i>1.17</i> | 1006 | 0.71 | 31092 | \checkmark |
| neos-555927 | 2009877 | 7200 | 5251 | 28264 | 1186 | 36 | 2016037 | 1.00 | 7200 | 1.00 | 7697 | <i>1.47</i> | 29230 | 1.03 | 1454 | <i>1.23</i> | 39 | <i>1.07</i> | 31286 | \checkmark |
| neos-565672 | 52 | 6798 | 347333 | 359297 | 6307 | 5 | 73 | <i>1.40</i> | 6663 | 0.98 | 335261 | 0.97 | 347131 | 0.97 | 6599 | <i>1.05</i> | 5 | 0.96 | 15154 | |
| neos-565815 | 3 | 16 | 140 | 418 | 5 | 1 | 4 | <i>1.22</i> | 16 | 0.98 | 139 | 0.99 | 412 | 0.99 | 4 | 0.76 | 1 | 1.00 | 70 | |
| neos-570431 | 526 | 15 | 82 | 618 | 4 | < 1 | 624 | <i>1.19</i> | 19 | <i>1.23</i> | 118 | <i>1.45</i> | 757 | <i>1.23</i> | 8 | <i>1.87</i> | < 1 | 0.90 | 19 | |
| neos-574665 | 7790654 | 7200 | 151 | 313 | 3376 | 1 | 9524835 | <i>1.22</i> | 7200 | 1.00 | 137 | 0.91 | 468 | <i>1.49</i> | 3535 | <i>1.05</i> | 1 | 0.91 | 19848 | \checkmark |
| neos-578379 | 2 | 226 | 22617 | 22627 | 226 | 226 | 1 | 0.67 | 199 | 0.88 | 19933 | 0.88 | 19921 | 0.88 | 199 | 0.88 | 199 | 0.88 | 25 | \checkmark |
| neos-582605 | 826431 | 7200 | 802 | 720001 | 2219 | 8 | 963152 | <i>1.17</i> | 7200 | 1.00 | 233 | 0.29 | 720003 | 1.00 | 2028 | 0.91 | 2 | 0.29 | 71486 | |
| neos-583731 | 38 | 13 | 1277 | 1276 | 13 | 13 | 9 | 0.25 | 6 | 0.47 | 593 | 0.46 | 595 | 0.47 | 6 | 0.47 | 6 | 0.47 | 52 | \checkmark |
| neos-584146 | 1820616 | 7200 | 0 | 720001 | 4119 | < 1 | 2240222 | <i>1.23</i> | 7200 | 1.00 | 203584 | <i>inf</i> | 720002 | 1.00 | 3760 | 0.91 | < 1 | 0.70 | 20182 | |
| neos-584851 | 395 | 9 | 77 | 296 | 2 | < 1 | 192 | 0.48 | 9 | 0.98 | 116 | <i>1.51</i> | 322 | <i>1.09</i> | 4 | <i>2.05</i> | < 1 | 0.98 | 50 | \checkmark |
| neos-584866 | 376079 | 7200 | 16197 | 583807 | 2379 | 3 | 303003 | 0.81 | 7200 | 1.00 | 27184 | <i>1.68</i> | 588641 | 1.01 | 3449 | <i>1.45</i> | 3 | 1.02 | 423 | |
| neos-585192 | 819 | 25 | 396 | 591 | 23 | 3 | 749 | 0.91 | 24 | 0.94 | 363 | 0.92 | 551 | 0.93 | 21 | 0.91 | 3 | 1.00 | 142 | |
| neos-585467 | 62 | 9 | 203 | 267 | 8 | 1 | 106 | <i>1.71</i> | 11 | <i>1.24</i> | 209 | 1.03 | 291 | <i>1.09</i> | 9 | <i>1.16</i> | 1 | 0.99 | 54 | \checkmark |
| neos-593853 | 54583 | 119 | 243 | 241 | 108 | 1 | 85034 | <i>1.56</i> | 193 | <i>1.62</i> | 422 | <i>1.74</i> | 422 | <i>1.75</i> | 181 | <i>1.68</i> | 1 | 0.83 | 436 | \checkmark |
| neos-595904 | 5 | 26 | 1223 | 1224 | 19 | 12 | 4 | 0.83 | 26 | 1.00 | 1232 | 1.01 | 1235 | 1.01 | 16 | 0.87 | 12 | 1.01 | 2004 | |
| neos-595905 | 4 | 6 | 282 | 282 | 3 | 3 | 4 | <i>1.10</i> | 7 | <i>1.17</i> | 253 | 0.90 | 255 | 0.90 | 3 | 0.95 | 3 | 0.89 | 287 | \checkmark |
| neos-595925 | 445 | 22 | 387 | 411 | 16 | 4 | 482 | <i>1.08</i> | 19 | 0.87 | 368 | 0.95 | 385 | 0.94 | 13 | 0.82 | 4 | 0.95 | 328 | |
| neos-598183 | 10 | 8 | 128 | 134 | 8 | 1 | 6 | 0.63 | 11 | <i>1.39</i> | 117 | 0.92 | 125 | 0.93 | 11 | <i>1.31</i> | 1 | 0.99 | 636 | \checkmark |
| neos-603073 | 641179 | 2688 | 291 | 11236 | 735 | 1 | 814475 | <i>1.27</i> | 3632 | <i>1.35</i> | 299 | 1.03 | 17766 | <i>1.58</i> | 420 | 0.57 | 1 | 1.00 | 2073 | |
| neos-611135 | 184810 | 7200 | 33749 | 38760 | 4959 | 2 | 173581 | 0.94 | 7200 | 1.00 | 24781 | 0.73 | 29806 | 0.77 | 6190 | <i>1.25</i> | 3 | 1.02 | 824 | \checkmark |
| neos-611838 | 1020 | 28 | 24 | 101 | 19 | < 1 | 1019 | 1.00 | 28 | 1.00 | 26 | <i>1.08</i> | 102 | 1.01 | 18 | 0.92 | < 1 | 1.00 | 3 | |
| neos-612125 | 385 | 23 | 15 | 96 | 17 | < 1 | 424 | <i>1.10</i> | 25 | <i>1.09</i> | 16 | 1.03 | 102 | <i>1.06</i> | 15 | 0.88 | < 1 | 0.94 | 3 | |
| neos-612143 | 808 | 26 | 22 | 98 | 22 | < 1 | 649 | 0.80 | 28 | <i>1.09</i> | 22 | 1.02 | 106 | <i>1.08</i> | 24 | <i>1.11</i> | < 1 | 0.99 | 4 | \checkmark |
| neos-612162 | 897 | 27 | 23 | 102 | 22 | < 1 | 867 | 0.97 | 28 | 1.04 | 27 | <i>1.16</i> | 109 | <i>1.07</i> | 23 | 1.04 | < 1 | 1.02 | 5 | |

cont. on next page

Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|-------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | | |
| neos-619167 | 141 | 7200 | 305500 | 426710 | 1167 | < 1 | 143 | 1.01 | 7200 | 1.00 | 309618 | 1.01 | 430193 | 1.01 | 1408 | <i>1.21</i> | < 1 | 0.97 | 19 | | |
| neos-631164 | 245619 | 7200 | 9257 | 160888 | 5590 | < 1 | 274313 | <i>1.12</i> | 7200 | 1.00 | 8416 | 0.91 | 154058 | 0.96 | 4628 | 0.83 | < 1 | 0.99 | 669 \checkmark | | |
| neos-631517 | 281712 | 7200 | 6475 | 137114 | 4413 | < 1 | 264265 | 0.94 | 7200 | 1.00 | 6581 | 1.02 | 137847 | 1.01 | 4993 | <i>1.13</i> | < 1 | 0.95 | 1174 | | |
| neos-631694 | 880754 | 5594 | 1977 | 35421 | 20 | 20 | 855719 | 0.97 | 6267 | <i>1.12</i> | 2710 | <i>1.37</i> | 40151 | <i>1.13</i> | 27 | <i>1.37</i> | 27 | <i>1.37</i> | 2056 \checkmark | | |
| neos-631709 | 447 | 7200 | 16941 | 79917 | 4963 | 17 | 831 | <i>1.86</i> | 7200 | 1.00 | 19976 | <i>1.18</i> | 82462 | 1.03 | 3378 | 0.68 | 19 | <i>1.12</i> | 13 | | |
| neos-631710 | 3 | 7200 | 47192 | 189154 | 1113 | 82 | 2 | 0.63 | 7200 | 1.00 | 48026 | 1.02 | 191625 | 1.01 | 1229 | <i>1.10</i> | 84 | 1.03 | 21 | | |
| neos-631784 | 107426 | 6127 | 1642 | 38819 | 61 | 15 | 190576 | <i>1.77</i> | 7200 | <i>1.18</i> | 1670 | 1.02 | 45290 | <i>1.17</i> | 62 | 1.03 | 16 | 1.02 | 7167 | | |
| neos-632335 | 133 | 10 | 141 | 1003 | 10 | < 1 | 133 | 1.00 | 10 | 1.00 | 143 | 1.01 | 1001 | 1.00 | 10 | 1.00 | < 1 | 1.02 | 0 | | |
| neos-633273 | 252 | 13 | 180 | 1336 | 13 | < 1 | 252 | 1.00 | 13 | 0.99 | 178 | 0.99 | 1329 | 0.99 | 13 | 0.99 | < 1 | 0.97 | 0 | | |
| neos-655508 | 1 | 1 | 27 | 27 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 28 | <i>1.06</i> | 27 | 1.01 | < 1 | 1.02 | < 1 | 1.02 | 0 | | |
| neos-662469 | 52248 | 7200 | 38466 | 38610 | 6245 | 1 | 46198 | 0.88 | 7200 | 1.00 | 22272 | 0.58 | 22402 | 0.58 | 5037 | 0.81 | 1 | 1.00 | 14034 | | |
| neos-686190 | 8949 | 127 | 1817 | 2923 | 114 | 4 | 6792 | 0.76 | 111 | 0.87 | 1579 | 0.87 | 2654 | 0.91 | 91 | 0.79 | < 1 | 0.04 | 650 | | |
| neos-691058 | 6408 | 7200 | 6286 | 44306 | 3950 | 3 | 4869 | 0.76 | 7200 | 1.00 | 4588 | 0.73 | 46937 | <i>1.06</i> | 3834 | 0.97 | 3 | 1.00 | 737 | | |
| neos-691073 | 12911 | 7200 | 4531 | 44178 | 4189 | 25 | 10095 | 0.78 | 7200 | 1.00 | 6617 | <i>1.46</i> | 46049 | 1.04 | 4096 | 0.98 | 44 | <i>1.74</i> | 1368 | | |
| neos-693347 | 50294 | 5034 | 89808 | 89790 | 4422 | 814 | 33698 | 0.67 | 3578 | 0.71 | 34642 | 0.39 | 34640 | 0.39 | 3578 | 0.81 | 304 | 0.37 | 10124 | | |
| neos-702280 | 5798 | 7200 | 55845 | 303171 | 1072 | < 1 | 5716 | 0.99 | 7200 | 1.00 | 55839 | 1.00 | 303610 | 1.00 | 5 | 0.00 | < 1 | 1.01 | 3 | | |
| neos-709469 | 509 | 1 | 72 | 71 | 1 | 1 | 893 | <i>1.76</i> | 1 | <i>1.15</i> | 88 | <i>1.23</i> | 88 | <i>1.25</i> | 1 | <i>1.25</i> | 1 | <i>1.25</i> | 81 | | |
| neos-717614 | 1458306 | 1207 | 116 | 117 | 14 | 1 | 14426 | 0.01 | 54 | 0.04 | 115 | 0.99 | 118 | 1.01 | 50 | <i>3.67</i> | 1 | 0.99 | 72 | | |
| neos-738098 | 775 | 7200 | 720075 | 720075 | 7200 | 7200 | 1402 | <i>1.81</i> | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 201 | | |
| neos-775946 | 26 | 12 | 455 | 462 | 12 | 1 | 8 | 0.31 | 12 | 1.01 | 431 | 0.95 | 439 | 0.95 | 12 | 1.02 | 1 | 1.03 | 232 \checkmark | | |
| neos-780889 | 2 | 90 | 6057 | 6059 | 90 | 60 | 2 | 1.00 | 104 | <i>1.15</i> | 6310 | 1.04 | 6307 | 1.04 | 104 | <i>1.15</i> | 61 | 1.02 | 11599 \checkmark | | |
| neos-785899 | 37 | 4 | 229 | 234 | 4 | 2 | 36 | 0.96 | 4 | 0.99 | 268 | <i>1.17</i> | 272 | <i>1.16</i> | 4 | 0.99 | 3 | <i>1.17</i> | 34 | | |
| neos-785912 | 304 | 64 | 6394 | 720000 | 7200 | 7200 | 206 | 0.68 | 49 | 0.76 | 4889 | 0.76 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 89 | | |
| neos-785914 | 8 | 6 | 645 | 647 | 6 | 6 | 21 | <i>2.48</i> | 7 | 1.01 | 652 | 1.01 | 652 | 1.01 | 7 | 1.01 | 7 | 1.01 | 28 | | |
| neos-787933 | 1 | 2 | 153 | 157 | 2 | < 1 | 1 | 1.00 | 2 | 0.99 | 153 | 1.00 | 154 | 0.99 | 2 | 0.99 | < 1 | 0.98 | 0 | | |
| neos-791021 | 92 | 548 | 26989 | 31244 | 461 | 206 | 65 | 0.71 | 450 | 0.82 | 19009 | 0.70 | 20625 | 0.66 | 449 | 0.97 | 128 | 0.62 | 70 | | |
| neos-796608 | 1104043 | 258 | 2 | 2 | < 1 | < 1 | 932453 | 0.84 | 214 | 0.83 | 3 | <i>1.10</i> | 2 | <i>1.12</i> | 2 | <i>36.85</i> | < 1 | 1.00 | 151 | | |
| neos-799838 | 6 | 97 | 1114 | 1346 | 97 | 8 | 6 | 1.00 | 100 | 1.03 | 1164 | <i>1.05</i> | 1446 | <i>1.07</i> | 100 | 1.03 | 8 | 0.99 | 21 | | |
| neos-801834 | 135 | 31 | 64 | 202 | 6 | < 1 | 258 | <i>1.91</i> | 38 | <i>1.22</i> | 103 | <i>1.62</i> | 273 | <i>1.35</i> | 16 | <i>2.56</i> | < 1 | 0.90 | 6 | | |
| neos-803219 | 11685 | 38 | 76 | 460 | 23 | < 1 | 12658 | <i>1.08</i> | 38 | 0.99 | 78 | 1.02 | 361 | 0.79 | 17 | 0.74 | < 1 | 0.96 | 452 | | |

cont. on next page

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| Instance | default | | | | | | confdiving | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|-------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | |
| neos-803220 | 40810 | 89 | 93 | 758 | 43 | < 1 | 43764 | <i>1.07</i> | 95 | <i>1.06</i> | 104 | <i>1.12</i> | 866 | <i>1.14</i> | 48 | <i>1.12</i> | < 1 | <i>1.10</i> | 1463 | \checkmark |
| neos-806323 | 6810 | 39 | 575 | 870 | 14 | 4 | 5981 | 0.88 | 35 | 0.91 | 535 | 0.93 | 810 | 0.93 | 13 | 0.93 | 4 | 0.95 | 214 | \checkmark |
| neos-807454 | 1 | 3 | 258 | 720000 | 7200 | 7200 | 1 | 1.00 | 3 | <i>1.12</i> | 290 | <i>1.12</i> | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 9 | |
| neos-807639 | 2612 | 22 | 157 | 322 | 4 | 2 | 2463 | 0.94 | 24 | <i>1.08</i> | 75 | 0.48 | 254 | 0.79 | 4 | 0.92 | 1 | 0.45 | 641 | \checkmark |
| neos-807705 | 3369 | 32 | 333 | 560 | 14 | 3 | 3635 | <i>1.08</i> | 35 | <i>1.12</i> | 109 | 0.33 | 449 | 0.80 | 18 | <i>1.29</i> | < 1 | 0.14 | 231 | \checkmark |
| neos-808072 | 263 | 31 | 2113 | 2387 | 29 | 20 | 170 | 0.65 | 28 | 0.89 | 2272 | <i>1.08</i> | 2312 | 0.97 | 27 | 0.91 | 22 | <i>1.10</i> | 36 | |
| neos-808214 | 5105 | 54 | 1612 | 4362 | 16 | 16 | 4687 | 0.92 | 54 | 1.01 | 2005 | <i>1.24</i> | 4832 | <i>1.11</i> | 23 | <i>1.46</i> | 20 | <i>1.25</i> | 1014 | |
| neos-810286 | 307 | 157 | 9926 | 9935 | 157 | 97 | 987 | <i>3.21</i> | 323 | <i>2.06</i> | 27206 | <i>2.74</i> | 27210 | <i>2.74</i> | 323 | <i>2.06</i> | 269 | <i>2.78</i> | 418 | |
| neos-810326 | 1653 | 74 | 1516 | 1591 | 72 | 13 | 955 | 0.58 | 50 | 0.68 | 2211 | <i>1.46</i> | 2255 | <i>1.42</i> | 47 | 0.65 | 21 | <i>1.55</i> | 184 | |
| neos-820146 | 1955429 | 7200 | 720000 | 720000 | 7200 | 7200 | 1985580 | 1.02 | 7200 | 1.00 | 720000 | 1.00 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 54916 | |
| neos-820157 | 1343991 | 7200 | 720002 | 720002 | 7200 | 7200 | 1502156 | <i>1.12</i> | 7200 | 1.00 | 720001 | 1.00 | 720001 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 46349 | |
| neos-820879 | 616 | 59 | 1531 | 1578 | 56 | 14 | 792 | <i>1.29</i> | 71 | <i>1.20</i> | 2008 | <i>1.31</i> | 2056 | <i>1.30</i> | 68 | <i>1.22</i> | 18 | <i>1.30</i> | 328 | |
| neos-824661 | 81 | 1720 | 26267 | 26660 | 1720 | 2 | 26 | 0.32 | 947 | 0.55 | 19671 | 0.75 | 20061 | 0.75 | 947 | 0.55 | 2 | 0.98 | 69 | \checkmark |
| neos-824695 | 53 | 461 | 6529 | 6660 | 461 | 1 | 51 | 0.95 | 462 | 1.00 | 5858 | 0.90 | 5990 | 0.90 | 462 | 1.00 | 1 | 0.99 | 47 | \checkmark |
| neos-825075 | 6 | 2 | 181 | 180 | 2 | 1 | 5 | 0.76 | 3 | <i>1.40</i> | 191 | <i>1.06</i> | 192 | <i>1.06</i> | 3 | <i>1.41</i> | 1 | <i>1.08</i> | 77 | \checkmark |
| neos-826224 | 1 | 20 | 324 | 605 | 20 | 1 | 1 | 1.00 | 20 | 1.01 | 319 | 0.98 | 602 | 0.99 | 20 | 1.01 | 1 | 1.02 | 2 | |
| neos-826250 | 13 | 109 | 1675 | 1693 | 109 | < 1 | 29 | <i>2.23</i> | 155 | <i>1.41</i> | 1624 | 0.97 | 1643 | 0.97 | 154 | <i>1.41</i> | < 1 | 0.96 | 20 | |
| neos-826650 | 29781 | 7200 | 413829 | 424387 | 4547 | 4036 | 38867 | <i>1.31</i> | 7200 | 1.00 | 219879 | 0.53 | 237116 | 0.56 | 3425 | 0.75 | 2024 | 0.50 | 3212 | |
| neos-826694 | 65 | 460 | 3088 | 3226 | 460 | 1 | 76 | <i>1.17</i> | 487 | <i>1.06</i> | 4247 | <i>1.38</i> | 4384 | <i>1.36</i> | 487 | <i>1.06</i> | 1 | 0.97 | 40 | |
| neos-826812 | 5 | 127 | 1767 | 1979 | 127 | < 1 | 4 | 0.87 | 102 | 0.80 | 1582 | 0.90 | 1793 | 0.91 | 102 | 0.80 | < 1 | 1.01 | 63 | |
| neos-826841 | 205677 | 7200 | 2636 | 27365 | 2430 | 19 | 209253 | 1.02 | 7200 | 1.00 | 5005 | <i>1.90</i> | 29655 | <i>1.08</i> | 1542 | 0.63 | 47 | <i>2.51</i> | 12812 | |
| neos-827015 | 404 | 1678 | 31092 | 39044 | 1023 | 3 | 232 | 0.58 | 1146 | 0.68 | 21900 | 0.70 | 28068 | 0.72 | 792 | 0.77 | 3 | 1.00 | 713 | \checkmark |
| neos-827175 | 2 | 29 | 156 | 615 | 29 | 1 | 2 | <i>1.30</i> | 28 | 0.96 | 144 | 0.93 | 598 | 0.97 | 28 | 0.96 | 1 | 0.92 | 0 | |
| neos-829552 | 294 | 328 | 13241 | 14453 | 248 | 1 | 285 | 0.97 | 355 | <i>1.08</i> | 9318 | 0.70 | 11162 | 0.77 | 285 | <i>1.15</i> | 1 | 0.97 | 312 | \checkmark |
| neos-830439 | 1 | 1 | 10 | 12 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 12 | <i>1.17</i> | 13 | <i>1.08</i> | < 1 | <i>1.07</i> | < 1 | <i>1.07</i> | 0 | |
| neos-831188 | 4128 | 478 | 6343 | 15459 | 76 | 63 | 3415 | 0.83 | 419 | 0.88 | 7329 | <i>1.16</i> | 15188 | 0.98 | 93 | <i>1.22</i> | 72 | <i>1.15</i> | 492 | |
| neos-839838 | 6952 | 7200 | 7735 | 620861 | 2035 | 1 | 6477 | 0.93 | 7200 | 1.00 | 6624 | 0.86 | 621525 | 1.00 | 862 | 0.42 | 1 | 1.00 | 132 | |
| neos-839859 | 3189 | 56 | 175 | 328 | 42 | < 1 | 17509 | <i>5.49</i> | 308 | <i>5.51</i> | 303 | <i>1.74</i> | 920 | <i>2.80</i> | 102 | <i>2.44</i> | < 1 | 1.04 | 150 | \checkmark |
| neos-839894 | 368 | 7200 | 45762 | 255078 | 700 | 24 | 491 | <i>1.34</i> | 7200 | 1.00 | 56129 | <i>1.23</i> | 261549 | 1.03 | 3144 | <i>4.49</i> | 24 | 1.02 | 116 | \checkmark |
| neos-841664 | 80864 | 7200 | 2120 | 112920 | 38 | < 1 | 84658 | <i>1.05</i> | 7200 | 1.00 | 1557 | 0.73 | 100971 | 0.89 | 1115 | <i>29.30</i> | < 1 | 0.93 | 2101 | \checkmark |

cont. on next page

Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | \mathbf{I} |
|-------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|-------------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | |
| neos-847302 | 258494 | 7200 | 2257 | 717454 | 2379 | 4 | 264049 | 1.02 | 7200 | 1.00 | 4044 | <i>1.79</i> | 718277 | 1.00 | 1703 | 0.72 | 5 | 1.02 | 18970 | |
| neos-848150 | 89 | 16 | 1595 | 1594 | 16 | 16 | 26 | 0.29 | 16 | 1.00 | 1590 | 1.00 | 1590 | 1.00 | 16 | 1.00 | 16 | 1.00 | 59 | |
| neos-848198 | 1435 | 7200 | 41678 | 85297 | 2715 | < 1 | 1623 | <i>1.13</i> | 7200 | 1.00 | 44429 | <i>1.07</i> | 87830 | 1.03 | 4468 | <i>1.65</i> | < 1 | 1.01 | 52 | |
| neos-848589 | 182 | 7200 | 173325 | 238789 | 2374 | < 1 | 182 | 1.00 | 7200 | 1.00 | 173261 | 1.00 | 238759 | 1.00 | 2335 | 0.98 | 51 | 1.01 | 0 | |
| neos-848845 | 60038 | 1102 | 110217 | 110217 | 1102 | 1102 | 32154 | 0.54 | 705 | 0.64 | 70533 | 0.64 | 70536 | 0.64 | 705 | 0.64 | 705 | 0.64 | 547 | |
| neos-849702 | 19129 | 457 | 45692 | 45680 | 457 | 457 | 24138 | <i>1.26</i> | 554 | <i>1.21</i> | 55383 | <i>1.21</i> | 55392 | <i>1.21</i> | 554 | <i>1.21</i> | 554 | <i>1.21</i> | 453 | |
| neos-850681 | 97 | 21 | 323 | 447 | 21 | < 1 | 62 | 0.65 | 22 | <i>1.07</i> | 438 | <i>1.36</i> | 517 | <i>1.16</i> | 22 | <i>1.07</i> | < 1 | 0.98 | 56 \checkmark | |
| neos-856059 | 169468 | 3590 | 1402 | 1841 | 2474 | < 1 | 164037 | 0.97 | 3400 | 0.95 | 1303 | 0.93 | 1743 | 0.95 | 3400 | <i>1.37</i> | < 1 | <i>1.11</i> | 592 | |
| neos-859770 | 1 | 176 | 17636 | 720000 | 7200 | 7200 | 1 | 1.00 | 175 | 0.99 | 17505 | 0.99 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 6 | |
| neos-860244 | 2 | 6 | 214 | 251 | 6 | 2 | 1 | 0.73 | 6 | 1.00 | 207 | 0.97 | 245 | 0.98 | 5 | 0.96 | 2 | 0.98 | 74 \checkmark | |
| neos-860300 | 4 | 22 | 635 | 712 | 15 | 4 | 3 | 0.90 | 24 | <i>1.10</i> | 776 | <i>1.22</i> | 868 | <i>1.22</i> | 17 | <i>1.18</i> | 4 | 1.02 | 180 \checkmark | |
| neos-862348 | 61 | 11 | 192 | 218 | 7 | < 1 | 141 | <i>2.33</i> | 14 | <i>1.35</i> | 279 | <i>1.45</i> | 315 | <i>1.44</i> | 13 | <i>1.72</i> | < 1 | 0.96 | 53 \checkmark | |
| neos-863472 | 259721 | 272 | 64 | 979 | 61 | 1 | 246129 | 0.95 | 265 | 0.97 | 39 | 0.61 | 622 | 0.64 | 109 | <i>1.77</i> | < 1 | 0.59 | 2551 \checkmark | |
| neos-872648 | 98 | 7200 | 67053 | 358931 | 1990 | 24 | 97 | 0.99 | 7200 | 1.00 | 68085 | 1.02 | 358790 | 1.00 | 326 | 0.16 | 24 | 1.00 | 3 | |
| neos-873061 | 2276 | 7200 | 44207 | 88161 | 3619 | 23 | 194 | 0.09 | 7200 | 1.00 | 42494 | 0.96 | 88947 | 1.01 | 4801 | <i>1.33</i> | 23 | 1.00 | 4 | |
| neos-876808 | 663 | 7200 | 393063 | 560738 | 4838 | 8 | 364 | 0.55 | 7200 | 1.00 | 325446 | 0.83 | 501576 | 0.89 | 5524 | <i>1.14</i> | 8 | 0.99 | 36 | |
| neos-880324 | 12 | 1 | 92 | 94 | 1 | 1 | 7 | 0.57 | 1 | 0.92 | 77 | 0.84 | 77 | 0.82 | 1 | 0.81 | 1 | 0.81 | 191 \checkmark | |
| neos-881765 | 12 | 2 | 152 | 152 | 2 | 2 | 18 | <i>1.49</i> | 2 | <i>1.25</i> | 195 | <i>1.29</i> | 195 | <i>1.28</i> | 2 | <i>1.28</i> | 2 | <i>1.28</i> | 44 | |
| neos-885086 | 371 | 6549 | 12278 | 12361 | 2980 | < 1 | 359 | 0.97 | 6557 | 1.00 | 12036 | 0.98 | 12113 | 0.98 | 2738 | 0.92 | < 1 | <i>1.06</i> | 0 | |
| neos-885524 | 1112 | 121 | 752 | 754 | 121 | 7 | 3580 | <i>3.22</i> | 925 | <i>7.64</i> | 2944 | <i>3.91</i> | 2944 | <i>3.90</i> | 925 | <i>7.64</i> | 29 | <i>3.86</i> | 197 \checkmark | |
| neos-886822 | 243671 | 2571 | 2247 | 181007 | 1672 | < 1 | 374800 | <i>1.54</i> | 3712 | <i>1.44</i> | 3329 | <i>1.48</i> | 252324 | <i>1.39</i> | 2633 | <i>1.57</i> | < 1 | 1.00 | 973 | |
| neos-892255 | 507 | 59 | 10 | 1163 | < 1 | < 1 | 633 | <i>1.25</i> | 84 | <i>1.43</i> | 10 | 1.00 | 1582 | <i>1.36</i> | < 1 | 0.96 | < 1 | 0.96 | 104 | |
| neos-905856 | 19767 | 252 | 12210 | 12239 | 252 | 83 | 24321 | <i>1.23</i> | 279 | <i>1.11</i> | 14144 | <i>1.16</i> | 14331 | <i>1.17</i> | 279 | <i>1.11</i> | 73 | 0.88 | 1651 | |
| neos-906865 | 17823 | 134 | 58 | 1377 | 28 | < 1 | 17481 | 0.98 | 126 | 0.94 | 56 | 0.97 | 1357 | 0.99 | 19 | 0.67 | < 1 | <i>1.07</i> | 138 | |
| neos-911880 | 751773 | 7200 | 2234 | 11810 | 1068 | < 1 | 1163271 | <i>1.55</i> | 7200 | 1.00 | 2036 | 0.91 | 11867 | 1.00 | 1033 | 0.97 | < 1 | 0.92 | 1287 \checkmark | |
| neos-911970 | 1536793 | 6035 | 1683 | 6976 | 1815 | < 1 | 1358093 | 0.88 | 6951 | <i>1.15</i> | 1134 | 0.67 | 5715 | 0.82 | 1749 | 0.96 | < 1 | <i>1.23</i> | 1147 \checkmark | |
| neos-912015 | 147 | 10 | 631 | 632 | 10 | 5 | 700 | <i>4.75</i> | 16 | <i>1.57</i> | 963 | <i>1.53</i> | 963 | <i>1.52</i> | 16 | <i>1.57</i> | 7 | <i>1.46</i> | 141 | |
| neos-912023 | 186 | 11 | 780 | 797 | 10 | 7 | 75 | 0.40 | 10 | 0.93 | 840 | <i>1.08</i> | 846 | <i>1.06</i> | 10 | 1.01 | 8 | <i>1.12</i> | 80 | |
| neos-913984 | 1 | 2 | 217 | 217 | 2 | 2 | 1 | 1.00 | 2 | <i>1.07</i> | 235 | <i>1.08</i> | 234 | <i>1.08</i> | 2 | <i>1.08</i> | 2 | <i>1.08</i> | 0 | |
| neos-914441 | 7 | 20 | 739 | 992 | 20 | < 1 | 37 | <i>5.12</i> | 28 | <i>1.42</i> | 1170 | <i>1.58</i> | 1698 | <i>1.71</i> | 28 | <i>1.42</i> | < 1 | 1.00 | 67 \checkmark | |

cont. on next page

Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|-------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | |
| neos-916173 | 15115 | 162 | 2451 | 4732 | 142 | 12 | 19667 | <i>1.30</i> | 194 | <i>1.20</i> | 3009 | <i>1.23</i> | 5641 | <i>1.19</i> | 182 | <i>1.27</i> | 15 | <i>1.22</i> | 95 | |
| neos-916792 | 119285 | 971 | 2478 | 7968 | 290 | 13 | 147959 | <i>1.24</i> | 1193 | <i>1.23</i> | 2588 | 1.04 | 10161 | <i>1.28</i> | 392 | <i>1.35</i> | 13 | 0.98 | 99 | |
| neos-930752 | 1498 | 7200 | 33802 | 71641 | 5030 | 4 | 1486 | 0.99 | 7200 | 1.00 | 35480 | <i>1.05</i> | 74455 | 1.04 | 3103 | 0.62 | 5 | <i>1.17</i> | 178 | |
| neos-931517 | 1509 | 7200 | 73830 | 163780 | 2571 | 4 | 1517 | 1.01 | 7200 | 1.00 | 75671 | 1.02 | 168806 | 1.03 | 2065 | 0.80 | 3 | 0.89 | 417 | |
| neos-931538 | 78 | 387 | 3075 | 3614 | 301 | 3 | 5 | 0.07 | 116 | 0.30 | 2187 | 0.71 | 2542 | 0.70 | 116 | 0.38 | 3 | 0.99 | 105 \checkmark | |
| neos-932721 | 11 | 29 | 199 | 200 | 29 | < 1 | 11 | 0.98 | 29 | 0.99 | 195 | 0.98 | 197 | 0.99 | 29 | 0.99 | < 1 | 0.96 | 2 | |
| neos-932816 | 578 | 7200 | 155970 | 421024 | 5846 | < 1 | 543 | 0.94 | 7200 | 1.00 | 143847 | 0.92 | 420054 | 1.00 | 6360 | <i>1.09</i> | < 1 | 1.03 | 67 | |
| neos-933364 | 55902 | 129 | 82 | 100 | 43 | < 1 | 52820 | 0.94 | 119 | 0.92 | 84 | 1.02 | 102 | 1.02 | 40 | 0.92 | < 1 | <i>1.11</i> | 230 | |
| neos-933550 | 1 | 1 | 30 | 29 | < 1 | < 1 | 1 | 1.00 | 1 | 1.00 | 28 | 0.94 | 29 | 0.98 | < 1 | 0.98 | < 1 | 0.98 | 0 | |
| neos-933562 | 26991 | 7200 | 26451 | 720001 | 1678 | < 1 | 26595 | 0.99 | 7200 | 1.00 | 19007 | 0.72 | 720000 | 1.00 | 1166 | 0.69 | < 1 | 1.03 | 13429 | |
| neos-933638 | 327 | 3609 | 88808 | 88810 | 3566 | < 1 | 417 | <i>1.28</i> | 3569 | 0.99 | 148946 | <i>1.68</i> | 148968 | <i>1.68</i> | 3072 | 0.86 | < 1 | <i>1.17</i> | 56 | |
| neos-933815 | 1137328 | 4060 | 84 | 193 | 100 | < 1 | 2283670 | <i>2.01</i> | 3791 | 0.93 | 79 | 0.95 | 112 | 0.58 | 78 | 0.78 | < 1 | <i>1.06</i> | 3966 | |
| neos-933966 | 649 | 2723 | 136937 | 136946 | 2723 | < 1 | 447 | 0.69 | 1553 | 0.57 | 66945 | 0.49 | 66931 | 0.49 | 1553 | 0.57 | < 1 | 0.98 | 67 | |
| neos-934278 | 1254 | 7200 | 348201 | 348917 | 4801 | < 1 | 661 | 0.53 | 7200 | 1.00 | 405372 | <i>1.16</i> | 405996 | <i>1.16</i> | 2940 | 0.61 | < 1 | 0.89 | 141 | |
| neos-934441 | 819 | 7200 | 248079 | 249147 | 5096 | < 1 | 1185 | <i>1.45</i> | 7200 | 1.00 | 250987 | 1.01 | 252048 | 1.01 | 5058 | 0.99 | < 1 | <i>1.08</i> | 320 | |
| neos-934531 | 19 | 145 | 14188 | 14195 | 145 | 141 | 13 | 0.67 | 134 | 0.92 | 13137 | 0.93 | 13155 | 0.93 | 134 | 0.92 | 131 | 0.93 | 145 | |
| neos-935234 | 951 | 7200 | 286657 | 288191 | 4681 | 1 | 1059 | <i>1.11</i> | 7200 | 1.00 | 182746 | 0.64 | 184443 | 0.64 | 5027 | <i>1.07</i> | 1 | 1.00 | 52 | |
| neos-935348 | 1007 | 7200 | 265175 | 266797 | 4739 | 1 | 1278 | <i>1.27</i> | 7200 | 1.00 | 174841 | 0.66 | 176604 | 0.66 | 4971 | <i>1.05</i> | 1 | 0.93 | 117 | |
| neos-935496 | 1021676 | 7200 | 7895 | 363953 | 2202 | 28 | 1078585 | <i>1.06</i> | 7200 | 1.00 | 4900 | 0.62 | 362464 | 1.00 | 649 | 0.29 | 10 | 0.35 | 15976 | |
| neos-935627 | 1245 | 7121 | 76421 | 79168 | 5837 | 1 | 831 | 0.67 | 7200 | 1.01 | 61843 | 0.81 | 64761 | 0.82 | 6277 | <i>1.08</i> | 1 | <i>1.09</i> | 46 | |
| neos-935674 | 865975 | 7200 | 6447 | 363224 | 915 | 12 | 867107 | 1.00 | 7200 | 1.00 | 7065 | <i>1.10</i> | 363531 | 1.00 | 1638 | <i>1.79</i> | 6 | 0.54 | 13769 \checkmark | |
| neos-935769 | 965 | 3723 | 35913 | 38726 | 3707 | 1 | 1487 | <i>1.54</i> | 5857 | <i>1.57</i> | 34843 | 0.97 | 37130 | 0.96 | 4782 | <i>1.29</i> | 1 | 1.02 | 96 | |
| neos-936660 | 1567 | 7200 | 53953 | 55447 | 4496 | 1 | 747 | 0.48 | 6525 | 0.91 | 72195 | <i>1.34</i> | 73986 | <i>1.33</i> | 3701 | 0.82 | 1 | <i>1.06</i> | 15 | |
| neos-937446 | 848 | 5350 | 58516 | 60007 | 4366 | 1 | 698 | 0.82 | 5913 | <i>1.11</i> | 59290 | 1.01 | 60680 | 1.01 | 5182 | <i>1.19</i> | 1 | 0.88 | 35 | |
| neos-937511 | 442 | 5517 | 35226 | 36533 | 2510 | 1 | 691 | <i>1.56</i> | 5645 | 1.02 | 54094 | <i>1.54</i> | 55460 | <i>1.52</i> | 3689 | <i>1.47</i> | 1 | <i>1.08</i> | 32 \checkmark | |
| neos-937815 | 1040 | 7200 | 75221 | 78283 | 4920 | 1 | 2205 | <i>2.12</i> | 7200 | 1.00 | 85926 | <i>1.14</i> | 88746 | <i>1.13</i> | 4528 | 0.92 | 1 | 0.81 | 86 \checkmark | |
| neos-941262 | 1704 | 7200 | 87642 | 88289 | 3427 | 1 | 2150 | <i>1.26</i> | 7200 | 1.00 | 109596 | <i>1.25</i> | 110234 | <i>1.25</i> | 4471 | <i>1.30</i> | 1 | 1.00 | 94 \checkmark | |
| neos-941313 | 52 | 2303 | 18320 | 18320 | 1865 | 152 | 24 | 0.46 | 1418 | 0.62 | 17221 | 0.94 | 17216 | 0.94 | 1418 | 0.76 | 152 | 1.00 | 1028 | |
| neos-941698 | 56 | 11 | 902 | 902 | 11 | 6 | 184 | <i>3.32</i> | 15 | <i>1.35</i> | 1148 | <i>1.27</i> | 1148 | <i>1.27</i> | 15 | <i>1.35</i> | 7 | <i>1.24</i> | 94 | |
| neos-941717 | 952413 | 7200 | 4207 | 93682 | 337 | 19 | 1095340 | <i>1.15</i> | 7200 | 1.00 | 4972 | <i>1.18</i> | 94351 | 1.01 | 2756 | <i>8.18</i> | 16 | 0.84 | 8468 | |

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Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | \mathbf{C} | \mathbf{I} |
|-------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|-------------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | | |
| neos-941782 | 1666693 | 7200 | 3137 | 88235 | 2091 | 12 | 1378285 | 0.83 | 7200 | 1.00 | 3322 | <i>1.06</i> | 92469 | <i>1.05</i> | 4251 | <i>2.03</i> | 18 | <i>1.47</i> | 14047 | |
| neos-942323 | 472 | 7 | 170 | 202 | 4 | 1 | 558 | <i>1.18</i> | 7 | 1.03 | 149 | 0.88 | 184 | 0.91 | 4 | <i>1.24</i> | 1 | 0.65 | 239 \checkmark | |
| neos-942830 | 658868 | 1928 | 1115 | 7834 | 30 | 4 | 416475 | 0.63 | 1272 | 0.66 | 1150 | 1.03 | 5906 | 0.75 | 41 | <i>1.38</i> | 5 | <i>1.23</i> | 1886 | |
| neos-942886 | 1 | 1 | 24 | 720000 | 7200 | 7200 | 1 | 1.00 | 1 | 1.00 | 22 | 0.94 | 720000 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 10 | |
| neos-948126 | 1733 | 7200 | 152485 | 154718 | 6094 | 1 | 1601 | 0.92 | 7200 | 1.00 | 181224 | <i>1.19</i> | 183454 | <i>1.19</i> | 5578 | 0.92 | 1 | 1.03 | 32 \checkmark | |
| neos-948268 | 16 | 35 | 3523 | 3519 | 35 | 35 | 13 | 0.81 | 39 | <i>1.10</i> | 3883 | <i>1.10</i> | 3886 | <i>1.10</i> | 39 | <i>1.10</i> | 39 | <i>1.10</i> | 0 | |
| neos-948346 | 139 | 7200 | 205860 | 208360 | 3768 | < 1 | 95 | 0.68 | 7200 | 1.00 | 169312 | 0.82 | 171288 | 0.82 | 3534 | 0.94 | < 1 | 0.75 | 309 \checkmark | |
| neos-950242 | 8547 | 7200 | 62818 | 424595 | 776 | 484 | 6934 | 0.81 | 7200 | 1.00 | 84972 | <i>1.35</i> | 414309 | 0.98 | 940 | <i>1.21</i> | 827 | <i>1.71</i> | 166 \checkmark | |
| neos-952987 | 14 | 7200 | 720002 | 720002 | 7200 | 7200 | 16 | <i>1.21</i> | 7200 | 1.00 | 720002 | 1.00 | 720002 | 1.00 | 7200 | 1.00 | 7200 | 1.00 | 40 | |
| neos-953928 | 50 | 559 | 1891 | 5485 | 558 | < 1 | 73 | <i>1.46</i> | 566 | 1.01 | 2406 | <i>1.27</i> | 6094 | <i>1.11</i> | 498 | 0.89 | < 1 | 0.88 | 36 \checkmark | |
| neos-954925 | 226 | 5685 | 8847 | 10366 | 2651 | < 1 | 232 | 1.03 | 5550 | 0.98 | 10873 | <i>1.23</i> | 12686 | <i>1.22</i> | 3242 | <i>1.22</i> | < 1 | <i>1.23</i> | 115 \checkmark | |
| neos-955215 | 25278 | 20 | 45 | 47 | 6 | < 1 | 46070 | <i>1.82</i> | 25 | <i>1.22</i> | 44 | 0.96 | 47 | 0.99 | 7 | <i>1.11</i> | < 1 | 0.96 | 168 | |
| neos-955800 | 460336 | 6748 | 6314 | 225508 | 206 | 42 | 409899 | 0.89 | 6299 | 0.93 | 5871 | 0.93 | 201837 | 0.90 | 236 | <i>1.15</i> | 44 | <i>1.06</i> | 2006 \checkmark | |
| neos-956971 | 242 | 5526 | 4515 | 5960 | 3850 | < 1 | 317 | <i>1.31</i> | 5724 | 1.04 | 6412 | <i>1.42</i> | 8033 | <i>1.35</i> | 2089 | 0.54 | < 1 | <i>1.13</i> | 73 \checkmark | |
| neos-957143 | 319 | 2126 | 2158 | 3062 | 2126 | < 1 | 227 | 0.71 | 2307 | <i>1.09</i> | 2286 | <i>1.06</i> | 3196 | 1.04 | 2307 | <i>1.09</i> | < 1 | 0.95 | 16 | |
| neos-957270 | 1 | 2 | 233 | 234 | 2 | 2 | 1 | 1.00 | 2 | 0.99 | 232 | 0.99 | 232 | 0.99 | 2 | 0.99 | 2 | 0.99 | 0 | |
| neos-957323 | 3 | 97 | 574 | 2323 | 80 | < 1 | 4 | <i>1.73</i> | 96 | 1.00 | 609 | <i>1.06</i> | 2353 | 1.01 | 85 | <i>1.07</i> | < 1 | 0.84 | 3 \checkmark | |
| neos-957389 | 1 | 16 | 1615 | 1625 | 16 | 16 | 1 | 1.00 | 16 | 1.00 | 1615 | 1.00 | 1620 | 1.00 | 16 | 1.00 | 16 | 1.00 | 0 | |
| neos-960392 | 201 | 1760 | 23086 | 23098 | 1760 | < 1 | 176 | 0.87 | 1919 | <i>1.09</i> | 28447 | <i>1.23</i> | 28426 | <i>1.23</i> | 1919 | <i>1.09</i> | < 1 | 1.02 | 127 | |
| neos-983171 | 1042 | 7200 | 116979 | 119936 | 3701 | 1 | 2108 | <i>2.02</i> | 7200 | 1.00 | 102659 | 0.88 | 105677 | 0.88 | 4815 | <i>1.30</i> | 1 | 0.99 | 95 \checkmark | |
| neos-984165 | 1456 | 7200 | 127659 | 132256 | 4399 | 1 | 1295 | 0.89 | 7200 | 1.00 | 178821 | <i>1.40</i> | 183123 | <i>1.38</i> | 5786 | <i>1.32</i> | 1 | 1.00 | 55 \checkmark | |
| newdano | 1307144 | 6819 | 5482 | 130091 | 2922 | < 1 | 1390208 | <i>1.06</i> | 6909 | 1.01 | 6164 | <i>1.12</i> | 144565 | <i>1.11</i> | 3718 | <i>1.27</i> | < 1 | <i>1.29</i> | 859 \checkmark | |
| nsa | 166 | 2 | 156 | 156 | 2 | 2 | 172 | 1.04 | 2 | 0.98 | 149 | 0.96 | 152 | 0.97 | 2 | 0.98 | 2 | 0.97 | 9 | |
| nug08 | 2 | 50 | 986 | 1258 | 42 | 1 | 2 | <i>1.11</i> | 66 | <i>1.32</i> | 381 | 0.39 | 735 | 0.58 | 60 | <i>1.42</i> | 1 | 0.98 | 77 \checkmark | |
| p6b | 536562 | 7200 | 38900 | 197930 | 2785 | < 1 | 536070 | 1.00 | 7200 | 1.00 | 38901 | 1.00 | 197963 | 1.00 | 2783 | 1.00 | < 1 | 1.00 | 207 | |
| pg | 2946 | 653 | 1401 | 3859 | 564 | < 1 | 3437 | <i>1.17</i> | 546 | 0.84 | 1188 | 0.85 | 3418 | 0.89 | 484 | 0.86 | < 1 | <i>1.20</i> | 20 | |
| pg5_34 | 145643 | 1556 | 257 | 753 | 997 | < 1 | 190791 | <i>1.31</i> | 2926 | <i>1.88</i> | 399 | <i>1.55</i> | 492 | 0.65 | 1295 | <i>1.30</i> | < 1 | 1.00 | 111 \checkmark | |
| prod1 | 24729 | 20 | 12 | 242 | 2 | < 1 | 26524 | <i>1.07</i> | 22 | <i>1.10</i> | 12 | 0.97 | 149 | 0.62 | 1 | 0.56 | < 1 | 0.86 | 539 \checkmark | |
| prod2 | 85658 | 94 | 344 | 188 | 94 | < 1 | 89214 | 1.04 | 101 | <i>1.07</i> | 328 | 0.95 | 366 | <i>1.95</i> | 99 | <i>1.05</i> | < 1 | 1.00 | 1842 | |
| qap10 | 3 | 90 | 2010 | 3548 | 79 | 4 | 3 | 0.90 | 94 | <i>1.05</i> | 2071 | 1.03 | 3626 | 1.02 | 82 | 1.03 | 4 | 1.02 | 0 | |

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Table 6: Detailed computational results on CORAL test set. The table shows the absolute and relative numbers of nodes (\mathbf{N} , \mathbf{N}_Q), solving time (\mathbf{T} , \mathbf{T}_Q), primal integral (\mathbf{PI} , \mathbf{PI}_Q), primal-dual integral (\mathbf{PDI} , \mathbf{PDI}_Q), time to best (\mathbf{TtB} , \mathbf{TtB}_Q) and first solution (\mathbf{TtF} , \mathbf{TtF}_Q), and number of conflicts found by conflict diving (\mathbf{C}). The right-most column (\mathbf{I}) indicates whether at least one improving solution was found by conflict diving (\checkmark). All changes in the numbers of at least 5% are highlighted in bold and blue (**improvement**) or italic and red (*deterioration*).

| Instance | default | | | | | | confdiving | | | | | | | | | | | | | |
|-----------------|--------------|--------------|---------------|----------------|----------------|----------------|--------------|----------------|--------------|----------------|---------------|-----------------|----------------|------------------|----------------|------------------|----------------|------------------|--------------|--------------|
| | \mathbf{N} | \mathbf{T} | \mathbf{PI} | \mathbf{PDI} | \mathbf{TtB} | \mathbf{TtF} | \mathbf{N} | \mathbf{N}_Q | \mathbf{T} | \mathbf{T}_Q | \mathbf{PI} | \mathbf{PI}_Q | \mathbf{PDI} | \mathbf{PDI}_Q | \mathbf{TtB} | \mathbf{TtB}_Q | \mathbf{TtF} | \mathbf{TtF}_Q | \mathbf{C} | \mathbf{I} |
| ramos3 | 33 | 7200 | 116043 | 290943 | < 1 | < 1 | 33 | 1.02 | 7200 | 1.00 | 116043 | 1.00 | 290543 | 1.00 | < 1 | 0.97 | < 1 | 1.00 | | 0 |
| ran14x18_1 | 724840 | 2031 | 853 | 5664 | 615 | < 1 | 754078 | 1.04 | 2421 | <i>1.19</i> | 1089 | <i>1.28</i> | 6318 | <i>1.12</i> | 1053 | <i>1.71</i> | < 1 | 1.00 | | 416 |
| rlp1 | 40206966 | 7200 | 2 | 48004 | < 1 | < 1 | 41817546 | 1.04 | 7200 | 1.00 | 2 | 0.75 | 48003 | 1.00 | < 1 | 0.72 | < 1 | 0.83 | 302342 | \checkmark |
| roy | 2 | 1 | 2 | 4 | < 1 | < 1 | 2 | 1.00 | 1 | 1.02 | 2 | 0.95 | 4 | <i>1.07</i> | < 1 | <i>1.10</i> | < 1 | 0.86 | 108 | \checkmark |
| seymour-disj-10 | 97420 | 7200 | 2025 | 13136 | 2992 | < 1 | 97507 | 1.00 | 7200 | 1.00 | 1492 | 0.74 | 12452 | 0.95 | 1980 | 0.66 | < 1 | 0.88 | 702 | |
| sp97ic | 25579 | 7200 | 16558 | 35392 | 2210 | < 1 | 31960 | <i>1.25</i> | 7200 | 1.00 | 14393 | 0.87 | 33563 | 0.95 | 4194 | <i>1.90</i> | < 1 | 0.98 | 175 | |
| sp98ar | 2686 | 7200 | 35560 | 49360 | 4360 | 40 | 2502 | 0.93 | 7200 | 1.00 | 40340 | <i>1.13</i> | 53675 | <i>1.09</i> | 4738 | <i>1.09</i> | 38 | 0.93 | 68 | |
| sp98ic | 47572 | 7200 | 22132 | 30460 | 6050 | 1 | 55434 | <i>1.17</i> | 7200 | 1.00 | 19883 | 0.90 | 28943 | 0.95 | 4513 | 0.75 | 1 | 1.00 | 6444 | \checkmark |
| sp98ir | 4915 | 80 | 271 | 345 | 56 | 1 | 6741 | <i>1.37</i> | 101 | <i>1.27</i> | 295 | <i>1.09</i> | 385 | <i>1.12</i> | 68 | <i>1.21</i> | 1 | 0.96 | 308 | |
| geom. | 2259.63 | 333.16 | - | - | 133.13 | 0.99 | 2117.84 | 0.94 | 327.87 | 0.98 | - | - | 5249.79 | - | 134.44 | 1.01 | 0.96 | 0.97 | - | |
| shgeom. | 5026.97 | 362.44 | 1463.79 | 5664.86 | 161.23 | 3.74 | 4930.14 | 0.98 | 357.28 | 0.99 | 1504.23 | 1.03 | 5629.40 | 0.99 | 162.40 | 1.01 | 3.67 | 0.98 | 288.71 | |