# Supplementary material to "Augmented Lagrangian methods with telescopic subproblems for MPCCs and cardinality constraints with general constraints: constraint-preserving swaps and B-stationarity"

Results by instance

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This supplement reports, instance by instance, the results of the methods compared in Section 7 of the paper: CPS AL (Algorithm 5.3), Telescopic AL (Algorithm 4.1), CPS $AL_0$ and Telescopic $AL_0$ (the same methods without Phase I), Algencan applied to the NLP reformulation, the regularization method of Scholtes, CPLEX and, in sparse PCA, the truncated power method. Its purpose is to allow comparisons with other methods without running ours. The same data are given in the files `macmpec.csv`, `mv.csv`, `sp500.csv` and `spca.csv` of the folder `supplement` of the package of codes described in Section 7, which also contains the final points.

**Columns.** $n$ and $m$ are the numbers of variables and constraints of the problem solved by each method (with slack variables and, for Algencan and Scholtes, in the NLP reformulation), and "pairs" is the number of complementarity pairs. $f$ is the objective value at the final point (in the portfolio problems with the S&P 500, the return; in sparse PCA, the explained variance), and "viol" is the violation of the constraints $h$. For Algencan and Scholtes, "comp" is the complementarity residual. In the MacMPEC tables, "stat" is the result of the independent verification of Section 7.2: S or B (feasible and S- or B-stationary), none (feasible, not stationary), $\Psi$ (infeasible and stationary for the infeasibility measure), inf (infeasible, not stationary for $\Psi$), or fail (no final point). In the other tables, "verif." says whether the final point passed the verification described in Section 7.3. For the augmented Lagrangian methods, $k$ is the number of outer iterations, "calls" the number of calls to the Telescopic Method (a new call follows each accepted CPS), "it-T" and "it-G" the total numbers of iterations of the Telescopic Method and of Gencan, "swaps" the number of accepted original swaps, "CPS" the number of accepted constraint-preserving swaps and $\rho$ the final penalty parameter. For Algencan and Scholtes, "out" and "inner" are the outer and inner iterations. "time" is the CPU time in seconds, and "status" is the status returned by CPLEX.

**Parameters.** In the mean-variance portfolios, $s$ is the cardinality (s5, s10, s20). In the S&P 500 portfolios, p$p$_u$u$_s$\sigma$ identifies the problem: at most $p$ assets of each sector, upper bound $u$ on each $x_j$ and risk level $\sigma_{\max} = \sigma$. In sparse PCA, p5, p10 and p20 give the cardinality.

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# 1 MacMPEC (Section 7.2, Table 3)

Table 1: MacMPEC, CPS AL.

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar-truss-3 | 41 | 35 | 6 | 1.01665728e+04 | 2.3e-13 | S | 7 | 6 | 6 | 39 | 0 | 0 | 1.0e+05 | 34.05 |
| bard1 | 8 | 4 | 3 | 1.70000000e+01 | 8.0e-11 | S | 4 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| bard1m | 9 | 4 | 3 | 1.70000000e+01 | 8.0e-11 | S | 4 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| bard2 | 17 | 9 | 4 | 6.59800000e+03 | 9.0e-12 | S | 5 | 1 | 1 | 1 | 0 | 0 | 6.6e+04 | 0.01 |
| bard2m | 21 | 13 | 4 | -6.59800000e+03 | 1.4e-12 | S | 5 | 1 | 1 | 1 | 0 | 0 | 6.6e+04 | 0.01 |
| bard3 | 9 | 5 | 2 | -1.26787109e+01 | 1.5e-12 | S | 3 | 1 | 1 | 1 | 0 | 0 | 1.3e+02 | 0.00 |
| bard3m | 11 | 5 | 4 | -1.26787109e+01 | 1.5e-10 | S | 5 | 2 | 2 | 2 | 0 | 0 | 1.3e+02 | 0.00 |
| bem-milanc30-s | 4901 | 3433 | 1464 | 9.44349217e-02 | 7.2e-12 | S | 50 | 10 | 471 | 4657 | 1982 | 0 | 8.5e+06 | 1586.91 |
| bilevel1 | 19 | 11 | 6 | 0.00000000e+00 | 2.8e-09 | S | 7 | 1 | 1 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| bilevel1m | 19 | 11 | 6 | 0.00000000e+00 | 2.8e-09 | S | 7 | 1 | 1 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| bilevel2 | 33 | 17 | 12 | -6.60000000e+03 | 2.0e-18 | S | 13 | 1 | 1 | 0 | 0 | 0 | 6.6e+04 | 0.01 |
| bilevel2m | 37 | 21 | 12 | -6.60000000e+03 | 3.3e-13 | S | 13 | 1 | 1 | 1 | 0 | 0 | 6.6e+04 | 0.01 |
| bilevel3 | 17 | 11 | 4 | -1.26787109e+01 | 3.2e-14 | S | 5 | 1 | 1 | 1 | 0 | 0 | 1.3e+02 | 0.00 |
| bilin | 15 | 7 | 6 | 1.84000000e+01 | 2.5e-14 | S | 7 | 1 | 1 | 1 | 0 | 0 | 1.8e+02 | 0.00 |
| dempe | 4 | 2 | 1 | 2.82500000e+01 | 6.1e-10 | S | 2 | 6 | 10947 | 109456 | 0 | 0 | 2.8e+04 | 1.55 |
| design-cent-1 | 18 | 12 | 3 | 1.86064735e+00 | 1.1e-11 | S | 4 | 1 | 1 | 0 | 0 | 0 | 1.9e+01 | 0.00 |
| design-cent-2 | 23 | 16 | 3 | 3.48381575e+00 | 9.5e-09 | S | 4 | 7 | 8 | 26 | 0 | 0 | 1.0e+02 | 0.01 |
| design-cent-21 | 23 | 16 | 3 | 3.48381566e+00 | 4.8e-10 | S | 4 | 1 | 1 | 2 | 0 | 0 | 3.5e+01 | 0.00 |
| design-cent-3 | 21 | 12 | 3 | 3.72336906e+00 | 9.2e-10 | S | 4 | 8 | 10 | 45 | 0 | 0 | 1.0e+02 | 0.01 |
| design-cent-31 | 21 | 12 | 3 | 3.72336907e+00 | 7.2e-10 | S | 4 | 3 | 3 | 4 | 0 | 0 | 3.7e+02 | 0.00 |
| design-cent-4 | 37 | 21 | 12 | 3.30491441e-31 | 4.4e-16 | S | 13 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| desilva | 8 | 4 | 2 | -1.00000000e+00 | 2.3e-10 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| df1 | 5 | 3 | 1 | 1.17124352e-19 | 6.8e-10 | S | 2 | 3 | 3 | 3 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.1.1 | 18 | 12 | 5 | -1.30000000e+01 | 5.3e-15 | S | 6 | 1 | 1 | 0 | 0 | 0 | 1.3e+02 | 0.00 |
| ex9.1.10 | 20 | 12 | 5 | -3.25000000e+00 | 2.5e-17 | S | 6 | 1 | 1 | 0 | 0 | 0 | 3.2e+01 | 0.00 |
| ex9.1.2 | 15 | 10 | 5 | -6.25000000e+00 | 1.4e-23 | S | 6 | 1 | 1 | 0 | 0 | 0 | 6.2e+01 | 0.00 |
| ex9.1.3 | 29 | 21 | 6 | -1.60000000e+01 | 8.9e-16 | S | 7 | 1 | 1 | 0 | 0 | 0 | 1.6e+02 | 0.01 |
| ex9.1.4 | 14 | 9 | 4 | -3.70000000e+01 | 4.3e-14 | S | 5 | 2 | 3 | 4 | 1 | 0 | 7.0e+01 | 0.01 |
| ex9.1.5 | 18 | 12 | 5 | -1.00000000e+00 | 3.3e-16 | S | 6 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.1.6 | 20 | 13 | 6 | -4.90000000e+01 | 3.6e-15 | S | 7 | 1 | 1 | 0 | 0 | 0 | 4.9e+02 | 0.00 |
| ex9.1.7 | 23 | 15 | 6 | -2.60000000e+01 | 2.2e-16 | S | 7 | 1 | 1 | 0 | 0 | 0 | 2.6e+02 | 0.00 |
| ex9.1.8 | 20 | 12 | 5 | -3.25000000e+00 | 2.5e-17 | S | 6 | 1 | 1 | 0 | 0 | 0 | 3.2e+01 | 0.00 |
| ex9.1.9 | 17 | 11 | 5 | 3.11111111e+00 | 1.8e-15 | S | 6 | 1 | 1 | 0 | 0 | 0 | 3.1e+01 | 0.00 |
| ex9.2.1 | 14 | 9 | 4 | 1.70000000e+01 | 2.5e-10 | S | 5 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| ex9.2.2 | 17 | 11 | 4 | 1.00000000e+02 | 1.0e-10 | B | 5 | 17 | 33 | 110 | 16 | 0 | 1.0e+11 | 0.02 |
| ex9.2.3 | 23 | 15 | 6 | 5.00000000e+00 | 7.1e-15 | S | 7 | 1 | 1 | 0 | 0 | 0 | 5.0e+01 | 0.01 |
| ex9.2.4 | 10 | 7 | 2 | 4.99999985e-01 | 7.7e-09 | S | 3 | 4 | 4 | 4 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.2.5 | 11 | 7 | 3 | 4.99999999e+00 | 2.0e-09 | S | 4 | 2 | 2 | 2 | 0 | 0 | 5.0e+01 | 0.00 |
| ex9.2.6 | 22 | 12 | 6 | -1.00000000e+00 | 1.4e-15 | S | 7 | 19 | 19 | 30 | 0 | 0 | 1.0e+08 | 0.01 |
| ex9.2.7 | 14 | 9 | 4 | 1.70000000e+01 | 2.5e-10 | S | 5 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| ex9.2.8 | 8 | 5 | 2 | 1.50000000e+00 | 0.0e+00 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.5e+01 | 0.00 |
| ex9.2.9 | 12 | 8 | 3 | 2.00000000e+00 | 0.0e+00 | S | 4 | 1 | 1 | 0 | 0 | 0 | 2.0e+01 | 0.00 |
| flp2 | 6 | 2 | 2 | 2.27064059e-28 | 4.3e-14 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| flp4-1 | 140 | 60 | 30 | 6.39304124e-39 | 4.4e-16 | S | 31 | 2 | 2 | 4 | 0 | 0 | 1.0e+01 | 0.05 |
| flp4-2 | 220 | 110 | 60 | 1.60801071e-37 | 8.9e-16 | S | 50 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.17 |
| flp4-3 | 310 | 170 | 70 | 5.24167649e-38 | 4.4e-16 | S | 50 | 2 | 3 | 3 | 1 | 0 | 1.0e+01 | 0.23 |
| flp4-4 | 450 | 250 | 100 | 1.17375450e-36 | 8.9e-16 | S | 50 | 2 | 3 | 5 | 1 | 0 | 1.0e+01 | 0.58 |
| gauvin | 5 | 2 | 2 | 2.00000000e+01 | 1.4e-14 | S | 3 | 1 | 1 | 1 | 0 | 0 | 2.0e+02 | 0.00 |
| gnash10 | 21 | 12 | 8 | -2.30823207e+02 | 3.7e-09 | S | 9 | 1 | 1 | 2 | 0 | 0 | 2.3e+03 | 0.01 |
| gnash10m | 25 | 16 | 8 | -2.30823207e+02 | 3.7e-09 | S | 9 | 1 | 1 | 2 | 0 | 0 | 2.3e+03 | 0.01 |
| gnash11 | 21 | 12 | 8 | -1.29911924e+02 | 1.4e-11 | S | 9 | 2 | 2 | 3 | 0 | 0 | 1.3e+03 | 0.00 |
| gnash11m | 25 | 16 | 8 | -1.29911924e+02 | 1.4e-11 | S | 9 | 2 | 2 | 3 | 0 | 0 | 1.3e+03 | 0.01 |
| gnash12 | 21 | 12 | 8 | -3.69331068e+01 | 2.2e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 3.7e+02 | 0.00 |
| gnash12m | 25 | 16 | 8 | -3.69331068e+01 | 2.3e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 3.7e+02 | 0.00 |
| gnash13 | 21 | 12 | 8 | -7.06178327e+00 | 3.3e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 7.1e+01 | 0.00 |
| gnash13m | 25 | 16 | 8 | -7.06178327e+00 | 3.3e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 7.1e+01 | 0.00 |
| gnash14 | 21 | 12 | 8 | -1.79046320e-01 | 9.2e-09 | S | 9 | 3 | 3 | 3 | 0 | 0 | 1.0e+01 | 0.01 |
| gnash14m | 25 | 16 | 8 | -1.79046320e-01 | 9.2e-09 | S | 9 | 3 | 3 | 3 | 0 | 0 | 1.0e+01 | 0.01 |
| gnash15 | 21 | 12 | 8 | -3.54699059e+02 | 6.6e-13 | S | 9 | 1 | 1 | 1 | 0 | 0 | 3.6e+03 | 0.01 |
| gnash15m | 25 | 16 | 8 | -3.54699059e+02 | 3.6e-10 | S | 9 | 1 | 1 | 1 | 0 | 0 | 3.6e+03 | 0.01 |
| gnash16 | 21 | 12 | 8 | -2.41441977e+02 | 4.6e-10 | S | 9 | 1 | 1 | 1 | 0 | 0 | 2.4e+03 | 0.01 |
| gnash16m | 25 | 16 | 8 | -2.41441977e+02 | 5.2e-10 | S | 9 | 1 | 1 | 1 | 0 | 0 | 2.4e+03 | 0.01 |
| gnash17 | 21 | 12 | 8 | -9.07491018e+01 | 2.2e-12 | S | 9 | 2 | 2 | 2 | 0 | 0 | 9.1e+02 | 0.00 |
| gnash17m | 25 | 16 | 8 | -9.07491018e+01 | 1.2e-09 | S | 9 | 1 | 1 | 1 | 0 | 0 | 9.1e+02 | 0.00 |
| gnash18 | 21 | 12 | 8 | -2.56982153e+01 | 8.7e-11 | S | 9 | 3 | 3 | 4 | 0 | 0 | 2.6e+02 | 0.01 |
| gnash18m | 25 | 16 | 8 | -2.56982153e+01 | 6.4e-11 | S | 9 | 3 | 3 | 6 | 0 | 0 | 2.6e+02 | 0.01 |
| gnash19 | 21 | 12 | 8 | -6.11670824e+00 | 3.3e-09 | S | 9 | 3 | 3 | 4 | 0 | 0 | 6.1e+01 | 0.01 |
| gnash19m | 25 | 16 | 8 | -6.11670822e+00 | 4.0e-10 | S | 9 | 4 | 4 | 7 | 0 | 0 | 6.1e+01 | 0.01 |
| hakonsen | 12 | 6 | 4 | 2.43668144e+01 | 4.5e-09 | S | 5 | 8 | 21 | 156 | 0 | 0 | 1.6e+02 | 0.01 |
| hs044-i | 30 | 14 | 10 | 1.56177689e+01 | 4.7e-10 | S | 11 | 2 | 2 | 2 | 0 | 0 | 1.6e+02 | 0.01 |
| incid-set1-16 | 815 | 555 | 225 | -1.44140438e-11 | 2.4e-10 | S | 50 | 2 | 2 | 6 | 0 | 0 | 1.0e+01 | 2.29 |
| incid-set1-32 | 3159 | 2131 | 961 | 6.17939192e-12 | 8.2e-11 | S | 50 | 8 | 106 | 998 | 7 | 0 | 1.0e+03 | 43.78 |
| incid-set1-8 | 219 | 151 | 49 | 1.83112972e-09 | 6.6e-09 | S | 50 | 2 | 2 | 5 | 0 | 0 | 1.0e+01 | 0.08 |
| incid-set1c-16 | 830 | 570 | 225 | -4.19348376e-11 | 1.8e-09 | S | 50 | 5 | 6 | 27 | 0 | 0 | 1.0e+03 | 2.53 |
| incid-set1c-32 | 3190 | 2162 | 961 | 9.89089816e-06 | 2.3e-10 | S | 50 | 9 | 132 | 1268 | 49 | 0 | 1.0e+05 | 51.71 |
| incid-set1c-8 | 226 | 158 | 49 | 9.82857773e-12 | 2.4e-10 | S | 50 | 2 | 2 | 8 | 0 | 0 | 1.0e+01 | 0.17 |
| incid-set2-16 | 815 | 555 | 225 | 3.04180794e-03 | 8.3e-09 | S | 50 | 10 | 78 | 720 | 35 | 0 | 1.0e+04 | 5.52 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| incid-set2-32 | 3159 | 2131 | 961 | 1.74411556e-03 | 1.5e-10 | S | 50 | 14 | 120 | 1143 | 128 | 0 | 1.0e+05 | 49.02 |
| incid-set2-8 | 219 | 151 | 49 | 4.51786986e-03 | 8.3e-09 | S | 50 | 12 | 43 | 369 | 8 | 0 | 1.0e+03 | 0.50 |
| incid-set2c-16 | 830 | 570 | 225 | 3.61578143e-03 | 5.9e-09 | S | 50 | 11 | 60 | 526 | 48 | 0 | 1.0e+03 | 4.47 |
| incid-set2c-32 | 3190 | 2162 | 961 | 2.42826244e-03 | 5.4e-10 | S | 50 | 11 | 94 | 893 | 122 | 0 | 1.0e+05 | 45.20 |
| incid-set2c-8 | 226 | 158 | 49 | 5.47126501e-03 | 8.3e-10 | S | 50 | 9 | 30 | 251 | 11 | 0 | 1.0e+03 | 0.39 |
| jr1 | 3 | 1 | 1 | 5.00000000e-01 | 1.2e-10 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| jr2 | 3 | 1 | 1 | 5.00000006e-01 | 6.0e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| kth1 | 3 | 1 | 1 | 0.00000000e+00 | 0.0e+00 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| kth2 | 3 | 1 | 1 | 2.08308583e-30 | 2.2e-16 | S | 2 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| kth3 | 3 | 1 | 1 | 5.00000000e-01 | 0.0e+00 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| liswet1-050 | 203 | 103 | 50 | 1.39940636e-02 | 4.5e-09 | S | 50 | 6 | 6 | 4 | 0 | 0 | 1.0e+05 | 0.04 |
| liswet1-100 | 403 | 203 | 100 | 1.37338490e-02 | 4.5e-10 | S | 50 | 16 | 21 | 124 | 0 | 0 | 1.0e+06 | 0.15 |
| liswet1-200 | 803 | 403 | 200 | 1.70079808e-02 | 7.2e-10 | S | 50 | 22 | 40 | 310 | 0 | 0 | 1.0e+07 | 0.75 |
| monteiro | 293 | 175 | 115 | 3.75300240e+01 | 1.5e-12 | S | 50 | 17 | 44 | 368 | 18 | 0 | 2.0e+10 | 0.47 |
| monteiroB | 293 | 175 | 115 | 8.27859480e+02 | 1.7e-12 | S | 50 | 15 | 33 | 287 | 22 | 0 | 7.8e+06 | 0.33 |
| nash1a | 8 | 4 | 2 | 0.00000000e+00 | 1.8e-15 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1b | 8 | 4 | 2 | 1.20848726e-23 | 4.7e-12 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1c | 8 | 4 | 2 | 1.97215226e-30 | 1.8e-15 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1d | 8 | 4 | 2 | 5.70130105e-20 | 5.8e-09 | S | 3 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1e | 8 | 4 | 2 | 0.00000000e+00 | 7.1e-15 | S | 3 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| outrata31 | 9 | 4 | 4 | 3.20770002e+00 | 5.7e-10 | S | 5 | 3 | 3 | 4 | 0 | 0 | 3.2e+01 | 0.00 |
| outrata32 | 9 | 4 | 4 | 3.44940357e+00 | 3.7e-10 | S | 5 | 3 | 3 | 4 | 0 | 0 | 3.4e+01 | 0.00 |
| outrata33 | 9 | 4 | 4 | 4.60425365e+00 | 1.8e-10 | S | 5 | 1 | 1 | 1 | 0 | 0 | 4.6e+01 | 0.00 |
| outrata34 | 9 | 4 | 4 | 6.59268383e+00 | 3.9e-11 | S | 5 | 1 | 1 | 1 | 0 | 0 | 6.6e+01 | 0.00 |
| pack-comp1-16 | 817 | 575 | 225 | 6.16951353e-01 | 2.6e-09 | S | 50 | 13 | 39 | 301 | 140 | 0 | 1.0e+05 | 1.87 |
| pack-comp1-32 | 3229 | 2235 | 961 | 6.52978810e-01 | 6.6e-09 | S | 50 | 18 | 78 | 680 | 805 | 0 | 1.0e+06 | 25.33 |
| pack-comp1-8 | 211 | 153 | 49 | 6.00000000e-01 | 6.9e-11 | S | 50 | 1 | 2 | 4 | 1 | 0 | 1.0e+01 | 0.06 |
| pack-comp1c-16 | 832 | 590 | 225 | 6.23042796e-01 | 1.6e-09 | S | 50 | 15 | 34 | 240 | 113 | 0 | 1.0e+05 | 2.39 |
| pack-comp1c-32 | 3260 | 2266 | 961 | 6.61443062e-01 | 1.6e-09 | S | 50 | 17 | 55 | 435 | 503 | 0 | 1.0e+06 | 21.24 |
| pack-comp1c-8 | 218 | 160 | 49 | 6.00000000e-01 | 5.6e-15 | S | 50 | 1 | 1 | 2 | 0 | 0 | 1.0e+01 | 0.04 |
| pack-comp1p-16 | 772 | 530 | 225 | 6.16954033e-01 | 1.5e-09 | S | 50 | 13 | 34 | 260 | 73 | 0 | 1.0e+05 | 3.47 |
| pack-comp1p-32 | 3076 | 2082 | 961 | 6.52980684e-01 | 7.7e-09 | S | 50 | 17 | 68 | 555 | 367 | 0 | 1.0e+05 | 48.70 |
| pack-comp1p-8 | 196 | 138 | 49 | 6.00000005e-01 | 4.0e-12 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.35 |
| pack-comp2-16 | 817 | 575 | 225 | 7.27135140e-01 | 6.6e-09 | S | 50 | 12 | 52 | 449 | 231 | 0 | 1.0e+05 | 2.77 |
| pack-comp2-32 | 3229 | 2235 | 961 | 7.82603403e-01 | 5.0e-09 | S | 50 | 18 | 106 | 954 | 995 | 0 | 1.0e+06 | 35.61 |
| pack-comp2-8 | 211 | 153 | 49 | 6.73117136e-01 | 1.2e-09 | S | 50 | 3 | 4 | 22 | 0 | 0 | 1.0e+01 | 0.14 |
| pack-comp2c-16 | 832 | 590 | 225 | 7.27467565e-01 | 3.9e-09 | S | 50 | 16 | 37 | 260 | 127 | 0 | 1.0e+05 | 2.04 |
| pack-comp2c-32 | 3260 | 2266 | 961 | 7.82943480e-01 | 3.1e-09 | S | 50 | 14 | 65 | 565 | 615 | 0 | 1.0e+06 | 26.02 |
| pack-comp2c-8 | 218 | 160 | 49 | 6.73458165e-01 | 5.9e-09 | S | 50 | 13 | 20 | 117 | 26 | 0 | 1.0e+04 | 0.19 |
| pack-comp2p-16 | 772 | 530 | 225 | 7.27135795e-01 | 3.3e-09 | S | 50 | 13 | 27 | 192 | 22 | 0 | 1.0e+05 | 3.33 |
| pack-comp2p-32 | 3076 | 2082 | 961 | 7.82601026e-01 | 7.3e-09 | S | 50 | 16 | 41 | 314 | 86 | 0 | 1.0e+06 | 28.17 |
| pack-comp2p-8 | 196 | 138 | 49 | 6.73112885e-01 | 5.3e-09 | S | 50 | 9 | 9 | 27 | 0 | 0 | 1.0e+04 | 0.48 |
| pack-rig1-16 | 817 | 575 | 225 | 8.26011947e-01 | 8.7e-09 | S | 50 | 14 | 40 | 327 | 130 | 0 | 1.0e+05 | 1.92 |
| pack-rig1-32 | 3229 | 2235 | 961 | 8.50893458e-01 | 4.3e-09 | S | 50 | 16 | 87 | 765 | 791 | 0 | 1.0e+06 | 25.74 |
| pack-rig1-8 | 211 | 153 | 49 | 7.87931475e-01 | 6.4e-09 | S | 50 | 13 | 32 | 244 | 76 | 0 | 1.0e+04 | 0.24 |
| pack-rig1c-16 | 832 | 590 | 225 | 8.26498335e-01 | 3.7e-09 | S | 50 | 13 | 36 | 289 | 125 | 0 | 1.0e+05 | 1.76 |
| pack-rig1c-32 | 3260 | 2266 | 961 | 8.51639453e-01 | 5.2e-09 | S | 50 | 15 | 82 | 715 | 546 | 0 | 1.0e+06 | 29.48 |
| pack-rig1c-8 | 218 | 160 | 49 | 7.88300126e-01 | 4.7e-09 | S | 50 | 15 | 28 | 181 | 42 | 0 | 1.0e+04 | 0.21 |
| pack-rig1p-16 | 772 | 530 | 225 | 8.26012732e-01 | 5.7e-10 | S | 50 | 5 | 5 | 20 | 0 | 0 | 1.0e+03 | 1.04 |
| pack-rig1p-32 | 3076 | 2082 | 961 | 8.50895112e-01 | 2.3e-09 | S | 50 | 15 | 80 | 669 | 704 | 0 | 1.0e+06 | 28.08 |
| pack-rig1p-8 | 196 | 138 | 49 | 7.87931831e-01 | 6.5e-09 | S | 50 | 17 | 21 | 91 | 3 | 0 | 1.0e+04 | 0.15 |
| pack-rig2-16 | 817 | 575 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 201 | 1919 | 62 | 0 | 1.0e+21 | 26.64 |
| pack-rig2-32 | 3229 | 2235 | 961 | 6.00000000e-01 | 2.3e-03 | inf | 50 | 1 | 5 | 29 | 111 | 0 | 1.0e+01 | 3635.61 |
| pack-rig2-8 | 211 | 153 | 49 | 7.80404318e-01 | 3.5e-09 | S | 50 | 4 | 6 | 38 | 0 | 0 | 1.0e+03 | 0.15 |
| pack-rig2c-16 | 832 | 590 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 159 | 1459 | 66 | 0 | 1.0e+21 | 41.06 |
| pack-rig2c-32 | 3260 | 2266 | 961 | 6.00000000e-01 | 2.3e-03 | inf | 50 | 1 | 4 | 26 | 111 | 0 | 1.0e+01 | 3601.88 |
| pack-rig2c-8 | 218 | 160 | 49 | 7.99305792e-01 | 3.5e-10 | S | 50 | 14 | 30 | 190 | 42 | 0 | 1.0e+06 | 0.23 |
| pack-rig2p-16 | 772 | 530 | 225 | 1.08513672e+00 | 1.2e-11 | S | 50 | 16 | 84 | 736 | 305 | 0 | 1.0e+07 | 4.73 |
| pack-rig2p-32 | 3076 | 2082 | 961 | 1.13588533e+00 | 1.0e-16 | S | 50 | 18 | 62 | 532 | 186 | 0 | 1.1e+08 | 34.26 |
| pack-rig2p-8 | 196 | 138 | 49 | 7.80404299e-01 | 2.9e-09 | S | 50 | 15 | 37 | 291 | 38 | 0 | 1.0e+05 | 0.32 |
| pack-rig3-16 | 817 | 575 | 225 | 8.00430077e-01 | 3.0e-09 | S | 50 | 16 | 71 | 621 | 271 | 0 | 1.0e+06 | 3.86 |
| pack-rig3-32 | 3229 | 2235 | 961 | 8.86402459e-01 | 6.4e-09 | S | 50 | 20 | 170 | 1580 | 1063 | 0 | 1.0e+07 | 59.71 |
| pack-rig3-8 | 211 | 153 | 49 | 7.35201921e-01 | 4.5e-09 | S | 50 | 18 | 35 | 240 | 44 | 0 | 1.0e+04 | 0.26 |
| pack-rig3c-16 | 832 | 590 | 225 | 8.18598858e-01 | 8.4e-09 | S | 50 | 17 | 52 | 409 | 260 | 0 | 1.0e+06 | 3.27 |
| pack-rig3c-32 | 3260 | 2266 | 961 | 9.08903802e-01 | 5.8e-09 | S | 50 | 22 | 147 | 1314 | 1027 | 0 | 1.0e+07 | 64.42 |
| pack-rig3c-8 | 218 | 160 | 49 | 7.53472225e-01 | 7.9e-09 | S | 50 | 17 | 31 | 201 | 41 | 0 | 1.0e+04 | 0.20 |
| portfl-i-1 | 99 | 25 | 12 | 1.50244660e-05 | 6.9e-09 | S | 13 | 8 | 8 | 10 | 0 | 0 | 1.0e+03 | 0.03 |
| portfl-i-2 | 99 | 25 | 12 | 1.45723970e-05 | 5.8e-09 | S | 13 | 9 | 9 | 11 | 0 | 0 | 1.0e+03 | 0.02 |
| portfl-i-3 | 99 | 25 | 12 | 6.26509223e-06 | 3.2e-09 | S | 13 | 9 | 9 | 17 | 0 | 0 | 1.0e+03 | 0.03 |
| portfl-i-4 | 99 | 25 | 12 | 2.17739790e-06 | 4.4e-09 | S | 13 | 7 | 7 | 9 | 0 | 0 | 1.0e+03 | 0.02 |
| portfl-i-6 | 99 | 25 | 12 | 2.36122010e-06 | 8.4e-09 | S | 13 | 5 | 5 | 5 | 0 | 0 | 1.0e+03 | 0.02 |
| qpec-100-1 | 207 | 102 | 100 | 3.09244627e-01 | 3.9e-09 | S | 50 | 8 | 17 | 39 | 25 | 0 | 1.0e+02 | 0.83 |
| qpec-100-2 | 212 | 102 | 100 | -6.59073475e+00 | 3.8e-09 | S | 50 | 7 | 7 | 7 | 0 | 0 | 6.6e+01 | 0.65 |
| qpec-100-3 | 214 | 104 | 100 | -5.48167103e+00 | 6.3e-09 | S | 50 | 9 | 9 | 12 | 0 | 0 | 5.5e+01 | 1.01 |
| qpec-100-4 | 224 | 104 | 100 | -4.09555361e+00 | 1.7e-09 | S | 50 | 6 | 6 | 7 | 0 | 0 | 4.1e+02 | 0.55 |
| qpec-200-1 | 414 | 204 | 200 | -1.93482969e+00 | 5.4e-09 | S | 50 | 15 | 35 | 101 | 88 | 0 | 1.8e+04 | 9.53 |
| qpec-200-2 | 424 | 204 | 200 | -2.40363362e+01 | 7.1e-09 | S | 50 | 2 | 2 | 2 | 0 | 0 | 2.4e+02 | 2.24 |
| qpec-200-3 | 428 | 208 | 200 | -1.94834124e+00 | 5.0e-09 | S | 50 | 18 | 32 | 97 | 84 | 0 | 1.0e+03 | 18.38 |
| qpec-200-4 | 448 | 208 | 200 | -6.19323445e+00 | 2.6e-09 | S | 50 | 12 | 18 | 47 | 49 | 0 | 1.0e+02 | 9.12 |
| qpec1 | 50 | 20 | 20 | 8.00000000e+01 | 1.1e-16 | S | 21 | 1 | 1 | 0 | 0 | 0 | 8.0e+02 | 0.00 |
| qpec2 | 50 | 20 | 20 | 4.49999996e+01 | 8.9e-09 | B | 21 | 13 | 25 | 25 | 120 | 0 | 4.5e+08 | 0.04 |
| ralph1 | 3 | 1 | 1 | 0.00000000e+00 | 1.0e-08 | B | 2 | 15 | 29 | 36 | 14 | 0 | 1.0e+08 | 0.01 |
| ralph2 | 3 | 1 | 1 | 0.00000000e+00 | 0.0e+00 | S | 2 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ralphmod | 204 | 100 | 100 | -6.83033020e+02 | 2.5e-13 | S | 50 | 4 | 4 | 30 | 0 | 0 | 6.8e+03 | 0.58 |
| scale1 | 3 | 1 | 1 | 1.00000000e+00 | 0.0e+00 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| scale2 | 3 | 1 | 1 | 1.00000001e+00 | 6.4e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| scale3 | 3 | 1 | 1 | 1.00000000e+00 | 0.0e+00 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| scale4 | 3 | 1 | 1 | 9.99999248e-01 | 3.8e-09 | S | 2 | 13 | 13 | 13 | 0 | 0 | 1.0e+05 | 0.00 |
| scale5 | 3 | 1 | 1 | 1.00000000e+02 | 4.5e-12 | S | 2 | 1 | 1 | 0 | 0 | 0 | 1.0e+03 | 0.00 |
| scholtes1 | 5 | 2 | 1 | 2.00000000e+00 | 1.3e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 2.0e+01 | 0.00 |
| scholtes2 | 5 | 2 | 1 | 1.49999999e+01 | 3.9e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.5e+02 | 0.00 |
| scholtes3 | 3 | 1 | 1 | 4.99999999e-01 | 1.4e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| scholtes4 | 6 | 3 | 1 | -2.50000000e-10 | 2.0e-09 | B | 2 | 17 | 33 | 63 | 16 | 0 | 1.0e+09 | 0.01 |
| scholtes5 | 5 | 2 | 2 | 9.99999997e-01 | 1.4e-09 | S | 3 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| siouxfls | 4151 | 2376 | 1748 | 2.08257987e+02 | 5.4e-10 | S | 50 | 10 | 96 | 918 | 38 | 0 | 2.1e+03 | 1816.09 |
| siouxfls1 | 4151 | 2376 | 1748 | 9.79386339e+02 | 9.0e-11 | S | 50 | 6 | 17 | 141 | 43 | 0 | 1.0e+04 | 338.56 |
| sl1 | 11 | 5 | 3 | 9.99999946e-05 | 2.7e-10 | S | 4 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| stackelberg1 | 4 | 2 | 1 | -3.26666667e+03 | 1.4e-14 | S | 2 | 1 | 1 | 1 | 0 | 0 | 3.3e+04 | 0.00 |
| tap-09 | 126 | 70 | 36 | 1.09143432e+02 | 4.3e-12 | S | 37 | 3 | 8 | 68 | 6 | 0 | 1.1e+03 | 0.05 |
| tap-15 | 309 | 174 | 99 | 1.84709097e+02 | 5.4e-12 | S | 50 | 3 | 11 | 96 | 8 | 0 | 1.9e+03 | 0.20 |
| taxmcp | 31 | 16 | 14 | 1.23881909e+00 | 3.0e-01 | inf | 15 | 1 | 1 | 10 | 0 | 0 | 1.3e+01 | 3600.52 |
| TSC-1 | 1346 | 1100 | 244 | 5.49634692e+01 | 1.0e-15 | S | 50 | 3 | 5 | 15 | 2 | 0 | 5.5e+02 | 0.16 |
| TSC-10 | 1346 | 1100 | 244 | 5.48021373e+01 | 1.0e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 5.5e+02 | 0.08 |
| TSC-11 | 1346 | 1100 | 244 | 1.01567690e+02 | 5.1e-11 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+03 | 0.09 |
| TSC-12 | 1346 | 1100 | 244 | 2.02398857e+02 | 7.9e-03 | inf | 50 | 1 | 1 | 8 | 0 | 0 | 2.0e+03 | 3600.10 |
| TSC-13 | 1346 | 1100 | 244 | 8.64028645e+01 | 1.5e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 8.6e+02 | 0.08 |
| TSC-2 | 1346 | 1100 | 244 | 5.25708119e+01 | 1.4e-15 | S | 50 | 1 | 1 | 1 | 0 | 0 | 5.3e+02 | 0.06 |
| TSC-3 | 1346 | 1100 | 244 | 8.70673771e+01 | 2.3e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 8.7e+02 | 0.08 |
| TSC-4 | 1346 | 1100 | 244 | 7.90435431e+01 | 2.4e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 7.9e+02 | 0.11 |
| TSC-5 | 1346 | 1100 | 244 | 1.01468684e+02 | 4.7e-11 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+03 | 0.17 |
| TSC-6 | 1346 | 1100 | 244 | 1.01528435e+02 | 3.6e-15 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+03 | 0.21 |
| TSC-7 | 1346 | 1100 | 244 | 1.95231054e+02 | 7.8e-01 | inf | 50 | 1 | 1 | 8 | 0 | 0 | 1.9e+02 | 3600.05 |
| TSC-8 | 1346 | 1100 | 244 | 2.00180940e+02 | 7.3e-01 | inf | 50 | 1 | 1 | 8 | 0 | 0 | 2.3e+02 | 3600.09 |
| TSC-9 | 1346 | 1100 | 244 | 5.32050328e+01 | 1.2e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 5.3e+02 | 0.07 |
| water-FL | 257 | 160 | 44 | 3.30758918e+03 | 1.1e-11 | S | 45 | 8 | 280 | 2769 | 15 | 0 | 5.2e+04 | 10.71 |
| water-net | 80 | 50 | 14 | 1.06948467e+03 | 6.1e-13 | S | 15 | 6 | 29 | 265 | 2 | 0 | 1.7e+04 | 1.83 |

Table 2: MacMPEC, Telescopic AL.

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar-truss-3 | 41 | 35 | 6 | 1.01665728e+04 | 2.3e-13 | S | 7 | 6 | 6 | 39 | 0 | 0 | 1.0e+05 | 33.82 |
| bard1 | 8 | 4 | 3 | 1.70000000e+01 | 8.0e-11 | S | 4 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| bard1m | 9 | 4 | 3 | 1.70000000e+01 | 8.0e-11 | S | 4 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| bard2 | 17 | 9 | 4 | 6.59800000e+03 | 9.0e-12 | S | 5 | 1 | 1 | 1 | 0 | 0 | 6.6e+04 | 0.01 |
| bard2m | 21 | 13 | 4 | -6.59800000e+03 | 1.4e-12 | S | 5 | 1 | 1 | 1 | 0 | 0 | 6.6e+04 | 0.01 |
| bard3 | 9 | 5 | 2 | -1.26787109e+01 | 1.5e-12 | S | 3 | 1 | 1 | 1 | 0 | 0 | 1.3e+02 | 0.00 |
| bard3m | 11 | 5 | 4 | -1.26787109e+01 | 1.5e-10 | S | 5 | 2 | 2 | 2 | 0 | 0 | 1.3e+02 | 0.00 |
| bem-milanc30-s | 4901 | 3433 | 1464 | 9.44349217e-02 | 7.2e-12 | S | 50 | 10 | 471 | 4657 | 1982 | 0 | 8.5e+06 | 433.29 |
| bilevel1 | 19 | 11 | 6 | 0.00000000e+00 | 2.8e-09 | S | 7 | 1 | 1 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| bilevel1m | 19 | 11 | 6 | 0.00000000e+00 | 2.8e-09 | S | 7 | 1 | 1 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| bilevel2 | 33 | 17 | 12 | -6.60000000e+03 | 2.0e-18 | S | 13 | 1 | 1 | 0 | 0 | 0 | 6.6e+04 | 0.01 |
| bilevel2m | 37 | 21 | 12 | -6.60000000e+03 | 3.3e-13 | S | 13 | 1 | 1 | 1 | 0 | 0 | 6.6e+04 | 0.01 |
| bilevel3 | 17 | 11 | 4 | -1.26787109e+01 | 3.2e-14 | S | 5 | 1 | 1 | 1 | 0 | 0 | 1.3e+02 | 0.00 |
| bilin | 15 | 7 | 6 | 1.84000000e+01 | 2.5e-14 | S | 7 | 1 | 1 | 1 | 0 | 0 | 1.8e+02 | 0.00 |
| dempe | 4 | 2 | 1 | 2.82500000e+01 | 6.1e-10 | S | 2 | 6 | 10947 | 109456 | 0 | 0 | 2.8e+04 | 1.34 |
| design-cent-1 | 18 | 12 | 3 | 1.86064735e+00 | 1.1e-11 | S | 4 | 1 | 1 | 0 | 0 | 0 | 1.9e+01 | 0.00 |
| design-cent-2 | 23 | 16 | 3 | 3.48381575e+00 | 9.5e-09 | S | 4 | 7 | 8 | 26 | 0 | 0 | 1.0e+02 | 0.01 |
| design-cent-21 | 23 | 16 | 3 | 3.48381566e+00 | 4.8e-10 | S | 4 | 1 | 1 | 2 | 0 | 0 | 3.5e+01 | 0.00 |
| design-cent-3 | 21 | 12 | 3 | 3.72336906e+00 | 9.2e-10 | S | 4 | 8 | 10 | 45 | 0 | 0 | 1.0e+02 | 0.01 |
| design-cent-31 | 21 | 12 | 3 | 3.72336907e+00 | 7.2e-10 | S | 4 | 3 | 3 | 4 | 0 | 0 | 3.7e+02 | 0.00 |
| design-cent-4 | 37 | 21 | 12 | 3.30491441e-31 | 4.4e-16 | S | 13 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| desilva | 8 | 4 | 2 | -1.00000000e+00 | 2.3e-10 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| df1 | 5 | 3 | 1 | 1.17124352e-19 | 6.8e-10 | S | 2 | 3 | 3 | 3 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.1.1 | 18 | 12 | 5 | -1.30000000e+01 | 5.3e-15 | S | 6 | 1 | 1 | 0 | 0 | 0 | 1.3e+02 | 0.00 |
| ex9.1.10 | 20 | 12 | 5 | -3.25000000e+00 | 2.5e-17 | S | 6 | 1 | 1 | 0 | 0 | 0 | 3.2e+01 | 0.00 |
| ex9.1.2 | 15 | 10 | 5 | -6.25000000e+00 | 1.4e-23 | S | 6 | 1 | 1 | 0 | 0 | 0 | 6.2e+01 | 0.00 |
| ex9.1.3 | 29 | 21 | 6 | -1.60000000e+01 | 8.9e-16 | S | 7 | 1 | 1 | 0 | 0 | 0 | 1.6e+02 | 0.01 |
| ex9.1.4 | 14 | 9 | 4 | -3.70000000e+01 | 4.3e-14 | S | 5 | 2 | 3 | 4 | 1 | 0 | 7.0e+01 | 0.00 |
| ex9.1.5 | 18 | 12 | 5 | -1.00000000e+00 | 3.3e-16 | S | 6 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.1.6 | 20 | 13 | 6 | -4.90000000e+01 | 3.6e-15 | S | 7 | 1 | 1 | 0 | 0 | 0 | 4.9e+02 | 0.00 |
| ex9.1.7 | 23 | 15 | 6 | -2.60000000e+01 | 2.2e-16 | S | 7 | 1 | 1 | 0 | 0 | 0 | 2.6e+02 | 0.00 |
| ex9.1.8 | 20 | 12 | 5 | -3.25000000e+00 | 2.5e-17 | S | 6 | 1 | 1 | 0 | 0 | 0 | 3.2e+01 | 0.00 |
| ex9.1.9 | 17 | 11 | 5 | 3.11111111e+00 | 1.8e-15 | S | 6 | 1 | 1 | 0 | 0 | 0 | 3.1e+01 | 0.00 |
| ex9.2.1 | 14 | 9 | 4 | 1.70000000e+01 | 2.5e-10 | S | 5 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| ex9.2.2 | 17 | 11 | 4 | 1.00000000e+02 | 1.0e-10 | B | 5 | 17 | 33 | 110 | 16 | 0 | 1.0e+11 | 0.01 |
| ex9.2.3 | 23 | 15 | 6 | 5.00000000e+00 | 7.1e-15 | S | 7 | 1 | 1 | 0 | 0 | 0 | 5.0e+01 | 0.00 |
| ex9.2.4 | 10 | 7 | 2 | 4.99999985e-01 | 7.7e-09 | S | 3 | 4 | 4 | 4 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.2.5 | 11 | 7 | 3 | 4.99999999e+00 | 2.0e-09 | S | 4 | 2 | 2 | 2 | 0 | 0 | 5.0e+01 | 0.00 |
| ex9.2.6 | 22 | 12 | 6 | -1.00000000e+00 | 1.4e-15 | S | 7 | 19 | 19 | 30 | 0 | 0 | 1.0e+08 | 0.00 |
| ex9.2.7 | 14 | 9 | 4 | 1.70000000e+01 | 2.5e-10 | S | 5 | 2 | 2 | 2 | 0 | 0 | 1.7e+02 | 0.00 |
| ex9.2.8 | 8 | 5 | 2 | 1.50000000e+00 | 0.0e+00 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.5e+01 | 0.00 |
| ex9.2.9 | 12 | 8 | 3 | 2.00000000e+00 | 0.0e+00 | S | 4 | 1 | 1 | 0 | 0 | 0 | 2.0e+01 | 0.00 |
| flp2 | 6 | 2 | 2 | 2.27064059e-28 | 4.3e-14 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| flp4-1 | 140 | 60 | 30 | 6.39304124e-39 | 4.4e-16 | S | 31 | 2 | 2 | 4 | 0 | 0 | 1.0e+01 | 0.04 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| flp4-2 | 220 | 110 | 60 | 1.60801071e-37 | 8.9e-16 | S | 50 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.16 |
| flp4-3 | 310 | 170 | 70 | 5.24167649e-38 | 4.4e-16 | S | 50 | 2 | 3 | 3 | 1 | 0 | 1.0e+01 | 0.16 |
| flp4-4 | 450 | 250 | 100 | 1.17375450e-36 | 8.9e-16 | S | 50 | 2 | 3 | 5 | 1 | 0 | 1.0e+01 | 0.44 |
| gauvin | 5 | 2 | 2 | 2.00000000e+01 | 1.4e-14 | S | 3 | 1 | 1 | 1 | 0 | 0 | 2.0e+02 | 0.00 |
| gnash10 | 21 | 12 | 8 | -2.30823207e+02 | 3.7e-09 | S | 9 | 1 | 1 | 2 | 0 | 0 | 2.3e+03 | 0.00 |
| gnash10m | 25 | 16 | 8 | -2.30823207e+02 | 3.7e-09 | S | 9 | 1 | 1 | 2 | 0 | 0 | 2.3e+03 | 0.01 |
| gnash11 | 21 | 12 | 8 | -1.29911924e+02 | 1.4e-11 | S | 9 | 2 | 2 | 3 | 0 | 0 | 1.3e+03 | 0.00 |
| gnash11m | 25 | 16 | 8 | -1.29911924e+02 | 1.4e-11 | S | 9 | 2 | 2 | 3 | 0 | 0 | 1.3e+03 | 0.00 |
| gnash12 | 21 | 12 | 8 | -3.69331068e+01 | 2.2e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 3.7e+02 | 0.00 |
| gnash12m | 25 | 16 | 8 | -3.69331068e+01 | 2.3e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 3.7e+02 | 0.00 |
| gnash13 | 21 | 12 | 8 | -7.06178327e+00 | 3.3e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 7.1e+01 | 0.00 |
| gnash13m | 25 | 16 | 8 | -7.06178327e+00 | 3.3e-10 | S | 9 | 2 | 2 | 2 | 0 | 0 | 7.1e+01 | 0.00 |
| gnash14 | 21 | 12 | 8 | -1.79046320e-01 | 9.2e-09 | S | 9 | 3 | 3 | 3 | 0 | 0 | 1.0e+01 | 0.01 |
| gnash14m | 25 | 16 | 8 | -1.79046320e-01 | 9.2e-09 | S | 9 | 3 | 3 | 3 | 0 | 0 | 1.0e+01 | 0.01 |
| gnash15 | 21 | 12 | 8 | -3.54699059e+02 | 6.6e-13 | S | 9 | 1 | 1 | 1 | 0 | 0 | 3.6e+03 | 0.00 |
| gnash15m | 25 | 16 | 8 | -3.54699059e+02 | 3.6e-10 | S | 9 | 1 | 1 | 1 | 0 | 0 | 3.6e+03 | 0.00 |
| gnash16 | 21 | 12 | 8 | -2.41441977e+02 | 4.6e-10 | S | 9 | 1 | 1 | 1 | 0 | 0 | 2.4e+03 | 0.00 |
| gnash16m | 25 | 16 | 8 | -2.41441977e+02 | 5.2e-10 | S | 9 | 1 | 1 | 1 | 0 | 0 | 2.4e+03 | 0.00 |
| gnash17 | 21 | 12 | 8 | -9.07491018e+01 | 2.2e-12 | S | 9 | 2 | 2 | 2 | 0 | 0 | 9.1e+02 | 0.00 |
| gnash17m | 25 | 16 | 8 | -9.07491018e+01 | 1.2e-09 | S | 9 | 1 | 1 | 1 | 0 | 0 | 9.1e+02 | 0.01 |
| gnash18 | 21 | 12 | 8 | -2.56982153e+01 | 8.7e-11 | S | 9 | 3 | 3 | 4 | 0 | 0 | 2.6e+02 | 0.01 |
| gnash18m | 25 | 16 | 8 | -2.56982153e+01 | 6.4e-11 | S | 9 | 3 | 3 | 6 | 0 | 0 | 2.6e+02 | 0.01 |
| gnash19 | 21 | 12 | 8 | -6.11670824e+00 | 3.3e-09 | S | 9 | 3 | 3 | 4 | 0 | 0 | 6.1e+01 | 0.01 |
| gnash19m | 25 | 16 | 8 | -6.11670822e+00 | 4.0e-10 | S | 9 | 4 | 4 | 7 | 0 | 0 | 6.1e+01 | 0.00 |
| hakonsen | 12 | 6 | 4 | 2.43668144e+01 | 4.5e-09 | S | 5 | 8 | 21 | 156 | 0 | 0 | 1.6e+02 | 0.01 |
| hs044-i | 30 | 14 | 10 | 1.56177689e+01 | 4.7e-10 | S | 11 | 2 | 2 | 2 | 0 | 0 | 1.6e+02 | 0.01 |
| incid-set1-16 | 815 | 555 | 225 | -1.44140438e-11 | 2.4e-10 | S | 50 | 2 | 2 | 6 | 0 | 0 | 1.0e+01 | 2.28 |
| incid-set1-32 | 3159 | 2131 | 961 | 6.17939192e-12 | 8.2e-11 | S | 50 | 8 | 106 | 998 | 7 | 0 | 1.0e+03 | 43.33 |
| incid-set1-8 | 219 | 151 | 49 | 1.83112972e-09 | 6.6e-09 | S | 50 | 2 | 2 | 5 | 0 | 0 | 1.0e+01 | 0.07 |
| incid-set1c-16 | 830 | 570 | 225 | -4.19348376e-11 | 1.8e-09 | S | 50 | 5 | 6 | 27 | 0 | 0 | 1.0e+03 | 2.51 |
| incid-set1c-32 | 3190 | 2162 | 961 | 9.89089816e-06 | 2.3e-10 | S | 50 | 9 | 132 | 1268 | 49 | 0 | 1.0e+05 | 51.13 |
| incid-set1c-8 | 226 | 158 | 49 | 9.82857773e-12 | 2.4e-10 | S | 50 | 2 | 2 | 8 | 0 | 0 | 1.0e+01 | 0.17 |
| incid-set2-16 | 815 | 555 | 225 | 3.04180794e-03 | 8.3e-09 | S | 50 | 10 | 78 | 720 | 35 | 0 | 1.0e+04 | 5.53 |
| incid-set2-32 | 3159 | 2131 | 961 | 1.74411556e-03 | 1.5e-10 | S | 50 | 14 | 120 | 1143 | 128 | 0 | 1.0e+05 | 47.89 |
| incid-set2-8 | 219 | 151 | 49 | 4.51786986e-03 | 8.3e-09 | S | 50 | 12 | 43 | 369 | 8 | 0 | 1.0e+03 | 0.50 |
| incid-set2c-16 | 830 | 570 | 225 | 3.61578143e-03 | 5.9e-09 | S | 50 | 11 | 60 | 526 | 48 | 0 | 1.0e+03 | 4.38 |
| incid-set2c-32 | 3190 | 2162 | 961 | 2.42826244e-03 | 5.4e-10 | S | 50 | 11 | 94 | 893 | 122 | 0 | 1.0e+05 | 44.38 |
| incid-set2c-8 | 226 | 158 | 49 | 5.47126501e-03 | 8.3e-10 | S | 50 | 9 | 30 | 251 | 11 | 0 | 1.0e+03 | 0.39 |
| jr1 | 3 | 1 | 1 | 5.00000000e-01 | 1.2e-10 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| jr2 | 3 | 1 | 1 | 5.00000006e-01 | 6.0e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| kth1 | 3 | 1 | 1 | 0.00000000e+00 | 0.0e+00 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| kth2 | 3 | 1 | 1 | 2.08308583e-30 | 2.2e-16 | S | 2 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| kth3 | 3 | 1 | 1 | 5.00000000e-01 | 0.0e+00 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| liswet1-050 | 203 | 103 | 50 | 1.39940636e-02 | 4.5e-09 | S | 50 | 6 | 6 | 4 | 0 | 0 | 1.0e+05 | 0.04 |
| liswet1-100 | 403 | 203 | 100 | 1.37338490e-02 | 4.5e-10 | S | 50 | 16 | 21 | 124 | 0 | 0 | 1.0e+06 | 0.15 |
| liswet1-200 | 803 | 403 | 200 | 1.70079808e-02 | 7.2e-10 | S | 50 | 22 | 40 | 310 | 0 | 0 | 1.0e+07 | 0.73 |
| monteiro | 293 | 175 | 115 | 3.75300240e+01 | 1.5e-12 | S | 50 | 17 | 44 | 368 | 18 | 0 | 2.0e+10 | 0.21 |
| monteiroB | 293 | 175 | 115 | 8.27859480e+02 | 1.7e-12 | S | 50 | 15 | 33 | 287 | 22 | 0 | 7.8e+06 | 0.21 |
| nash1a | 8 | 4 | 2 | 0.00000000e+00 | 1.8e-15 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1b | 8 | 4 | 2 | 1.20848726e-23 | 4.7e-12 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1c | 8 | 4 | 2 | 1.97215226e-30 | 1.8e-15 | S | 3 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1d | 8 | 4 | 2 | 5.70130105e-20 | 5.8e-09 | S | 3 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| nash1e | 8 | 4 | 2 | 0.00000000e+00 | 7.1e-15 | S | 3 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| outrata31 | 9 | 4 | 4 | 3.20770002e+00 | 5.7e-10 | S | 5 | 3 | 3 | 4 | 0 | 0 | 3.2e+01 | 0.00 |
| outrata32 | 9 | 4 | 4 | 3.44940357e+00 | 3.7e-10 | S | 5 | 3 | 3 | 4 | 0 | 0 | 3.4e+01 | 0.00 |
| outrata33 | 9 | 4 | 4 | 4.60425365e+00 | 1.8e-10 | S | 5 | 1 | 1 | 1 | 0 | 0 | 4.6e+01 | 0.00 |
| outrata34 | 9 | 4 | 4 | 6.59268383e+00 | 3.9e-11 | S | 5 | 1 | 1 | 1 | 0 | 0 | 6.6e+01 | 0.00 |
| pack-comp1-16 | 817 | 575 | 225 | 6.16951353e-01 | 2.6e-09 | S | 50 | 13 | 39 | 301 | 140 | 0 | 1.0e+05 | 1.82 |
| pack-comp1-32 | 3229 | 2235 | 961 | 6.52978810e-01 | 6.6e-09 | S | 50 | 18 | 78 | 680 | 805 | 0 | 1.0e+06 | 24.07 |
| pack-comp1-8 | 211 | 153 | 49 | 6.00000000e-01 | 6.9e-11 | S | 50 | 1 | 2 | 4 | 1 | 0 | 1.0e+01 | 0.06 |
| pack-comp1c-16 | 832 | 590 | 225 | 6.23042796e-01 | 1.6e-09 | S | 50 | 15 | 34 | 240 | 113 | 0 | 1.0e+05 | 2.30 |
| pack-comp1c-32 | 3260 | 2266 | 961 | 6.61443062e-01 | 1.6e-09 | S | 50 | 17 | 55 | 435 | 503 | 0 | 1.0e+06 | 19.78 |
| pack-comp1c-8 | 218 | 160 | 49 | 6.00000000e-01 | 5.6e-15 | S | 50 | 1 | 1 | 2 | 0 | 0 | 1.0e+01 | 0.04 |
| pack-comp1p-16 | 772 | 530 | 225 | 6.16954033e-01 | 1.5e-09 | S | 50 | 13 | 34 | 260 | 73 | 0 | 1.0e+05 | 3.37 |
| pack-comp1p-32 | 3076 | 2082 | 961 | 6.52980684e-01 | 7.7e-09 | S | 50 | 17 | 68 | 555 | 367 | 0 | 1.0e+05 | 46.27 |
| pack-comp1p-8 | 196 | 138 | 49 | 6.00000005e-01 | 4.0e-12 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.34 |
| pack-comp2-16 | 817 | 575 | 225 | 7.27135140e-01 | 6.6e-09 | S | 50 | 12 | 52 | 449 | 231 | 0 | 1.0e+05 | 2.76 |
| pack-comp2-32 | 3229 | 2235 | 961 | 7.82603403e-01 | 5.0e-09 | S | 50 | 18 | 106 | 954 | 995 | 0 | 1.0e+06 | 34.21 |
| pack-comp2-8 | 211 | 153 | 49 | 6.73117136e-01 | 1.2e-09 | S | 50 | 3 | 4 | 22 | 0 | 0 | 1.0e+01 | 0.13 |
| pack-comp2c-16 | 832 | 590 | 225 | 7.27467565e-01 | 3.9e-09 | S | 50 | 16 | 37 | 260 | 127 | 0 | 1.0e+05 | 2.04 |
| pack-comp2c-32 | 3260 | 2266 | 961 | 7.82943480e-01 | 3.1e-09 | S | 50 | 14 | 65 | 565 | 615 | 0 | 1.0e+06 | 25.13 |
| pack-comp2c-8 | 218 | 160 | 49 | 6.73458165e-01 | 5.9e-09 | S | 50 | 13 | 20 | 117 | 26 | 0 | 1.0e+04 | 0.19 |
| pack-comp2p-16 | 772 | 530 | 225 | 7.27135795e-01 | 3.3e-09 | S | 50 | 13 | 27 | 192 | 22 | 0 | 1.0e+05 | 3.29 |
| pack-comp2p-32 | 3076 | 2082 | 961 | 7.82601026e-01 | 7.3e-09 | S | 50 | 16 | 41 | 314 | 86 | 0 | 1.0e+06 | 26.85 |
| pack-comp2p-8 | 196 | 138 | 49 | 6.73112885e-01 | 5.3e-09 | S | 50 | 9 | 9 | 27 | 0 | 0 | 1.0e+04 | 0.48 |
| pack-rig1-16 | 817 | 575 | 225 | 8.26011947e-01 | 8.7e-09 | S | 50 | 14 | 40 | 327 | 130 | 0 | 1.0e+05 | 1.89 |
| pack-rig1-32 | 3229 | 2235 | 961 | 8.50893458e-01 | 4.3e-09 | S | 50 | 16 | 87 | 765 | 791 | 0 | 1.0e+06 | 25.37 |
| pack-rig1-8 | 211 | 153 | 49 | 7.87931475e-01 | 6.4e-09 | S | 50 | 13 | 32 | 244 | 76 | 0 | 1.0e+04 | 0.23 |
| pack-rig1c-16 | 832 | 590 | 225 | 8.26498335e-01 | 3.7e-09 | S | 50 | 13 | 36 | 289 | 125 | 0 | 1.0e+05 | 1.72 |
| pack-rig1c-32 | 3260 | 2266 | 961 | 8.51639453e-01 | 5.2e-09 | S | 50 | 15 | 82 | 715 | 546 | 0 | 1.0e+06 | 29.02 |
| pack-rig1c-8 | 218 | 160 | 49 | 7.88300126e-01 | 4.7e-09 | S | 50 | 15 | 28 | 181 | 42 | 0 | 1.0e+04 | 0.21 |
| pack-rig1p-16 | 772 | 530 | 225 | 8.26012732e-01 | 5.7e-10 | S | 50 | 5 | 5 | 20 | 0 | 0 | 1.0e+03 | 0.99 |
| pack-rig1p-32 | 3076 | 2082 | 961 | 8.50895112e-01 | 2.3e-09 | S | 50 | 15 | 80 | 669 | 704 | 0 | 1.0e+06 | 27.54 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pack-rig1p-8 | 196 | 138 | 49 | 7.87931831e-01 | 6.5e-09 | S | 50 | 17 | 21 | 91 | 3 | 0 | 1.0e+04 | 0.15 |
| pack-rig2-16 | 817 | 575 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 201 | 1919 | 62 | 0 | 1.0e+21 | 26.64 |
| pack-rig2-32 | 3229 | 2235 | 961 | 6.00000000e-01 | 2.3e-03 | inf | 50 | 1 | 5 | 29 | 111 | 0 | 1.0e+01 | 3632.86 |
| pack-rig2-8 | 211 | 153 | 49 | 7.80404318e-01 | 3.5e-09 | S | 50 | 4 | 6 | 38 | 0 | 0 | 1.0e+03 | 0.12 |
| pack-rig2c-16 | 832 | 590 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 159 | 1459 | 66 | 0 | 1.0e+21 | 41.16 |
| pack-rig2c-32 | 3260 | 2266 | 961 | 6.00000000e-01 | 2.3e-03 | inf | 50 | 1 | 4 | 26 | 111 | 0 | 1.0e+01 | 3612.27 |
| pack-rig2c-8 | 218 | 160 | 49 | 7.99305792e-01 | 3.5e-10 | S | 50 | 14 | 30 | 190 | 42 | 0 | 1.0e+06 | 0.23 |
| pack-rig2p-16 | 772 | 530 | 225 | 1.08513672e+00 | 1.2e-11 | S | 50 | 16 | 84 | 736 | 305 | 0 | 1.0e+07 | 4.71 |
| pack-rig2p-32 | 3076 | 2082 | 961 | 1.13588533e+00 | 1.0e-16 | S | 50 | 18 | 62 | 532 | 186 | 0 | 1.1e+08 | 33.66 |
| pack-rig2p-8 | 196 | 138 | 49 | 7.80404299e-01 | 2.9e-09 | S | 50 | 15 | 37 | 291 | 38 | 0 | 1.0e+05 | 0.31 |
| pack-rig3-16 | 817 | 575 | 225 | 8.00430523e-01 | 5.4e-11 | S | 50 | 18 | 73 | 625 | 271 | 0 | 1.0e+06 | 3.86 |
| pack-rig3-32 | 3229 | 2235 | 961 | 8.86402459e-01 | 6.4e-09 | S | 50 | 20 | 170 | 1580 | 1063 | 0 | 1.0e+07 | 58.97 |
| pack-rig3-8 | 211 | 153 | 49 | 7.35201921e-01 | 4.5e-09 | S | 50 | 18 | 35 | 240 | 44 | 0 | 1.0e+04 | 0.26 |
| pack-rig3c-16 | 832 | 590 | 225 | 8.18600322e-01 | 2.7e-10 | S | 50 | 19 | 54 | 413 | 260 | 0 | 1.0e+06 | 3.30 |
| pack-rig3c-32 | 3260 | 2266 | 961 | 9.08903802e-01 | 5.8e-09 | S | 50 | 22 | 147 | 1314 | 1027 | 0 | 1.0e+07 | 63.59 |
| pack-rig3c-8 | 218 | 160 | 49 | 7.53472225e-01 | 7.9e-09 | S | 50 | 17 | 31 | 201 | 41 | 0 | 1.0e+04 | 0.20 |
| portfl-i-1 | 99 | 25 | 12 | 1.50244660e-05 | 6.9e-09 | S | 13 | 8 | 8 | 10 | 0 | 0 | 1.0e+03 | 0.02 |
| portfl-i-2 | 99 | 25 | 12 | 1.45723970e-05 | 5.8e-09 | S | 13 | 9 | 9 | 11 | 0 | 0 | 1.0e+03 | 0.02 |
| portfl-i-3 | 99 | 25 | 12 | 6.26509223e-06 | 3.2e-09 | S | 13 | 9 | 9 | 17 | 0 | 0 | 1.0e+03 | 0.02 |
| portfl-i-4 | 99 | 25 | 12 | 2.17739790e-06 | 4.4e-09 | S | 13 | 7 | 7 | 9 | 0 | 0 | 1.0e+03 | 0.02 |
| portfl-i-6 | 99 | 25 | 12 | 2.36122010e-06 | 8.4e-09 | S | 13 | 5 | 5 | 5 | 0 | 0 | 1.0e+03 | 0.02 |
| qpec-100-1 | 207 | 102 | 100 | 3.09244627e-01 | 3.9e-09 | S | 50 | 8 | 17 | 39 | 25 | 0 | 1.0e+02 | 0.67 |
| qpec-100-2 | 212 | 102 | 100 | -6.59073475e+00 | 3.8e-09 | S | 50 | 7 | 7 | 7 | 0 | 0 | 6.6e+01 | 0.44 |
| qpec-100-3 | 214 | 104 | 100 | -5.48167103e+00 | 6.3e-09 | S | 50 | 9 | 9 | 12 | 0 | 0 | 5.5e+01 | 0.75 |
| qpec-100-4 | 224 | 104 | 100 | -4.09555361e+00 | 1.7e-09 | S | 50 | 6 | 6 | 7 | 0 | 0 | 4.1e+02 | 0.36 |
| qpec-200-1 | 414 | 204 | 200 | -1.93482969e+00 | 5.4e-09 | S | 50 | 15 | 35 | 101 | 88 | 0 | 1.8e+04 | 8.01 |
| qpec-200-2 | 424 | 204 | 200 | -2.40363362e+01 | 7.1e-09 | S | 50 | 2 | 2 | 2 | 0 | 0 | 2.4e+02 | 1.66 |
| qpec-200-3 | 428 | 208 | 200 | -1.94834124e+00 | 5.0e-09 | S | 50 | 18 | 32 | 97 | 84 | 0 | 1.0e+03 | 16.60 |
| qpec-200-4 | 448 | 208 | 200 | -6.19323445e+00 | 2.6e-09 | S | 50 | 12 | 18 | 47 | 49 | 0 | 1.0e+02 | 7.18 |
| qpec1 | 50 | 20 | 20 | 8.00000000e+01 | 1.1e-16 | S | 21 | 1 | 1 | 0 | 0 | 0 | 8.0e+02 | 0.00 |
| qpec2 | 50 | 20 | 20 | 4.49999996e+01 | 8.9e-09 | B | 21 | 13 | 25 | 25 | 120 | 0 | 4.5e+08 | 0.01 |
| ralph1 | 3 | 1 | 1 | 0.00000000e+00 | 1.0e-08 | B | 2 | 15 | 29 | 36 | 14 | 0 | 1.0e+08 | 0.01 |
| ralph2 | 3 | 1 | 1 | 0.00000000e+00 | 0.0e+00 | S | 2 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| ralphmod | 204 | 100 | 100 | -6.83033020e+02 | 2.5e-13 | S | 50 | 4 | 4 | 30 | 0 | 0 | 6.8e+03 | 0.40 |
| scale1 | 3 | 1 | 1 | 1.00000000e+00 | 0.0e+00 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| scale2 | 3 | 1 | 1 | 1.00000001e+00 | 6.4e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| scale3 | 3 | 1 | 1 | 1.00000000e+00 | 0.0e+00 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| scale4 | 3 | 1 | 1 | 9.99999248e-01 | 3.8e-09 | S | 2 | 13 | 13 | 13 | 0 | 0 | 1.0e+05 | 0.00 |
| scale5 | 3 | 1 | 1 | 1.00000000e+02 | 4.5e-12 | S | 2 | 1 | 1 | 0 | 0 | 0 | 1.0e+03 | 0.00 |
| scholtes1 | 5 | 2 | 1 | 2.00000000e+00 | 1.3e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 2.0e+01 | 0.00 |
| scholtes2 | 5 | 2 | 1 | 1.49999999e+01 | 3.9e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.5e+02 | 0.00 |
| scholtes3 | 3 | 1 | 1 | 4.99999999e-01 | 1.4e-09 | S | 2 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| scholtes4 | 6 | 3 | 1 | -2.50000000e-10 | 2.0e-09 | B | 2 | 17 | 33 | 63 | 16 | 0 | 1.0e+09 | 0.01 |
| scholtes5 | 5 | 2 | 2 | 9.99999997e-01 | 1.4e-09 | S | 3 | 1 | 1 | 1 | 0 | 0 | 1.0e+01 | 0.00 |
| siouxfls | 4151 | 2376 | 1748 | 2.08257987e+02 | 5.4e-10 | S | 50 | 10 | 96 | 918 | 38 | 0 | 2.1e+03 | 1578.95 |
| siouxfls1 | 4151 | 2376 | 1748 | 9.79386339e+02 | 9.0e-11 | S | 50 | 6 | 17 | 141 | 43 | 0 | 1.0e+04 | 274.83 |
| sl1 | 11 | 5 | 3 | 9.99999946e-05 | 2.7e-10 | S | 4 | 1 | 1 | 0 | 0 | 0 | 1.0e+01 | 0.00 |
| stackelberg1 | 4 | 2 | 1 | -3.26666667e+03 | 1.4e-14 | S | 2 | 1 | 1 | 1 | 0 | 0 | 3.3e+04 | 0.00 |
| tap-09 | 126 | 70 | 36 | 1.09143432e+02 | 4.3e-12 | S | 37 | 3 | 8 | 68 | 6 | 0 | 1.1e+03 | 0.04 |
| tap-15 | 309 | 174 | 99 | 1.84709097e+02 | 5.4e-12 | S | 50 | 3 | 11 | 96 | 8 | 0 | 1.9e+03 | 0.18 |
| taxmcp | 31 | 16 | 14 | 1.23881909e+00 | 3.0e-01 | inf | 15 | 1 | 1 | 10 | 0 | 0 | 1.3e+01 | 3600.65 |
| TSC-1 | 1346 | 1100 | 244 | 5.49634692e+01 | 1.0e-15 | S | 50 | 3 | 5 | 15 | 2 | 0 | 5.5e+02 | 0.06 |
| TSC-10 | 1346 | 1100 | 244 | 5.48021373e+01 | 1.0e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 5.5e+02 | 0.04 |
| TSC-11 | 1346 | 1100 | 244 | 1.01567690e+02 | 5.1e-11 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+03 | 0.06 |
| TSC-12 | 1346 | 1100 | 244 | 2.02398857e+02 | 7.9e-03 | inf | 50 | 1 | 1 | 8 | 0 | 0 | 2.0e+03 | 3600.03 |
| TSC-13 | 1346 | 1100 | 244 | 8.64028645e+01 | 1.5e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 8.6e+02 | 0.05 |
| TSC-2 | 1346 | 1100 | 244 | 5.25708119e+01 | 1.4e-15 | S | 50 | 1 | 1 | 1 | 0 | 0 | 5.3e+02 | 0.03 |
| TSC-3 | 1346 | 1100 | 244 | 8.70673771e+01 | 2.3e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 8.7e+02 | 0.05 |
| TSC-4 | 1346 | 1100 | 244 | 7.90435431e+01 | 2.4e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 7.9e+02 | 0.07 |
| TSC-5 | 1346 | 1100 | 244 | 1.01468684e+02 | 4.7e-11 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+03 | 0.06 |
| TSC-6 | 1346 | 1100 | 244 | 1.01528435e+02 | 3.6e-15 | S | 50 | 1 | 1 | 1 | 0 | 0 | 1.0e+03 | 0.05 |
| TSC-7 | 1346 | 1100 | 244 | 1.95231054e+02 | 7.8e-01 | inf | 50 | 1 | 1 | 8 | 0 | 0 | 1.9e+02 | 3600.04 |
| TSC-8 | 1346 | 1100 | 244 | 2.00180940e+02 | 7.3e-01 | inf | 50 | 1 | 1 | 8 | 0 | 0 | 2.3e+02 | 3600.08 |
| TSC-9 | 1346 | 1100 | 244 | 5.32050328e+01 | 1.2e-15 | S | 50 | 1 | 1 | 0 | 0 | 0 | 5.3e+02 | 0.04 |
| water-FL | 257 | 160 | 44 | 3.30758918e+03 | 1.1e-11 | S | 45 | 8 | 280 | 2769 | 15 | 0 | 5.2e+04 | 10.61 |
| water-net | 80 | 50 | 14 | 1.06948467e+03 | 6.1e-13 | S | 15 | 6 | 29 | 265 | 2 | 0 | 1.7e+04 | 1.83 |

Table 3: MacMPEC, CPS $AL_0$.

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar-truss-3 | 41 | 35 | 6 | 0.00000000e+00 | 5.9e-06 | inf | 7 | 25 | 1903011 | 19030274 | 108 | 0 | 5.2e+20 | 918.88 |
| bard1 | 8 | 4 | 3 | 1.70000000e+01 | 4.4e-10 | S | 4 | 7 | 7 | 9 | 0 | 0 | 6.7e+00 | 0.00 |
| bard1m | 9 | 4 | 3 | 1.70000000e+01 | 4.4e-10 | S | 4 | 7 | 7 | 9 | 0 | 0 | 6.7e+00 | 0.00 |
| bard2 | 17 | 9 | 4 | 6.59800000e+03 | 2.1e-09 | S | 5 | 14 | 14 | 26 | 0 | 0 | 3.5e+02 | 0.00 |
| bard2m | 21 | 13 | 4 | -6.59800000e+03 | 2.1e-09 | S | 5 | 14 | 14 | 29 | 0 | 0 | 3.5e+02 | 0.00 |
| bard3 | 9 | 5 | 2 | -1.26787109e+01 | 3.8e-09 | S | 3 | 12 | 14 | 42 | 0 | 0 | 4.0e+00 | 0.00 |
| bard3m | 11 | 5 | 4 | -1.26787109e+01 | 3.8e-09 | S | 5 | 12 | 14 | 42 | 0 | 0 | 4.0e+00 | 0.00 |
| bem-milanc30-s | 4901 | 3433 | 1464 | 1.26184682e-01 | 5.9e-10 | none | 50 | 26 | 419 | 4084 | 884 | 0 | 1.3e+06 | 2569.13 |
| bilevel1 | 19 | 11 | 6 | 5.00000000e+00 | 7.1e-15 | S | 7 | 4 | 4 | 8 | 0 | 0 | 2.7e-01 | 0.00 |
| bilevel1m | 19 | 11 | 6 | 5.00000000e+00 | 1.4e-14 | S | 7 | 4 | 4 | 8 | 0 | 0 | 2.7e-01 | 0.00 |
| bilevel2 | 33 | 17 | 12 | -6.60000000e+03 | 3.7e-09 | S | 13 | 17 | 20 | 41 | 3 | 0 | 3.4e+01 | 0.00 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bilevel2m | 37 | 21 | 12 | -6.60000000e+03 | 2.5e-09 | S | 13 | 17 | 20 | 50 | 5 | 0 | 3.4e+01 | 0.00 |
| bilevel3 | 17 | 11 | 4 | -1.33684211e+01 | 1.1e+00 | Ψ | 5 | 22 | 24 | 97 | 2 | 0 | 1.5e+20 | 0.00 |
| bilin | 15 | 7 | 6 | 1.46000000e+01 | 4.4e-16 | S | 7 | 5 | 9 | 23 | 5 | 0 | 2.3e+02 | 0.00 |
| dempe | 4 | 2 | 1 | 2.82500000e+01 | 5.5e-12 | S | 2 | 8 | 12010 | 120078 | 0 | 0 | 3.1e+04 | 1.42 |
| design-cent-1 | 18 | 12 | 3 | 1.86064733e+00 | 2.7e-09 | S | 4 | 8 | 8 | 19 | 0 | 0 | 3.1e+01 | 0.01 |
| design-cent-2 | 23 | 16 | 3 | 3.48381570e+00 | 3.9e-09 | S | 4 | 5 | 6 | 25 | 0 | 0 | 3.1e+02 | 0.00 |
| design-cent-21 | 23 | 16 | 3 | 5.56313458e-02 | 4.5e-04 | inf | 4 | 23 | 1639 | 16282 | 0 | 0 | 3.1e+20 | 0.64 |
| design-cent-3 | 21 | 12 | 3 | 3.72336912e+00 | 4.3e-09 | S | 4 | 5 | 9 | 55 | 0 | 0 | 3.1e+02 | 0.01 |
| design-cent-31 | 21 | 12 | 3 | 3.72336907e+00 | 2.0e-09 | S | 4 | 13 | 16 | 66 | 0 | 0 | 3.1e+02 | 0.01 |
| design-cent-4 | 37 | 21 | 12 | 3.07920139e+00 | 3.2e-09 | S | 13 | 8 | 9 | 37 | 0 | 0 | 1.9e+02 | 0.01 |
| desilva | 8 | 4 | 2 | -1.00000000e+00 | 4.5e-09 | S | 3 | 13 | 13 | 27 | 0 | 0 | 1.0e+01 | 0.00 |
| df1 | 5 | 3 | 1 | 0.00000000e+00 | 0.0e+00 | S | 2 | 1 | 1 | 7 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.1.1 | 18 | 12 | 5 | -1.30000000e+01 | 7.1e-15 | S | 6 | 8 | 10 | 14 | 2 | 0 | 7.3e+00 | 0.00 |
| ex9.1.10 | 20 | 12 | 5 | -3.25000000e+00 | 1.8e-15 | S | 6 | 2 | 3 | 8 | 1 | 0 | 7.3e-01 | 0.00 |
| ex9.1.2 | 15 | 10 | 5 | -6.25000000e+00 | 1.8e-15 | S | 6 | 6 | 8 | 13 | 4 | 0 | 6.7e+00 | 0.00 |
| ex9.1.3 | 29 | 21 | 6 | -2.30000000e+01 | 2.2e-16 | S | 7 | 7 | 11 | 24 | 6 | 0 | 2.2e+02 | 0.00 |
| ex9.1.4 | 14 | 9 | 4 | -6.30000000e+01 | 1.0e+00 | Ψ | 5 | 27 | 28 | 13 | 2 | 0 | 1.7e+20 | 0.00 |
| ex9.1.5 | 18 | 12 | 5 | -1.00000000e+00 | 2.2e-16 | S | 6 | 2 | 4 | 6 | 2 | 0 | 4.0e+00 | 0.00 |
| ex9.1.6 | 20 | 13 | 6 | -4.90000000e+01 | 7.1e-15 | S | 7 | 6 | 7 | 8 | 3 | 0 | 8.5e-01 | 0.00 |
| ex9.1.7 | 23 | 15 | 6 | -6.00000000e+00 | 2.8e-16 | S | 7 | 7 | 11 | 22 | 7 | 0 | 2.2e+02 | 0.00 |
| ex9.1.8 | 20 | 12 | 5 | -3.25000000e+00 | 1.8e-15 | S | 6 | 2 | 3 | 8 | 1 | 0 | 7.3e-01 | 0.00 |
| ex9.1.9 | 17 | 11 | 5 | 2.00000000e+00 | 1.0e+00 | Ψ | 6 | 22 | 24 | 61 | 3 | 0 | 2.6e+20 | 0.00 |
| ex9.2.1 | 14 | 9 | 4 | 2.49999999e+01 | 2.7e-09 | S | 5 | 13 | 15 | 23 | 3 | 0 | 6.7e+01 | 0.00 |
| ex9.2.2 | 17 | 11 | 4 | 1.00000000e+02 | 2.2e-10 | B | 5 | 23 | 44 | 128 | 22 | 0 | 4.6e+10 | 0.01 |
| ex9.2.3 | 23 | 15 | 6 | -8.00000000e+00 | 1.0e+00 | Ψ | 7 | 23 | 24 | 38 | 2 | 0 | 2.8e+20 | 0.00 |
| ex9.2.4 | 10 | 7 | 2 | 4.99999988e-01 | 5.8e-09 | S | 3 | 6 | 8 | 13 | 2 | 0 | 4.0e+01 | 0.00 |
| ex9.2.5 | 11 | 7 | 3 | 4.99999999e+00 | 1.5e-09 | S | 4 | 12 | 14 | 17 | 3 | 1 | 8.6e+01 | 0.00 |
| ex9.2.6 | 22 | 12 | 6 | -1.00000000e+00 | 3.7e-09 | S | 7 | 10 | 12 | 18 | 4 | 0 | 4.0e+01 | 0.01 |
| ex9.2.7 | 14 | 9 | 4 | 2.49999999e+01 | 2.7e-09 | S | 5 | 13 | 15 | 23 | 3 | 0 | 6.7e+01 | 0.00 |
| ex9.2.8 | 8 | 5 | 2 | 1.50000000e+00 | 4.2e-18 | S | 3 | 3 | 5 | 13 | 2 | 0 | 1.0e+02 | 0.00 |
| ex9.2.9 | 12 | 8 | 3 | 2.00000000e+00 | 1.3e-15 | S | 4 | 1 | 2 | 5 | 1 | 0 | 9.1e-01 | 0.00 |
| flp2 | 6 | 2 | 2 | 4.49199124e-27 | 1.3e-13 | S | 3 | 1 | 1 | 2 | 0 | 0 | 2.3e+00 | 0.00 |
| flp4-1 | 140 | 60 | 30 | 2.88607396e-38 | 3.5e-18 | S | 31 | 1 | 1 | 10 | 0 | 0 | 3.8e-04 | 0.02 |
| flp4-2 | 220 | 110 | 60 | 1.20065728e-36 | 2.2e-16 | S | 50 | 1 | 1 | 9 | 0 | 0 | 2.0e-04 | 0.06 |
| flp4-3 | 310 | 170 | 70 | 9.90827316e-40 | 8.7e-19 | S | 50 | 1 | 2 | 11 | 0 | 0 | 1.3e-04 | 0.19 |
| flp4-4 | 450 | 250 | 100 | 1.74887429e-37 | 4.4e-16 | S | 50 | 1 | 1 | 9 | 0 | 0 | 6.3e-05 | 0.48 |
| gauvin | 5 | 2 | 2 | 2.00000000e+01 | 4.4e-10 | S | 3 | 7 | 8 | 11 | 1 | 0 | 3.9e+00 | 0.00 |
| gnash10 | 21 | 12 | 8 | -2.30823206e+02 | 9.5e-09 | S | 9 | 16 | 24 | 109 | 8 | 0 | 7.3e+00 | 0.00 |
| gnash10m | 25 | 16 | 8 | -2.30823206e+02 | 9.5e-09 | S | 9 | 16 | 23 | 109 | 8 | 0 | 7.3e+00 | 0.00 |
| gnash11 | 21 | 12 | 8 | -1.29911924e+02 | 5.1e-09 | S | 9 | 24 | 25 | 69 | 0 | 0 | 4.7e+00 | 0.00 |
| gnash11m | 25 | 16 | 8 | -1.29911924e+02 | 5.1e-09 | S | 9 | 24 | 25 | 71 | 0 | 0 | 4.7e+00 | 0.00 |
| gnash12 | 21 | 12 | 8 | -3.69331069e+01 | 6.9e-09 | S | 9 | 12 | 15 | 63 | 0 | 0 | 1.6e+01 | 0.00 |
| gnash12m | 25 | 16 | 8 | -3.69331069e+01 | 6.9e-09 | S | 9 | 12 | 14 | 60 | 0 | 0 | 1.6e+01 | 0.00 |
| gnash13 | 21 | 12 | 8 | -7.06178326e+00 | 1.5e-09 | S | 9 | 12 | 13 | 48 | 0 | 0 | 2.0e+01 | 0.00 |
| gnash13m | 25 | 16 | 8 | -7.06178326e+00 | 1.5e-09 | S | 9 | 12 | 13 | 50 | 0 | 0 | 2.0e+01 | 0.00 |
| gnash14 | 21 | 12 | 8 | -1.79046306e-01 | 2.8e-09 | S | 9 | 14 | 19 | 92 | 0 | 0 | 5.6e+00 | 0.01 |
| gnash14m | 25 | 16 | 8 | -1.79046306e-01 | 2.8e-09 | S | 9 | 14 | 19 | 94 | 0 | 0 | 5.6e+00 | 0.00 |
| gnash15 | 21 | 12 | 8 | -3.54699059e+02 | 5.6e-10 | S | 9 | 8 | 12 | 49 | 5 | 0 | 1.9e+01 | 0.01 |
| gnash15m | 25 | 16 | 8 | -3.54699059e+02 | 1.3e-10 | S | 9 | 8 | 11 | 48 | 5 | 0 | 1.9e+01 | 0.01 |
| gnash16 | 21 | 12 | 8 | -2.41441977e+02 | 3.4e-10 | S | 9 | 8 | 11 | 39 | 3 | 0 | 1.8e+01 | 0.01 |
| gnash16m | 25 | 16 | 8 | -2.41441977e+02 | 7.6e-09 | S | 9 | 7 | 11 | 49 | 5 | 0 | 1.8e+01 | 0.01 |
| gnash17 | 21 | 12 | 8 | -9.07491017e+01 | 4.8e-09 | S | 9 | 8 | 11 | 41 | 3 | 0 | 1.9e+01 | 0.00 |
| gnash17m | 25 | 16 | 8 | -9.07491018e+01 | 2.2e-09 | S | 9 | 8 | 11 | 46 | 5 | 0 | 1.9e+01 | 0.00 |
| gnash18 | 21 | 12 | 8 | -2.56982153e+01 | 9.6e-09 | S | 9 | 7 | 9 | 33 | 3 | 0 | 1.9e+01 | 0.00 |
| gnash18m | 25 | 16 | 8 | -2.56982153e+01 | 1.9e-10 | S | 9 | 7 | 12 | 58 | 7 | 0 | 1.9e+02 | 0.00 |
| gnash19 | 21 | 12 | 8 | -6.11670818e+00 | 6.7e-09 | S | 9 | 8 | 10 | 33 | 2 | 0 | 1.7e+01 | 0.00 |
| gnash19m | 25 | 16 | 8 | -6.11670819e+00 | 5.2e-09 | S | 9 | 8 | 12 | 48 | 4 | 0 | 1.7e+01 | 0.00 |
| hakonsen | 12 | 6 | 4 | 3.82729298e+09 | 1.0e+00 | inf | 5 | 18 | 23 | 140 | 0 | 0 | 7.7e+20 | 0.01 |
| hs044-i | 30 | 14 | 10 | 1.70901220e+01 | 9.2e-11 | S | 11 | 10 | 10 | 29 | 0 | 0 | 9.8e+03 | 0.00 |
| incid-set1-16 | 815 | 555 | 225 | -7.35967738e-11 | 4.3e-10 | S | 50 | 6 | 44 | 409 | 45 | 0 | 1.0e+02 | 1.86 |
| incid-set1-32 | 3159 | 2131 | 961 | -1.44662230e-13 | 6.7e-12 | S | 50 | 8 | 154 | 1499 | 158 | 0 | 1.0e+03 | 40.86 |
| incid-set1-8 | 219 | 151 | 49 | 1.21885823e-11 | 2.7e-10 | S | 50 | 5 | 35 | 327 | 5 | 0 | 1.0e+02 | 0.28 |
| incid-set1c-16 | 830 | 570 | 225 | 8.74613126e-13 | 3.2e-11 | S | 50 | 8 | 80 | 759 | 36 | 0 | 1.0e+03 | 3.34 |
| incid-set1c-32 | 3190 | 2162 | 961 | 9.86028652e-06 | 3.7e-11 | S | 50 | 13 | 135 | 1276 | 172 | 0 | 1.0e+05 | 34.98 |
| incid-set1c-8 | 226 | 158 | 49 | 1.50768287e-09 | 4.5e-09 | S | 50 | 6 | 38 | 357 | 11 | 0 | 1.0e+02 | 0.30 |
| incid-set2-16 | 815 | 555 | 225 | 3.22333781e-03 | 7.4e-09 | S | 50 | 13 | 54 | 470 | 55 | 0 | 1.0e+04 | 2.12 |
| incid-set2-32 | 3159 | 2131 | 961 | 1.73594514e-03 | 1.0e-08 | S | 50 | 14 | 122 | 1156 | 148 | 0 | 6.7e+04 | 33.55 |
| incid-set2-8 | 219 | 151 | 49 | 4.51786931e-03 | 8.2e-09 | S | 50 | 10 | 46 | 396 | 6 | 0 | 1.0e+03 | 0.32 |
| incid-set2c-16 | 830 | 570 | 225 | 3.60273979e-03 | 4.5e-09 | S | 50 | 10 | 69 | 626 | 33 | 0 | 1.0e+04 | 2.77 |
| incid-set2c-32 | 3190 | 2162 | 961 | 2.42728259e-03 | 4.3e-09 | S | 50 | 12 | 68 | 604 | 151 | 0 | 6.7e+04 | 18.10 |
| incid-set2c-8 | 226 | 158 | 49 | 5.47126365e-03 | 2.8e-09 | S | 50 | 9 | 30 | 252 | 5 | 0 | 1.0e+03 | 0.20 |
| jr1 | 3 | 1 | 1 | 4.99999995e-01 | 4.7e-09 | S | 2 | 8 | 8 | 10 | 0 | 0 | 1.0e+01 | 0.00 |
| jr2 | 3 | 1 | 1 | 4.99999995e-01 | 4.7e-09 | S | 2 | 8 | 8 | 9 | 0 | 0 | 1.0e+01 | 0.00 |
| kth1 | 3 | 1 | 1 | -1.38777878e-16 | 1.4e-16 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| kth2 | 3 | 1 | 1 | 1.77493704e-30 | 1.1e-16 | S | 2 | 1 | 2 | 3 | 1 | 0 | 2.0e+01 | 0.00 |
| kth3 | 3 | 1 | 1 | 5.00000000e-01 | 0.0e+00 | S | 2 | 9 | 9 | 9 | 0 | 1 | 1.0e+02 | 0.00 |
| liswet1-050 | 203 | 103 | 50 | 1.39942149e-02 | 1.4e-09 | S | 50 | 12 | 22 | 127 | 40 | 0 | 2.0e+05 | 0.03 |
| liswet1-100 | 403 | 203 | 100 | 1.37338921e-02 | 2.2e-10 | S | 50 | 15 | 29 | 213 | 72 | 0 | 2.0e+06 | 0.10 |
| liswet1-200 | 803 | 403 | 200 | 1.70084031e-02 | 2.2e-10 | S | 50 | 17 | 58 | 509 | 164 | 0 | 2.0e+07 | 0.81 |
| monteiro | 293 | 175 | 115 | 3.75300241e+01 | 4.2e-11 | S | 50 | 28 | 53 | 313 | 82 | 0 | 1.4e+05 | 0.24 |
| monteiroB | 293 | 175 | 115 | 8.27859482e+02 | 6.3e-09 | S | 50 | 23 | 44 | 208 | 81 | 0 | 1.4e+03 | 0.09 |
| nash1a | 8 | 4 | 2 | 0.00000000e+00 | 3.2e-14 | S | 3 | 1 | 1 | 7 | 0 | 0 | 9.1e-03 | 0.00 |
| nash1b | 8 | 4 | 2 | 1.57772181e-30 | 3.6e-15 | S | 3 | 1 | 1 | 3 | 0 | 0 | 2.6e-01 | 0.00 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| nash1c | 8 | 4 | 2 | 0.00000000e+00 | 3.6e-15 | S | 3 | 1 | 1 | 3 | 0 | 0 | 1.1e+00 | 0.00 |
| nash1d | 8 | 4 | 2 | 3.94430453e-31 | 0.0e+00 | S | 3 | 1 | 1 | 3 | 0 | 0 | 5.0e-01 | 0.00 |
| nash1e | 8 | 4 | 2 | 3.94430453e-31 | 0.0e+00 | S | 3 | 1 | 1 | 8 | 0 | 0 | 5.0e-01 | 0.00 |
| outrata31 | 9 | 4 | 4 | 3.20770002e+00 | 4.2e-09 | S | 5 | 15 | 16 | 42 | 1 | 0 | 2.8e+00 | 0.00 |
| outrata32 | 9 | 4 | 4 | 3.44940356e+00 | 5.7e-09 | S | 5 | 14 | 16 | 46 | 2 | 0 | 2.9e+00 | 0.00 |
| outrata33 | 9 | 4 | 4 | 4.60425364e+00 | 1.8e-09 | S | 5 | 8 | 9 | 28 | 1 | 0 | 2.8e+00 | 0.00 |
| outrata34 | 9 | 4 | 4 | 6.59268383e+00 | 1.1e-09 | S | 5 | 10 | 11 | 31 | 1 | 0 | 3.0e+00 | 0.00 |
| pack-comp1-16 | 817 | 575 | 225 | 6.16951316e-01 | 4.5e-09 | S | 50 | 11 | 20 | 108 | 182 | 0 | 1.0e+05 | 0.55 |
| pack-comp1-32 | 3229 | 2235 | 961 | 6.52979207e-01 | 1.5e-10 | S | 50 | 13 | 30 | 200 | 685 | 0 | 1.0e+06 | 7.02 |
| pack-comp1-8 | 211 | 153 | 49 | 6.00000000e-01 | 3.8e-17 | S | 50 | 1 | 3 | 18 | 32 | 0 | 1.0e+01 | 0.02 |
| pack-comp1c-16 | 832 | 590 | 225 | 6.23042745e-01 | 3.0e-09 | S | 50 | 11 | 19 | 112 | 109 | 0 | 1.0e+07 | 0.54 |
| pack-comp1c-32 | 3260 | 2266 | 961 | 6.61443083e-01 | 1.2e-09 | S | 50 | 12 | 31 | 201 | 690 | 0 | 1.0e+06 | 7.13 |
| pack-comp1c-8 | 218 | 160 | 49 | 6.00000000e-01 | 3.0e-17 | S | 50 | 1 | 3 | 15 | 28 | 0 | 1.0e+01 | 0.02 |
| pack-comp1p-16 | 772 | 530 | 225 | 6.16949509e-01 | 1.3e-09 | S | 50 | 7 | 82 | 790 | 181 | 0 | 2.6e+06 | 3.79 |
| pack-comp1p-32 | 3076 | 2082 | 961 | 6.52978185e-01 | 4.9e-09 | S | 50 | 8 | 90 | 859 | 726 | 0 | 1.3e+06 | 27.42 |
| pack-comp1p-8 | 196 | 138 | 49 | 6.00000000e-01 | 6.6e-17 | S | 50 | 6 | 40 | 366 | 46 | 0 | 9.0e+05 | 0.31 |
| pack-comp2-16 | 817 | 575 | 225 | 7.27135126e-01 | 7.1e-09 | S | 50 | 11 | 24 | 163 | 123 | 0 | 1.0e+05 | 0.79 |
| pack-comp2-32 | 3229 | 2235 | 961 | 7.82602874e-01 | 8.8e-09 | S | 50 | 16 | 40 | 280 | 764 | 0 | 1.0e+06 | 9.21 |
| pack-comp2-8 | 211 | 153 | 49 | 6.73117127e-01 | 6.7e-09 | S | 50 | 13 | 17 | 87 | 24 | 0 | 1.0e+04 | 0.07 |
| pack-comp2c-16 | 832 | 590 | 225 | 7.27467326e-01 | 9.1e-09 | S | 50 | 11 | 23 | 152 | 103 | 0 | 1.0e+05 | 0.78 |
| pack-comp2c-32 | 3260 | 2266 | 961 | 7.82943295e-01 | 3.7e-09 | S | 50 | 13 | 37 | 273 | 587 | 0 | 1.0e+06 | 8.61 |
| pack-comp2c-8 | 218 | 160 | 49 | 6.73458175e-01 | 4.3e-09 | S | 50 | 15 | 20 | 84 | 24 | 0 | 1.0e+04 | 0.08 |
| pack-comp2p-16 | 772 | 530 | 225 | 7.27134908e-01 | 3.8e-10 | S | 50 | 8 | 26 | 219 | 148 | 0 | 4.7e+05 | 1.06 |
| pack-comp2p-32 | 3076 | 2082 | 961 | 7.82603498e-01 | 2.0e-09 | S | 50 | 9 | 48 | 432 | 651 | 0 | 3.1e+06 | 14.11 |
| pack-comp2p-8 | 196 | 138 | 49 | 6.73058038e-01 | 8.3e-09 | S | 50 | 6 | 37 | 336 | 37 | 0 | 1.2e+06 | 0.28 |
| pack-rig1-16 | 817 | 575 | 225 | 8.26012361e-01 | 3.8e-09 | S | 50 | 13 | 23 | 131 | 96 | 0 | 1.0e+05 | 0.48 |
| pack-rig1-32 | 3229 | 2235 | 961 | 8.50893605e-01 | 3.8e-09 | S | 50 | 14 | 44 | 298 | 776 | 0 | 1.0e+06 | 7.56 |
| pack-rig1-8 | 211 | 153 | 49 | 7.87931773e-01 | 4.0e-09 | S | 50 | 16 | 20 | 87 | 7 | 0 | 1.0e+04 | 0.06 |
| pack-rig1c-16 | 832 | 590 | 225 | 8.26498133e-01 | 3.7e-09 | S | 50 | 13 | 22 | 133 | 86 | 0 | 1.0e+05 | 0.52 |
| pack-rig1c-32 | 3260 | 2266 | 961 | 8.51639509e-01 | 5.1e-09 | S | 50 | 14 | 44 | 306 | 477 | 0 | 1.0e+06 | 7.66 |
| pack-rig1c-8 | 218 | 160 | 49 | 7.88299897e-01 | 7.8e-09 | S | 50 | 15 | 19 | 90 | 7 | 0 | 1.0e+04 | 0.06 |
| pack-rig1p-16 | 772 | 530 | 225 | 8.26012656e-01 | 9.0e-10 | S | 50 | 10 | 31 | 253 | 123 | 0 | 2.6e+05 | 0.91 |
| pack-rig1p-32 | 3076 | 2082 | 961 | 8.50894489e-01 | 1.1e-09 | S | 50 | 10 | 57 | 524 | 756 | 0 | 2.2e+06 | 12.16 |
| pack-rig1p-8 | 196 | 138 | 49 | 7.87931828e-01 | 4.4e-09 | S | 50 | 10 | 22 | 161 | 24 | 0 | 3.6e+04 | 0.10 |
| pack-rig2-16 | 817 | 575 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 202 | 1899 | 117 | 0 | 1.0e+21 | 6.55 |
| pack-rig2-32 | 3229 | 2235 | 961 | 9.99784408e-01 | 2.3e-04 | Ψ | 50 | 22 | 294 | 2827 | 976 | 0 | 1.0e+21 | 62.99 |
| pack-rig2-8 | 211 | 153 | 49 | 7.80404077e-01 | 4.0e-09 | S | 50 | 13 | 18 | 95 | 8 | 0 | 1.0e+05 | 0.06 |
| pack-rig2c-16 | 832 | 590 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 160 | 1471 | 89 | 0 | 1.0e+21 | 5.08 |
| pack-rig2c-32 | 3260 | 2266 | 961 | 9.99784408e-01 | 2.3e-04 | Ψ | 50 | 22 | 226 | 2132 | 816 | 0 | 1.0e+21 | 52.41 |
| pack-rig2c-8 | 218 | 160 | 49 | 7.99305119e-01 | 8.7e-09 | S | 50 | 13 | 21 | 113 | 10 | 0 | 1.0e+06 | 0.08 |
| pack-rig2p-16 | 772 | 530 | 225 | 1.08513671e+00 | 4.4e-11 | S | 50 | 9 | 51 | 474 | 141 | 0 | 6.3e+07 | 1.84 |
| pack-rig2p-32 | 3076 | 2082 | 961 | 1.13588533e+00 | 7.4e-13 | S | 50 | 12 | 62 | 568 | 655 | 0 | 8.7e+07 | 14.44 |
| pack-rig2p-8 | 196 | 138 | 49 | 7.80404313e-01 | 4.9e-09 | S | 50 | 14 | 26 | 185 | 28 | 0 | 4.7e+04 | 0.12 |
| pack-rig3-16 | 817 | 575 | 225 | 8.00429260e-01 | 8.3e-09 | S | 50 | 13 | 33 | 242 | 153 | 0 | 1.0e+06 | 0.99 |
| pack-rig3-32 | 3229 | 2235 | 961 | 8.86401966e-01 | 6.9e-09 | S | 50 | 18 | 69 | 545 | 1007 | 0 | 1.0e+07 | 14.44 |
| pack-rig3-8 | 211 | 153 | 49 | 7.35202060e-01 | 1.3e-09 | S | 50 | 14 | 21 | 114 | 21 | 0 | 1.0e+05 | 0.07 |
| pack-rig3c-16 | 832 | 590 | 225 | 8.18599358e-01 | 5.6e-09 | S | 50 | 14 | 29 | 186 | 67 | 0 | 1.0e+06 | 0.80 |
| pack-rig3c-32 | 3260 | 2266 | 961 | 9.08907121e-01 | 2.5e-09 | S | 50 | 20 | 72 | 580 | 717 | 0 | 1.0e+07 | 17.10 |
| pack-rig3c-8 | 218 | 160 | 49 | 7.53472366e-01 | 5.7e-09 | S | 50 | 21 | 26 | 103 | 9 | 0 | 1.0e+04 | 0.08 |
| portfl-i-1 | 99 | 25 | 12 | 1.50239520e-05 | 6.8e-09 | S | 13 | 11 | 13 | 32 | 6 | 0 | 1.0e+03 | 0.03 |
| portfl-i-2 | 99 | 25 | 12 | 1.45723820e-05 | 6.0e-09 | S | 13 | 13 | 15 | 39 | 7 | 0 | 1.0e+03 | 0.03 |
| portfl-i-3 | 99 | 25 | 12 | 6.26470499e-06 | 8.0e-09 | S | 13 | 10 | 11 | 28 | 6 | 0 | 1.0e+03 | 0.03 |
| portfl-i-4 | 99 | 25 | 12 | 2.17725534e-06 | 5.7e-09 | S | 13 | 10 | 12 | 31 | 6 | 0 | 1.0e+03 | 0.03 |
| portfl-i-6 | 99 | 25 | 12 | 2.36109192e-06 | 8.1e-09 | S | 13 | 9 | 11 | 37 | 6 | 0 | 1.0e+03 | 0.03 |
| qpec-100-1 | 207 | 102 | 100 | 2.78165101e-01 | 5.8e-10 | S | 50 | 15 | 31 | 88 | 84 | 1 | 5.7e+03 | 1.21 |
| qpec-100-2 | 212 | 102 | 100 | -6.59073475e+00 | 5.5e-09 | S | 50 | 16 | 39 | 147 | 98 | 1 | 4.2e+02 | 1.94 |
| qpec-100-3 | 214 | 104 | 100 | -5.27572730e+00 | 1.8e-09 | S | 50 | 13 | 30 | 81 | 86 | 0 | 6.5e+02 | 1.71 |
| qpec-100-4 | 224 | 104 | 100 | -3.37025798e+00 | 9.0e-09 | S | 50 | 13 | 32 | 104 | 93 | 0 | 4.0e+02 | 1.90 |
| qpec-200-1 | 414 | 204 | 200 | -1.93482972e+00 | 2.7e-09 | S | 50 | 17 | 48 | 145 | 191 | 0 | 2.4e+04 | 12.23 |
| qpec-200-2 | 424 | 204 | 200 | -2.38080019e+01 | 5.1e-10 | S | 50 | 14 | 36 | 130 | 210 | 1 | 1.2e+03 | 13.56 |
| qpec-200-3 | 428 | 208 | 200 | -1.95340558e+00 | 5.0e-09 | S | 50 | 18 | 41 | 139 | 181 | 0 | 1.9e+03 | 21.30 |
| qpec-200-4 | 448 | 208 | 200 | -4.98448843e+00 | 8.4e-09 | S | 50 | 16 | 50 | 203 | 227 | 3 | 9.2e+04 | 22.66 |
| qpec1 | 50 | 20 | 20 | 8.00000000e+01 | 2.2e-16 | S | 21 | 1 | 2 | 3 | 10 | 0 | 4.4e+02 | 0.00 |
| qpec2 | 50 | 20 | 20 | 4.49999996e+01 | 1.0e-08 | B | 21 | 15 | 29 | 29 | 140 | 0 | 4.0e+08 | 0.03 |
| ralph1 | 3 | 1 | 1 | -1.00000000e-08 | 1.0e-08 | B | 2 | 15 | 29 | 29 | 14 | 0 | 1.0e+08 | 0.00 |
| ralph2 | 3 | 1 | 1 | 4.93038066e-32 | 2.2e-16 | S | 2 | 1 | 1 | 1 | 0 | 0 | 2.0e+01 | 0.00 |
| ralphmod | 204 | 100 | 100 | 4.83957210e+13 | 2.2e-01 | inf | 50 | 25 | 88 | 769 | 68 | 0 | 3.6e+20 | 7.70 |
| scale1 | 3 | 1 | 1 | 9.99999991e-01 | 4.7e-09 | S | 2 | 8 | 8 | 9 | 0 | 0 | 2.0e+01 | 0.00 |
| scale2 | 3 | 1 | 1 | 9.99999985e-01 | 7.7e-09 | S | 2 | 3 | 3 | 4 | 0 | 0 | 1.0e+03 | 0.00 |
| scale3 | 3 | 1 | 1 | 1.00000000e+00 | 2.2e-16 | S | 2 | 3 | 4 | 5 | 1 | 0 | 1.0e+04 | 0.00 |
| scale4 | 3 | 1 | 1 | 9.99999746e-01 | 1.3e-09 | S | 2 | 12 | 12 | 14 | 0 | 0 | 2.0e+05 | 0.00 |
| scale5 | 3 | 1 | 1 | 9.99999991e+01 | 4.7e-09 | S | 2 | 8 | 8 | 10 | 0 | 0 | 2.0e+03 | 0.00 |
| scholtes1 | 5 | 2 | 1 | 2.00000000e+00 | 1.9e-09 | S | 2 | 11 | 12 | 25 | 1 | 0 | 1.0e+01 | 0.00 |
| scholtes2 | 5 | 2 | 1 | 1.49999999e+01 | 4.0e-09 | S | 2 | 19 | 19 | 39 | 0 | 0 | 4.6e+01 | 0.00 |
| scholtes3 | 3 | 1 | 1 | 4.99999995e-01 | 4.7e-09 | S | 2 | 8 | 8 | 8 | 0 | 0 | 1.0e+01 | 0.00 |
| scholtes4 | 6 | 3 | 1 | -4.25000000e-09 | 2.0e-09 | B | 2 | 17 | 34 | 67 | 17 | 0 | 1.0e+09 | 0.00 |
| scholtes5 | 5 | 2 | 2 | 9.99999994e-01 | 2.9e-09 | S | 3 | 5 | 5 | 5 | 0 | 0 | 5.0e+01 | 0.00 |
| siouxfls | – | – | – | – | – | – | – | – | – | – | – | – | – | fail |
| siouxfls1 | 4151 | 2376 | 1748 | 3.34419890e+02 | 2.8e+00 | Ψ | 50 | 23 | 40 | 285 | 1218 | 0 | 3.2e+20 | 14.47 |
| sl1 | 11 | 5 | 3 | 9.99999504e-05 | 2.5e-09 | S | 4 | 9 | 9 | 11 | 0 | 0 | 2.0e+01 | 0.00 |
| stackelberg1 | 4 | 2 | 1 | -3.26666667e+03 | 4.1e-09 | S | 2 | 14 | 14 | 18 | 0 | 0 | 2.0e+00 | 0.00 |
| tap-09 | 126 | 70 | 36 | 1.09131033e+02 | 3.0e-09 | S | 37 | 15 | 16 | 52 | 5 | 0 | 5.4e-01 | 0.04 |
| tap-15 | 309 | 174 | 99 | 1.84294855e+02 | 1.0e-09 | S | 50 | 24 | 29 | 131 | 19 | 0 | 3.5e+00 | 0.09 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| taxmcp | 31 | 16 | 14 | 1.05981002e+16 | 1.6e+06 | Ψ | 15 | 21 | 102140 | 1021326 | 5 | 0 | 3.1e+20 | 43.28 |
| TSC-1 | 1346 | 1100 | 244 | 5.49634692e+01 | 8.0e-15 | S | 50 | 6 | 10 | 51 | 58 | 0 | 1.4e+00 | 0.10 |
| TSC-10 | 1346 | 1100 | 244 | 5.48021373e+01 | 1.5e-15 | S | 50 | 10 | 14 | 62 | 33 | 0 | 1.3e+02 | 0.13 |
| TSC-11 | 1346 | 1100 | 244 | 1.01567690e+02 | 3.6e-15 | S | 50 | 8 | 14 | 96 | 36 | 0 | 6.8e+01 | 0.14 |
| TSC-12 | 1346 | 1100 | 244 | 2.02441462e+02 | 7.7e-03 | Ψ | 50 | 27 | 48 | 308 | 71 | 0 | 5.9e+20 | 0.37 |
| TSC-13 | 1346 | 1100 | 244 | 8.64028645e+01 | 2.8e-15 | S | 50 | 6 | 8 | 48 | 73 | 0 | 6.5e+00 | 0.09 |
| TSC-2 | 1346 | 1100 | 244 | 5.25708119e+01 | 2.7e-14 | S | 50 | 6 | 8 | 45 | 28 | 0 | 1.6e+00 | 0.09 |
| TSC-3 | 1346 | 1100 | 244 | 8.70673771e+01 | 3.2e-15 | S | 50 | 9 | 17 | 90 | 59 | 0 | 8.5e+01 | 0.15 |
| TSC-4 | 1346 | 1100 | 244 | 7.90435431e+01 | 2.4e-15 | S | 50 | 7 | 16 | 90 | 85 | 0 | 8.8e+00 | 0.15 |
| TSC-5 | 1346 | 1100 | 244 | 1.01468684e+02 | 3.9e-15 | S | 50 | 6 | 15 | 91 | 36 | 0 | 7.8e+00 | 0.14 |
| TSC-6 | 1346 | 1100 | 244 | 1.01528435e+02 | 2.4e-14 | S | 50 | 7 | 13 | 81 | 54 | 0 | 7.1e+00 | 0.13 |
| TSC-7 | 1346 | 1100 | 244 | 1.95586787e+02 | 7.8e-01 | Ψ | 50 | 24 | 36 | 240 | 58 | 0 | 6.3e+20 | 0.29 |
| TSC-8 | 1346 | 1100 | 244 | 2.00453736e+02 | 7.3e-01 | Ψ | 50 | 25 | 39 | 264 | 57 | 0 | 5.8e+20 | 0.31 |
| TSC-9 | 1346 | 1100 | 244 | 5.32050328e+01 | 1.5e-15 | S | 50 | 8 | 13 | 59 | 5 | 0 | 1.4e+01 | 0.12 |
| water-FL | 257 | 160 | 44 | 3.69003063e+03 | 1.2e-10 | S | 45 | 15 | 9182 | 91756 | 45 | 0 | 1.6e+05 | 33.25 |
| water-net | 80 | 50 | 14 | 1.01687723e+03 | 7.1e-15 | S | 15 | 11 | 2455 | 24502 | 16 | 0 | 2.3e+05 | 1.67 |

Table 4: MacMPEC, Telescopic $AL_0$.

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bar-truss-3 | 41 | 35 | 6 | 0.00000000e+00 | 5.9e-06 | inf | 7 | 25 | 1903011 | 19030274 | 108 | 0 | 5.2e+20 | 918.70 |
| bard1 | 8 | 4 | 3 | 1.70000000e+01 | 4.4e-10 | S | 4 | 7 | 7 | 9 | 0 | 0 | 6.7e+00 | 0.00 |
| bard1m | 9 | 4 | 3 | 1.70000000e+01 | 4.4e-10 | S | 4 | 7 | 7 | 9 | 0 | 0 | 6.7e+00 | 0.00 |
| bard2 | 17 | 9 | 4 | 6.59800000e+03 | 2.1e-09 | S | 5 | 14 | 14 | 26 | 0 | 0 | 3.5e+02 | 0.00 |
| bard2m | 21 | 13 | 4 | -6.59800000e+03 | 2.1e-09 | S | 5 | 14 | 14 | 29 | 0 | 0 | 3.5e+02 | 0.00 |
| bard3 | 9 | 5 | 2 | -1.26787109e+01 | 3.8e-09 | S | 3 | 12 | 14 | 42 | 0 | 0 | 4.0e+00 | 0.00 |
| bard3m | 11 | 5 | 4 | -1.26787109e+01 | 3.8e-09 | S | 5 | 12 | 14 | 42 | 0 | 0 | 4.0e+00 | 0.00 |
| bem-milanc30-s | 4901 | 3433 | 1464 | 1.26184682e-01 | 5.9e-10 | none | 50 | 26 | 419 | 4084 | 884 | 0 | 1.3e+06 | 278.18 |
| bilevel1 | 19 | 11 | 6 | 5.00000000e+00 | 7.1e-15 | S | 7 | 4 | 4 | 8 | 0 | 0 | 2.7e-01 | 0.00 |
| bilevel1m | 19 | 11 | 6 | 5.00000000e+00 | 1.4e-14 | S | 7 | 4 | 4 | 8 | 0 | 0 | 2.7e-01 | 0.00 |
| bilevel2 | 33 | 17 | 12 | -6.60000000e+03 | 3.7e-09 | S | 13 | 17 | 20 | 41 | 3 | 0 | 3.4e+01 | 0.00 |
| bilevel2m | 37 | 21 | 12 | -6.60000000e+03 | 2.5e-09 | S | 13 | 17 | 20 | 50 | 5 | 0 | 3.4e+01 | 0.00 |
| bilevel3 | 17 | 11 | 4 | -1.33684211e+01 | 1.1e+00 | Ψ | 5 | 22 | 24 | 97 | 2 | 0 | 1.5e+20 | 0.00 |
| bilin | 15 | 7 | 6 | 1.46000000e+01 | 4.4e-16 | S | 7 | 5 | 9 | 23 | 5 | 0 | 2.3e+02 | 0.00 |
| dempe | 4 | 2 | 1 | 2.82500000e+01 | 5.5e-12 | S | 2 | 8 | 12010 | 120078 | 0 | 0 | 3.1e+04 | 1.44 |
| design-cent-1 | 18 | 12 | 3 | 1.86064733e+00 | 2.7e-09 | S | 4 | 8 | 8 | 19 | 0 | 0 | 3.1e+01 | 0.00 |
| design-cent-2 | 23 | 16 | 3 | 3.48381570e+00 | 3.9e-09 | S | 4 | 5 | 6 | 25 | 0 | 0 | 3.1e+02 | 0.00 |
| design-cent-21 | 23 | 16 | 3 | 5.56313458e-02 | 4.5e-04 | inf | 4 | 23 | 1639 | 16282 | 0 | 0 | 3.1e+20 | 0.67 |
| design-cent-3 | 21 | 12 | 3 | 3.72336912e+00 | 4.3e-09 | S | 4 | 5 | 9 | 55 | 0 | 0 | 3.1e+02 | 0.01 |
| design-cent-31 | 21 | 12 | 3 | 3.72336907e+00 | 2.0e-09 | S | 4 | 13 | 16 | 66 | 0 | 0 | 3.1e+02 | 0.00 |
| design-cent-4 | 37 | 21 | 12 | 3.07920139e+00 | 3.2e-09 | S | 13 | 8 | 9 | 37 | 0 | 0 | 1.9e+02 | 0.00 |
| desilva | 8 | 4 | 2 | -1.00000000e+00 | 4.5e-09 | S | 3 | 13 | 13 | 27 | 0 | 0 | 1.0e+01 | 0.00 |
| df1 | 5 | 3 | 1 | 0.00000000e+00 | 0.0e+00 | S | 2 | 1 | 1 | 7 | 0 | 0 | 1.0e+01 | 0.00 |
| ex9.1.1 | 18 | 12 | 5 | -1.30000000e+01 | 7.1e-15 | S | 6 | 8 | 10 | 14 | 2 | 0 | 7.3e+00 | 0.00 |
| ex9.1.10 | 20 | 12 | 5 | -3.25000000e+00 | 1.8e-15 | S | 6 | 2 | 3 | 8 | 1 | 0 | 7.3e-01 | 0.00 |
| ex9.1.2 | 15 | 10 | 5 | -6.25000000e+00 | 1.8e-15 | S | 6 | 6 | 8 | 13 | 4 | 0 | 6.7e+00 | 0.00 |
| ex9.1.3 | 29 | 21 | 6 | -2.30000000e+01 | 2.2e-16 | S | 7 | 7 | 11 | 24 | 6 | 0 | 2.2e+02 | 0.00 |
| ex9.1.4 | 14 | 9 | 4 | -6.30000000e+01 | 1.0e+00 | Ψ | 5 | 27 | 28 | 13 | 2 | 0 | 1.7e+20 | 0.00 |
| ex9.1.5 | 18 | 12 | 5 | -1.00000000e+00 | 2.2e-16 | S | 6 | 2 | 4 | 6 | 2 | 0 | 4.0e+00 | 0.00 |
| ex9.1.6 | 20 | 13 | 6 | -4.90000000e+01 | 7.1e-15 | S | 7 | 6 | 7 | 8 | 3 | 0 | 8.5e-01 | 0.00 |
| ex9.1.7 | 23 | 15 | 6 | -6.00000000e+00 | 2.8e-16 | S | 7 | 7 | 11 | 22 | 7 | 0 | 2.2e+02 | 0.00 |
| ex9.1.8 | 20 | 12 | 5 | -3.25000000e+00 | 1.8e-15 | S | 6 | 2 | 3 | 8 | 1 | 0 | 7.3e-01 | 0.00 |
| ex9.1.9 | 17 | 11 | 5 | 2.00000000e+00 | 1.0e+00 | Ψ | 6 | 22 | 24 | 61 | 3 | 0 | 2.6e+20 | 0.00 |
| ex9.2.1 | 14 | 9 | 4 | 2.49999999e+01 | 2.7e-09 | S | 5 | 13 | 15 | 23 | 3 | 0 | 6.7e+01 | 0.00 |
| ex9.2.2 | 17 | 11 | 4 | 1.00000000e+02 | 2.2e-10 | B | 5 | 23 | 44 | 128 | 22 | 0 | 4.6e+10 | 0.00 |
| ex9.2.3 | 23 | 15 | 6 | -8.00000000e+00 | 1.0e+00 | Ψ | 7 | 23 | 24 | 38 | 2 | 0 | 2.8e+20 | 0.00 |
| ex9.2.4 | 10 | 7 | 2 | 4.99999988e-01 | 5.8e-09 | S | 3 | 6 | 8 | 13 | 2 | 0 | 4.0e+01 | 0.00 |
| ex9.2.5 | 11 | 7 | 3 | 8.99999999e+00 | 3.2e-09 | S | 4 | 9 | 11 | 14 | 3 | 0 | 8.6e+00 | 0.00 |
| ex9.2.6 | 22 | 12 | 6 | -1.00000000e+00 | 3.7e-09 | S | 7 | 10 | 12 | 18 | 4 | 0 | 4.0e+01 | 0.00 |
| ex9.2.7 | 14 | 9 | 4 | 2.49999999e+01 | 2.7e-09 | S | 5 | 13 | 15 | 23 | 3 | 0 | 6.7e+01 | 0.00 |
| ex9.2.8 | 8 | 5 | 2 | 1.50000000e+00 | 4.2e-18 | S | 3 | 3 | 5 | 13 | 2 | 0 | 1.0e+02 | 0.00 |
| ex9.2.9 | 12 | 8 | 3 | 2.00000000e+00 | 1.3e-15 | S | 4 | 1 | 2 | 5 | 1 | 0 | 9.1e-01 | 0.00 |
| flp2 | 6 | 2 | 2 | 4.49199124e-27 | 1.3e-13 | S | 3 | 1 | 1 | 2 | 0 | 0 | 2.3e+00 | 0.00 |
| flp4-1 | 140 | 60 | 30 | 2.88607396e-38 | 3.5e-18 | S | 31 | 1 | 1 | 10 | 0 | 0 | 3.8e-04 | 0.03 |
| flp4-2 | 220 | 110 | 60 | 1.20065728e-36 | 2.2e-16 | S | 50 | 1 | 1 | 9 | 0 | 0 | 2.0e-04 | 0.06 |
| flp4-3 | 310 | 170 | 70 | 9.90827316e-40 | 8.7e-19 | S | 50 | 1 | 2 | 11 | 0 | 0 | 1.3e-04 | 0.15 |
| flp4-4 | 450 | 250 | 100 | 1.74887429e-37 | 4.4e-16 | S | 50 | 1 | 1 | 9 | 0 | 0 | 6.3e-05 | 0.36 |
| gauvin | 5 | 2 | 2 | 2.00000000e+01 | 4.4e-10 | S | 3 | 7 | 8 | 11 | 1 | 0 | 3.9e+00 | 0.00 |
| gnash10 | 21 | 12 | 8 | -2.30823206e+02 | 9.5e-09 | S | 9 | 16 | 24 | 109 | 8 | 0 | 7.3e+00 | 0.00 |
| gnash10m | 25 | 16 | 8 | -2.30823206e+02 | 9.5e-09 | S | 9 | 16 | 23 | 109 | 8 | 0 | 7.3e+00 | 0.00 |
| gnash11 | 21 | 12 | 8 | -1.29911924e+02 | 5.1e-09 | S | 9 | 24 | 25 | 69 | 0 | 0 | 4.7e+00 | 0.00 |
| gnash11m | 25 | 16 | 8 | -1.29911924e+02 | 5.1e-09 | S | 9 | 24 | 25 | 71 | 0 | 0 | 4.7e+00 | 0.00 |
| gnash12 | 21 | 12 | 8 | -3.69331069e+01 | 6.9e-09 | S | 9 | 12 | 15 | 63 | 0 | 0 | 1.6e+01 | 0.00 |
| gnash12m | 25 | 16 | 8 | -3.69331069e+01 | 6.9e-09 | S | 9 | 12 | 14 | 60 | 0 | 0 | 1.6e+01 | 0.00 |
| gnash13 | 21 | 12 | 8 | -7.06178326e+00 | 1.5e-09 | S | 9 | 12 | 13 | 48 | 0 | 0 | 2.0e+01 | 0.00 |
| gnash13m | 25 | 16 | 8 | -7.06178326e+00 | 1.5e-09 | S | 9 | 12 | 13 | 50 | 0 | 0 | 2.0e+01 | 0.00 |
| gnash14 | 21 | 12 | 8 | -1.79046306e-01 | 2.8e-09 | S | 9 | 14 | 19 | 92 | 0 | 0 | 5.6e+00 | 0.00 |
| gnash14m | 25 | 16 | 8 | -1.79046306e-01 | 2.8e-09 | S | 9 | 14 | 19 | 94 | 0 | 0 | 5.6e+00 | 0.00 |
| gnash15 | 21 | 12 | 8 | -3.54699059e+02 | 5.6e-10 | S | 9 | 8 | 12 | 49 | 5 | 0 | 1.9e+01 | 0.00 |
| gnash15m | 25 | 16 | 8 | -3.54699059e+02 | 1.3e-10 | S | 9 | 8 | 11 | 48 | 5 | 0 | 1.9e+01 | 0.00 |
| gnash16 | 21 | 12 | 8 | -2.41441977e+02 | 3.4e-10 | S | 9 | 8 | 11 | 39 | 3 | 0 | 1.8e+01 | 0.00 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| gnash16m | 25 | 16 | 8 | -2.41441977e+02 | 7.6e-09 | S | 9 | 7 | 11 | 49 | 5 | 0 | 1.8e+01 | 0.00 |
| gnash17 | 21 | 12 | 8 | -9.07491017e+01 | 4.8e-09 | S | 9 | 8 | 11 | 41 | 3 | 0 | 1.9e+01 | 0.00 |
| gnash17m | 25 | 16 | 8 | -9.07491018e+01 | 2.2e-09 | S | 9 | 8 | 11 | 46 | 5 | 0 | 1.9e+01 | 0.00 |
| gnash18 | 21 | 12 | 8 | -2.56982153e+01 | 9.6e-09 | S | 9 | 7 | 9 | 33 | 3 | 0 | 1.9e+01 | 0.00 |
| gnash18m | 25 | 16 | 8 | -2.56982153e+01 | 1.9e-10 | S | 9 | 7 | 12 | 58 | 7 | 0 | 1.9e+02 | 0.00 |
| gnash19 | 21 | 12 | 8 | -6.11670818e+00 | 6.7e-09 | S | 9 | 8 | 10 | 33 | 2 | 0 | 1.7e+01 | 0.00 |
| gnash19m | 25 | 16 | 8 | -6.11670819e+00 | 5.2e-09 | S | 9 | 8 | 12 | 48 | 4 | 0 | 1.7e+01 | 0.00 |
| hakonsen | 12 | 6 | 4 | 7.99678713e+09 | 1.0e+00 | inf | 5 | 18 | 27 | 177 | 0 | 0 | 7.7e+20 | 0.01 |
| hs044-i | 30 | 14 | 10 | 1.70901220e+01 | 9.2e-11 | S | 11 | 10 | 10 | 29 | 0 | 0 | 9.8e+03 | 0.00 |
| incid-set1-16 | 815 | 555 | 225 | -7.35967738e-11 | 4.3e-10 | S | 50 | 6 | 44 | 409 | 45 | 0 | 1.0e+02 | 1.83 |
| incid-set1-32 | 3159 | 2131 | 961 | -1.44662230e-13 | 6.7e-12 | S | 50 | 8 | 154 | 1499 | 158 | 0 | 1.0e+03 | 40.33 |
| incid-set1-8 | 219 | 151 | 49 | 1.21885823e-11 | 2.7e-10 | S | 50 | 5 | 35 | 327 | 5 | 0 | 1.0e+02 | 0.33 |
| incid-set1c-16 | 830 | 570 | 225 | 8.74613126e-13 | 3.2e-11 | S | 50 | 8 | 80 | 759 | 36 | 0 | 1.0e+03 | 3.36 |
| incid-set1c-32 | 3190 | 2162 | 961 | 9.86028652e-06 | 3.7e-11 | S | 50 | 13 | 135 | 1276 | 172 | 0 | 1.0e+05 | 34.32 |
| incid-set1c-8 | 226 | 158 | 49 | 1.50768287e-09 | 4.5e-09 | S | 50 | 6 | 38 | 357 | 11 | 0 | 1.0e+02 | 0.31 |
| incid-set2-16 | 815 | 555 | 225 | 3.22333781e-03 | 7.4e-09 | S | 50 | 13 | 54 | 470 | 55 | 0 | 1.0e+04 | 2.05 |
| incid-set2-32 | 3159 | 2131 | 961 | 1.73594514e-03 | 1.0e-08 | S | 50 | 14 | 122 | 1156 | 148 | 0 | 6.7e+04 | 32.69 |
| incid-set2-8 | 219 | 151 | 49 | 4.51786931e-03 | 8.2e-09 | S | 50 | 10 | 46 | 396 | 6 | 0 | 1.0e+03 | 0.31 |
| incid-set2c-16 | 830 | 570 | 225 | 3.60273979e-03 | 4.5e-09 | S | 50 | 10 | 69 | 626 | 33 | 0 | 1.0e+04 | 2.71 |
| incid-set2c-32 | 3190 | 2162 | 961 | 2.42728259e-03 | 4.3e-09 | S | 50 | 12 | 68 | 604 | 151 | 0 | 6.7e+04 | 17.08 |
| incid-set2c-8 | 226 | 158 | 49 | 5.47126365e-03 | 2.8e-09 | S | 50 | 9 | 30 | 252 | 5 | 0 | 1.0e+03 | 0.21 |
| jr1 | 3 | 1 | 1 | 4.99999995e-01 | 4.7e-09 | S | 2 | 8 | 8 | 10 | 0 | 0 | 1.0e+01 | 0.00 |
| jr2 | 3 | 1 | 1 | 4.99999995e-01 | 4.7e-09 | S | 2 | 8 | 8 | 9 | 0 | 0 | 1.0e+01 | 0.00 |
| kth1 | 3 | 1 | 1 | -1.38777878e-16 | 1.4e-16 | S | 2 | 2 | 2 | 2 | 0 | 0 | 1.0e+01 | 0.00 |
| kth2 | 3 | 1 | 1 | 1.77493704e-30 | 1.1e-16 | S | 2 | 1 | 2 | 3 | 1 | 0 | 2.0e+01 | 0.00 |
| kth3 | 3 | 1 | 1 | 9.99999994e-01 | 2.8e-09 | S | 2 | 11 | 11 | 11 | 0 | 0 | 1.0e+01 | 0.00 |
| liswet1-050 | 203 | 103 | 50 | 1.39942149e-02 | 1.4e-09 | S | 50 | 12 | 22 | 127 | 40 | 0 | 2.0e+05 | 0.03 |
| liswet1-100 | 403 | 203 | 100 | 1.37338921e-02 | 2.2e-10 | S | 50 | 15 | 29 | 213 | 72 | 0 | 2.0e+06 | 0.10 |
| liswet1-200 | 803 | 403 | 200 | 1.70084031e-02 | 2.2e-10 | S | 50 | 17 | 58 | 509 | 164 | 0 | 2.0e+07 | 0.79 |
| monteiro | 293 | 175 | 115 | 3.75300241e+01 | 4.2e-11 | S | 50 | 28 | 53 | 313 | 82 | 0 | 1.4e+05 | 0.09 |
| monteiroB | 293 | 175 | 115 | 8.27859482e+02 | 6.3e-09 | S | 50 | 23 | 44 | 208 | 81 | 0 | 1.4e+03 | 0.07 |
| nash1a | 8 | 4 | 2 | 0.00000000e+00 | 3.2e-14 | S | 3 | 1 | 1 | 7 | 0 | 0 | 9.1e-03 | 0.00 |
| nash1b | 8 | 4 | 2 | 1.57772181e-30 | 3.6e-15 | S | 3 | 1 | 1 | 3 | 0 | 0 | 2.6e-01 | 0.00 |
| nash1c | 8 | 4 | 2 | 0.00000000e+00 | 3.6e-15 | S | 3 | 1 | 1 | 3 | 0 | 0 | 1.1e+00 | 0.00 |
| nash1d | 8 | 4 | 2 | 3.94430453e-31 | 0.0e+00 | S | 3 | 1 | 1 | 3 | 0 | 0 | 5.0e-01 | 0.00 |
| nash1e | 8 | 4 | 2 | 3.94430453e-31 | 0.0e+00 | S | 3 | 1 | 1 | 8 | 0 | 0 | 5.0e-01 | 0.00 |
| outrata31 | 9 | 4 | 4 | 3.20770002e+00 | 4.2e-09 | S | 5 | 15 | 16 | 42 | 1 | 0 | 2.8e+00 | 0.00 |
| outrata32 | 9 | 4 | 4 | 3.44940356e+00 | 5.7e-09 | S | 5 | 14 | 16 | 46 | 2 | 0 | 2.9e+00 | 0.00 |
| outrata33 | 9 | 4 | 4 | 4.60425364e+00 | 1.8e-09 | S | 5 | 8 | 9 | 28 | 1 | 0 | 2.8e+00 | 0.00 |
| outrata34 | 9 | 4 | 4 | 6.59268383e+00 | 1.1e-09 | S | 5 | 10 | 11 | 31 | 1 | 0 | 3.0e+00 | 0.00 |
| pack-comp1-16 | 817 | 575 | 225 | 6.16951316e-01 | 4.5e-09 | S | 50 | 11 | 20 | 108 | 182 | 0 | 1.0e+05 | 0.51 |
| pack-comp1-32 | 3229 | 2235 | 961 | 6.52979207e-01 | 1.5e-10 | S | 50 | 13 | 30 | 200 | 685 | 0 | 1.0e+06 | 5.50 |
| pack-comp1-8 | 211 | 153 | 49 | 6.00000000e-01 | 3.8e-17 | S | 50 | 1 | 3 | 18 | 32 | 0 | 1.0e+01 | 0.02 |
| pack-comp1c-16 | 832 | 590 | 225 | 6.23042745e-01 | 3.0e-09 | S | 50 | 11 | 19 | 112 | 109 | 0 | 1.0e+07 | 0.51 |
| pack-comp1c-32 | 3260 | 2266 | 961 | 6.61443083e-01 | 1.2e-09 | S | 50 | 12 | 31 | 201 | 690 | 0 | 1.0e+06 | 6.07 |
| pack-comp1c-8 | 218 | 160 | 49 | 6.00000000e-01 | 3.0e-17 | S | 50 | 1 | 3 | 15 | 28 | 0 | 1.0e+01 | 0.01 |
| pack-comp1p-16 | 772 | 530 | 225 | 6.16949509e-01 | 1.3e-09 | S | 50 | 7 | 82 | 790 | 181 | 0 | 2.6e+06 | 3.77 |
| pack-comp1p-32 | 3076 | 2082 | 961 | 6.52978185e-01 | 4.9e-09 | S | 50 | 8 | 90 | 859 | 726 | 0 | 1.3e+06 | 27.29 |
| pack-comp1p-8 | 196 | 138 | 49 | 6.00000000e-01 | 6.6e-17 | S | 50 | 6 | 40 | 366 | 46 | 0 | 9.0e+05 | 0.31 |
| pack-comp2-16 | 817 | 575 | 225 | 7.27135126e-01 | 7.1e-09 | S | 50 | 11 | 24 | 163 | 123 | 0 | 1.0e+05 | 0.76 |
| pack-comp2-32 | 3229 | 2235 | 961 | 7.82602874e-01 | 8.8e-09 | S | 50 | 16 | 40 | 280 | 764 | 0 | 1.0e+06 | 8.16 |
| pack-comp2-8 | 211 | 153 | 49 | 6.73117127e-01 | 6.7e-09 | S | 50 | 13 | 17 | 87 | 24 | 0 | 1.0e+04 | 0.07 |
| pack-comp2c-16 | 832 | 590 | 225 | 7.27467326e-01 | 9.1e-09 | S | 50 | 11 | 23 | 152 | 103 | 0 | 1.0e+05 | 0.76 |
| pack-comp2c-32 | 3260 | 2266 | 961 | 7.82943295e-01 | 3.7e-09 | S | 50 | 13 | 37 | 273 | 587 | 0 | 1.0e+06 | 7.91 |
| pack-comp2c-8 | 218 | 160 | 49 | 6.73458175e-01 | 4.3e-09 | S | 50 | 15 | 20 | 84 | 24 | 0 | 1.0e+04 | 0.07 |
| pack-comp2p-16 | 772 | 530 | 225 | 7.27134908e-01 | 3.8e-10 | S | 50 | 8 | 26 | 219 | 148 | 0 | 4.7e+05 | 1.04 |
| pack-comp2p-32 | 3076 | 2082 | 961 | 7.82603498e-01 | 2.0e-09 | S | 50 | 9 | 48 | 432 | 651 | 0 | 3.1e+06 | 13.31 |
| pack-comp2p-8 | 196 | 138 | 49 | 6.73058038e-01 | 8.3e-09 | S | 50 | 6 | 37 | 336 | 37 | 0 | 1.2e+06 | 0.27 |
| pack-rig1-16 | 817 | 575 | 225 | 8.26012361e-01 | 3.8e-09 | S | 50 | 13 | 23 | 131 | 96 | 0 | 1.0e+05 | 0.47 |
| pack-rig1-32 | 3229 | 2235 | 961 | 8.50893605e-01 | 3.8e-09 | S | 50 | 14 | 44 | 298 | 776 | 0 | 1.0e+06 | 7.12 |
| pack-rig1-8 | 211 | 153 | 49 | 7.87931773e-01 | 4.0e-09 | S | 50 | 16 | 20 | 87 | 7 | 0 | 1.0e+04 | 0.06 |
| pack-rig1c-16 | 832 | 590 | 225 | 8.26498133e-01 | 3.7e-09 | S | 50 | 13 | 22 | 133 | 86 | 0 | 1.0e+05 | 0.50 |
| pack-rig1c-32 | 3260 | 2266 | 961 | 8.51639509e-01 | 5.1e-09 | S | 50 | 14 | 44 | 306 | 477 | 0 | 1.0e+06 | 7.24 |
| pack-rig1c-8 | 218 | 160 | 49 | 7.88299897e-01 | 7.8e-09 | S | 50 | 15 | 19 | 90 | 7 | 0 | 1.0e+04 | 0.07 |
| pack-rig1p-16 | 772 | 530 | 225 | 8.26012656e-01 | 9.0e-10 | S | 50 | 10 | 31 | 253 | 123 | 0 | 2.6e+05 | 0.89 |
| pack-rig1p-32 | 3076 | 2082 | 961 | 8.50894489e-01 | 1.1e-09 | S | 50 | 10 | 57 | 524 | 756 | 0 | 2.2e+06 | 11.78 |
| pack-rig1p-8 | 196 | 138 | 49 | 7.87931828e-01 | 4.4e-09 | S | 50 | 10 | 22 | 161 | 24 | 0 | 3.6e+04 | 0.10 |
| pack-rig2-16 | 817 | 575 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 202 | 1899 | 117 | 0 | 1.0e+21 | 6.57 |
| pack-rig2-32 | 3229 | 2235 | 961 | 9.99784408e-01 | 2.3e-04 | Ψ | 50 | 22 | 294 | 2827 | 976 | 0 | 1.0e+21 | 63.09 |
| pack-rig2-8 | 211 | 153 | 49 | 7.80404077e-01 | 4.0e-09 | S | 50 | 13 | 18 | 95 | 8 | 0 | 1.0e+05 | 0.06 |
| pack-rig2c-16 | 832 | 590 | 225 | 9.99167660e-01 | 1.0e-04 | Ψ | 50 | 24 | 160 | 1471 | 89 | 0 | 1.0e+21 | 5.07 |
| pack-rig2c-32 | 3260 | 2266 | 961 | 9.99784408e-01 | 2.3e-04 | Ψ | 50 | 22 | 226 | 2132 | 816 | 0 | 1.0e+21 | 52.46 |
| pack-rig2c-8 | 218 | 160 | 49 | 7.99305119e-01 | 8.7e-09 | S | 50 | 13 | 21 | 113 | 10 | 0 | 1.0e+06 | 0.08 |
| pack-rig2p-16 | 772 | 530 | 225 | 1.08513671e+00 | 4.4e-11 | S | 50 | 9 | 51 | 474 | 141 | 0 | 6.3e+07 | 1.83 |
| pack-rig2p-32 | 3076 | 2082 | 961 | 1.13588533e+00 | 7.4e-13 | S | 50 | 12 | 62 | 568 | 655 | 0 | 8.7e+07 | 14.07 |
| pack-rig2p-8 | 196 | 138 | 49 | 7.80404313e-01 | 4.9e-09 | S | 50 | 14 | 26 | 185 | 28 | 0 | 4.7e+04 | 0.12 |
| pack-rig3-16 | 817 | 575 | 225 | 8.00430508e-01 | 1.5e-10 | S | 50 | 15 | 35 | 246 | 153 | 0 | 1.0e+06 | 1.01 |
| pack-rig3-32 | 3229 | 2235 | 961 | 8.86401966e-01 | 6.9e-09 | S | 50 | 18 | 69 | 545 | 1007 | 0 | 1.0e+07 | 13.70 |
| pack-rig3-8 | 211 | 153 | 49 | 7.35202060e-01 | 1.3e-09 | S | 50 | 14 | 21 | 114 | 21 | 0 | 1.0e+05 | 0.07 |
| pack-rig3c-16 | 832 | 590 | 225 | 8.18600338e-01 | 1.8e-10 | S | 50 | 16 | 31 | 189 | 67 | 0 | 1.0e+06 | 0.79 |
| pack-rig3c-32 | 3260 | 2266 | 961 | 9.08907121e-01 | 2.5e-09 | S | 50 | 20 | 72 | 580 | 717 | 0 | 1.0e+07 | 16.10 |
| pack-rig3c-8 | 218 | 160 | 49 | 7.53472366e-01 | 5.7e-09 | S | 50 | 21 | 26 | 103 | 9 | 0 | 1.0e+04 | 0.07 |
| portfl-i-1 | 99 | 25 | 12 | 1.50239520e-05 | 6.8e-09 | S | 13 | 11 | 13 | 32 | 6 | 0 | 1.0e+03 | 0.03 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | stat | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| portfl-i-2 | 99 | 25 | 12 | 1.45723820e-05 | 6.0e-09 | S | 13 | 13 | 15 | 39 | 7 | 0 | 1.0e+03 | 0.03 |
| portfl-i-3 | 99 | 25 | 12 | 6.26470499e-06 | 8.0e-09 | S | 13 | 10 | 11 | 28 | 6 | 0 | 1.0e+03 | 0.02 |
| portfl-i-4 | 99 | 25 | 12 | 2.17725534e-06 | 5.7e-09 | S | 13 | 10 | 12 | 31 | 6 | 0 | 1.0e+03 | 0.02 |
| portfl-i-6 | 99 | 25 | 12 | 2.36109192e-06 | 8.1e-09 | S | 13 | 9 | 11 | 37 | 6 | 0 | 1.0e+03 | 0.03 |
| qpec-100-1 | 207 | 102 | 100 | 2.82809834e-01 | 3.5e-09 | S | 50 | 16 | 32 | 83 | 84 | 0 | 5.7e+02 | 1.06 |
| qpec-100-2 | 212 | 102 | 100 | -4.25171768e+00 | 3.4e-09 | S | 50 | 15 | 29 | 89 | 70 | 0 | 4.2e+01 | 1.17 |
| qpec-100-3 | 214 | 104 | 100 | -5.27572730e+00 | 1.8e-09 | S | 50 | 13 | 30 | 81 | 86 | 0 | 6.5e+02 | 1.58 |
| qpec-100-4 | 224 | 104 | 100 | -3.37025798e+00 | 9.0e-09 | S | 50 | 13 | 32 | 104 | 93 | 0 | 4.0e+02 | 1.76 |
| qpec-200-1 | 414 | 204 | 200 | -1.93482972e+00 | 2.7e-09 | S | 50 | 17 | 48 | 145 | 191 | 0 | 2.4e+04 | 11.21 |
| qpec-200-2 | 424 | 204 | 200 | -2.37928133e+01 | 8.6e-09 | S | 50 | 13 | 35 | 127 | 210 | 0 | 1.2e+02 | 12.25 |
| qpec-200-3 | 428 | 208 | 200 | -1.95340558e+00 | 5.0e-09 | S | 50 | 18 | 41 | 139 | 181 | 0 | 1.9e+03 | 19.51 |
| qpec-200-4 | 448 | 208 | 200 | -3.21836158e+00 | 8.2e-09 | S | 50 | 12 | 36 | 136 | 195 | 0 | 9.2e+02 | 15.15 |
| qpec1 | 50 | 20 | 20 | 8.00000000e+01 | 2.2e-16 | S | 21 | 1 | 2 | 3 | 10 | 0 | 4.4e+02 | 0.00 |
| qpec2 | 50 | 20 | 20 | 4.49999996e+01 | 1.0e-08 | B | 21 | 15 | 29 | 29 | 140 | 0 | 4.0e+08 | 0.01 |
| ralph1 | 3 | 1 | 1 | -1.00000000e-08 | 1.0e-08 | B | 2 | 15 | 29 | 29 | 14 | 0 | 1.0e+08 | 0.00 |
| ralph2 | 3 | 1 | 1 | 4.93038066e-32 | 2.2e-16 | S | 2 | 1 | 1 | 1 | 0 | 0 | 2.0e+01 | 0.00 |
| ralphmod | 204 | 100 | 100 | 4.83957210e+13 | 2.2e-01 | inf | 50 | 25 | 88 | 769 | 68 | 0 | 3.6e+20 | 7.55 |
| scale1 | 3 | 1 | 1 | 9.99999991e-01 | 4.7e-09 | S | 2 | 8 | 8 | 9 | 0 | 0 | 2.0e+01 | 0.00 |
| scale2 | 3 | 1 | 1 | 9.99999985e-01 | 7.7e-09 | S | 2 | 3 | 3 | 4 | 0 | 0 | 1.0e+03 | 0.00 |
| scale3 | 3 | 1 | 1 | 1.00000000e+00 | 2.2e-16 | S | 2 | 3 | 4 | 5 | 1 | 0 | 1.0e+04 | 0.00 |
| scale4 | 3 | 1 | 1 | 9.99999746e-01 | 1.3e-09 | S | 2 | 12 | 12 | 14 | 0 | 0 | 2.0e+05 | 0.00 |
| scale5 | 3 | 1 | 1 | 9.99999991e+01 | 4.7e-09 | S | 2 | 8 | 8 | 10 | 0 | 0 | 2.0e+03 | 0.00 |
| scholtes1 | 5 | 2 | 1 | 2.00000000e+00 | 1.9e-09 | S | 2 | 11 | 12 | 25 | 1 | 0 | 1.0e+01 | 0.00 |
| scholtes2 | 5 | 2 | 1 | 1.49999999e+01 | 4.0e-09 | S | 2 | 19 | 19 | 39 | 0 | 0 | 4.6e+01 | 0.00 |
| scholtes3 | 3 | 1 | 1 | 4.99999995e-01 | 4.7e-09 | S | 2 | 8 | 8 | 8 | 0 | 0 | 1.0e+01 | 0.00 |
| scholtes4 | 6 | 3 | 1 | -4.25000000e-09 | 2.0e-09 | B | 2 | 17 | 34 | 67 | 17 | 0 | 1.0e+09 | 0.00 |
| scholtes5 | 5 | 2 | 2 | 9.99999994e-01 | 2.9e-09 | S | 3 | 5 | 5 | 5 | 0 | 0 | 5.0e+01 | 0.00 |
| siouxfls | – | – | – | – | – | – | – | – | – | – | – | – | – | fail |
| siouxfls1 | 4151 | 2376 | 1748 | 3.34419890e+02 | 2.8e+00 | Ψ | 50 | 23 | 40 | 285 | 1218 | 0 | 3.2e+20 | 14.45 |
| sl1 | 11 | 5 | 3 | 9.99999504e-05 | 2.5e-09 | S | 4 | 9 | 9 | 11 | 0 | 0 | 2.0e+01 | 0.00 |
| stackelberg1 | 4 | 2 | 1 | -3.26666667e+03 | 4.1e-09 | S | 2 | 14 | 14 | 18 | 0 | 0 | 2.0e+00 | 0.00 |
| tap-09 | 126 | 70 | 36 | 1.09131033e+02 | 3.0e-09 | S | 37 | 15 | 16 | 52 | 5 | 0 | 5.4e-01 | 0.01 |
| tap-15 | 309 | 174 | 99 | 1.84294855e+02 | 1.0e-09 | S | 50 | 24 | 29 | 131 | 19 | 0 | 3.5e+00 | 0.07 |
| taxmcp | 31 | 16 | 14 | 1.05981002e+16 | 1.6e+06 | Ψ | 15 | 21 | 102140 | 1021326 | 5 | 0 | 3.1e+20 | 43.32 |
| TSC-1 | 1346 | 1100 | 244 | 5.49634692e+01 | 8.0e-15 | S | 50 | 6 | 10 | 51 | 58 | 0 | 1.4e+00 | 0.07 |
| TSC-10 | 1346 | 1100 | 244 | 5.48021373e+01 | 1.5e-15 | S | 50 | 10 | 14 | 62 | 33 | 0 | 1.3e+02 | 0.10 |
| TSC-11 | 1346 | 1100 | 244 | 1.01567690e+02 | 3.6e-15 | S | 50 | 8 | 14 | 96 | 36 | 0 | 6.8e+01 | 0.11 |
| TSC-12 | 1346 | 1100 | 244 | 2.02441462e+02 | 7.7e-03 | Ψ | 50 | 27 | 48 | 308 | 71 | 0 | 5.9e+20 | 0.37 |
| TSC-13 | 1346 | 1100 | 244 | 8.64028645e+01 | 2.8e-15 | S | 50 | 6 | 8 | 48 | 73 | 0 | 6.5e+00 | 0.06 |
| TSC-2 | 1346 | 1100 | 244 | 5.25708119e+01 | 2.7e-14 | S | 50 | 6 | 8 | 45 | 28 | 0 | 1.6e+00 | 0.06 |
| TSC-3 | 1346 | 1100 | 244 | 8.70673771e+01 | 3.2e-15 | S | 50 | 9 | 17 | 90 | 59 | 0 | 8.5e+01 | 0.12 |
| TSC-4 | 1346 | 1100 | 244 | 7.90435431e+01 | 2.4e-15 | S | 50 | 7 | 16 | 90 | 85 | 0 | 8.8e+00 | 0.12 |
| TSC-5 | 1346 | 1100 | 244 | 1.01468684e+02 | 3.9e-15 | S | 50 | 6 | 15 | 91 | 36 | 0 | 7.8e+00 | 0.11 |
| TSC-6 | 1346 | 1100 | 244 | 1.01528435e+02 | 2.4e-14 | S | 50 | 7 | 13 | 81 | 54 | 0 | 7.1e+00 | 0.10 |
| TSC-7 | 1346 | 1100 | 244 | 1.95586787e+02 | 7.8e-01 | Ψ | 50 | 24 | 36 | 240 | 58 | 0 | 6.3e+20 | 0.29 |
| TSC-8 | 1346 | 1100 | 244 | 2.00453736e+02 | 7.3e-01 | Ψ | 50 | 25 | 39 | 264 | 57 | 0 | 5.8e+20 | 0.31 |
| TSC-9 | 1346 | 1100 | 244 | 5.32050328e+01 | 1.5e-15 | S | 50 | 8 | 13 | 59 | 5 | 0 | 1.4e+01 | 0.09 |
| water-FL | 257 | 160 | 44 | 3.69003063e+03 | 1.2e-10 | S | 45 | 15 | 9182 | 91756 | 45 | 0 | 1.6e+05 | 33.21 |
| water-net | 80 | 50 | 14 | 1.01687723e+03 | 7.1e-15 | S | 15 | 11 | 2455 | 24502 | 16 | 0 | 2.3e+05 | 1.66 |

Table 5: MacMPEC, Algencan.

| Problem | $n$ | $m$ | pairs | $f$ | viol | comp | stat | out | inner | time |
|---|---|---|---|---|---|---|---|---|---|---|
| bar-truss-3 | 41 | 41 | 6 | 5.45304281e+03 | 5.2e+00 | 6.4e+00 | inf | 27 | 119346 | 13.41 |
| bard1 | 8 | 7 | 3 | 1.70000000e+01 | 3.6e-10 | 4.8e-10 | S | 4 | 14 | 0.00 |
| bard1m | 9 | 7 | 3 | 1.70000000e+01 | 3.6e-10 | 4.8e-10 | S | 4 | 14 | 0.01 |
| bard2 | 16 | 13 | 4 | 6.59800000e+03 | 6.2e-09 | 6.3e-14 | S | 10 | 25 | 0.01 |
| bard2m | 20 | 17 | 4 | -6.59800000e+03 | 6.2e-09 | 3.3e-14 | S | 10 | 26 | 0.01 |
| bard3 | 8 | 7 | 2 | -1.26787109e+01 | 1.8e-10 | 4.4e-16 | S | 7 | 32 | 0.01 |
| bard3m | 10 | 9 | 4 | -1.26787109e+01 | 1.2e-09 | 2.8e-09 | S | 11 | 46 | 0.01 |
| bem-milanc30-s | 4900 | 4897 | 1464 | 9.44345316e-02 | 3.5e-09 | 2.2e-01 | S | 28 | 4322 | 112.25 |
| bilevel1 | 18 | 17 | 6 | -2.25075603e-09 | 7.5e-09 | 9.4e-10 | S | 5 | 18 | 0.00 |
| bilevel1m | 18 | 17 | 6 | -2.25075603e-09 | 7.5e-09 | 9.4e-10 | S | 5 | 18 | 0.01 |
| bilevel2 | 32 | 29 | 12 | -6.60000000e+03 | 7.6e-12 | 8.7e-15 | S | 12 | 55 | 0.02 |
| bilevel2m | 36 | 33 | 12 | -6.60000000e+03 | 7.1e-15 | 9.7e-09 | S | 11 | 67 | 0.01 |
| bilevel3 | 16 | 15 | 4 | -1.26787109e+01 | 2.9e-10 | 3.6e-15 | S | 5 | 61 | 0.01 |
| bilin | 14 | 13 | 6 | 1.84000000e+01 | 2.2e-16 | 1.4e-14 | S | 6 | 40 | 0.01 |
| dempe | 4 | 3 | 1 | 2.82500000e+01 | 4.8e-13 | 1.7e-10 | S | 22 | 100010 | 7.48 |
| design-cent-1 | 15 | 15 | 3 | 1.86064735e+00 | 5.1e-12 | 1.3e-11 | S | 4 | 17 | 0.00 |
| design-cent-2 | 16 | 19 | 3 | 7.82340202e-01 | 4.3e-09 | 2.7e-09 | none | 24 | 142 | 0.02 |
| design-cent-21 | 16 | 19 | 3 | 3.48381566e+00 | 2.1e-11 | 4.9e-10 | S | 5 | 69 | 0.01 |
| design-cent-3 | 18 | 15 | 3 | 8.23406313e-01 | 7.8e-10 | 4.1e-10 | none | 26 | 209 | 0.06 |
| design-cent-31 | 18 | 15 | 3 | 3.72336907e+00 | 1.3e-11 | 7.9e-11 | S | 5 | 46 | 0.01 |
| design-cent-4 | 34 | 33 | 12 | 3.30491441e-31 | 3.3e-16 | 4.4e-16 | S | 1 | 3 | 0.00 |
| desilva | 8 | 6 | 2 | -1.00000000e+00 | 4.3e-10 | 3.7e-09 | S | 6 | 18 | 0.01 |
| df1 | 3 | 4 | 1 | 1.47677889e-22 | 1.2e-11 | 2.4e-11 | S | 1 | 5 | 0.00 |
| ex9.1.1 | 18 | 17 | 5 | -1.30000000e+01 | 5.8e-15 | 4.5e-14 | S | 6 | 12 | 0.01 |
| ex9.1.10 | 19 | 17 | 5 | -3.25000000e+00 | 3.0e-17 | 5.6e-17 | S | 3 | 13 | 0.01 |
| ex9.1.2 | 15 | 15 | 5 | -6.25000000e+00 | 1.4e-23 | 1.8e-33 | S | 6 | 10 | 0.00 |
| ex9.1.3 | 29 | 27 | 6 | -1.60000000e+01 | 8.9e-16 | 2.5e-13 | S | 5 | 41 | 0.01 |
| ex9.1.4 | 14 | 13 | 4 | -3.70000000e+01 | 2.8e-14 | 2.0e-10 | S | 12 | 33 | 0.01 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | comp | stat | out | inner | time |
|---|---|---|---|---|---|---|---|---|---|---|
| ex9.1.5 | 18 | 17 | 5 | -1.00000000e+00 | 3.3e-16 | 4.4e-16 | S | 2 | 9 | 0.01 |
| ex9.1.6 | 20 | 19 | 6 | -4.90000000e+01 | 3.6e-15 | 1.8e-15 | S | 5 | 20 | 0.01 |
| ex9.1.7 | 23 | 21 | 6 | -2.60000000e+01 | 2.2e-16 | 5.1e-29 | S | 5 | 40 | 0.01 |
| ex9.1.8 | 19 | 17 | 5 | -3.25000000e+00 | 3.0e-17 | 5.6e-17 | S | 3 | 13 | 0.00 |
| ex9.1.9 | 17 | 16 | 5 | 3.11111111e+00 | 1.8e-15 | 4.6e-14 | S | 5 | 26 | 0.01 |
| ex9.2.1 | 14 | 13 | 4 | 1.70000000e+01 | 7.5e-10 | 3.9e-09 | S | 5 | 18 | 0.00 |
| ex9.2.2 | 14 | 15 | 4 | 9.99996299e+01 | 4.1e-09 | 1.9e-10 | none | 28 | 182 | 0.04 |
| ex9.2.3 | 22 | 21 | 6 | 5.00000000e+00 | 3.6e-15 | 2.2e-16 | S | 9 | 42 | 0.01 |
| ex9.2.4 | 10 | 9 | 2 | 4.99999988e-01 | 8.8e-09 | 7.1e-09 | S | 4 | 16 | 0.01 |
| ex9.2.5 | 11 | 10 | 3 | 5.00000000e+00 | 1.2e-09 | 4.1e-09 | S | 15 | 40 | 0.01 |
| ex9.2.6 | 22 | 18 | 6 | -9.99999998e-01 | 9.4e-12 | 1.1e-09 | S | 6 | 17 | 0.01 |
| ex9.2.7 | 14 | 13 | 4 | 1.70000000e+01 | 7.5e-10 | 3.9e-09 | S | 5 | 18 | 0.00 |
| ex9.2.8 | 8 | 7 | 2 | 1.50000000e+00 | 0.0e+00 | 0.0e+00 | S | 3 | 15 | 0.00 |
| ex9.2.9 | 12 | 11 | 3 | 2.00000000e+00 | 0.0e+00 | 0.0e+00 | S | 1 | 7 | 0.00 |
| flp2 | 6 | 4 | 2 | 2.27064059e-28 | 4.3e-14 | 1.0e-13 | S | 1 | 2 | 0.00 |
| flp4-1 | 110 | 90 | 30 | 1.02198265e-40 | 4.4e-16 | 5.9e-18 | S | 4 | 16 | 0.03 |
| flp4-2 | 170 | 170 | 60 | 1.41796736e-38 | 4.4e-16 | 2.4e-18 | S | 4 | 17 | 0.08 |
| flp4-3 | 210 | 240 | 70 | 4.18863783e-40 | 8.7e-19 | 1.3e-21 | S | 5 | 17 | 0.04 |
| flp4-4 | 300 | 350 | 100 | 3.10892913e-36 | 4.4e-16 | 4.5e-18 | S | 4 | 20 | 0.09 |
| gauvin | 5 | 4 | 2 | 2.00000000e+01 | 9.2e-11 | 5.5e-12 | S | 5 | 15 | 0.00 |
| gnash10 | 21 | 20 | 8 | -2.30823207e+02 | 4.1e-09 | 2.8e-09 | S | 10 | 98 | 0.02 |
| gnash10m | 25 | 24 | 8 | -2.30823207e+02 | 4.1e-09 | 2.8e-09 | S | 10 | 102 | 0.01 |
| gnash11 | 21 | 20 | 8 | -1.29911924e+02 | 2.7e-09 | 1.4e-09 | S | 14 | 58 | 0.01 |
| gnash11m | 25 | 24 | 8 | -1.29911924e+02 | 2.7e-09 | 1.4e-09 | S | 14 | 58 | 0.01 |
| gnash12 | 21 | 20 | 8 | -3.69331068e+01 | 3.9e-09 | 2.6e-09 | S | 9 | 56 | 0.01 |
| gnash12m | 25 | 24 | 8 | -3.69331068e+01 | 4.0e-09 | 2.6e-09 | S | 9 | 59 | 0.01 |
| gnash13 | 21 | 20 | 8 | -7.06178329e+00 | 4.7e-09 | 4.2e-09 | S | 9 | 48 | 0.01 |
| gnash13m | 25 | 24 | 8 | -7.06178329e+00 | 4.7e-09 | 4.2e-09 | S | 9 | 50 | 0.01 |
| gnash14 | 21 | 20 | 8 | -1.79046309e-01 | 9.6e-11 | 2.5e-10 | S | 9 | 88 | 0.01 |
| gnash14m | 25 | 24 | 8 | -1.79046309e-01 | 9.6e-11 | 2.5e-10 | S | 9 | 87 | 0.01 |
| gnash15 | 21 | 20 | 8 | -3.54699059e+02 | 3.6e-15 | 5.7e-13 | S | 8 | 48 | 0.01 |
| gnash15m | 25 | 24 | 8 | -3.54699059e+02 | 1.7e-11 | 1.7e-09 | S | 8 | 58 | 0.01 |
| gnash16 | 21 | 20 | 8 | -2.41441977e+02 | 4.0e-09 | 6.7e-09 | S | 6 | 37 | 0.01 |
| gnash16m | 25 | 24 | 8 | -2.41441977e+02 | 4.6e-09 | 8.1e-09 | S | 7 | 38 | 0.01 |
| gnash17 | 21 | 20 | 8 | -9.07491018e+01 | 4.9e-11 | 1.1e-10 | S | 7 | 36 | 0.01 |
| gnash17m | 25 | 24 | 8 | -9.07491018e+01 | 2.0e-09 | 1.3e-09 | S | 6 | 38 | 0.01 |
| gnash18 | 21 | 20 | 8 | -2.56982153e+01 | 2.0e-11 | 4.1e-09 | S | 17 | 68 | 0.01 |
| gnash18m | 25 | 24 | 8 | -2.56982153e+01 | 3.6e-15 | 4.1e-11 | S | 16 | 80 | 0.02 |
| gnash19 | 21 | 20 | 8 | -6.11670822e+00 | 7.0e-12 | 5.0e-10 | S | 11 | 46 | 0.01 |
| gnash19m | 25 | 24 | 8 | -6.11670822e+00 | 3.4e-09 | 4.0e-11 | S | 10 | 57 | 0.01 |
| hakonsen | 11 | 10 | 4 | 1.55155633e+01 | 2.7e-13 | 1.6e-11 | none | 33 | 147 | 0.03 |
| hs044-i | 30 | 24 | 10 | 1.56177689e+01 | 1.7e-14 | 1.4e-15 | S | 9 | 63 | 0.01 |
| incid-set1-16 | 774 | 812 | 225 | 2.39736745e-11 | 8.4e-10 | 5.9e-09 | S | 4 | 684 | 3.10 |
| incid-set1-32 | 3078 | 3156 | 961 | 2.40574727e-07 | 1.1e-09 | 1.2e-04 | S | 10 | 9198 | 207.05 |
| incid-set1-8 | 198 | 216 | 49 | 5.40737198e-10 | 2.0e-09 | 1.2e-09 | S | 4 | 68 | 0.07 |
| incid-set1c-16 | 774 | 827 | 225 | -1.70870200e-12 | 1.4e-10 | 2.3e-10 | S | 9 | 870 | 4.09 |
| incid-set1c-32 | 3078 | 3187 | 961 | 9.95483054e-06 | 2.2e-12 | 7.8e-09 | S | 11 | 1565 | 37.90 |
| incid-set1c-8 | 198 | 223 | 49 | -3.97238273e-11 | 1.0e-09 | 1.3e-09 | S | 4 | 149 | 0.16 |
| incid-set2-16 | 774 | 812 | 225 | 2.99916645e-03 | 2.2e-12 | 8.7e-11 | S | 6 | 855 | 3.88 |
| incid-set2-32 | 3078 | 3156 | 961 | 1.74476532e-03 | 9.8e-09 | 6.7e-06 | S | 14 | 1041 | 24.30 |
| incid-set2-8 | 198 | 216 | 49 | 4.51787854e-03 | 2.5e-14 | 8.2e-14 | S | 4 | 454 | 0.44 |
| incid-set2c-16 | 774 | 827 | 225 | 3.62080923e-03 | 4.0e-11 | 4.7e-09 | S | 7 | 504 | 2.25 |
| incid-set2c-32 | 3078 | 3187 | 961 | 2.42731926e-03 | 8.2e-15 | 5.8e-13 | S | 9 | 1024 | 23.34 |
| incid-set2c-8 | 198 | 223 | 49 | 5.47126503e-03 | 3.7e-15 | 1.9e-14 | S | 4 | 228 | 0.25 |
| jr1 | 3 | 2 | 1 | 4.99999999e-01 | 1.4e-09 | 0.0e+00 | S | 3 | 5 | 0.00 |
| jr2 | 3 | 2 | 1 | 5.00000000e-01 | 6.8e-16 | 5.6e-16 | S | 4 | 18 | 0.00 |
| kth1 | 3 | 2 | 1 | -1.38777878e-16 | 1.4e-16 | 0.0e+00 | S | 2 | 2 | 0.00 |
| kth2 | 3 | 2 | 1 | 1.97215226e-31 | 4.4e-16 | 8.9e-16 | S | 1 | 3 | 0.00 |
| kth3 | 3 | 2 | 1 | 4.99999996e-01 | 4.1e-09 | 8.3e-09 | S | 4 | 16 | 0.00 |
| liswet1-050 | 202 | 153 | 50 | 1.39942818e-02 | 1.2e-11 | 4.4e-16 | S | 6 | 175 | 0.05 |
| liswet1-100 | 402 | 303 | 100 | 1.37338985e-02 | 1.9e-10 | 3.7e-10 | S | 7 | 313 | 0.13 |
| liswet1-200 | 802 | 603 | 200 | 1.70077678e-02 | 9.8e-10 | 3.6e-15 | S | 8 | 784 | 0.61 |
| monteiro | 290 | 293 | 115 | 3.75300240e+01 | 1.1e-11 | 5.2e-03 | S | 29 | 766 | 0.32 |
| monteiroB | 290 | 293 | 115 | 7.77575093e+02 | 9.6e-09 | 1.2e-12 | W | 28 | 2681 | 1.05 |
| nash1a | 8 | 6 | 2 | 0.00000000e+00 | 1.8e-15 | 7.4e-17 | S | 3 | 14 | 0.00 |
| nash1b | 8 | 6 | 2 | 0.00000000e+00 | 3.6e-15 | 1.8e-15 | S | 1 | 5 | 0.00 |
| nash1c | 8 | 6 | 2 | 1.97215226e-30 | 1.8e-15 | 3.6e-15 | S | 1 | 3 | 0.00 |
| nash1d | 8 | 6 | 2 | 1.97215226e-30 | 3.6e-15 | 1.4e-15 | S | 1 | 6 | 0.00 |
| nash1e | 8 | 6 | 2 | 1.57699614e-20 | 6.4e-10 | 3.2e-10 | S | 1 | 9 | 0.00 |
| outrata31 | 9 | 8 | 4 | 3.20770002e+00 | 1.3e-10 | 2.1e-11 | S | 5 | 27 | 0.01 |
| outrata32 | 9 | 8 | 4 | 3.44940357e+00 | 8.5e-11 | 1.3e-11 | S | 5 | 30 | 0.01 |
| outrata33 | 9 | 8 | 4 | 4.60425365e+00 | 1.1e-15 | 2.1e-16 | S | 4 | 22 | 0.00 |
| outrata34 | 9 | 8 | 4 | 6.59268383e+00 | 2.0e-09 | 9.3e-09 | S | 5 | 26 | 0.00 |
| pack-comp1-16 | 756 | 816 | 225 | 6.16951412e-01 | 8.1e-12 | 5.3e-10 | S | 7 | 101 | 0.58 |
| pack-comp1-32 | 3044 | 3228 | 961 | 6.52979217e-01 | 6.3e-13 | 2.0e-12 | S | 10 | 542 | 11.26 |
| pack-comp1-8 | 188 | 210 | 49 | 6.00000000e-01 | 1.2e-12 | 3.4e-12 | S | 4 | 41 | 0.05 |
| pack-comp1c-16 | 756 | 831 | 225 | 6.23042844e-01 | 7.4e-14 | 2.1e-13 | S | 6 | 313 | 1.53 |
| pack-comp1c-32 | 3044 | 3259 | 961 | 6.61443494e-01 | 2.6e-13 | 6.4e-13 | none | 8 | 716 | 15.48 |
| pack-comp1c-8 | 188 | 217 | 49 | 6.00000000e-01 | 1.1e-12 | 9.8e-13 | S | 3 | 26 | 0.04 |
| pack-comp1p-16 | 756 | 771 | 225 | 6.16951413e-01 | 1.5e-13 | 1.8e-11 | S | 4 | 606 | 2.39 |
| pack-comp1p-32 | 3044 | 3075 | 961 | 6.52979217e-01 | 8.6e-13 | 3.9e-12 | S | 4 | 1438 | 28.76 |
| pack-comp1p-8 | 188 | 195 | 49 | 6.00000000e-01 | 2.9e-17 | 3.6e-11 | S | 3 | 480 | 0.39 |
| pack-comp2-16 | 756 | 816 | 225 | 7.27135449e-01 | 1.5e-11 | 1.6e-09 | S | 8 | 214 | 1.01 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | comp | stat | out | inner | time |
|---|---|---|---|---|---|---|---|---|---|---|
| pack-comp2-32 | 3044 | 3228 | 961 | 7.82603959e-01 | 2.8e-11 | 2.5e-09 | S | 8 | 430 | 8.65 |
| pack-comp2-8 | 188 | 210 | 49 | 6.73117149e-01 | 1.4e-12 | 3.5e-11 | S | 7 | 98 | 0.11 |
| pack-comp2c-16 | 756 | 831 | 225 | 7.27467594e-01 | 2.4e-12 | 8.9e-15 | S | 8 | 191 | 1.17 |
| pack-comp2c-32 | 3044 | 3259 | 961 | 7.82943827e-01 | 1.4e-13 | 8.3e-14 | S | 8 | 489 | 10.33 |
| pack-comp2c-8 | 188 | 217 | 49 | 6.73458193e-01 | 3.2e-12 | 1.9e-10 | S | 7 | 88 | 0.11 |
| pack-comp2p-16 | 756 | 771 | 225 | 7.27135450e-01 | 1.2e-13 | 1.1e-11 | S | 4 | 650 | 2.57 |
| pack-comp2p-32 | 3044 | 3075 | 961 | 7.82603962e-01 | 1.3e-12 | 2.9e-12 | S | 5 | 900 | 16.87 |
| pack-comp2p-8 | 188 | 195 | 49 | 6.73117138e-01 | 7.5e-13 | 3.2e-11 | S | 3 | 654 | 0.54 |
| pack-rig1-16 | 756 | 816 | 225 | 8.26012710e-01 | 7.0e-16 | 2.1e-14 | S | 8 | 164 | 0.65 |
| pack-rig1-32 | 3044 | 3228 | 961 | 8.50894541e-01 | 4.4e-09 | 2.4e-07 | none | 20 | 643 | 12.59 |
| pack-rig1-8 | 188 | 210 | 49 | 7.87931846e-01 | 2.8e-12 | 3.4e-10 | S | 8 | 81 | 0.10 |
| pack-rig1c-16 | 756 | 831 | 225 | 8.26498479e-01 | 1.0e-13 | 1.0e-13 | S | 8 | 230 | 1.03 |
| pack-rig1c-32 | 3044 | 3259 | 961 | 8.51639212e-01 | 7.9e-09 | 7.3e-05 | S | 12 | 678 | 13.08 |
| pack-rig1c-8 | 188 | 217 | 49 | 7.88300145e-01 | 3.8e-12 | 5.1e-10 | S | 8 | 93 | 0.11 |
| pack-rig1p-16 | 756 | 771 | 225 | 8.26012710e-01 | 8.2e-14 | 6.2e-14 | S | 5 | 279 | 1.00 |
| pack-rig1p-32 | 3044 | 3075 | 961 | 8.50894598e-01 | 3.3e-10 | 1.4e-04 | S | 16 | 804 | 14.46 |
| pack-rig1p-8 | 188 | 195 | 49 | 7.87931846e-01 | 3.1e-11 | 2.5e-13 | S | 6 | 109 | 0.10 |
| pack-rig2-16 | 756 | 816 | 225 | 9.99167676e-01 | 1.0e-04 | 2.4e-13 | Ψ | 24 | 2912 | 9.49 |
| pack-rig2-32 | 3044 | 3228 | 961 | 9.99784405e-01 | 2.3e-04 | 9.9e-13 | Ψ | 23 | 8178 | 130.29 |
| pack-rig2-8 | 188 | 210 | 49 | 7.80404285e-01 | 2.9e-09 | 1.9e-13 | S | 8 | 109 | 0.10 |
| pack-rig2c-16 | 756 | 831 | 225 | 9.99167691e-01 | 1.0e-04 | 5.2e-13 | Ψ | 24 | 2124 | 7.48 |
| pack-rig2c-32 | 3044 | 3259 | 961 | 9.99784403e-01 | 2.3e-04 | 1.0e-12 | Ψ | 24 | 7730 | 127.55 |
| pack-rig2c-8 | 188 | 217 | 49 | 7.99305818e-01 | 2.3e-11 | 2.4e-09 | S | 9 | 118 | 0.14 |
| pack-rig2p-16 | 756 | 771 | 225 | 1.08513672e+00 | 7.6e-14 | 2.3e-13 | S | 7 | 450 | 1.55 |
| pack-rig2p-32 | 3044 | 3075 | 961 | 1.13588533e+00 | 7.6e-13 | 8.6e-09 | S | 10 | 1124 | 18.99 |
| pack-rig2p-8 | 188 | 195 | 49 | 7.80404312e-01 | 4.4e-09 | 3.1e-12 | S | 13 | 193 | 0.20 |
| pack-rig3-16 | 756 | 816 | 225 | 8.00430530e-01 | 6.9e-12 | 1.3e-10 | S | 8 | 274 | 1.05 |
| pack-rig3-32 | 3044 | 3228 | 961 | 8.86405205e-01 | 3.4e-09 | 3.5e-08 | S | 15 | 957 | 17.88 |
| pack-rig3-8 | 188 | 210 | 49 | 7.35202114e-01 | 3.7e-14 | 1.2e-14 | S | 8 | 112 | 0.13 |
| pack-rig3c-16 | 756 | 831 | 225 | 8.18600370e-01 | 3.4e-10 | 3.1e-14 | S | 10 | 349 | 1.57 |
| pack-rig3c-32 | 3044 | 3259 | 961 | 9.08903850e-01 | 5.7e-09 | 5.4e-02 | S | 14 | 3217 | 59.58 |
| pack-rig3c-8 | 188 | 217 | 49 | 7.53472622e-01 | 2.3e-12 | 5.7e-11 | S | 7 | 84 | 0.09 |
| portfl-i-1 | 99 | 37 | 12 | 1.50239763e-05 | 1.7e-10 | 6.2e-10 | S | 6 | 31 | 0.03 |
| portfl-i-2 | 99 | 37 | 12 | 1.45728266e-05 | 8.0e-14 | 9.6e-15 | S | 6 | 22 | 0.03 |
| portfl-i-3 | 99 | 37 | 12 | 6.26495599e-06 | 2.5e-09 | 8.8e-09 | S | 4 | 23 | 0.03 |
| portfl-i-4 | 99 | 37 | 12 | 2.17731339e-06 | 5.5e-10 | 9.1e-09 | S | 5 | 35 | 0.03 |
| portfl-i-6 | 99 | 37 | 12 | 2.36133035e-06 | 1.9e-10 | 6.2e-11 | S | 5 | 37 | 0.03 |
| qpec-100-1 | 205 | 202 | 100 | 9.90027809e-02 | 3.6e-11 | 8.4e-09 | S | 12 | 127 | 0.31 |
| qpec-100-2 | 210 | 202 | 100 | -6.59073475e+00 | 6.1e-12 | 1.0e-09 | S | 11 | 129 | 0.32 |
| qpec-100-3 | 210 | 204 | 100 | -5.48167103e+00 | 1.2e-11 | 3.2e-09 | S | 11 | 177 | 0.52 |
| qpec-100-4 | 220 | 204 | 100 | -4.09555361e+00 | 4.5e-11 | 6.1e-09 | S | 11 | 105 | 0.39 |
| qpec-200-1 | 410 | 404 | 200 | -1.93482970e+00 | 7.5e-11 | 3.3e-09 | S | 13 | 151 | 1.17 |
| qpec-200-2 | 420 | 404 | 200 | -2.40363362e+01 | 3.0e-13 | 4.7e-14 | S | 9 | 155 | 1.65 |
| qpec-200-3 | 420 | 408 | 200 | -1.95340554e+00 | 2.2e-12 | 2.0e-09 | S | 15 | 141 | 2.05 |
| qpec-200-4 | 440 | 408 | 200 | -6.21021638e+00 | 1.5e-12 | 1.0e-10 | S | 11 | 215 | 2.39 |
| qpec1 | 50 | 40 | 20 | 8.00000000e+01 | 1.1e-16 | 6.8e-14 | S | 1 | 7 | 0.00 |
| qpec2 | 50 | 40 | 20 | 4.49976324e+01 | 3.5e-09 | 9.7e-11 | none | 25 | 152 | 0.04 |
| ralph1 | 3 | 2 | 1 | -5.91905851e-05 | 3.5e-09 | 2.6e-14 | none | 22 | 101 | 0.02 |
| ralph2 | 3 | 2 | 1 | 0.00000000e+00 | 0.0e+00 | 7.6e-17 | S | 1 | 1 | 0.00 |
| ralphmod | 204 | 200 | 100 | -6.83033020e+02 | 9.6e-13 | 2.9e-11 | S | 16 | 221 | 0.46 |
| scale1 | 3 | 2 | 1 | 1.00000000e+00 | 1.5e-12 | 2.2e-11 | S | 6 | 25 | 0.01 |
| scale2 | 3 | 2 | 1 | 1.00000000e+00 | 4.6e-14 | 2.4e-12 | S | 2 | 8 | 0.00 |
| scale3 | 3 | 2 | 1 | 9.99999967e-01 | 1.6e-10 | 6.1e-09 | S | 5 | 18 | 0.00 |
| scale4 | 3 | 2 | 1 | 1.00000000e+00 | 0.0e+00 | 4.2e-15 | S | 9 | 27 | 0.01 |
| scale5 | 3 | 2 | 1 | 1.00000000e+02 | 0.0e+00 | 0.0e+00 | S | 3 | 18 | 0.00 |
| scholtes1 | 4 | 3 | 1 | 2.00000000e+00 | 5.9e-09 | 2.2e-16 | S | 6 | 18 | 0.00 |
| scholtes2 | 4 | 3 | 1 | 1.50000000e+01 | 9.4e-10 | 5.6e-10 | S | 9 | 25 | 0.00 |
| scholtes3 | 3 | 2 | 1 | 5.00000000e-01 | 2.2e-16 | 2.2e-16 | S | 3 | 13 | 0.00 |
| scholtes4 | 4 | 4 | 1 | -1.49150928e-04 | 5.6e-09 | 4.2e-13 | none | 23 | 108 | 0.02 |
| scholtes5 | 5 | 4 | 2 | 9.99999999e-01 | 2.9e-10 | 1.1e-10 | S | 3 | 3 | 0.00 |
| siouxfls | 4151 | 4124 | 1748 | 2.07132521e+02 | 8.5e-09 | 1.6e-09 | none | 26 | 26713 | 1382.77 |
| siouxfls1 | 4151 | 4124 | 1748 | 9.79386338e+02 | 1.4e-09 | 1.4e-01 | S | 24 | 6594 | 113.74 |
| sl1 | 11 | 8 | 3 | 9.99999946e-05 | 2.7e-10 | 1.3e-16 | S | 5 | 9 | 0.01 |
| stackelberg1 | 4 | 3 | 1 | -3.26666667e+03 | 2.2e-09 | 1.8e-15 | S | 10 | 14 | 0.00 |
| tap-09 | 126 | 106 | 36 | 1.09131033e+02 | 7.1e-15 | 8.3e-10 | S | 15 | 96 | 0.04 |
| tap-15 | 309 | 273 | 99 | 1.84294855e+02 | 8.4e-10 | 6.2e-09 | S | 25 | 261 | 0.25 |
| taxmcp | 31 | 30 | 14 | 1.25527897e+00 | 1.8e-01 | 9.5e-12 | Ψ | 22 | 85746 | 8.60 |
| TSC-1 | 612 | 1590 | 244 | 5.49634692e+01 | 1.3e-15 | 1.1e-14 | S | 3 | 34 | 0.03 |
| TSC-10 | 612 | 1590 | 244 | 5.48021373e+01 | 1.5e-15 | 1.0e-12 | S | 7 | 47 | 0.05 |
| TSC-11 | 612 | 1590 | 244 | 1.01567690e+02 | 3.6e-15 | 9.7e-13 | S | 6 | 84 | 0.06 |
| TSC-12 | 612 | 1590 | 244 | 2.02441462e+02 | 7.7e-03 | 5.4e-13 | Ψ | 27 | 475 | 0.39 |
| TSC-13 | 612 | 1590 | 244 | 8.64028645e+01 | 1.5e-15 | 2.2e-09 | S | 6 | 52 | 0.05 |
| TSC-2 | 612 | 1590 | 244 | 5.25708119e+01 | 8.8e-10 | 7.3e-15 | S | 3 | 37 | 0.03 |
| TSC-3 | 612 | 1590 | 244 | 8.70673771e+01 | 3.6e-15 | 7.7e-13 | S | 5 | 75 | 0.05 |
| TSC-4 | 612 | 1590 | 244 | 7.90435431e+01 | 2.4e-15 | 1.4e-13 | S | 7 | 85 | 0.07 |
| TSC-5 | 612 | 1590 | 244 | 1.01468684e+02 | 3.9e-15 | 1.6e-13 | S | 6 | 82 | 0.06 |
| TSC-6 | 612 | 1590 | 244 | 1.01528435e+02 | 2.9e-10 | 4.3e-15 | S | 5 | 74 | 0.05 |
| TSC-7 | 612 | 1590 | 244 | 1.95586787e+02 | 7.8e-01 | 2.5e-13 | Ψ | 23 | 281 | 0.36 |
| TSC-8 | 612 | 1590 | 244 | 2.00453736e+02 | 7.3e-01 | 5.5e-13 | Ψ | 23 | 265 | 0.32 |
| TSC-9 | 612 | 1590 | 244 | 5.32050328e+01 | 1.2e-15 | 2.0e-09 | S | 4 | 42 | 0.04 |
| water-FL | 257 | 204 | 44 | 5.86186967e+04 | 5.7e-12 | 2.0e+02 | none | 26 | 106447 | 34.31 |
| water-net | 80 | 64 | 14 | 5.08460287e+04 | 3.6e-09 | 1.0e+05 | none | 31 | 112207 | 17.67 |

Table 6: MacMPEC, Scholtes.

| Problem | $n$ | $m$ | pairs | $f$ | viol | comp | stat | out | inner | time |
|---|---|---|---|---|---|---|---|---|---|---|
| bar-truss-3 | 41 | 41 | 6 | 5.45307959e+03 | 5.2e+00 | 1.1e+01 | inf | 189 | 410711 | 61.48 |
| bard1 | 8 | 7 | 3 | 1.70000000e+01 | 8.9e-16 | 4.4e-16 | S | 11 | 58 | 0.01 |
| bard1m | 9 | 7 | 3 | 1.70000000e+01 | 8.9e-16 | 4.4e-16 | S | 11 | 58 | 0.01 |
| bard2 | 16 | 13 | 4 | 6.59800000e+03 | 6.2e-09 | 6.4e-14 | S | 10 | 25 | 0.01 |
| bard2m | 20 | 17 | 4 | -6.59800000e+03 | 6.2e-09 | 3.2e-14 | S | 10 | 26 | 0.01 |
| bard3 | 8 | 7 | 2 | -1.26787109e+01 | 4.4e-16 | 1.7e-16 | S | 13 | 48 | 0.01 |
| bard3m | 10 | 9 | 4 | -1.26787109e+01 | 8.9e-16 | 4.4e-16 | S | 13 | 52 | 0.01 |
| bem-milanc30-s | – | – | – | – | – | – | – | – | – | fail |
| bilevel1 | 18 | 17 | 6 | 0.00000000e+00 | 3.6e-15 | 1.3e-16 | S | 14 | 32 | 0.01 |
| bilevel1m | 18 | 17 | 6 | 0.00000000e+00 | 3.6e-15 | 1.3e-16 | S | 14 | 32 | 0.01 |
| bilevel2 | 32 | 29 | 12 | -6.60000000e+03 | 2.6e-10 | 2.3e-10 | S | 29 | 119 | 0.03 |
| bilevel2m | 36 | 33 | 12 | -6.60000000e+03 | 7.1e-15 | 8.7e-15 | S | 36 | 195 | 0.05 |
| bilevel3 | 16 | 15 | 4 | -1.26787109e+01 | 8.9e-16 | 2.2e-16 | S | 12 | 91 | 0.02 |
| bilin | 14 | 13 | 6 | 1.46000000e+01 | 6.4e-15 | 5.0e-14 | S | 19 | 174 | 0.03 |
| dempe | 4 | 3 | 1 | 2.82500000e+01 | 1.2e-17 | 2.3e-16 | S | 27 | 41115 | 4.94 |
| design-cent-1 | 15 | 15 | 3 | 1.86064735e+00 | 4.4e-16 | 7.4e-16 | S | 14 | 55 | 0.02 |
| design-cent-2 | 16 | 19 | 3 | 7.82340202e-01 | 4.3e-09 | 2.6e+00 | none | 259 | 1316 | 0.29 |
| design-cent-21 | 16 | 19 | 3 | 3.48381566e+00 | 5.0e-15 | 1.4e-14 | S | 27 | 292 | 0.05 |
| design-cent-3 | 18 | 15 | 3 | 8.23406313e-01 | 7.8e-10 | 2.6e+00 | none | 269 | 1633 | 0.50 |
| design-cent-31 | 18 | 15 | 3 | 3.72336907e+00 | 1.7e-10 | 1.1e-09 | S | 20 | 159 | 0.03 |
| design-cent-4 | 34 | 33 | 12 | 3.30491441e-31 | 3.3e-16 | 4.4e-16 | S | 1 | 3 | 0.00 |
| desilva | 8 | 6 | 2 | -1.00000000e+00 | 4.3e-10 | 5.4e-09 | S | 6 | 18 | 0.01 |
| df1 | 3 | 4 | 1 | 1.47677889e-22 | 2.4e-11 | 2.4e-11 | S | 1 | 5 | 0.00 |
| ex9.1.1 | 18 | 17 | 5 | -1.30000000e+01 | 7.1e-15 | 7.4e-12 | S | 7 | 17 | 0.01 |
| ex9.1.10 | 19 | 17 | 5 | -3.25000000e+00 | 2.8e-23 | 0.0e+00 | S | 10 | 37 | 0.01 |
| ex9.1.2 | 15 | 15 | 5 | -6.25000000e+00 | 0.0e+00 | 0.0e+00 | S | 10 | 27 | 0.01 |
| ex9.1.3 | 29 | 27 | 6 | -2.92000000e+01 | 4.4e-16 | 3.7e-15 | S | 14 | 129 | 0.02 |
| ex9.1.4 | 14 | 13 | 4 | -3.70000000e+01 | 1.0e-08 | 4.2e-15 | S | 21 | 111 | 0.03 |
| ex9.1.5 | 18 | 17 | 5 | -1.00000000e+00 | 1.3e-18 | 1.1e-16 | S | 5 | 12 | 0.01 |
| ex9.1.6 | 20 | 19 | 6 | -4.90000000e+01 | 3.6e-15 | 2.4e-19 | S | 18 | 176 | 0.03 |
| ex9.1.7 | 23 | 21 | 6 | -2.60000000e+01 | 2.2e-16 | 1.8e-15 | S | 37 | 209 | 0.04 |
| ex9.1.8 | 19 | 17 | 5 | -3.25000000e+00 | 2.8e-23 | 0.0e+00 | S | 10 | 37 | 0.01 |
| ex9.1.9 | 17 | 16 | 5 | 3.11111111e+00 | 1.0e-08 | 3.3e-16 | S | 14 | 93 | 0.02 |
| ex9.2.1 | 14 | 13 | 4 | 1.70000000e+01 | 4.4e-16 | 4.4e-16 | S | 11 | 68 | 0.01 |
| ex9.2.2 | 14 | 15 | 4 | 1.00000000e+02 | 1.5e-10 | 3.9e-34 | B | 111 | 576 | 0.10 |
| ex9.2.3 | 22 | 21 | 6 | 5.00000000e+00 | 1.8e-15 | 9.2e-18 | S | 15 | 99 | 0.02 |
| ex9.2.4 | 10 | 9 | 2 | 5.00000000e-01 | 5.5e-16 | 4.4e-16 | S | 21 | 56 | 0.02 |
| ex9.2.5 | 11 | 10 | 3 | 5.00000000e+00 | 1.0e-08 | 4.4e-16 | S | 36 | 99 | 0.03 |
| ex9.2.6 | 22 | 18 | 6 | -1.00000000e+00 | 1.5e-16 | 1.1e-16 | S | 23 | 61 | 0.01 |
| ex9.2.7 | 14 | 13 | 4 | 1.70000000e+01 | 4.4e-16 | 4.4e-16 | S | 11 | 68 | 0.01 |
| ex9.2.8 | 8 | 7 | 2 | 1.50000000e+00 | 2.2e-16 | 5.6e-17 | S | 10 | 33 | 0.01 |
| ex9.2.9 | 12 | 11 | 3 | 2.00000000e+00 | 8.9e-16 | 8.9e-16 | S | 1 | 7 | 0.00 |
| flp2 | 6 | 4 | 2 | 2.27064059e-28 | 4.3e-14 | 1.0e-13 | S | 1 | 2 | 0.00 |
| flp4-1 | 110 | 90 | 30 | 1.02198265e-40 | 4.4e-16 | 5.9e-18 | S | 4 | 16 | 0.03 |
| flp4-2 | 170 | 170 | 60 | 1.41796736e-38 | 4.4e-16 | 2.4e-18 | S | 4 | 17 | 0.09 |
| flp4-3 | 210 | 240 | 70 | 4.18863783e-40 | 8.7e-19 | 1.3e-21 | S | 5 | 17 | 0.05 |
| flp4-4 | 300 | 350 | 100 | 3.10892913e-36 | 4.4e-16 | 4.5e-18 | S | 4 | 20 | 0.10 |
| gauvin | 5 | 4 | 2 | 2.00000000e+01 | 1.7e-18 | 8.9e-16 | S | 15 | 45 | 0.01 |
| gnash10 | 21 | 20 | 8 | -2.30823207e+02 | 3.6e-15 | 1.6e-15 | S | 14 | 161 | 0.03 |
| gnash10m | 25 | 24 | 8 | -2.30823207e+02 | 3.6e-15 | 1.5e-15 | S | 14 | 151 | 0.02 |
| gnash11 | 21 | 20 | 8 | -1.29911924e+02 | 1.3e-15 | 1.5e-15 | S | 13 | 80 | 0.02 |
| gnash11m | 25 | 24 | 8 | -1.29911924e+02 | 1.3e-15 | 1.5e-15 | S | 13 | 100 | 0.03 |
| gnash12 | 21 | 20 | 8 | -3.69331068e+01 | 4.4e-15 | 1.3e-15 | S | 12 | 72 | 0.02 |
| gnash12m | 25 | 24 | 8 | -3.69331068e+01 | 2.8e-14 | 3.9e-15 | S | 14 | 87 | 0.02 |
| gnash13 | 21 | 20 | 8 | -7.06178327e+00 | 5.3e-15 | 3.1e-15 | S | 15 | 85 | 0.02 |
| gnash13m | 25 | 24 | 8 | -7.06178327e+00 | 5.3e-15 | 3.1e-15 | S | 15 | 86 | 0.02 |
| gnash14 | 21 | 20 | 8 | -1.79046309e-01 | 1.8e-15 | 2.7e-16 | S | 17 | 135 | 0.03 |
| gnash14m | 25 | 24 | 8 | -1.79046309e-01 | 1.8e-15 | 2.2e-15 | S | 17 | 136 | 0.03 |
| gnash15 | 21 | 20 | 8 | -3.54699059e+02 | 5.9e-10 | 1.3e-09 | S | 42 | 128 | 0.03 |
| gnash15m | 25 | 24 | 8 | -3.54699059e+02 | 3.6e-15 | 5.0e-15 | S | 41 | 163 | 0.03 |
| gnash16 | 21 | 20 | 8 | -2.41441977e+02 | 9.8e-15 | 2.2e-15 | S | 13 | 69 | 0.01 |
| gnash16m | 25 | 24 | 8 | -2.41441977e+02 | 9.8e-15 | 1.2e-15 | S | 11 | 91 | 0.02 |
| gnash17 | 21 | 20 | 8 | -9.07491018e+01 | 4.4e-15 | 4.3e-15 | S | 11 | 65 | 0.01 |
| gnash17m | 25 | 24 | 8 | -9.07491018e+01 | 3.6e-15 | 3.9e-15 | S | 30 | 102 | 0.03 |
| gnash18 | 21 | 20 | 8 | -2.56982153e+01 | 2.0e-13 | 1.8e-12 | S | 23 | 115 | 0.03 |
| gnash18m | 25 | 24 | 8 | -2.56982153e+01 | 2.0e-13 | 1.8e-12 | S | 39 | 142 | 0.03 |
| gnash19 | 21 | 20 | 8 | -6.11670822e+00 | 1.1e-14 | 3.8e-14 | S | 17 | 88 | 0.02 |
| gnash19m | 25 | 24 | 8 | -6.11670822e+00 | 1.3e-10 | 1.2e-09 | S | 47 | 122 | 0.03 |
| hakonsen | 11 | 10 | 4 | 2.43668145e+01 | 1.4e-14 | 2.1e-15 | S | 42 | 889 | 0.16 |
| hs044-i | 30 | 24 | 10 | 1.56177689e+01 | 1.8e-15 | 5.2e-15 | S | 19 | 97 | 0.02 |
| incid-set1-16 | 774 | 812 | 225 | 2.39736745e-11 | 8.4e-10 | 5.9e-09 | S | 4 | 684 | 3.10 |
| incid-set1-32 | 3078 | 3156 | 961 | -6.75937726e-13 | 3.4e-11 | 3.8e-11 | S | 7 | 2524 | 56.90 |
| incid-set1-8 | 198 | 216 | 49 | 5.40737198e-10 | 2.0e-09 | 1.2e-09 | S | 4 | 68 | 0.07 |
| incid-set1c-16 | 774 | 827 | 225 | -1.70870200e-12 | 1.4e-10 | 2.3e-10 | S | 9 | 870 | 4.13 |
| incid-set1c-32 | 3078 | 3187 | 961 | 9.96216101e-06 | 4.8e-10 | 6.3e-09 | S | 9 | 1496 | 35.08 |
| incid-set1c-8 | 198 | 223 | 49 | -3.97238273e-11 | 1.0e-09 | 1.3e-09 | S | 4 | 149 | 0.17 |
| incid-set2-16 | 774 | 812 | 225 | 2.99916645e-03 | 2.2e-12 | 8.7e-11 | S | 6 | 908 | 3.86 |
| incid-set2-32 | 3078 | 3156 | 961 | 1.74476566e-03 | 5.8e-14 | 1.8e-12 | S | 8 | 1020 | 22.29 |
| incid-set2-8 | 198 | 216 | 49 | 4.51787854e-03 | 2.5e-14 | 8.1e-14 | S | 4 | 454 | 0.42 |
| incid-set2c-16 | 774 | 827 | 225 | 3.62080923e-03 | 4.0e-11 | 4.7e-09 | S | 7 | 491 | 2.34 |
| incid-set2c-32 | 3078 | 3187 | 961 | 2.42731926e-03 | 2.6e-12 | 2.5e-14 | S | 11 | 1033 | 24.20 |
| incid-set2c-8 | 198 | 223 | 49 | 5.47126503e-03 | 3.7e-15 | 1.9e-14 | S | 4 | 228 | 0.25 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | comp | stat | out | inner | time |
|---|---|---|---|---|---|---|---|---|---|---|
| jr1 | 3 | 2 | 1 | 4.99999999e-01 | 1.4e-09 | 0.0e+00 | S | 3 | 5 | 0.00 |
| jr2 | 3 | 2 | 1 | 5.00000000e-01 | 1.2e-15 | 1.7e-15 | S | 26 | 59 | 0.02 |
| kth1 | 3 | 2 | 1 | -1.38777878e-16 | 1.4e-16 | 0.0e+00 | S | 2 | 2 | 0.00 |
| kth2 | 3 | 2 | 1 | 1.97215226e-31 | 4.4e-16 | 8.9e-16 | S | 1 | 3 | 0.00 |
| kth3 | 3 | 2 | 1 | 4.99999990e-01 | 1.0e-08 | 4.0e-15 | S | 11 | 31 | 0.01 |
| liswet1-050 | 202 | 153 | 50 | 1.39942150e-02 | 1.4e-09 | 1.6e-09 | S | 12 | 192 | 0.07 |
| liswet1-100 | 402 | 303 | 100 | 1.37338636e-02 | 3.7e-10 | 1.8e-15 | S | 7 | 314 | 0.14 |
| liswet1-200 | 802 | 603 | 200 | 1.70056777e-02 | 3.5e-09 | 6.7e-12 | S | 21 | 855 | 0.69 |
| monteiro | 290 | 293 | 115 | 3.75300240e+01 | 1.2e-10 | 4.3e-09 | S | 69 | 22724 | 8.63 |
| monteiroB | 290 | 293 | 115 | 8.27859481e+02 | 9.3e-09 | 2.5e-05 | S | 64 | 14602 | 4.69 |
| nash1a | 8 | 6 | 2 | 0.00000000e+00 | 2.1e-14 | 1.1e-16 | S | 3 | 14 | 0.00 |
| nash1b | 8 | 6 | 2 | 0.00000000e+00 | 3.6e-15 | 7.5e-14 | S | 2 | 7 | 0.00 |
| nash1c | 8 | 6 | 2 | 1.97215226e-30 | 1.8e-15 | 3.6e-15 | S | 1 | 3 | 0.00 |
| nash1d | 8 | 6 | 2 | 1.97215226e-30 | 7.1e-15 | 4.4e-15 | S | 1 | 6 | 0.00 |
| nash1e | 8 | 6 | 2 | 0.00000000e+00 | 1.8e-15 | 4.9e-24 | S | 5 | 17 | 0.01 |
| outrata31 | 9 | 8 | 4 | 3.20770002e+00 | 9.7e-16 | 2.2e-16 | S | 12 | 61 | 0.01 |
| outrata32 | 9 | 8 | 4 | 3.44940357e+00 | 7.7e-16 | 2.2e-16 | S | 11 | 60 | 0.01 |
| outrata33 | 9 | 8 | 4 | 4.60425365e+00 | 6.3e-16 | 7.9e-16 | S | 10 | 47 | 0.01 |
| outrata34 | 9 | 8 | 4 | 6.59268383e+00 | 1.5e-15 | 5.9e-16 | S | 14 | 48 | 0.01 |
| pack-comp1-16 | 756 | 816 | 225 | 6.16951412e-01 | 8.1e-12 | 5.3e-10 | S | 7 | 106 | 0.68 |
| pack-comp1-32 | 3044 | 3228 | 961 | 6.52979217e-01 | 6.3e-13 | 4.8e-09 | S | 10 | 299 | 7.40 |
| pack-comp1-8 | 188 | 210 | 49 | 6.00000000e-01 | 9.3e-09 | 1.1e-10 | none | 10 | 48 | 0.08 |
| pack-comp1c-16 | 756 | 831 | 225 | 6.23042844e-01 | 7.3e-14 | 1.7e-13 | S | 6 | 310 | 1.43 |
| pack-comp1c-32 | 3044 | 3259 | 961 | 6.61442982e-01 | 3.0e-09 | 1.0e-09 | S | 10 | 616 | 13.60 |
| pack-comp1c-8 | 188 | 217 | 49 | 6.00000000e-01 | 9.8e-09 | 1.1e-10 | none | 10 | 35 | 0.06 |
| pack-comp1p-16 | 756 | 771 | 225 | 6.16951413e-01 | 1.5e-13 | 8.3e-12 | S | 4 | 632 | 2.58 |
| pack-comp1p-32 | 3044 | 3075 | 961 | 6.52979217e-01 | 8.6e-13 | 4.4e-12 | S | 4 | 1371 | 28.79 |
| pack-comp1p-8 | 188 | 195 | 49 | 6.00000000e-01 | 3.5e-17 | 6.8e-10 | S | 4 | 501 | 0.49 |
| pack-comp2-16 | 756 | 816 | 225 | 7.27135449e-01 | 1.5e-11 | 1.6e-09 | S | 8 | 213 | 0.99 |
| pack-comp2-32 | 3044 | 3228 | 961 | 7.82603959e-01 | 2.8e-11 | 2.5e-09 | S | 8 | 463 | 9.35 |
| pack-comp2-8 | 188 | 210 | 49 | 6.73117149e-01 | 1.4e-12 | 3.5e-11 | S | 7 | 96 | 0.11 |
| pack-comp2c-16 | 756 | 831 | 225 | 7.27467594e-01 | 2.4e-12 | 2.1e-14 | S | 8 | 209 | 1.20 |
| pack-comp2c-32 | 3044 | 3259 | 961 | 7.82943772e-01 | 4.0e-10 | 7.5e-10 | S | 11 | 748 | 14.69 |
| pack-comp2c-8 | 188 | 217 | 49 | 6.73458193e-01 | 3.2e-12 | 1.9e-10 | S | 7 | 88 | 0.11 |
| pack-comp2p-16 | 756 | 771 | 225 | 7.27135450e-01 | 1.2e-13 | 2.0e-11 | S | 4 | 724 | 2.83 |
| pack-comp2p-32 | 3044 | 3075 | 961 | 7.82603962e-01 | 1.3e-12 | 3.4e-12 | S | 5 | 1181 | 25.10 |
| pack-comp2p-8 | 188 | 195 | 49 | 6.73117138e-01 | 7.5e-13 | 7.1e-11 | S | 3 | 654 | 0.56 |
| pack-rig1-16 | 756 | 816 | 225 | 8.26012710e-01 | 3.0e-12 | 3.5e-13 | S | 8 | 167 | 0.69 |
| pack-rig1-32 | 3044 | 3228 | 961 | 8.50894552e-01 | 3.5e-09 | 6.2e-04 | none | 65 | 1605 | 32.53 |
| pack-rig1-8 | 188 | 210 | 49 | 7.87931846e-01 | 4.9e-12 | 3.6e-15 | S | 7 | 86 | 0.08 |
| pack-rig1c-16 | 756 | 831 | 225 | 8.26498479e-01 | 1.0e-13 | 1.1e-13 | S | 8 | 196 | 0.94 |
| pack-rig1c-32 | 3044 | 3259 | 961 | 8.51640703e-01 | 9.4e-09 | 6.1e-09 | none | 26 | 757 | 16.75 |
| pack-rig1c-8 | 188 | 217 | 49 | 7.88300145e-01 | 4.9e-12 | 3.6e-15 | S | 8 | 95 | 0.14 |
| pack-rig1p-16 | 756 | 771 | 225 | 8.26012710e-01 | 2.5e-11 | 5.7e-14 | S | 17 | 256 | 1.26 |
| pack-rig1p-32 | 3044 | 3075 | 961 | 8.50894561e-01 | 2.5e-09 | 2.7e-02 | none | 74 | 2389 | 52.55 |
| pack-rig1p-8 | 188 | 195 | 49 | 7.87931846e-01 | 4.1e-12 | 2.8e-14 | S | 12 | 223 | 0.20 |
| pack-rig2-16 | 756 | 816 | 225 | 9.99167660e-01 | 1.0e-04 | 5.0e-13 | Ψ | 227 | 28099 | 90.89 |
| pack-rig2-32 | 3044 | 3228 | 961 | 9.99784407e-01 | 2.3e-04 | 7.8e-13 | Ψ | 226 | 80024 | 1333.00 |
| pack-rig2-8 | 188 | 210 | 49 | 7.80404304e-01 | 2.1e-12 | 7.1e-15 | S | 8 | 114 | 0.12 |
| pack-rig2c-16 | 756 | 831 | 225 | 9.99167660e-01 | 1.0e-04 | 3.5e-13 | Ψ | 222 | 22239 | 78.26 |
| pack-rig2c-32 | 3044 | 3259 | 961 | 9.99784407e-01 | 2.3e-04 | 6.4e-13 | Ψ | 222 | 68504 | 1208.37 |
| pack-rig2c-8 | 188 | 217 | 49 | 7.99305820e-01 | 2.7e-12 | 4.8e-15 | S | 13 | 136 | 0.17 |
| pack-rig2p-16 | 756 | 771 | 225 | 1.08513672e+00 | 2.8e-09 | 2.3e-13 | none | 44 | 2526 | 9.54 |
| pack-rig2p-32 | 3044 | 3075 | 961 | 1.13588534e+00 | 9.9e-09 | 6.6e-11 | none | 76 | 7021 | 132.96 |
| pack-rig2p-8 | 188 | 195 | 49 | 7.80404304e-01 | 1.7e-12 | 2.8e-14 | S | 24 | 417 | 0.39 |
| pack-rig3-16 | 756 | 816 | 225 | 8.00430531e-01 | 5.0e-09 | 4.3e-14 | none | 13 | 384 | 1.70 |
| pack-rig3-32 | 3044 | 3228 | 961 | 8.86402904e-01 | 1.0e-08 | 3.6e-09 | none | 97 | 7056 | 137.29 |
| pack-rig3-8 | 188 | 210 | 49 | 7.35202114e-01 | 3.7e-14 | 1.5e-14 | S | 8 | 115 | 0.12 |
| pack-rig3c-16 | 756 | 831 | 225 | 8.18600369e-01 | 9.9e-09 | 9.2e-10 | none | 30 | 819 | 3.61 |
| pack-rig3c-32 | 3044 | 3259 | 961 | 9.08900732e-01 | 9.9e-09 | 6.9e-09 | none | 131 | 29466 | 561.15 |
| pack-rig3c-8 | 188 | 217 | 49 | 7.53472579e-01 | 4.8e-09 | 3.1e-06 | S | 7 | 113 | 0.14 |
| portfl-i-1 | 99 | 37 | 12 | 1.50242018e-05 | 3.1e-12 | 5.1e-11 | S | 6 | 22 | 0.03 |
| portfl-i-2 | 99 | 37 | 12 | 1.45728253e-05 | 1.8e-12 | 9.8e-12 | S | 10 | 34 | 0.04 |
| portfl-i-3 | 99 | 37 | 12 | 6.26498177e-06 | 1.5e-13 | 2.5e-11 | S | 11 | 30 | 0.04 |
| portfl-i-4 | 99 | 37 | 12 | 2.17731827e-06 | 4.7e-11 | 2.9e-09 | S | 6 | 37 | 0.03 |
| portfl-i-6 | 99 | 37 | 12 | 2.36132893e-06 | 3.5e-12 | 3.2e-11 | S | 17 | 49 | 0.06 |
| qpec-100-1 | 205 | 202 | 100 | 9.90027813e-02 | 1.4e-12 | 1.3e-11 | S | 26 | 293 | 0.84 |
| qpec-100-2 | 210 | 202 | 100 | -6.59073475e+00 | 9.7e-15 | 1.2e-13 | S | 21 | 360 | 0.97 |
| qpec-100-3 | 210 | 204 | 100 | -5.48167103e+00 | 1.1e-11 | 7.2e-10 | S | 23 | 263 | 1.00 |
| qpec-100-4 | 220 | 204 | 100 | -4.09196540e+00 | 2.9e-14 | 8.2e-13 | S | 25 | 260 | 0.91 |
| qpec-200-1 | 410 | 404 | 200 | -1.93482970e+00 | 1.4e-11 | 6.2e-10 | S | 46 | 499 | 6.90 |
| qpec-200-2 | 420 | 404 | 200 | -2.41169702e+01 | 8.0e-15 | 2.4e-14 | S | 20 | 452 | 6.03 |
| qpec-200-3 | 420 | 408 | 200 | -1.95340554e+00 | 4.0e-11 | 8.5e-10 | S | 30 | 351 | 5.98 |
| qpec-200-4 | 440 | 408 | 200 | -6.21104756e+00 | 3.5e-13 | 8.6e-12 | S | 24 | 263 | 5.03 |
| qpec1 | 50 | 40 | 20 | 8.00000000e+01 | 2.2e-16 | 9.8e-14 | S | 1 | 6 | 0.00 |
| qpec2 | 50 | 40 | 20 | 4.49961791e+01 | 9.1e-09 | 4.6e-09 | none | 76 | 265 | 0.09 |
| ralph1 | 3 | 2 | 1 | -9.84185968e-05 | 9.7e-09 | 3.1e-17 | none | 80 | 184 | 0.06 |
| ralph2 | 3 | 2 | 1 | 4.93038066e-32 | 2.2e-16 | 4.9e-15 | S | 1 | 1 | 0.00 |
| ralphmod | 204 | 200 | 100 | -6.83033020e+02 | 1.8e-12 | 2.9e-11 | S | 76 | 1853 | 4.30 |
| scale1 | 3 | 2 | 1 | 9.99998000e-01 | 1.0e-08 | 2.0e-14 | none | 10 | 43 | 0.01 |
| scale2 | 3 | 2 | 1 | 1.00000000e+00 | 3.0e-16 | 5.9e-16 | S | 19 | 36 | 0.01 |
| scale3 | 3 | 2 | 1 | 9.99999999e-01 | 3.0e-12 | 2.0e-12 | S | 13 | 29 | 0.01 |
| scale4 | 3 | 2 | 1 | 1.00000020e+00 | 3.0e-10 | 6.2e-10 | S | 10 | 25 | 0.01 |

*(continued)*

| Problem | $n$ | $m$ | pairs | $f$ | viol | comp | stat | out | inner | time |
|---|---|---|---|---|---|---|---|---|---|---|
| scale5 | 3 | 2 | 1 | 9.99999980e+01 | 1.0e-08 | 2.8e-14 | S | 18 | 58 | 0.01 |
| scholtes1 | 4 | 3 | 1 | 2.00000000e+00 | 5.9e-09 | 2.2e-16 | S | 6 | 18 | 0.00 |
| scholtes2 | 4 | 3 | 1 | 1.50000000e+01 | 9.4e-10 | 5.6e-10 | S | 9 | 25 | 0.01 |
| scholtes3 | 3 | 2 | 1 | 4.99999990e-01 | 1.0e-08 | 1.1e-16 | S | 11 | 34 | 0.01 |
| scholtes4 | 4 | 4 | 1 | -1.96760499e-04 | 9.7e-09 | 8.7e-13 | none | 88 | 215 | 0.06 |
| scholtes5 | 5 | 4 | 2 | 9.99999999e-01 | 2.9e-10 | 1.1e-10 | S | 3 | 3 | 0.00 |
| siouxfls | – | – | – | – | – | – | – | – | – | fail |
| siouxfls1 | 4151 | 4124 | 1748 | 9.79386338e+02 | 2.9e-09 | 1.6e+00 | S | 104 | 29775 | 708.10 |
| sl1 | 11 | 8 | 3 | 9.99999998e-05 | 6.4e-10 | 4.4e-16 | S | 5 | 12 | 0.01 |
| stackelberg1 | 4 | 3 | 1 | -3.26666667e+03 | 2.2e-09 | 0.0e+00 | S | 10 | 14 | 0.01 |
| tap-09 | 126 | 106 | 36 | 1.09131033e+02 | 3.8e-13 | 5.6e-08 | S | 60 | 401 | 0.19 |
| tap-15 | 309 | 273 | 99 | 1.84294855e+02 | 1.1e-09 | 1.5e-06 | S | 67 | 613 | 0.61 |
| taxmcp | 31 | 30 | 14 | 1.25527897e+00 | 1.8e-01 | 2.9e-15 | Ψ | 203 | 86692 | 8.76 |
| TSC-1 | 612 | 1590 | 244 | 5.49634692e+01 | 8.8e-10 | 1.8e-15 | S | 3 | 38 | 0.03 |
| TSC-10 | 612 | 1590 | 244 | 5.48021373e+01 | 1.5e-15 | 4.4e-13 | S | 7 | 47 | 0.03 |
| TSC-11 | 612 | 1590 | 244 | 1.01567690e+02 | 3.3e-15 | 9.7e-13 | S | 6 | 95 | 0.06 |
| TSC-12 | 612 | 1590 | 244 | 2.02441462e+02 | 7.7e-03 | 1.2e-13 | Ψ | 193 | 1595 | 1.98 |
| TSC-13 | 612 | 1590 | 244 | 8.64028645e+01 | 6.8e-10 | 2.7e-09 | S | 6 | 56 | 0.05 |
| TSC-2 | 612 | 1590 | 244 | 5.25708119e+01 | 8.8e-10 | 9.8e-15 | S | 3 | 39 | 0.03 |
| TSC-3 | 612 | 1590 | 244 | 8.70673771e+01 | 3.2e-15 | 7.3e-13 | S | 5 | 85 | 0.05 |
| TSC-4 | 612 | 1590 | 244 | 7.90435431e+01 | 2.4e-15 | 1.1e-13 | S | 7 | 90 | 0.06 |
| TSC-5 | 612 | 1590 | 244 | 1.01468684e+02 | 3.9e-15 | 7.1e-14 | S | 6 | 89 | 0.06 |
| TSC-6 | 612 | 1590 | 244 | 1.01528435e+02 | 2.9e-10 | 5.5e-15 | S | 5 | 83 | 0.05 |
| TSC-7 | 612 | 1590 | 244 | 1.95586787e+02 | 7.8e-01 | 5.3e-08 | Ψ | 195 | 1301 | 1.97 |
| TSC-8 | 612 | 1590 | 244 | 2.00453736e+02 | 7.3e-01 | 7.9e-09 | Ψ | 194 | 1378 | 1.77 |
| TSC-9 | 612 | 1590 | 244 | 5.32050328e+01 | 8.9e-16 | 4.2e-09 | S | 4 | 42 | 0.03 |
| water-FL | 257 | 204 | 44 | 4.17592717e+03 | 2.0e-12 | 1.1e+02 | S | 152 | 596540 | 216.96 |
| water-net | 80 | 64 | 14 | 1.08904364e+03 | 9.5e-15 | 1.0e-13 | S | 114 | 466291 | 74.17 |

# 2 Mean-variance portfolios (Section 7.3.1, Table 4)

Table 7: Mean-variance portfolios, CPS AL.

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.44478798e+02 | yes | 1 | 22 | 25 | 25 | 0 | 6 | 1.0e+06 | 0.64 |
| s5 | orl200-005-b | 1.44752841e+02 | yes | 1 | 17 | 20 | 20 | 0 | 2 | 1.0e+05 | 0.52 |
| s5 | orl200-005-c | 1.45961725e+02 | yes | 1 | 15 | 17 | 17 | 1 | 2 | 1.0e+06 | 0.43 |
| s5 | orl200-005-d | 1.45944776e+02 | yes | 1 | 19 | 22 | 22 | 0 | 3 | 1.0e+05 | 0.59 |
| s5 | orl200-005-e | 1.44667773e+02 | yes | 1 | 17 | 21 | 21 | 1 | 2 | 1.0e+05 | 0.55 |
| s5 | orl200-005-f | 1.48016156e+02 | yes | 1 | 16 | 20 | 20 | 3 | 3 | 1.0e+07 | 0.52 |
| s5 | orl200-005-g | 1.44497412e+02 | yes | 1 | 14 | 17 | 17 | 2 | 1 | 1.0e+07 | 0.44 |
| s5 | orl200-005-h | 1.45288866e+02 | yes | 1 | 16 | 18 | 18 | 1 | 3 | 1.0e+07 | 0.48 |
| s5 | orl200-005-i | 1.46590198e+02 | yes | 1 | 17 | 20 | 20 | 0 | 2 | 1.0e+05 | 0.54 |
| s5 | orl200-005-j | 1.45391952e+02 | yes | 1 | 14 | 17 | 17 | 1 | 0 | 1.0e+05 | 0.44 |
| s5 | orl200-05-a | 1.04232888e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 0.54 |
| s5 | orl200-05-b | 1.03199355e+02 | yes | 1 | 14 | 21 | 21 | 5 | 0 | 1.0e+03 | 0.59 |
| s5 | orl200-05-c | 1.05032684e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 0.54 |
| s5 | orl200-05-d | 1.07915878e+02 | yes | 1 | 15 | 19 | 19 | 3 | 1 | 1.3e+08 | 0.51 |
| s5 | orl200-05-e | 1.13457187e+02 | yes | 1 | 35 | 160 | 160 | 7 | 8 | 2.3e+10 | 6.59 |
| s5 | orl200-05-f | 1.07582428e+02 | yes | 1 | 25 | 61 | 61 | 2 | 4 | 1.0e+09 | 1.79 |
| s5 | orl200-05-g | 1.05788540e+02 | yes | 1 | 14 | 17 | 17 | 1 | 0 | 1.0e+03 | 0.50 |
| s5 | orl200-05-h | 1.04362621e+02 | yes | 1 | 14 | 21 | 21 | 5 | 1 | 1.0e+04 | 0.53 |
| s5 | orl200-05-i | 1.04784005e+02 | yes | 1 | 14 | 18 | 18 | 2 | 1 | 1.0e+04 | 0.50 |
| s5 | orl200-05-j | 1.07599136e+02 | yes | 1 | 14 | 18 | 18 | 3 | 1 | 1.0e+07 | 0.46 |
| s5 | orl300-005-a | 2.28470848e+02 | yes | 1 | 17 | 40 | 40 | 3 | 0 | 2.1e+09 | 2.85 |
| s5 | orl300-005-b | 2.19566342e+02 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 1.0e+06 | 0.97 |
| s5 | orl300-005-c | 2.16314165e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.69 |
| s5 | orl300-005-d | 2.20089390e+02 | yes | 1 | 27 | 69 | 69 | 1 | 3 | 1.0e+09 | 4.29 |
| s5 | orl300-005-e | 2.16667697e+02 | yes | 1 | 24 | 51 | 51 | 5 | 3 | 1.0e+09 | 3.19 |
| s5 | orl300-005-f | 2.16634153e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.70 |
| s5 | orl300-005-g | 2.17340809e+02 | yes | 1 | 19 | 22 | 22 | 1 | 0 | 1.0e+03 | 1.63 |
| s5 | orl300-005-h | 2.16074126e+02 | yes | 1 | 19 | 24 | 24 | 3 | 0 | 1.0e+03 | 1.77 |
| s5 | orl300-005-i | 2.14630110e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.69 |
| s5 | orl300-005-j | 2.15237468e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.69 |
| s5 | orl300-05-a | 1.67216383e+02 | yes | 1 | 25 | 140 | 140 | 13 | 5 | 2.8e+10 | 10.22 |
| s5 | orl300-05-b | 1.66620560e+02 | yes | 1 | 19 | 20 | 20 | 0 | 5 | 1.0e+07 | 1.35 |
| s5 | orl300-05-c | 1.63675065e+02 | yes | 1 | 21 | 25 | 25 | 1 | 4 | 1.0e+06 | 1.42 |
| s5 | orl300-05-d | 1.67853365e+02 | yes | 1 | 20 | 21 | 21 | 0 | 6 | 1.0e+07 | 1.37 |
| s5 | orl300-05-e | 1.65033502e+02 | yes | 1 | 21 | 24 | 24 | 0 | 4 | 1.0e+06 | 1.36 |
| s5 | orl300-05-f | 1.64351584e+02 | yes | 1 | 24 | 27 | 27 | 0 | 6 | 1.0e+06 | 1.56 |
| s5 | orl300-05-g | 1.78144375e+02 | yes | 1 | 31 | 142 | 142 | 12 | 7 | 5.0e+10 | 11.11 |
| s5 | orl300-05-h | 1.66331830e+02 | yes | 1 | 17 | 20 | 20 | 0 | 2 | 1.0e+05 | 1.24 |
| s5 | orl300-05-i | 1.81590681e+02 | yes | 1 | 23 | 90 | 90 | 8 | 1 | 8.9e+09 | 7.87 |
| s5 | orl300-05-j | 1.70928992e+02 | yes | 1 | 27 | 50 | 50 | 0 | 5 | 1.3e+09 | 3.18 |
| s5 | orl400-005-a | 2.93444960e+02 | yes | 1 | 22 | 24 | 24 | 1 | 6 | 1.0e+07 | 2.94 |
| s5 | orl400-005-b | 2.96729135e+02 | yes | 1 | 19 | 29 | 29 | 1 | 2 | 1.1e+08 | 3.72 |
| s5 | orl400-005-c | 2.86218779e+02 | yes | 1 | 25 | 28 | 28 | 0 | 4 | 1.0e+06 | 3.14 |
| s5 | orl400-005-d | 2.89207804e+02 | yes | 1 | 19 | 21 | 21 | 0 | 2 | 1.0e+06 | 2.33 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl400-005-e | 2.85588794e+02 | yes | 1 | 22 | 23 | 23 | 0 | 6 | 1.0e+06 | 2.56 |
| s5 | orl400-005-f | 2.90516683e+02 | yes | 1 | 22 | 25 | 25 | 2 | 6 | 1.0e+07 | 2.90 |
| s5 | orl400-005-g | 2.86289365e+02 | yes | 1 | 17 | 18 | 18 | 0 | 2 | 1.0e+06 | 2.08 |
| s5 | orl400-005-h | 2.88315488e+02 | yes | 1 | 21 | 24 | 24 | 0 | 1 | 1.0e+04 | 3.08 |
| s5 | orl400-005-i | 2.87144075e+02 | yes | 1 | 22 | 23 | 23 | 0 | 6 | 1.0e+07 | 2.75 |
| s5 | orl400-005-j | 2.91696646e+02 | yes | 1 | 17 | 22 | 22 | 0 | 2 | 1.6e+08 | 2.73 |
| s5 | orl400-05-a | 2.06091039e+02 | yes | 1 | 16 | 19 | 19 | 2 | 1 | 1.0e+07 | 2.29 |
| s5 | orl400-05-b | 2.04112454e+02 | yes | 1 | 15 | 19 | 19 | 3 | 1 | 1.0e+06 | 2.14 |
| s5 | orl400-05-c | 2.07902506e+02 | yes | 1 | 16 | 20 | 20 | 3 | 2 | 1.0e+07 | 2.34 |
| s5 | orl400-05-d | 2.07601973e+02 | yes | 1 | 21 | 23 | 23 | 1 | 5 | 1.0e+08 | 2.80 |
| s5 | orl400-05-e | 2.11251149e+02 | yes | 1 | 22 | 55 | 55 | 1 | 3 | 1.0e+09 | 6.62 |
| s5 | orl400-05-f | 2.04034766e+02 | yes | 1 | 14 | 23 | 23 | 6 | 0 | 1.0e+05 | 2.49 |
| s5 | orl400-05-g | 2.14937382e+02 | yes | 1 | 16 | 19 | 19 | 2 | 1 | 1.0e+07 | 2.20 |
| s5 | orl400-05-h | 2.07202338e+02 | yes | 1 | 28 | 86 | 86 | 5 | 3 | 1.0e+10 | 10.99 |
| s5 | orl400-05-i | 2.03750797e+02 | yes | 1 | 18 | 23 | 23 | 3 | 0 | 1.0e+03 | 2.89 |
| s5 | orl400-05-j | 2.03915488e+02 | yes | 1 | 18 | 25 | 25 | 5 | 0 | 1.0e+03 | 3.23 |
| s5 | pard200-a | 4.11202154e+02 | yes | 1 | 26 | 29 | 29 | 0 | 0 | 1.0e+03 | 0.92 |
| s5 | pard200-b | 4.47959012e+02 | yes | 1 | 31 | 168 | 168 | 9 | 11 | 5.9e+09 | 5.83 |
| s5 | pard200-c | 4.19679100e+02 | yes | 1 | 15 | 17 | 17 | 1 | 2 | 7.5e+07 | 0.50 |
| s5 | pard200-d | 4.18421157e+02 | yes | 1 | 16 | 36 | 36 | 2 | 1 | 4.1e+08 | 1.04 |
| s5 | pard200-e | 4.11101246e+02 | yes | 1 | 26 | 30 | 30 | 1 | 0 | 1.0e+03 | 0.95 |
| s5 | pard200-f | 4.06353714e+02 | yes | 1 | 26 | 31 | 31 | 2 | 0 | 1.0e+03 | 1.00 |
| s5 | pard200-g | 4.14718297e+02 | yes | 1 | 15 | 18 | 18 | 2 | 1 | 3.0e+07 | 0.53 |
| s5 | pard200-h | 4.12107147e+02 | yes | 1 | 26 | 29 | 29 | 1 | 0 | 1.0e+03 | 0.93 |
| s5 | pard200-i | 4.10460364e+02 | yes | 1 | 26 | 30 | 30 | 2 | 0 | 1.0e+03 | 0.97 |
| s5 | pard200-j | 4.08608545e+02 | yes | 1 | 26 | 29 | 29 | 0 | 0 | 1.0e+03 | 0.94 |
| s5 | pard300-a | 6.07512093e+02 | yes | 1 | 14 | 17 | 17 | 0 | 2 | 1.0e+06 | 1.27 |
| s5 | pard300-b | 6.11377947e+02 | yes | 1 | 26 | 98 | 98 | 0 | 4 | 1.0e+10 | 7.44 |
| s5 | pard300-c | 6.18177256e+02 | yes | 1 | 20 | 21 | 21 | 0 | 7 | 1.0e+07 | 1.48 |
| s5 | pard300-d | 6.11268194e+02 | yes | 1 | 13 | 16 | 16 | 0 | 1 | 1.0e+05 | 1.21 |
| s5 | pard300-e | 6.08952959e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.25 |
| s5 | pard300-f | 6.05916252e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.23 |
| s5 | pard300-g | 6.08415419e+02 | yes | 1 | 16 | 24 | 24 | 3 | 0 | 2.3e+08 | 1.71 |
| s5 | pard300-h | 6.06957996e+02 | yes | 1 | 16 | 19 | 19 | 0 | 3 | 1.0e+05 | 1.43 |
| s5 | pard300-i | 6.10657570e+02 | yes | 1 | 20 | 22 | 22 | 1 | 7 | 1.0e+07 | 1.54 |
| s5 | pard300-j | 6.15244535e+02 | yes | 1 | 14 | 17 | 17 | 0 | 2 | 1.0e+06 | 1.26 |
| s5 | pard400-a | 8.07743825e+02 | yes | 1 | 14 | 23 | 23 | 7 | 0 | 1.0e+06 | 2.93 |
| s5 | pard400-b | 8.74132180e+02 | yes | 1 | 30 | 175 | 175 | 8 | 6 | 2.3e+11 | 26.67 |
| s5 | pard400-c | 8.35980071e+02 | yes | 1 | 25 | 114 | 114 | 2 | 4 | 4.7e+10 | 15.01 |
| s5 | pard400-d | 8.06718931e+02 | yes | 1 | 13 | 20 | 20 | 6 | 1 | 1.0e+07 | 2.57 |
| s5 | pard400-e | 8.10912704e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+04 | 2.66 |
| s5 | pard400-f | 8.39778861e+02 | yes | 1 | 35 | 213 | 213 | 12 | 14 | 7.4e+10 | 33.52 |
| s5 | pard400-g | 8.13538701e+02 | yes | 1 | 15 | 20 | 20 | 2 | 2 | 1.0e+05 | 2.86 |
| s5 | pard400-h | 8.08036527e+02 | yes | 1 | 14 | 18 | 18 | 3 | 1 | 1.0e+07 | 2.26 |
| s5 | pard400-i | 8.06944486e+02 | yes | 1 | 14 | 18 | 18 | 1 | 1 | 1.0e+05 | 2.59 |
| s5 | pard400-j | 8.10310784e+02 | yes | 1 | 14 | 18 | 18 | 1 | 0 | 1.0e+04 | 2.74 |
| s10 | orl200-005-a | 7.62149165e+01 | yes | 1 | 15 | 18 | 18 | 1 | 3 | 1.0e+04 | 1.38 |
| s10 | orl200-005-b | 7.57595119e+01 | yes | 1 | 13 | 18 | 18 | 2 | 1 | 1.0e+04 | 1.33 |
| s10 | orl200-005-c | 7.63944358e+01 | yes | 1 | 25 | 27 | 27 | 1 | 13 | 1.0e+06 | 2.76 |
| s10 | orl200-005-d | 7.65770073e+01 | yes | 1 | 16 | 19 | 19 | 0 | 3 | 1.0e+05 | 1.42 |
| s10 | orl200-005-e | 7.59482207e+01 | yes | 1 | 13 | 16 | 16 | 1 | 1 | 1.0e+04 | 1.24 |
| s10 | orl200-005-f | 7.69682273e+01 | yes | 1 | 23 | 26 | 26 | 2 | 11 | 1.0e+06 | 2.44 |
| s10 | orl200-005-g | 7.49890975e+01 | yes | 1 | 15 | 18 | 18 | 2 | 3 | 1.0e+07 | 1.70 |
| s10 | orl200-005-h | 7.59969920e+01 | yes | 1 | 18 | 21 | 21 | 2 | 6 | 1.0e+07 | 2.12 |
| s10 | orl200-005-i | 7.76345677e+01 | yes | 1 | 14 | 17 | 17 | 0 | 2 | 1.0e+04 | 1.24 |
| s10 | orl200-005-j | 7.60335471e+01 | yes | 1 | 21 | 59 | 59 | 0 | 3 | 1.0e+09 | 8.08 |
| s10 | orl200-05-a | 5.51779125e+01 | yes | 1 | 13 | 20 | 20 | 5 | 2 | 1.0e+04 | 1.44 |
| s10 | orl200-05-b | 5.49726734e+01 | yes | 1 | 11 | 19 | 19 | 6 | 0 | 1.0e+03 | 1.37 |
| s10 | orl200-05-c | 5.56710544e+01 | yes | 1 | 11 | 18 | 18 | 5 | 0 | 1.0e+03 | 1.30 |
| s10 | orl200-05-d | 5.82557293e+01 | yes | 1 | 21 | 25 | 25 | 3 | 5 | 2.4e+07 | 2.38 |
| s10 | orl200-05-e | 6.05745885e+01 | yes | 1 | 29 | 121 | 121 | 15 | 12 | 4.4e+09 | 19.63 |
| s10 | orl200-05-f | 5.74073021e+01 | yes | 1 | 28 | 56 | 56 | 1 | 6 | 1.7e+08 | 7.02 |
| s10 | orl200-05-g | 5.60047776e+01 | yes | 1 | 11 | 15 | 15 | 2 | 0 | 1.0e+03 | 1.11 |
| s10 | orl200-05-h | 5.48324490e+01 | yes | 1 | 11 | 16 | 16 | 3 | 0 | 1.0e+03 | 1.20 |
| s10 | orl200-05-i | 5.52765889e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 1.27 |
| s10 | orl200-05-j | 5.72244498e+01 | yes | 1 | 16 | 21 | 21 | 4 | 4 | 1.0e+07 | 1.93 |
| s10 | orl300-005-a | 1.20925080e+02 | yes | 1 | 22 | 52 | 52 | 3 | 2 | 4.0e+08 | 17.38 |
| s10 | orl300-005-b | 1.12641914e+02 | yes | 1 | 19 | 24 | 24 | 4 | 6 | 1.0e+06 | 5.57 |
| s10 | orl300-005-c | 1.11718335e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 3.59 |
| s10 | orl300-005-d | 1.14089683e+02 | yes | 1 | 19 | 35 | 35 | 4 | 4 | 1.8e+08 | 10.73 |
| s10 | orl300-005-e | 1.11160654e+02 | yes | 1 | 13 | 17 | 17 | 3 | 0 | 1.0e+06 | 3.35 |
| s10 | orl300-005-f | 1.11966557e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 3.61 |
| s10 | orl300-005-g | 1.12176031e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 3.64 |
| s10 | orl300-005-h | 1.11664060e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 3.81 |
| s10 | orl300-005-i | 1.10603384e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 3.74 |
| s10 | orl300-005-j | 1.11553485e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 3.77 |
| s10 | orl300-05-a | 8.96215942e+01 | yes | 1 | 33 | 172 | 172 | 20 | 13 | 6.0e+09 | 66.98 |
| s10 | orl300-05-b | 8.62642965e+01 | yes | 1 | 20 | 21 | 21 | 0 | 7 | 1.0e+07 | 5.67 |
| s10 | orl300-05-c | 8.54259524e+01 | yes | 1 | 25 | 83 | 83 | 1 | 6 | 1.0e+09 | 30.33 |
| s10 | orl300-05-d | 8.78537847e+01 | yes | 1 | 28 | 29 | 29 | 0 | 15 | 1.0e+07 | 8.44 |
| s10 | orl300-05-e | 8.52882773e+01 | yes | 1 | 21 | 24 | 24 | 0 | 8 | 1.0e+06 | 4.85 |
| s10 | orl300-05-f | 8.53248298e+01 | yes | 1 | 23 | 26 | 26 | 0 | 8 | 1.0e+05 | 5.21 |
| s10 | orl300-05-g | 9.70281348e+01 | yes | 1 | 29 | 141 | 141 | 24 | 10 | 1.0e+10 | 52.66 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s10 | orl300-05-h | 8.61424183e+01 | yes | 1 | 21 | 24 | 24 | 0 | 7 | 1.0e+05 | 5.03 |
| s10 | orl300-05-i | 9.99165932e+01 | yes | 1 | 25 | 120 | 120 | 18 | 8 | 1.8e+10 | 44.07 |
| s10 | orl300-05-j | 8.92889557e+01 | yes | 1 | 32 | 88 | 88 | 0 | 8 | 2.3e+09 | 32.42 |
| s10 | orl400-005-a | 1.50393861e+02 | yes | 1 | 25 | 28 | 28 | 2 | 11 | 1.0e+07 | 14.55 |
| s10 | orl400-005-b | 1.53259574e+02 | yes | 1 | 18 | 43 | 43 | 2 | 5 | 2.0e+08 | 26.44 |
| s10 | orl400-005-c | 1.46049653e+02 | yes | 1 | 18 | 21 | 21 | 0 | 3 | 1.0e+05 | 7.73 |
| s10 | orl400-005-d | 1.47284899e+02 | yes | 1 | 30 | 105 | 105 | 0 | 9 | 1.0e+09 | 75.00 |
| s10 | orl400-005-e | 1.46114107e+02 | yes | 1 | 25 | 28 | 28 | 2 | 12 | 1.0e+06 | 12.92 |
| s10 | orl400-005-f | 1.49654502e+02 | yes | 1 | 33 | 77 | 77 | 3 | 13 | 1.0e+09 | 50.01 |
| s10 | orl400-005-g | 1.46640195e+02 | yes | 1 | 20 | 21 | 21 | 0 | 7 | 1.0e+06 | 9.48 |
| s10 | orl400-005-h | 1.47900616e+02 | yes | 1 | 24 | 27 | 27 | 0 | 8 | 1.0e+06 | 10.66 |
| s10 | orl400-005-i | 1.45795818e+02 | yes | 1 | 23 | 25 | 25 | 1 | 9 | 1.0e+07 | 12.81 |
| s10 | orl400-005-j | 1.49819510e+02 | yes | 1 | 33 | 91 | 91 | 1 | 9 | 3.0e+08 | 62.32 |
| s10 | orl400-05-a | 1.06419217e+02 | yes | 1 | 19 | 25 | 25 | 5 | 5 | 1.0e+07 | 11.36 |
| s10 | orl400-05-b | 1.05101734e+02 | yes | 1 | 18 | 25 | 25 | 6 | 5 | 1.0e+06 | 10.30 |
| s10 | orl400-05-c | 1.06520789e+02 | yes | 1 | 21 | 30 | 30 | 6 | 6 | 1.0e+08 | 14.53 |
| s10 | orl400-05-d | 1.09714206e+02 | yes | 1 | 20 | 36 | 36 | 3 | 6 | 1.4e+08 | 20.34 |
| s10 | orl400-05-e | 1.09745716e+02 | yes | 1 | 28 | 87 | 87 | 2 | 7 | 1.3e+09 | 60.03 |
| s10 | orl400-05-f | 1.05087647e+02 | yes | 1 | 21 | 64 | 64 | 8 | 1 | 1.0e+10 | 42.08 |
| s10 | orl400-05-g | 1.10335067e+02 | yes | 1 | 16 | 32 | 32 | 5 | 3 | 1.3e+08 | 17.10 |
| s10 | orl400-05-h | 1.06802685e+02 | yes | 1 | 40 | 173 | 173 | 8 | 16 | 1.0e+09 | 118.69 |
| s10 | orl400-05-i | 1.04714575e+02 | yes | 1 | 14 | 20 | 20 | 4 | 0 | 1.0e+03 | 7.38 |
| s10 | orl400-05-j | 1.04792437e+02 | yes | 1 | 14 | 20 | 20 | 4 | 0 | 1.0e+03 | 7.37 |
| s10 | pard200-a | 2.11728931e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.0e+03 | 1.87 |
| s10 | pard200-b | 2.23351624e+02 | yes | 1 | 44 | 237 | 237 | 13 | 23 | 1.2e+10 | 40.77 |
| s10 | pard200-c | 2.18880638e+02 | yes | 1 | 23 | 81 | 81 | 2 | 2 | 1.3e+09 | 11.79 |
| s10 | pard200-d | 2.15249437e+02 | yes | 1 | 26 | 72 | 72 | 1 | 4 | 7.6e+08 | 10.18 |
| s10 | pard200-e | 2.11873957e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 1.85 |
| s10 | pard200-f | 2.07431760e+02 | yes | 1 | 17 | 20 | 20 | 1 | 0 | 1.1e+03 | 1.70 |
| s10 | pard200-g | 2.15238287e+02 | yes | 1 | 21 | 25 | 25 | 2 | 3 | 5.4e+07 | 2.54 |
| s10 | pard200-h | 2.13337694e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 1.84 |
| s10 | pard200-i | 2.10095282e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.1e+03 | 1.93 |
| s10 | pard200-j | 2.09683632e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.0e+03 | 1.88 |
| s10 | pard300-a | 3.08238810e+02 | yes | 1 | 26 | 29 | 29 | 0 | 5 | 1.0e+05 | 6.33 |
| s10 | pard300-b | 3.12607502e+02 | yes | 1 | 28 | 96 | 96 | 0 | 4 | 1.0e+10 | 38.19 |
| s10 | pard300-c | 3.12677762e+02 | yes | 1 | 36 | 118 | 118 | 1 | 15 | 1.6e+09 | 44.30 |
| s10 | pard300-d | 3.09405282e+02 | yes | 1 | 17 | 20 | 20 | 0 | 1 | 1.0e+05 | 4.12 |
| s10 | pard300-e | 3.09632450e+02 | yes | 1 | 20 | 23 | 23 | 0 | 1 | 1.0e+04 | 4.77 |
| s10 | pard300-f | 3.09129093e+02 | yes | 1 | 24 | 27 | 27 | 0 | 4 | 1.0e+05 | 5.72 |
| s10 | pard300-g | 3.10819987e+02 | yes | 1 | 14 | 22 | 22 | 7 | 1 | 4.2e+07 | 5.69 |
| s10 | pard300-h | 3.08544393e+02 | yes | 1 | 23 | 26 | 26 | 0 | 4 | 1.0e+05 | 5.51 |
| s10 | pard300-i | 3.10574187e+02 | yes | 1 | 29 | 31 | 31 | 1 | 15 | 1.4e+07 | 8.82 |
| s10 | pard300-j | 3.12995192e+02 | yes | 1 | 20 | 23 | 23 | 0 | 1 | 1.0e+04 | 4.80 |
| s10 | pard400-a | 4.08640409e+02 | yes | 1 | 18 | 30 | 30 | 9 | 0 | 1.0e+04 | 11.47 |
| s10 | pard400-b | 4.60306458e+02 | yes | 1 | 31 | 204 | 204 | 17 | 13 | 4.6e+10 | 161.78 |
| s10 | pard400-c | 4.27652044e+02 | yes | 1 | 28 | 131 | 131 | 1 | 9 | 8.7e+09 | 99.49 |
| s10 | pard400-d | 4.08553369e+02 | yes | 1 | 20 | 30 | 30 | 9 | 4 | 1.0e+07 | 13.45 |
| s10 | pard400-e | 4.09769587e+02 | yes | 1 | 30 | 101 | 101 | 1 | 6 | 1.0e+11 | 74.98 |
| s10 | pard400-f | 4.40077310e+02 | yes | 1 | 38 | 216 | 216 | 14 | 16 | 1.5e+11 | 178.10 |
| s10 | pard400-g | 4.11544272e+02 | yes | 1 | 26 | 31 | 31 | 3 | 0 | 1.0e+03 | 12.77 |
| s10 | pard400-h | 4.07659662e+02 | yes | 1 | 18 | 27 | 27 | 8 | 1 | 1.2e+07 | 11.65 |
| s10 | pard400-i | 4.08814052e+02 | yes | 1 | 26 | 29 | 29 | 1 | 0 | 1.0e+03 | 12.23 |
| s10 | pard400-j | 4.08730701e+02 | yes | 1 | 26 | 32 | 32 | 4 | 0 | 1.0e+03 | 13.40 |
| s20 | orl200-005-a | 4.15988204e+01 | yes | 1 | 27 | 31 | 31 | 1 | 6 | 1.0e+05 | 6.50 |
| s20 | orl200-005-b | 4.14054976e+01 | yes | 1 | 30 | 33 | 33 | 0 | 8 | 1.0e+05 | 7.33 |
| s20 | orl200-005-c | 4.17638160e+01 | yes | 1 | 32 | 35 | 35 | 2 | 18 | 1.6e+06 | 10.82 |
| s20 | orl200-005-d | 4.18276604e+01 | yes | 1 | 32 | 35 | 35 | 0 | 9 | 1.0e+05 | 7.79 |
| s20 | orl200-005-e | 4.15989584e+01 | yes | 1 | 26 | 29 | 29 | 0 | 5 | 1.0e+05 | 6.14 |
| s20 | orl200-005-f | 4.16401965e+01 | yes | 1 | 42 | 46 | 46 | 3 | 26 | 1.0e+06 | 13.26 |
| s20 | orl200-005-g | 4.11664102e+01 | yes | 1 | 40 | 45 | 45 | 1 | 20 | 1.2e+08 | 14.85 |
| s20 | orl200-005-h | 4.16649397e+01 | yes | 1 | 43 | 74 | 74 | 1 | 23 | 1.8e+08 | 28.13 |
| s20 | orl200-005-i | 4.24868937e+01 | yes | 1 | 25 | 28 | 28 | 0 | 3 | 1.0e+04 | 5.83 |
| s20 | orl200-005-j | 4.08645402e+01 | yes | 1 | 22 | 25 | 25 | 1 | 3 | 1.0e+04 | 5.47 |
| s20 | orl200-05-a | 3.09311169e+01 | yes | 1 | 21 | 27 | 27 | 4 | 0 | 1.0e+02 | 5.65 |
| s20 | orl200-05-b | 3.08569522e+01 | yes | 1 | 21 | 31 | 31 | 8 | 0 | 1.0e+02 | 6.38 |
| s20 | orl200-05-c | 3.10927784e+01 | yes | 1 | 21 | 28 | 28 | 5 | 0 | 1.0e+02 | 5.85 |
| s20 | orl200-05-d | 3.31562391e+01 | yes | 1 | 44 | 194 | 194 | 0 | 27 | 4.7e+08 | 86.28 |
| s20 | orl200-05-e | 3.47865084e+01 | yes | 1 | 47 | 258 | 258 | 27 | 24 | 8.2e+09 | 122.32 |
| s20 | orl200-05-f | 3.18981889e+01 | yes | 1 | 38 | 126 | 126 | 1 | 23 | 3.2e+08 | 54.94 |
| s20 | orl200-05-g | 3.13769523e+01 | yes | 1 | 21 | 24 | 24 | 3 | 0 | 1.0e+02 | 5.10 |
| s20 | orl200-05-h | 3.04982144e+01 | yes | 1 | 21 | 28 | 28 | 5 | 0 | 1.0e+02 | 5.91 |
| s20 | orl200-05-i | 3.10942833e+01 | yes | 1 | 21 | 30 | 30 | 7 | 0 | 1.0e+02 | 6.25 |
| s20 | orl200-05-j | 3.18723082e+01 | yes | 1 | 27 | 32 | 32 | 4 | 12 | 1.1e+07 | 9.41 |
| s20 | orl300-005-a | 6.46607386e+01 | yes | 1 | 49 | 221 | 221 | 0 | 29 | 7.6e+09 | 279.08 |
| s20 | orl300-005-b | 5.97326704e+01 | yes | 1 | 21 | 27 | 27 | 5 | 9 | 1.0e+06 | 19.91 |
| s20 | orl300-005-c | 5.97672273e+01 | yes | 1 | 11 | 17 | 17 | 4 | 1 | 1.0e+04 | 9.84 |
| s20 | orl300-005-d | 6.17741943e+01 | yes | 1 | 34 | 109 | 109 | 6 | 13 | 3.2e+09 | 127.17 |
| s20 | orl300-005-e | 5.90102825e+01 | yes | 1 | 11 | 15 | 15 | 3 | 0 | 1.0e+06 | 9.42 |
| s20 | orl300-005-f | 5.98192631e+01 | yes | 1 | 12 | 16 | 16 | 2 | 2 | 1.0e+04 | 9.41 |
| s20 | orl300-005-g | 5.95657973e+01 | yes | 1 | 11 | 16 | 16 | 3 | 0 | 1.0e+03 | 9.74 |
| s20 | orl300-005-h | 5.93516295e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 10.25 |
| s20 | orl300-005-i | 5.85760512e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 10.19 |
| s20 | orl300-005-j | 5.96131058e+01 | yes | 1 | 11 | 17 | 17 | 4 | 1 | 1.0e+04 | 9.70 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s20 | orl300-05-a | 5.00201625e+01 | yes | 1 | 60 | 378 | 378 | 24 | 36 | 1.1e+10 | 498.87 |
| s20 | orl300-05-b | 4.61032758e+01 | yes | 1 | 53 | 207 | 207 | 3 | 32 | 1.9e+09 | 254.26 |
| s20 | orl300-05-c | 4.58386910e+01 | yes | 1 | 36 | 40 | 40 | 1 | 13 | 1.0e+05 | 24.61 |
| s20 | orl300-05-d | 4.72833350e+01 | yes | 1 | 56 | 120 | 120 | 1 | 36 | 1.4e+08 | 132.24 |
| s20 | orl300-05-e | 4.58537433e+01 | yes | 1 | 40 | 45 | 45 | 2 | 16 | 1.0e+05 | 27.67 |
| s20 | orl300-05-f | 4.57020463e+01 | yes | 1 | 39 | 43 | 43 | 1 | 14 | 1.0e+05 | 25.70 |
| s20 | orl300-05-g | 5.40927485e+01 | yes | 1 | 49 | 281 | 281 | 25 | 27 | 1.8e+10 | 374.79 |
| s20 | orl300-05-h | 4.62002097e+01 | yes | 1 | 46 | 49 | 49 | 0 | 22 | 1.0e+06 | 30.60 |
| s20 | orl300-05-i | 5.82722182e+01 | yes | 1 | 27 | 150 | 150 | 32 | 5 | 3.3e+11 | 180.22 |
| s20 | orl300-05-j | 4.82774228e+01 | yes | 1 | 36 | 112 | 112 | 2 | 16 | 4.2e+08 | 128.73 |
| s20 | orl400-005-a | 7.86982672e+01 | yes | 1 | 31 | 89 | 89 | 4 | 14 | 1.4e+09 | 200.86 |
| s20 | orl400-005-b | 8.34321871e+01 | no | 1 | 54 | 246 | 246 | 2 | 36 | 3.8e+09 | 605.41 |
| s20 | orl400-005-c | 7.65653097e+01 | yes | 1 | 22 | 26 | 26 | 1 | 9 | 1.0e+05 | 33.32 |
| s20 | orl400-005-d | 7.71343191e+01 | yes | 1 | 35 | 142 | 142 | 1 | 18 | 1.0e+09 | 332.84 |
| s20 | orl400-005-e | 7.68020669e+01 | yes | 1 | 36 | 41 | 41 | 4 | 24 | 1.0e+06 | 64.16 |
| s20 | orl400-005-f | 7.90080599e+01 | yes | 1 | 14 | 30 | 30 | 15 | 0 | 1.0e+08 | 42.72 |
| s20 | orl400-005-g | 7.65753198e+01 | yes | 1 | 28 | 31 | 31 | 2 | 16 | 1.0e+06 | 47.09 |
| s20 | orl400-005-h | 7.76955452e+01 | yes | 1 | 20 | 24 | 24 | 1 | 8 | 1.0e+05 | 30.89 |
| s20 | orl400-005-i | 7.70691165e+01 | yes | 1 | 24 | 31 | 31 | 6 | 11 | 1.3e+07 | 49.93 |
| s20 | orl400-005-j | 7.99043771e+01 | yes | 1 | 41 | 169 | 169 | 2 | 22 | 5.7e+09 | 411.22 |
| s20 | orl400-05-a | 5.66179069e+01 | yes | 1 | 47 | 175 | 175 | 3 | 30 | 1.1e+09 | 412.20 |
| s20 | orl400-05-b | 5.62042010e+01 | yes | 1 | 24 | 31 | 31 | 6 | 12 | 1.0e+06 | 43.98 |
| s20 | orl400-05-c | 5.68291260e+01 | yes | 1 | 33 | 65 | 65 | 6 | 16 | 1.0e+08 | 124.23 |
| s20 | orl400-05-d | 5.90540641e+01 | yes | 1 | 43 | 148 | 148 | 3 | 21 | 2.6e+09 | 350.01 |
| s20 | orl400-05-e | 5.87106019e+01 | yes | 1 | 43 | 122 | 122 | 6 | 21 | 2.4e+09 | 267.29 |
| s20 | orl400-05-f | 5.55421173e+01 | yes | 1 | 12 | 22 | 22 | 7 | 0 | 1.0e+03 | 24.27 |
| s20 | orl400-05-g | 5.91877411e+01 | yes | 1 | 36 | 129 | 129 | 5 | 15 | 2.5e+09 | 293.92 |
| s20 | orl400-05-h | 5.65029967e+01 | yes | 1 | 27 | 121 | 121 | 12 | 8 | 1.0e+09 | 263.86 |
| s20 | orl400-05-i | 5.54747480e+01 | yes | 1 | 11 | 21 | 21 | 8 | 0 | 1.0e+03 | 23.51 |
| s20 | orl400-05-j | 5.56949123e+01 | yes | 1 | 13 | 21 | 21 | 6 | 1 | 1.0e+03 | 23.64 |
| s20 | pard200-a | 1.11652762e+02 | yes | 1 | 11 | 14 | 14 | 0 | 0 | 2.1e+03 | 3.47 |
| s20 | pard200-b | 1.20792767e+02 | yes | 1 | 56 | 348 | 348 | 25 | 37 | 2.0e+10 | 172.36 |
| s20 | pard200-c | 1.15146223e+02 | yes | 1 | 53 | 289 | 289 | 1 | 34 | 2.2e+09 | 140.96 |
| s20 | pard200-d | 1.14089235e+02 | yes | 1 | 38 | 165 | 165 | 1 | 22 | 1.4e+09 | 77.16 |
| s20 | pard200-e | 1.11465017e+02 | yes | 1 | 14 | 17 | 17 | 1 | 3 | 2.1e+04 | 4.20 |
| s20 | pard200-f | 1.09175616e+02 | yes | 1 | 28 | 31 | 31 | 1 | 0 | 2.2e+02 | 7.66 |
| s20 | pard200-g | 1.14500382e+02 | yes | 1 | 44 | 207 | 207 | 0 | 26 | 9.7e+08 | 95.61 |
| s20 | pard200-h | 1.12710818e+02 | yes | 1 | 11 | 14 | 14 | 1 | 0 | 2.2e+03 | 3.50 |
| s20 | pard200-i | 1.10088180e+02 | yes | 1 | 11 | 14 | 14 | 1 | 0 | 2.1e+03 | 3.53 |
| s20 | pard200-j | 1.10553737e+02 | yes | 1 | 11 | 14 | 14 | 0 | 0 | 2.1e+03 | 3.50 |
| s20 | pard300-a | 1.58895484e+02 | yes | 1 | 16 | 19 | 19 | 0 | 3 | 1.4e+04 | 12.35 |
| s20 | pard300-b | 1.61146474e+02 | yes | 1 | 17 | 20 | 20 | 0 | 2 | 1.3e+04 | 13.21 |
| s20 | pard300-c | 1.60445067e+02 | yes | 1 | 21 | 30 | 30 | 8 | 8 | 3.1e+07 | 25.09 |
| s20 | pard300-d | 1.59272334e+02 | yes | 1 | 14 | 17 | 17 | 0 | 1 | 1.4e+04 | 11.15 |
| s20 | pard300-e | 1.60417805e+02 | yes | 1 | 19 | 22 | 22 | 0 | 6 | 1.4e+05 | 16.12 |
| s20 | pard300-f | 1.60117621e+02 | yes | 1 | 19 | 22 | 22 | 0 | 6 | 1.4e+05 | 15.42 |
| s20 | pard300-g | 1.62154620e+02 | yes | 1 | 54 | 207 | 207 | 2 | 34 | 7.6e+09 | 268.66 |
| s20 | pard300-h | 1.59487437e+02 | yes | 1 | 17 | 20 | 20 | 0 | 3 | 1.4e+05 | 13.19 |
| s20 | pard300-i | 1.60077515e+02 | yes | 1 | 24 | 33 | 33 | 7 | 11 | 2.6e+07 | 29.62 |
| s20 | pard300-j | 1.61894573e+02 | yes | 1 | 18 | 21 | 21 | 0 | 5 | 1.4e+05 | 14.47 |
| s20 | pard400-a | 2.08784654e+02 | yes | 1 | 18 | 35 | 35 | 14 | 0 | 1.1e+03 | 43.79 |
| s20 | pard400-b | 2.54608977e+02 | yes | 1 | 38 | 234 | 234 | 31 | 19 | 7.8e+10 | 604.54 |
| s20 | pard400-c | 2.22412412e+02 | yes | 1 | 50 | 252 | 252 | 1 | 34 | 1.6e+09 | 612.21 |
| s20 | pard400-d | 2.09462287e+02 | yes | 1 | 21 | 26 | 26 | 4 | 8 | 1.3e+07 | 43.76 |
| s20 | pard400-e | 2.10883030e+02 | yes | 1 | 27 | 91 | 91 | 1 | 3 | 1.0e+09 | 206.47 |
| s20 | pard400-f | 2.39890339e+02 | no | 1 | 37 | 240 | 240 | 27 | 22 | 2.8e+10 | 606.93 |
| s20 | pard400-g | 2.11152332e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.0e+03 | 28.83 |
| s20 | pard400-h | 2.09243177e+02 | yes | 1 | 34 | 81 | 81 | 5 | 16 | 2.2e+09 | 178.10 |
| s20 | pard400-i | 2.09667485e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 28.42 |
| s20 | pard400-j | 2.09225715e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 28.48 |

Table 8: Mean-variance portfolios, Telescopic AL.

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.46614995e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+03 | 0.48 |
| s5 | orl200-005-b | 1.46098774e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+03 | 0.46 |
| s5 | orl200-005-c | 1.48088124e+02 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 1.0e+06 | 0.32 |
| s5 | orl200-005-d | 1.47240903e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+03 | 0.46 |
| s5 | orl200-005-e | 1.46129893e+02 | yes | 1 | 16 | 20 | 20 | 1 | 0 | 1.0e+03 | 0.49 |
| s5 | orl200-005-f | 1.49004320e+02 | yes | 1 | 12 | 16 | 16 | 3 | 0 | 1.0e+07 | 0.38 |
| s5 | orl200-005-g | 1.45678366e+02 | yes | 1 | 12 | 15 | 15 | 2 | 0 | 1.0e+07 | 0.35 |
| s5 | orl200-005-h | 1.48263844e+02 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 1.0e+07 | 0.33 |
| s5 | orl200-005-i | 1.48311134e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+03 | 0.47 |
| s5 | orl200-005-j | 1.45391952e+02 | yes | 1 | 14 | 17 | 17 | 1 | 0 | 1.0e+05 | 0.40 |
| s5 | orl200-05-a | 1.04232888e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 0.44 |
| s5 | orl200-05-b | 1.03199355e+02 | yes | 1 | 14 | 21 | 21 | 5 | 0 | 1.0e+03 | 0.49 |
| s5 | orl200-05-c | 1.05032684e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 0.44 |
| s5 | orl200-05-d | 1.08294176e+02 | yes | 1 | 14 | 20 | 20 | 3 | 0 | 1.3e+08 | 0.50 |
| s5 | orl200-05-e | 1.86015475e+02 | yes | 1 | 27 | 91 | 91 | 7 | 0 | 2.3e+08 | 4.28 |
| s5 | orl200-05-f | 1.11156489e+02 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 1.0e+07 | 0.40 |
| s5 | orl200-05-g | 1.05788540e+02 | yes | 1 | 14 | 17 | 17 | 1 | 0 | 1.0e+03 | 0.39 |

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| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl200-05-h | 1.04765889e+02 | yes | 1 | 14 | 20 | 20 | 4 | 0 | 1.0e+03 | 0.47 |
| s5 | orl200-05-i | 1.04862808e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 0.44 |
| s5 | orl200-05-j | 1.09130220e+02 | yes | 1 | 12 | 16 | 16 | 3 | 0 | 1.0e+07 | 0.37 |
| s5 | orl300-005-a | 2.28470848e+02 | yes | 1 | 17 | 40 | 40 | 3 | 0 | 2.1e+09 | 2.75 |
| s5 | orl300-005-b | 2.19566342e+02 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 1.0e+06 | 0.93 |
| s5 | orl300-005-c | 2.16314165e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.36 |
| s5 | orl300-005-d | 2.27169693e+02 | yes | 1 | 14 | 16 | 16 | 1 | 0 | 1.0e+07 | 0.93 |
| s5 | orl300-005-e | 2.19408890e+02 | yes | 1 | 29 | 53 | 53 | 5 | 0 | 1.0e+08 | 3.23 |
| s5 | orl300-005-f | 2.16634153e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.36 |
| s5 | orl300-005-g | 2.17340809e+02 | yes | 1 | 19 | 22 | 22 | 1 | 0 | 1.0e+03 | 1.30 |
| s5 | orl300-005-h | 2.16074126e+02 | yes | 1 | 19 | 24 | 24 | 3 | 0 | 1.0e+03 | 1.44 |
| s5 | orl300-005-i | 2.14630110e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.36 |
| s5 | orl300-005-j | 2.15237468e+02 | yes | 1 | 19 | 23 | 23 | 2 | 0 | 1.0e+03 | 1.37 |
| s5 | orl300-05-a | 1.89268410e+02 | yes | 1 | 22 | 96 | 96 | 13 | 0 | 2.8e+08 | 6.22 |
| s5 | orl300-05-b | 1.69644514e+02 | yes | 1 | 13 | 14 | 14 | 0 | 0 | 1.0e+07 | 0.85 |
| s5 | orl300-05-c | 1.67024352e+02 | yes | 1 | 17 | 21 | 21 | 1 | 0 | 1.0e+03 | 1.17 |
| s5 | orl300-05-d | 1.75665661e+02 | yes | 1 | 13 | 14 | 14 | 0 | 0 | 1.0e+07 | 0.84 |
| s5 | orl300-05-e | 1.68134459e+02 | yes | 1 | 17 | 20 | 20 | 0 | 0 | 1.0e+03 | 1.14 |
| s5 | orl300-05-f | 1.70204410e+02 | yes | 1 | 17 | 20 | 20 | 0 | 0 | 1.0e+03 | 1.12 |
| s5 | orl300-05-g | 2.26792038e+02 | yes | 1 | 26 | 108 | 108 | 12 | 0 | 5.0e+08 | 6.69 |
| s5 | orl300-05-h | 1.67246367e+02 | yes | 1 | 17 | 20 | 20 | 0 | 0 | 1.0e+03 | 1.15 |
| s5 | orl300-05-i | 1.87559979e+02 | yes | 1 | 22 | 90 | 90 | 8 | 0 | 8.9e+09 | 7.20 |
| s5 | orl300-05-j | 1.81810689e+02 | yes | 1 | 13 | 14 | 14 | 0 | 0 | 1.3e+07 | 0.79 |
| s5 | orl400-005-a | 3.04616746e+02 | yes | 1 | 15 | 17 | 17 | 1 | 0 | 1.0e+07 | 1.97 |
| s5 | orl400-005-b | 3.00384923e+02 | yes | 1 | 18 | 28 | 28 | 1 | 0 | 1.1e+08 | 3.34 |
| s5 | orl400-005-c | 2.90532749e+02 | yes | 1 | 22 | 25 | 25 | 0 | 0 | 1.0e+03 | 2.73 |
| s5 | orl400-005-d | 2.90979744e+02 | yes | 1 | 15 | 17 | 17 | 0 | 0 | 1.0e+05 | 1.82 |
| s5 | orl400-005-e | 2.92683120e+02 | yes | 1 | 14 | 15 | 15 | 0 | 0 | 1.0e+06 | 1.61 |
| s5 | orl400-005-f | 3.05121024e+02 | yes | 1 | 15 | 18 | 18 | 2 | 0 | 1.0e+07 | 1.96 |
| s5 | orl400-005-g | 2.87875701e+02 | yes | 1 | 14 | 15 | 15 | 0 | 0 | 1.0e+06 | 1.62 |
| s5 | orl400-005-h | 2.90907865e+02 | yes | 1 | 22 | 25 | 25 | 0 | 0 | 1.0e+03 | 2.80 |
| s5 | orl400-005-i | 2.97036972e+02 | yes | 1 | 15 | 16 | 16 | 0 | 0 | 1.0e+07 | 1.84 |
| s5 | orl400-005-j | 2.95979246e+02 | yes | 1 | 14 | 15 | 15 | 0 | 0 | 1.6e+08 | 1.73 |
| s5 | orl400-05-a | 2.08102726e+02 | yes | 1 | 14 | 17 | 17 | 2 | 0 | 1.0e+07 | 1.91 |
| s5 | orl400-05-b | 2.04650622e+02 | yes | 1 | 13 | 17 | 17 | 3 | 0 | 1.0e+06 | 1.78 |
| s5 | orl400-05-c | 2.11505075e+02 | yes | 1 | 13 | 17 | 17 | 3 | 0 | 1.0e+07 | 1.79 |
| s5 | orl400-05-d | 2.15410963e+02 | yes | 1 | 15 | 17 | 17 | 1 | 0 | 1.0e+08 | 1.86 |
| s5 | orl400-05-e | 2.14867634e+02 | yes | 1 | 14 | 16 | 16 | 1 | 0 | 1.0e+08 | 1.76 |
| s5 | orl400-05-f | 2.04034766e+02 | yes | 1 | 14 | 23 | 23 | 6 | 0 | 1.0e+05 | 2.42 |
| s5 | orl400-05-g | 2.19109574e+02 | yes | 1 | 14 | 17 | 17 | 2 | 0 | 1.0e+07 | 1.87 |
| s5 | orl400-05-h | 2.24148234e+02 | yes | 1 | 28 | 44 | 44 | 5 | 0 | 1.0e+08 | 4.93 |
| s5 | orl400-05-i | 2.03750797e+02 | yes | 1 | 18 | 23 | 23 | 3 | 0 | 1.0e+03 | 2.48 |
| s5 | orl400-05-j | 2.03915488e+02 | yes | 1 | 18 | 25 | 25 | 5 | 0 | 1.0e+03 | 2.73 |
| s5 | pard200-a | 4.11202154e+02 | yes | 1 | 26 | 29 | 29 | 0 | 0 | 1.0e+03 | 0.74 |
| s5 | pard200-b | 7.26128445e+02 | yes | 1 | 19 | 63 | 63 | 9 | 0 | 5.9e+08 | 3.02 |
| s5 | pard200-c | 4.36275926e+02 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 7.5e+07 | 0.38 |
| s5 | pard200-d | 4.19539730e+02 | yes | 1 | 14 | 21 | 21 | 2 | 0 | 4.1e+08 | 0.59 |
| s5 | pard200-e | 4.11101246e+02 | yes | 1 | 26 | 30 | 30 | 1 | 0 | 1.0e+03 | 0.77 |
| s5 | pard200-f | 4.06353714e+02 | yes | 1 | 26 | 31 | 31 | 2 | 0 | 1.0e+03 | 0.82 |
| s5 | pard200-g | 4.17008150e+02 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 3.0e+07 | 0.45 |
| s5 | pard200-h | 4.12107147e+02 | yes | 1 | 26 | 29 | 29 | 1 | 0 | 1.0e+03 | 0.75 |
| s5 | pard200-i | 4.10460364e+02 | yes | 1 | 26 | 30 | 30 | 2 | 0 | 1.0e+03 | 0.78 |
| s5 | pard200-j | 4.08608545e+02 | yes | 1 | 26 | 29 | 29 | 0 | 0 | 1.0e+03 | 0.76 |
| s5 | pard300-a | 6.09445386e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.06 |
| s5 | pard300-b | 7.57456026e+02 | yes | 1 | 27 | 100 | 100 | 0 | 0 | 1.0e+09 | 7.54 |
| s5 | pard300-c | 6.33815683e+02 | yes | 1 | 12 | 13 | 13 | 0 | 0 | 1.0e+07 | 0.85 |
| s5 | pard300-d | 6.12149201e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.03 |
| s5 | pard300-e | 6.08952959e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.05 |
| s5 | pard300-f | 6.05916252e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.05 |
| s5 | pard300-g | 6.08415419e+02 | yes | 1 | 16 | 24 | 24 | 3 | 0 | 2.3e+08 | 1.64 |
| s5 | pard300-h | 6.11391091e+02 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+04 | 1.03 |
| s5 | pard300-i | 6.23686757e+02 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 1.0e+07 | 0.91 |
| s5 | pard300-j | 6.21156724e+02 | yes | 1 | 13 | 16 | 16 | 0 | 0 | 1.0e+04 | 1.12 |
| s5 | pard400-a | 8.07743825e+02 | yes | 1 | 14 | 23 | 23 | 7 | 0 | 1.0e+06 | 2.77 |
| s5 | pard400-b | 1.27517956e+03 | yes | 1 | 24 | 108 | 108 | 8 | 0 | 2.3e+10 | 13.68 |
| s5 | pard400-c | 8.58535626e+02 | yes | 1 | 15 | 29 | 29 | 2 | 0 | 4.7e+08 | 3.54 |
| s5 | pard400-d | 8.08813087e+02 | yes | 1 | 11 | 18 | 18 | 6 | 0 | 1.0e+07 | 2.14 |
| s5 | pard400-e | 8.10912704e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+04 | 2.25 |
| s5 | pard400-f | 1.96975062e+03 | yes | 1 | 21 | 109 | 109 | 12 | 0 | 7.4e+09 | 16.60 |
| s5 | pard400-g | 8.14368781e+02 | yes | 1 | 14 | 19 | 19 | 2 | 0 | 1.0e+04 | 2.43 |
| s5 | pard400-h | 8.10210999e+02 | yes | 1 | 12 | 16 | 16 | 3 | 0 | 1.0e+07 | 1.89 |
| s5 | pard400-i | 8.08575873e+02 | yes | 1 | 14 | 18 | 18 | 1 | 0 | 1.0e+04 | 2.32 |
| s5 | pard400-j | 8.10310784e+02 | yes | 1 | 14 | 18 | 18 | 1 | 0 | 1.0e+04 | 2.31 |
| s10 | orl200-005-a | 7.63998073e+01 | yes | 1 | 12 | 15 | 15 | 1 | 0 | 1.0e+03 | 1.00 |
| s10 | orl200-005-b | 7.59532767e+01 | yes | 1 | 12 | 17 | 17 | 2 | 0 | 1.0e+03 | 1.09 |
| s10 | orl200-005-c | 7.99241783e+01 | yes | 1 | 11 | 13 | 13 | 1 | 0 | 1.0e+06 | 0.99 |
| s10 | orl200-005-d | 7.72036294e+01 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+03 | 0.96 |
| s10 | orl200-005-e | 7.60113947e+01 | yes | 1 | 12 | 15 | 15 | 1 | 0 | 1.0e+03 | 0.98 |
| s10 | orl200-005-f | 7.92587423e+01 | yes | 1 | 11 | 14 | 14 | 2 | 0 | 1.0e+06 | 1.05 |
| s10 | orl200-005-g | 7.64528294e+01 | yes | 1 | 11 | 14 | 14 | 2 | 0 | 1.0e+07 | 1.07 |
| s10 | orl200-005-h | 7.83702961e+01 | yes | 1 | 12 | 15 | 15 | 2 | 0 | 1.0e+07 | 1.23 |
| s10 | orl200-005-i | 7.80161011e+01 | yes | 1 | 12 | 15 | 15 | 0 | 0 | 1.0e+03 | 0.98 |
| s10 | orl200-005-j | 7.63921174e+01 | yes | 1 | 19 | 29 | 29 | 0 | 0 | 1.0e+08 | 3.13 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s10 | orl200-05-a | 5.52595169e+01 | yes | 1 | 11 | 18 | 18 | 5 | 0 | 1.0e+03 | 1.12 |
| s10 | orl200-05-b | 5.49726734e+01 | yes | 1 | 11 | 19 | 19 | 6 | 0 | 1.0e+03 | 1.18 |
| s10 | orl200-05-c | 5.56710544e+01 | yes | 1 | 11 | 18 | 18 | 5 | 0 | 1.0e+03 | 1.12 |
| s10 | orl200-05-d | 6.04349179e+01 | yes | 1 | 15 | 19 | 19 | 3 | 0 | 2.4e+07 | 1.48 |
| s10 | orl200-05-e | 7.11185909e+01 | yes | 1 | 20 | 64 | 64 | 15 | 0 | 4.4e+08 | 9.34 |
| s10 | orl200-05-f | 5.95756921e+01 | yes | 1 | 16 | 18 | 18 | 1 | 0 | 1.7e+07 | 1.42 |
| s10 | orl200-05-g | 5.60047776e+01 | yes | 1 | 11 | 15 | 15 | 2 | 0 | 1.0e+03 | 0.94 |
| s10 | orl200-05-h | 5.48324490e+01 | yes | 1 | 11 | 16 | 16 | 3 | 0 | 1.0e+03 | 1.01 |
| s10 | orl200-05-i | 5.52765889e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 1.08 |
| s10 | orl200-05-j | 5.83750918e+01 | yes | 1 | 11 | 16 | 16 | 4 | 0 | 1.0e+07 | 1.18 |
| s10 | orl300-005-a | 1.23030083e+02 | yes | 1 | 17 | 45 | 45 | 3 | 0 | 4.0e+08 | 14.14 |
| s10 | orl300-005-b | 1.13924490e+02 | yes | 1 | 12 | 17 | 17 | 4 | 0 | 1.0e+06 | 3.23 |
| s10 | orl300-005-c | 1.11718335e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 3.01 |
| s10 | orl300-005-d | 1.16825116e+02 | yes | 1 | 12 | 17 | 17 | 4 | 0 | 1.8e+08 | 3.66 |
| s10 | orl300-005-e | 1.11160654e+02 | yes | 1 | 13 | 17 | 17 | 3 | 0 | 1.0e+06 | 3.24 |
| s10 | orl300-005-f | 1.11966557e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 3.02 |
| s10 | orl300-005-g | 1.12176031e+02 | yes | 1 | 14 | 18 | 18 | 2 | 0 | 1.0e+03 | 3.07 |
| s10 | orl300-005-h | 1.11664060e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 3.23 |
| s10 | orl300-005-i | 1.10603384e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 3.19 |
| s10 | orl300-005-j | 1.11553485e+02 | yes | 1 | 14 | 19 | 19 | 3 | 0 | 1.0e+03 | 3.22 |
| s10 | orl300-05-a | 1.12005939e+02 | yes | 1 | 18 | 78 | 78 | 20 | 0 | 6.0e+08 | 25.20 |
| s10 | orl300-05-b | 8.87713550e+01 | yes | 1 | 12 | 13 | 13 | 0 | 0 | 1.0e+07 | 2.84 |
| s10 | orl300-05-c | 8.80367379e+01 | yes | 1 | 19 | 21 | 21 | 1 | 0 | 1.0e+08 | 5.18 |
| s10 | orl300-05-d | 9.22449485e+01 | yes | 1 | 12 | 13 | 13 | 0 | 0 | 1.0e+07 | 2.83 |
| s10 | orl300-05-e | 8.69932113e+01 | yes | 1 | 13 | 16 | 16 | 0 | 0 | 1.0e+03 | 2.64 |
| s10 | orl300-05-f | 8.64305699e+01 | yes | 1 | 13 | 16 | 16 | 0 | 0 | 1.0e+03 | 2.62 |
| s10 | orl300-05-g | 1.18441380e+02 | yes | 1 | 22 | 89 | 89 | 24 | 0 | 1.0e+08 | 27.22 |
| s10 | orl300-05-h | 8.73170765e+01 | yes | 1 | 13 | 16 | 16 | 0 | 0 | 1.0e+03 | 2.64 |
| s10 | orl300-05-i | 1.13283211e+02 | yes | 1 | 19 | 89 | 89 | 18 | 0 | 1.8e+09 | 30.85 |
| s10 | orl300-05-j | 9.40289905e+01 | yes | 1 | 17 | 18 | 18 | 0 | 0 | 2.3e+07 | 3.72 |
| s10 | orl400-005-a | 1.57194946e+02 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 1.0e+07 | 6.57 |
| s10 | orl400-005-b | 1.56185657e+02 | yes | 1 | 12 | 17 | 17 | 2 | 0 | 2.0e+08 | 7.71 |
| s10 | orl400-005-c | 1.47188898e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+03 | 6.23 |
| s10 | orl400-005-d | 1.49243573e+02 | yes | 1 | 26 | 50 | 50 | 0 | 0 | 1.0e+08 | 29.57 |
| s10 | orl400-005-e | 1.50472826e+02 | yes | 1 | 12 | 15 | 15 | 2 | 0 | 1.0e+06 | 5.60 |
| s10 | orl400-005-f | 1.57054243e+02 | yes | 1 | 13 | 17 | 17 | 3 | 0 | 1.0e+07 | 6.67 |
| s10 | orl400-005-g | 1.49259138e+02 | yes | 1 | 12 | 13 | 13 | 0 | 0 | 1.0e+06 | 4.94 |
| s10 | orl400-005-h | 1.49193582e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+03 | 6.27 |
| s10 | orl400-005-i | 1.50854376e+02 | yes | 1 | 13 | 15 | 15 | 1 | 0 | 1.0e+07 | 6.14 |
| s10 | orl400-005-j | 1.55682435e+02 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 3.0e+07 | 6.05 |
| s10 | orl400-05-a | 1.08348348e+02 | yes | 1 | 13 | 19 | 19 | 5 | 0 | 1.0e+07 | 7.26 |
| s10 | orl400-05-b | 1.05597494e+02 | yes | 1 | 12 | 19 | 19 | 6 | 0 | 1.0e+06 | 6.63 |
| s10 | orl400-05-c | 1.08953659e+02 | yes | 1 | 13 | 20 | 20 | 6 | 0 | 1.0e+07 | 7.42 |
| s10 | orl400-05-d | 1.13749514e+02 | yes | 1 | 13 | 17 | 17 | 3 | 0 | 1.4e+08 | 6.75 |
| s10 | orl400-05-e | 1.13700981e+02 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 1.3e+07 | 6.33 |
| s10 | orl400-05-f | 1.16412323e+02 | yes | 1 | 21 | 69 | 69 | 8 | 0 | 1.0e+09 | 42.81 |
| s10 | orl400-05-g | 1.11547824e+02 | yes | 1 | 12 | 18 | 18 | 5 | 0 | 1.3e+08 | 7.38 |
| s10 | orl400-05-h | 1.50194736e+02 | yes | 1 | 25 | 56 | 56 | 8 | 0 | 1.0e+08 | 28.12 |
| s10 | orl400-05-i | 1.04714575e+02 | yes | 1 | 14 | 20 | 20 | 4 | 0 | 1.0e+03 | 6.32 |
| s10 | orl400-05-j | 1.04792437e+02 | yes | 1 | 14 | 20 | 20 | 4 | 0 | 1.0e+03 | 6.31 |
| s10 | pard200-a | 2.11728931e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.0e+03 | 1.54 |
| s10 | pard200-b | 3.21229848e+02 | yes | 1 | 21 | 65 | 65 | 13 | 0 | 1.2e+09 | 9.74 |
| s10 | pard200-c | 2.23542160e+02 | yes | 1 | 14 | 24 | 24 | 2 | 0 | 1.3e+08 | 2.57 |
| s10 | pard200-d | 2.19852838e+02 | yes | 1 | 15 | 17 | 17 | 1 | 0 | 7.6e+07 | 1.55 |
| s10 | pard200-e | 2.11873957e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 1.48 |
| s10 | pard200-f | 2.07431760e+02 | yes | 1 | 17 | 20 | 20 | 1 | 0 | 1.1e+03 | 1.42 |
| s10 | pard200-g | 2.17431605e+02 | yes | 1 | 17 | 21 | 21 | 2 | 0 | 5.4e+07 | 1.88 |
| s10 | pard200-h | 2.13337694e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 1.51 |
| s10 | pard200-i | 2.10095282e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.1e+03 | 1.57 |
| s10 | pard200-j | 2.09683632e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.0e+03 | 1.55 |
| s10 | pard300-a | 3.09381556e+02 | yes | 1 | 22 | 25 | 25 | 0 | 0 | 1.0e+03 | 4.68 |
| s10 | pard300-b | 3.36484533e+02 | yes | 1 | 25 | 77 | 77 | 0 | 0 | 1.0e+09 | 27.18 |
| s10 | pard300-c | 3.28459064e+02 | yes | 1 | 14 | 16 | 16 | 1 | 0 | 1.6e+07 | 3.57 |
| s10 | pard300-d | 3.09529755e+02 | yes | 1 | 16 | 19 | 19 | 0 | 0 | 1.0e+04 | 3.64 |
| s10 | pard300-e | 3.09901473e+02 | yes | 1 | 22 | 25 | 25 | 0 | 0 | 1.0e+03 | 4.70 |
| s10 | pard300-f | 3.09780033e+02 | yes | 1 | 22 | 25 | 25 | 0 | 0 | 1.0e+03 | 4.59 |
| s10 | pard300-g | 3.13494872e+02 | yes | 1 | 12 | 20 | 20 | 7 | 0 | 4.2e+07 | 4.80 |
| s10 | pard300-h | 3.08958517e+02 | yes | 1 | 22 | 25 | 25 | 0 | 0 | 1.0e+03 | 4.68 |
| s10 | pard300-i | 3.25091466e+02 | yes | 1 | 13 | 15 | 15 | 1 | 0 | 1.4e+07 | 3.20 |
| s10 | pard300-j | 3.13352757e+02 | yes | 1 | 23 | 26 | 26 | 0 | 0 | 1.0e+03 | 5.07 |
| s10 | pard400-a | 4.08640409e+02 | yes | 1 | 18 | 30 | 30 | 9 | 0 | 1.0e+04 | 10.87 |
| s10 | pard400-b | 5.56634185e+02 | yes | 1 | 20 | 105 | 105 | 17 | 0 | 4.6e+09 | 74.03 |
| s10 | pard400-c | 4.45054019e+02 | yes | 1 | 14 | 37 | 37 | 1 | 0 | 8.7e+08 | 23.87 |
| s10 | pard400-d | 4.09501860e+02 | yes | 1 | 15 | 25 | 25 | 9 | 0 | 1.0e+07 | 9.52 |
| s10 | pard400-e | 4.30030172e+02 | yes | 1 | 26 | 62 | 62 | 1 | 0 | 1.0e+09 | 38.78 |
| s10 | pard400-f | 6.86581235e+02 | yes | 1 | 24 | 126 | 126 | 14 | 0 | 1.5e+09 | 87.00 |
| s10 | pard400-g | 4.11544272e+02 | yes | 1 | 26 | 31 | 31 | 3 | 0 | 1.0e+03 | 10.96 |
| s10 | pard400-h | 4.08363727e+02 | yes | 1 | 16 | 25 | 25 | 8 | 0 | 1.2e+07 | 10.01 |
| s10 | pard400-i | 4.08814052e+02 | yes | 1 | 26 | 29 | 29 | 1 | 0 | 1.0e+03 | 10.35 |
| s10 | pard400-j | 4.08730701e+02 | yes | 1 | 26 | 32 | 32 | 4 | 0 | 1.0e+03 | 11.47 |
| s20 | orl200-005-a | 4.19100744e+01 | yes | 1 | 25 | 28 | 28 | 0 | 0 | 1.0e+02 | 5.20 |
| s20 | orl200-005-b | 4.16565460e+01 | yes | 1 | 25 | 28 | 28 | 0 | 0 | 1.0e+02 | 5.21 |
| s20 | orl200-005-c | 4.30617943e+01 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 1.6e+06 | 3.68 |

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| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s20 | orl200-005-d | 4.21655640e+01 | yes | 1 | 25 | 28 | 28 | 0 | 0 | 1.0e+02 | 5.21 |
| s20 | orl200-005-e | 4.18151705e+01 | yes | 1 | 25 | 28 | 28 | 0 | 0 | 1.0e+02 | 5.21 |
| s20 | orl200-005-f | 4.30318446e+01 | yes | 1 | 15 | 19 | 19 | 3 | 0 | 1.0e+06 | 4.07 |
| s20 | orl200-005-g | 4.29683698e+01 | yes | 1 | 14 | 16 | 16 | 1 | 0 | 1.2e+06 | 3.57 |
| s20 | orl200-005-h | 4.50679315e+01 | yes | 1 | 13 | 15 | 15 | 1 | 0 | 1.8e+06 | 3.40 |
| s20 | orl200-005-i | 4.25912967e+01 | yes | 1 | 26 | 29 | 29 | 0 | 0 | 1.0e+02 | 5.40 |
| s20 | orl200-005-j | 4.09268282e+01 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.0e+04 | 4.10 |
| s20 | orl200-05-a | 3.09311169e+01 | yes | 1 | 21 | 27 | 27 | 4 | 0 | 1.0e+02 | 4.72 |
| s20 | orl200-05-b | 3.08569522e+01 | yes | 1 | 21 | 31 | 31 | 8 | 0 | 1.0e+02 | 5.45 |
| s20 | orl200-05-c | 3.10927784e+01 | yes | 1 | 21 | 28 | 28 | 5 | 0 | 1.0e+02 | 4.93 |
| s20 | orl200-05-d | 3.53636892e+01 | yes | 1 | 12 | 13 | 13 | 0 | 0 | 4.7e+07 | 3.45 |
| s20 | orl200-05-e | 4.11660576e+01 | yes | 1 | 24 | 58 | 58 | 27 | 0 | 8.2e+07 | 17.97 |
| s20 | orl200-05-f | 3.35481735e+01 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 3.2e+07 | 3.56 |
| s20 | orl200-05-g | 3.13769523e+01 | yes | 1 | 21 | 24 | 24 | 3 | 0 | 1.0e+02 | 4.19 |
| s20 | orl200-05-h | 3.04982144e+01 | yes | 1 | 21 | 28 | 28 | 5 | 0 | 1.0e+02 | 4.92 |
| s20 | orl200-05-i | 3.10942833e+01 | yes | 1 | 21 | 30 | 30 | 7 | 0 | 1.0e+02 | 5.26 |
| s20 | orl200-05-j | 3.26149268e+01 | yes | 1 | 14 | 19 | 19 | 4 | 0 | 1.1e+07 | 4.02 |
| s20 | orl300-005-a | 7.33372361e+01 | yes | 1 | 12 | 13 | 13 | 0 | 0 | 7.6e+07 | 9.63 |
| s20 | orl300-005-b | 6.07800641e+01 | yes | 1 | 11 | 17 | 17 | 5 | 0 | 1.0e+06 | 10.16 |
| s20 | orl300-005-c | 5.97862164e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 8.94 |
| s20 | orl300-005-d | 6.42288189e+01 | yes | 1 | 14 | 21 | 21 | 6 | 0 | 3.2e+07 | 13.38 |
| s20 | orl300-005-e | 5.90102825e+01 | yes | 1 | 11 | 15 | 15 | 3 | 0 | 1.0e+06 | 9.12 |
| s20 | orl300-005-f | 5.98545838e+01 | yes | 1 | 11 | 15 | 15 | 2 | 0 | 1.0e+03 | 7.93 |
| s20 | orl300-005-g | 5.95657973e+01 | yes | 1 | 11 | 16 | 16 | 3 | 0 | 1.0e+03 | 8.49 |
| s20 | orl300-005-h | 5.93516295e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 9.01 |
| s20 | orl300-005-i | 5.85760512e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 8.96 |
| s20 | orl300-005-j | 5.96354737e+01 | yes | 1 | 11 | 17 | 17 | 4 | 0 | 1.0e+03 | 8.91 |
| s20 | orl300-05-a | 6.76472171e+01 | yes | 1 | 21 | 75 | 75 | 24 | 0 | 1.1e+08 | 65.13 |
| s20 | orl300-05-b | 4.93186951e+01 | yes | 1 | 14 | 18 | 18 | 3 | 0 | 1.9e+07 | 11.55 |
| s20 | orl300-05-c | 4.67468829e+01 | yes | 1 | 27 | 30 | 30 | 0 | 0 | 1.0e+02 | 15.10 |
| s20 | orl300-05-d | 4.99858590e+01 | yes | 1 | 14 | 16 | 16 | 1 | 0 | 1.4e+07 | 9.71 |
| s20 | orl300-05-e | 4.67398511e+01 | yes | 1 | 27 | 31 | 31 | 1 | 0 | 1.0e+02 | 15.54 |
| s20 | orl300-05-f | 4.66400299e+01 | yes | 1 | 27 | 30 | 30 | 0 | 0 | 1.0e+02 | 14.98 |
| s20 | orl300-05-g | 7.10254410e+01 | yes | 1 | 22 | 71 | 71 | 25 | 0 | 1.8e+08 | 64.63 |
| s20 | orl300-05-h | 4.71400111e+01 | yes | 1 | 27 | 30 | 30 | 0 | 0 | 1.0e+02 | 15.03 |
| s20 | orl300-05-i | 6.49591922e+01 | yes | 1 | 21 | 119 | 119 | 32 | 0 | 3.3e+09 | 128.27 |
| s20 | orl300-05-j | 5.08228802e+01 | yes | 1 | 13 | 16 | 16 | 2 | 0 | 4.2e+07 | 10.86 |
| s20 | orl400-005-a | 8.09938984e+01 | yes | 1 | 12 | 17 | 17 | 4 | 0 | 1.4e+07 | 22.42 |
| s20 | orl400-005-b | 9.03104674e+01 | yes | 1 | 15 | 18 | 18 | 2 | 0 | 3.8e+07 | 23.57 |
| s20 | orl400-005-c | 7.69597661e+01 | yes | 1 | 12 | 16 | 16 | 1 | 0 | 1.0e+03 | 17.17 |
| s20 | orl400-005-d | 8.01766945e+01 | yes | 1 | 20 | 30 | 30 | 1 | 0 | 1.0e+08 | 52.73 |
| s20 | orl400-005-e | 7.93782267e+01 | yes | 1 | 11 | 16 | 16 | 4 | 0 | 1.0e+06 | 19.25 |
| s20 | orl400-005-f | 7.90080599e+01 | yes | 1 | 14 | 30 | 30 | 15 | 0 | 1.0e+08 | 42.12 |
| s20 | orl400-005-g | 7.83950971e+01 | yes | 1 | 11 | 14 | 14 | 2 | 0 | 1.0e+06 | 16.93 |
| s20 | orl400-005-h | 7.80509265e+01 | yes | 1 | 12 | 16 | 16 | 1 | 0 | 1.0e+03 | 16.88 |
| s20 | orl400-005-i | 7.81605075e+01 | yes | 1 | 12 | 19 | 19 | 6 | 0 | 1.3e+07 | 24.51 |
| s20 | orl400-005-j | 8.53376852e+01 | yes | 1 | 13 | 17 | 17 | 2 | 0 | 5.7e+07 | 23.94 |
| s20 | orl400-05-a | 5.92723203e+01 | yes | 1 | 12 | 16 | 16 | 3 | 0 | 1.1e+07 | 20.23 |
| s20 | orl400-05-b | 5.70154825e+01 | yes | 1 | 11 | 18 | 18 | 6 | 0 | 1.0e+06 | 20.35 |
| s20 | orl400-05-c | 5.91399388e+01 | yes | 1 | 11 | 18 | 18 | 6 | 0 | 1.0e+07 | 20.66 |
| s20 | orl400-05-d | 6.22003499e+01 | yes | 1 | 15 | 19 | 19 | 3 | 0 | 2.6e+07 | 23.54 |
| s20 | orl400-05-e | 6.12259705e+01 | yes | 1 | 15 | 22 | 22 | 6 | 0 | 2.4e+07 | 26.61 |
| s20 | orl400-05-f | 5.55421173e+01 | yes | 1 | 12 | 22 | 22 | 7 | 0 | 1.0e+03 | 22.00 |
| s20 | orl400-05-g | 6.14823334e+01 | yes | 1 | 15 | 21 | 21 | 5 | 0 | 2.5e+07 | 25.53 |
| s20 | orl400-05-h | 5.74301426e+01 | yes | 1 | 18 | 40 | 40 | 12 | 0 | 1.0e+08 | 59.88 |
| s20 | orl400-05-i | 5.54747480e+01 | yes | 1 | 11 | 21 | 21 | 8 | 0 | 1.0e+03 | 21.12 |
| s20 | orl400-05-j | 5.57057223e+01 | yes | 1 | 11 | 19 | 19 | 6 | 0 | 1.0e+03 | 19.18 |
| s20 | pard200-a | 1.11652762e+02 | yes | 1 | 11 | 14 | 14 | 0 | 0 | 2.1e+03 | 2.99 |
| s20 | pard200-b | 1.55862347e+02 | yes | 1 | 16 | 73 | 73 | 25 | 0 | 2.0e+08 | 27.23 |
| s20 | pard200-c | 1.28617138e+02 | yes | 1 | 13 | 20 | 20 | 1 | 0 | 2.2e+08 | 6.68 |
| s20 | pard200-d | 1.20775299e+02 | yes | 1 | 12 | 14 | 14 | 1 | 0 | 1.4e+08 | 4.17 |
| s20 | pard200-e | 1.11511401e+02 | yes | 1 | 11 | 14 | 14 | 1 | 0 | 2.1e+03 | 2.99 |
| s20 | pard200-f | 1.09175616e+02 | yes | 1 | 28 | 31 | 31 | 1 | 0 | 2.2e+02 | 6.46 |
| s20 | pard200-g | 1.25076814e+02 | yes | 1 | 13 | 16 | 16 | 0 | 0 | 9.7e+07 | 4.87 |
| s20 | pard200-h | 1.12710818e+02 | yes | 1 | 11 | 14 | 14 | 1 | 0 | 2.2e+03 | 3.01 |
| s20 | pard200-i | 1.10088180e+02 | yes | 1 | 11 | 14 | 14 | 1 | 0 | 2.1e+03 | 3.04 |
| s20 | pard200-j | 1.10553737e+02 | yes | 1 | 11 | 14 | 14 | 0 | 0 | 2.1e+03 | 3.01 |
| s20 | pard300-a | 1.59037242e+02 | yes | 1 | 14 | 17 | 17 | 0 | 0 | 1.4e+03 | 9.93 |
| s20 | pard300-b | 1.61369510e+02 | yes | 1 | 15 | 18 | 18 | 0 | 0 | 1.3e+03 | 10.72 |
| s20 | pard300-c | 1.63064518e+02 | yes | 1 | 12 | 21 | 21 | 8 | 0 | 3.1e+07 | 14.49 |
| s20 | pard300-d | 1.59407733e+02 | yes | 1 | 14 | 17 | 17 | 0 | 0 | 1.4e+03 | 10.04 |
| s20 | pard300-e | 1.60691615e+02 | yes | 1 | 14 | 17 | 17 | 0 | 0 | 1.4e+03 | 10.21 |
| s20 | pard300-f | 1.60469408e+02 | yes | 1 | 14 | 17 | 17 | 0 | 0 | 1.4e+03 | 10.19 |
| s20 | pard300-g | 1.78284777e+02 | yes | 1 | 14 | 17 | 17 | 2 | 0 | 7.6e+07 | 12.67 |
| s20 | pard300-h | 1.59742852e+02 | yes | 1 | 14 | 17 | 17 | 0 | 0 | 1.4e+03 | 10.16 |
| s20 | pard300-i | 1.61909790e+02 | yes | 1 | 12 | 20 | 20 | 7 | 0 | 2.6e+07 | 14.07 |
| s20 | pard300-j | 1.62191850e+02 | yes | 1 | 14 | 17 | 17 | 0 | 0 | 1.4e+03 | 10.19 |
| s20 | pard400-a | 2.08784654e+02 | yes | 1 | 18 | 35 | 35 | 14 | 0 | 1.1e+03 | 40.34 |
| s20 | pard400-b | 2.98907317e+02 | yes | 1 | 22 | 121 | 121 | 32 | 0 | 7.8e+09 | 268.01 |
| s20 | pard400-c | 2.34690483e+02 | yes | 1 | 13 | 19 | 19 | 1 | 0 | 1.6e+08 | 31.35 |
| s20 | pard400-d | 2.10937744e+02 | yes | 1 | 12 | 17 | 17 | 4 | 0 | 1.3e+07 | 21.91 |
| s20 | pard400-e | 2.14149535e+02 | yes | 1 | 27 | 40 | 40 | 1 | 0 | 1.0e+08 | 74.00 |
| s20 | pard400-f | 2.92792312e+02 | yes | 1 | 19 | 109 | 109 | 27 | 0 | 2.8e+09 | 236.38 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s20 | pard400-g | 2.11152332e+02 | yes | 1 | 18 | 22 | 22 | 2 | 0 | 1.0e+03 | 25.27 |
| s20 | pard400-h | 2.14857031e+02 | yes | 1 | 12 | 18 | 18 | 5 | 0 | 2.2e+07 | 24.48 |
| s20 | pard400-i | 2.09667485e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 24.24 |
| s20 | pard400-j | 2.09225715e+02 | yes | 1 | 18 | 21 | 21 | 1 | 0 | 1.1e+03 | 24.24 |

Table 9: Mean-variance portfolios, CPS $AL_0$.

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.44478796e+02 | yes | 1 | 16 | 23 | 23 | 5 | 0 | 1.0e+03 | 0.66 |
| s5 | orl200-005-b | 1.44752841e+02 | yes | 1 | 16 | 23 | 23 | 5 | 0 | 1.0e+03 | 0.63 |
| s5 | orl200-005-c | 1.46101546e+02 | yes | 1 | 26 | 77 | 77 | 4 | 7 | 1.0e+09 | 2.11 |
| s5 | orl200-005-d | 1.45944775e+02 | yes | 1 | 16 | 23 | 23 | 5 | 0 | 1.0e+03 | 0.63 |
| s5 | orl200-005-e | 1.44667773e+02 | yes | 1 | 17 | 23 | 23 | 4 | 2 | 1.0e+05 | 0.55 |
| s5 | orl200-005-f | 1.49212586e+02 | yes | 1 | 26 | 67 | 67 | 5 | 1 | 1.0e+09 | 1.84 |
| s5 | orl200-005-g | 1.44729989e+02 | yes | 1 | 28 | 90 | 90 | 5 | 4 | 1.0e+10 | 2.41 |
| s5 | orl200-005-h | 1.45909936e+02 | yes | 1 | 29 | 100 | 100 | 5 | 6 | 1.0e+10 | 2.88 |
| s5 | orl200-005-i | 1.46590198e+02 | yes | 1 | 17 | 22 | 22 | 3 | 2 | 1.0e+05 | 0.55 |
| s5 | orl200-005-j | 1.44987893e+02 | yes | 1 | 16 | 22 | 22 | 4 | 1 | 1.0e+04 | 0.55 |
| s5 | orl200-05-a | 1.04232888e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 0.67 |
| s5 | orl200-05-b | 1.03706536e+02 | yes | 1 | 14 | 25 | 25 | 9 | 0 | 1.0e+03 | 0.64 |
| s5 | orl200-05-c | 1.05604532e+02 | yes | 1 | 14 | 21 | 21 | 5 | 0 | 1.0e+03 | 0.56 |
| s5 | orl200-05-d | 1.10143753e+02 | yes | 1 | 23 | 93 | 93 | 7 | 4 | 1.0e+10 | 2.33 |
| s5 | orl200-05-e | 1.13457187e+02 | yes | 1 | 25 | 113 | 113 | 11 | 5 | 1.0e+10 | 3.22 |
| s5 | orl200-05-f | 1.07815123e+02 | yes | 1 | 31 | 118 | 118 | 9 | 10 | 1.0e+09 | 3.25 |
| s5 | orl200-05-g | 1.05788540e+02 | yes | 1 | 14 | 22 | 22 | 6 | 0 | 1.0e+03 | 0.58 |
| s5 | orl200-05-h | 1.04958865e+02 | yes | 1 | 14 | 23 | 23 | 7 | 0 | 1.0e+03 | 0.60 |
| s5 | orl200-05-i | 1.04784005e+02 | yes | 1 | 14 | 22 | 22 | 6 | 1 | 1.0e+04 | 0.54 |
| s5 | orl200-05-j | 1.07622204e+02 | yes | 1 | 29 | 131 | 131 | 7 | 7 | 1.0e+10 | 3.89 |
| s5 | orl300-005-a | 2.35036434e+02 | yes | 1 | 43 | 230 | 230 | 8 | 22 | 1.0e+10 | 17.83 |
| s5 | orl300-005-b | 2.19580571e+02 | yes | 1 | 25 | 110 | 110 | 5 | 4 | 1.0e+10 | 8.65 |
| s5 | orl300-005-c | 2.16314165e+02 | yes | 1 | 19 | 26 | 26 | 5 | 0 | 1.0e+03 | 1.78 |
| s5 | orl300-005-d | 2.22331762e+02 | yes | 1 | 27 | 92 | 92 | 5 | 3 | 1.0e+10 | 5.16 |
| s5 | orl300-005-e | 2.16499755e+02 | yes | 1 | 27 | 72 | 72 | 5 | 3 | 1.0e+09 | 4.37 |
| s5 | orl300-005-f | 2.16634153e+02 | yes | 1 | 19 | 27 | 27 | 6 | 0 | 1.0e+03 | 1.85 |
| s5 | orl300-005-g | 2.17340809e+02 | yes | 1 | 19 | 29 | 29 | 8 | 0 | 1.0e+03 | 1.93 |
| s5 | orl300-005-h | 2.16074126e+02 | yes | 1 | 19 | 26 | 26 | 5 | 0 | 1.0e+03 | 1.80 |
| s5 | orl300-005-i | 2.15382371e+02 | yes | 1 | 19 | 25 | 25 | 4 | 0 | 1.0e+03 | 1.73 |
| s5 | orl300-005-j | 2.15237468e+02 | yes | 1 | 19 | 26 | 26 | 5 | 0 | 1.0e+03 | 1.77 |
| s5 | orl300-05-a | 1.67216383e+02 | yes | 1 | 29 | 108 | 108 | 7 | 6 | 1.0e+10 | 7.21 |
| s5 | orl300-05-b | 1.66150497e+02 | yes | 1 | 26 | 78 | 78 | 11 | 3 | 1.0e+10 | 5.20 |
| s5 | orl300-05-c | 1.64705157e+02 | yes | 1 | 22 | 31 | 31 | 7 | 5 | 1.0e+06 | 1.70 |
| s5 | orl300-05-d | 1.67186365e+02 | yes | 1 | 18 | 29 | 29 | 9 | 2 | 1.0e+05 | 1.64 |
| s5 | orl300-05-e | 1.65624153e+02 | yes | 1 | 24 | 37 | 37 | 11 | 6 | 1.0e+06 | 1.98 |
| s5 | orl300-05-f | 1.64351584e+02 | yes | 1 | 17 | 32 | 32 | 13 | 1 | 1.0e+04 | 1.85 |
| s5 | orl300-05-g | 1.80264183e+02 | yes | 1 | 26 | 109 | 109 | 14 | 5 | 1.0e+10 | 7.30 |
| s5 | orl300-05-h | 1.65493059e+02 | yes | 1 | 18 | 32 | 32 | 12 | 2 | 1.0e+05 | 1.80 |
| s5 | orl300-05-i | 1.81590664e+02 | yes | 1 | 28 | 133 | 133 | 13 | 3 | 1.0e+10 | 10.01 |
| s5 | orl300-05-j | 1.70246896e+02 | yes | 1 | 27 | 126 | 126 | 17 | 8 | 1.0e+10 | 9.08 |
| s5 | orl400-005-a | 2.92083450e+02 | yes | 1 | 31 | 126 | 126 | 6 | 9 | 1.0e+10 | 17.30 |
| s5 | orl400-005-b | 2.95867690e+02 | yes | 1 | 32 | 127 | 127 | 5 | 8 | 1.0e+10 | 18.24 |
| s5 | orl400-005-c | 2.85906306e+02 | yes | 1 | 16 | 22 | 22 | 5 | 0 | 1.0e+05 | 2.36 |
| s5 | orl400-005-d | 2.88657305e+02 | yes | 1 | 22 | 28 | 28 | 4 | 2 | 1.0e+05 | 3.12 |
| s5 | orl400-005-e | 2.86235584e+02 | yes | 1 | 20 | 24 | 24 | 3 | 3 | 1.0e+06 | 2.69 |
| s5 | orl400-005-f | 2.88839497e+02 | yes | 1 | 32 | 135 | 135 | 4 | 10 | 1.0e+10 | 17.46 |
| s5 | orl400-005-g | 2.86036509e+02 | yes | 1 | 26 | 100 | 100 | 6 | 5 | 1.0e+10 | 14.58 |
| s5 | orl400-005-h | 2.88315485e+02 | yes | 1 | 22 | 28 | 28 | 4 | 0 | 1.0e+03 | 3.63 |
| s5 | orl400-005-i | 2.86045198e+02 | yes | 1 | 26 | 76 | 76 | 5 | 2 | 1.0e+09 | 9.60 |
| s5 | orl400-005-j | 2.92076030e+02 | yes | 1 | 27 | 106 | 106 | 6 | 5 | 1.0e+10 | 13.66 |
| s5 | orl400-05-a | 2.06130237e+02 | yes | 1 | 26 | 97 | 97 | 10 | 6 | 1.0e+10 | 12.75 |
| s5 | orl400-05-b | 2.03716920e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 3.63 |
| s5 | orl400-05-c | 2.08218910e+02 | yes | 1 | 31 | 117 | 117 | 10 | 7 | 1.0e+10 | 15.77 |
| s5 | orl400-05-d | 2.08119812e+02 | yes | 1 | 33 | 161 | 161 | 11 | 12 | 1.0e+10 | 22.27 |
| s5 | orl400-05-e | 2.11076793e+02 | yes | 1 | 33 | 166 | 166 | 14 | 11 | 1.0e+10 | 21.59 |
| s5 | orl400-05-f | 2.04311568e+02 | yes | 1 | 23 | 86 | 86 | 13 | 2 | 1.0e+10 | 10.41 |
| s5 | orl400-05-g | 2.15515802e+02 | yes | 1 | 35 | 194 | 194 | 12 | 14 | 1.0e+10 | 25.71 |
| s5 | orl400-05-h | 2.08129314e+02 | yes | 1 | 25 | 106 | 106 | 13 | 6 | 1.0e+10 | 12.98 |
| s5 | orl400-05-i | 2.03750796e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 3.59 |
| s5 | orl400-05-j | 2.03915488e+02 | yes | 1 | 18 | 32 | 32 | 12 | 0 | 1.0e+03 | 3.79 |
| s5 | pard200-a | 4.11202153e+02 | yes | 1 | 26 | 36 | 36 | 8 | 0 | 1.0e+03 | 1.06 |
| s5 | pard200-b | 4.47959012e+02 | yes | 1 | 33 | 146 | 146 | 11 | 10 | 1.0e+10 | 3.85 |
| s5 | pard200-c | 4.20066921e+02 | yes | 1 | 30 | 117 | 117 | 12 | 8 | 1.0e+10 | 3.42 |
| s5 | pard200-d | 4.21885079e+02 | yes | 1 | 30 | 121 | 121 | 7 | 6 | 1.0e+10 | 2.83 |
| s5 | pard200-e | 4.11101246e+02 | yes | 1 | 26 | 36 | 36 | 8 | 0 | 1.0e+03 | 1.07 |
| s5 | pard200-f | 4.06353714e+02 | yes | 1 | 26 | 40 | 40 | 12 | 0 | 1.0e+03 | 1.17 |
| s5 | pard200-g | 4.17038236e+02 | yes | 1 | 28 | 113 | 113 | 8 | 4 | 1.0e+10 | 3.29 |
| s5 | pard200-h | 4.12107151e+02 | yes | 1 | 27 | 37 | 37 | 8 | 0 | 1.0e+03 | 1.11 |
| s5 | pard200-i | 4.10460364e+02 | yes | 1 | 26 | 37 | 37 | 9 | 0 | 1.0e+03 | 1.10 |
| s5 | pard200-j | 4.08608545e+02 | yes | 1 | 26 | 35 | 35 | 7 | 0 | 1.0e+03 | 1.05 |
| s5 | pard300-a | 6.07510957e+02 | yes | 1 | 15 | 22 | 22 | 5 | 2 | 1.0e+06 | 1.46 |
| s5 | pard300-b | 6.11377943e+02 | yes | 1 | 11 | 17 | 17 | 5 | 0 | 1.0e+05 | 1.10 |
| s5 | pard300-c | 6.11231281e+02 | yes | 1 | 22 | 95 | 95 | 6 | 4 | 1.0e+11 | 7.11 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | pard300-d | 6.12521479e+02 | yes | 1 | 20 | 60 | 60 | 5 | 1 | 1.0e+10 | 4.27 |
| s5 | pard300-e | 6.08633842e+02 | yes | 1 | 22 | 26 | 26 | 4 | 7 | 1.0e+06 | 1.71 |
| s5 | pard300-f | 6.05916252e+02 | yes | 1 | 12 | 19 | 19 | 5 | 0 | 1.0e+04 | 1.41 |
| s5 | pard300-g | 6.12467965e+02 | yes | 1 | 23 | 90 | 90 | 4 | 3 | 1.0e+10 | 5.00 |
| s5 | pard300-h | 6.06957998e+02 | yes | 1 | 17 | 24 | 24 | 5 | 4 | 1.0e+05 | 1.61 |
| s5 | pard300-i | 6.13524075e+02 | yes | 1 | 15 | 24 | 24 | 6 | 2 | 1.0e+05 | 1.63 |
| s5 | pard300-j | 6.17244753e+02 | yes | 1 | 16 | 26 | 26 | 10 | 3 | 1.0e+05 | 1.78 |
| s5 | pard400-a | 8.08534122e+02 | yes | 1 | 14 | 29 | 29 | 13 | 1 | 1.0e+05 | 3.73 |
| s5 | pard400-b | 8.74132180e+02 | yes | 1 | 27 | 133 | 133 | 13 | 6 | 1.0e+11 | 18.77 |
| s5 | pard400-c | 8.35980071e+02 | yes | 1 | 28 | 133 | 133 | 13 | 7 | 1.0e+11 | 16.94 |
| s5 | pard400-d | 8.08985528e+02 | yes | 1 | 14 | 28 | 28 | 13 | 1 | 1.0e+06 | 3.38 |
| s5 | pard400-e | 8.10674418e+02 | yes | 1 | 14 | 26 | 26 | 10 | 1 | 1.0e+05 | 3.39 |
| s5 | pard400-f | 8.41497358e+02 | yes | 1 | 33 | 183 | 183 | 16 | 11 | 1.0e+11 | 27.01 |
| s5 | pard400-g | 8.13538701e+02 | yes | 1 | 17 | 30 | 30 | 11 | 3 | 1.0e+05 | 3.90 |
| s5 | pard400-h | 8.11234430e+02 | yes | 1 | 28 | 134 | 134 | 15 | 8 | 1.0e+11 | 16.90 |
| s5 | pard400-i | 8.06944485e+02 | yes | 1 | 17 | 31 | 31 | 12 | 3 | 1.0e+06 | 3.80 |
| s5 | pard400-j | 8.08559257e+02 | yes | 1 | 18 | 31 | 31 | 11 | 4 | 1.0e+06 | 3.93 |
| s10 | orl200-005-a | 7.60759544e+01 | yes | 1 | 13 | 22 | 22 | 9 | 1 | 1.0e+04 | 1.58 |
| s10 | orl200-005-b | 7.56955044e+01 | yes | 1 | 12 | 23 | 23 | 9 | 0 | 1.0e+03 | 1.60 |
| s10 | orl200-005-c | 7.63858097e+01 | yes | 1 | 25 | 111 | 111 | 9 | 7 | 1.0e+09 | 15.38 |
| s10 | orl200-005-d | 7.65770073e+01 | yes | 1 | 19 | 27 | 27 | 8 | 5 | 1.0e+05 | 2.01 |
| s10 | orl200-005-e | 7.59115625e+01 | yes | 1 | 13 | 22 | 22 | 8 | 1 | 1.0e+04 | 1.55 |
| s10 | orl200-005-f | 7.69547177e+01 | yes | 1 | 25 | 98 | 98 | 9 | 5 | 1.0e+09 | 13.70 |
| s10 | orl200-005-g | 7.48246683e+01 | yes | 1 | 25 | 107 | 107 | 9 | 5 | 1.0e+09 | 14.92 |
| s10 | orl200-005-h | 7.58904434e+01 | yes | 1 | 27 | 100 | 100 | 9 | 7 | 1.0e+09 | 13.90 |
| s10 | orl200-005-i | 7.76345669e+01 | yes | 1 | 13 | 22 | 22 | 7 | 1 | 1.0e+04 | 1.52 |
| s10 | orl200-005-j | 7.55231211e+01 | yes | 1 | 18 | 29 | 29 | 9 | 5 | 1.0e+05 | 2.05 |
| s10 | orl200-05-a | 5.51779119e+01 | yes | 1 | 11 | 33 | 33 | 20 | 0 | 1.0e+03 | 2.12 |
| s10 | orl200-05-b | 5.53711422e+01 | yes | 1 | 11 | 26 | 26 | 13 | 0 | 1.0e+03 | 1.74 |
| s10 | orl200-05-c | 5.56710544e+01 | yes | 1 | 11 | 23 | 23 | 10 | 0 | 1.0e+03 | 1.56 |
| s10 | orl200-05-d | 5.82180960e+01 | yes | 1 | 37 | 158 | 158 | 13 | 17 | 1.0e+09 | 22.83 |
| s10 | orl200-05-e | 6.05746762e+01 | yes | 1 | 32 | 155 | 155 | 17 | 11 | 1.0e+10 | 23.79 |
| s10 | orl200-05-f | 5.70928375e+01 | yes | 1 | 34 | 183 | 183 | 15 | 14 | 1.0e+10 | 26.94 |
| s10 | orl200-05-g | 5.60047775e+01 | yes | 1 | 11 | 28 | 28 | 15 | 0 | 1.0e+03 | 1.85 |
| s10 | orl200-05-h | 5.48324489e+01 | yes | 1 | 11 | 25 | 25 | 12 | 0 | 1.0e+03 | 1.68 |
| s10 | orl200-05-i | 5.52765893e+01 | yes | 1 | 12 | 29 | 29 | 15 | 1 | 1.0e+04 | 1.94 |
| s10 | orl200-05-j | 5.71204578e+01 | yes | 1 | 32 | 159 | 159 | 14 | 12 | 1.0e+09 | 22.35 |
| s10 | orl300-005-a | 1.20742438e+02 | yes | 1 | 53 | 328 | 328 | 15 | 30 | 1.0e+10 | 138.48 |
| s10 | orl300-005-b | 1.12600877e+02 | yes | 1 | 27 | 99 | 99 | 10 | 8 | 1.0e+09 | 34.18 |
| s10 | orl300-005-c | 1.11718335e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 4.79 |
| s10 | orl300-005-d | 1.14670730e+02 | yes | 1 | 29 | 110 | 110 | 10 | 8 | 1.0e+10 | 41.53 |
| s10 | orl300-005-e | 1.11160654e+02 | yes | 1 | 34 | 163 | 163 | 10 | 13 | 1.0e+09 | 60.24 |
| s10 | orl300-005-f | 1.11966557e+02 | yes | 1 | 14 | 25 | 25 | 9 | 0 | 1.0e+03 | 4.65 |
| s10 | orl300-005-g | 1.12179720e+02 | yes | 1 | 14 | 27 | 27 | 11 | 0 | 1.0e+03 | 4.96 |
| s10 | orl300-005-h | 1.11664060e+02 | yes | 1 | 14 | 27 | 27 | 11 | 0 | 1.0e+03 | 5.01 |
| s10 | orl300-005-i | 1.10603384e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 4.80 |
| s10 | orl300-005-j | 1.11603076e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 4.79 |
| s10 | orl300-05-a | 8.96890944e+01 | yes | 1 | 27 | 122 | 122 | 18 | 7 | 1.0e+10 | 44.72 |
| s10 | orl300-05-b | 8.61167496e+01 | yes | 1 | 30 | 140 | 140 | 22 | 9 | 1.0e+10 | 51.44 |
| s10 | orl300-05-c | 8.50387463e+01 | yes | 1 | 20 | 41 | 41 | 19 | 6 | 1.0e+05 | 7.26 |
| s10 | orl300-05-d | 8.72785807e+01 | yes | 1 | 36 | 173 | 173 | 19 | 15 | 1.0e+10 | 67.93 |
| s10 | orl300-05-e | 8.52480667e+01 | yes | 1 | 32 | 48 | 48 | 16 | 17 | 1.0e+06 | 9.98 |
| s10 | orl300-05-f | 8.51145395e+01 | yes | 1 | 16 | 44 | 44 | 28 | 3 | 1.0e+04 | 7.58 |
| s10 | orl300-05-g | 9.62905040e+01 | yes | 1 | 26 | 128 | 128 | 24 | 7 | 1.0e+10 | 46.60 |
| s10 | orl300-05-h | 8.67146675e+01 | yes | 1 | 20 | 47 | 47 | 25 | 6 | 1.0e+06 | 8.52 |
| s10 | orl300-05-i | 9.97318420e+01 | yes | 1 | 27 | 146 | 146 | 24 | 7 | 1.0e+11 | 57.29 |
| s10 | orl300-05-j | 8.85787088e+01 | yes | 1 | 52 | 298 | 298 | 26 | 30 | 1.0e+10 | 120.75 |
| s10 | orl400-005-a | 1.49217164e+02 | yes | 1 | 55 | 270 | 270 | 12 | 31 | 1.0e+11 | 218.00 |
| s10 | orl400-005-b | 1.52987408e+02 | yes | 1 | 50 | 263 | 263 | 10 | 27 | 1.0e+10 | 208.54 |
| s10 | orl400-005-c | 1.45929081e+02 | yes | 1 | 30 | 100 | 100 | 9 | 7 | 1.0e+10 | 68.66 |
| s10 | orl400-005-d | 1.47410078e+02 | yes | 1 | 28 | 100 | 100 | 9 | 5 | 1.0e+09 | 67.46 |
| s10 | orl400-005-e | 1.46048957e+02 | yes | 1 | 19 | 29 | 29 | 8 | 4 | 1.0e+06 | 10.52 |
| s10 | orl400-005-f | 1.49654502e+02 | yes | 1 | 56 | 291 | 291 | 9 | 33 | 1.0e+10 | 230.53 |
| s10 | orl400-005-g | 1.46288619e+02 | yes | 1 | 24 | 60 | 60 | 8 | 4 | 1.0e+09 | 34.44 |
| s10 | orl400-005-h | 1.47900616e+02 | yes | 1 | 27 | 39 | 39 | 10 | 11 | 1.0e+06 | 15.22 |
| s10 | orl400-005-i | 1.46378427e+02 | yes | 1 | 25 | 79 | 79 | 10 | 4 | 1.0e+09 | 49.18 |
| s10 | orl400-005-j | 1.49819520e+02 | yes | 1 | 56 | 307 | 307 | 12 | 32 | 1.0e+10 | 241.98 |
| s10 | orl400-05-a | 1.06083198e+02 | yes | 1 | 37 | 190 | 190 | 17 | 14 | 1.0e+10 | 139.12 |
| s10 | orl400-05-b | 1.05064925e+02 | yes | 1 | 11 | 32 | 32 | 19 | 0 | 1.0e+05 | 10.14 |
| s10 | orl400-05-c | 1.06882907e+02 | yes | 1 | 47 | 262 | 262 | 17 | 26 | 1.0e+10 | 184.34 |
| s10 | orl400-05-d | 1.09374865e+02 | yes | 1 | 36 | 193 | 193 | 19 | 17 | 1.0e+11 | 145.35 |
| s10 | orl400-05-e | 1.10014006e+02 | yes | 1 | 43 | 237 | 237 | 24 | 22 | 1.0e+10 | 178.85 |
| s10 | orl400-05-f | 1.05087647e+02 | yes | 1 | 20 | 76 | 76 | 18 | 1 | 1.0e+10 | 48.32 |
| s10 | orl400-05-g | 1.10568641e+02 | yes | 1 | 53 | 268 | 268 | 19 | 31 | 1.0e+10 | 206.84 |
| s10 | orl400-05-h | 1.06802685e+02 | yes | 1 | 40 | 168 | 168 | 17 | 16 | 1.0e+09 | 113.10 |
| s10 | orl400-05-i | 1.04714575e+02 | yes | 1 | 14 | 34 | 34 | 18 | 0 | 1.0e+03 | 11.46 |
| s10 | orl400-05-j | 1.04792437e+02 | yes | 1 | 14 | 34 | 34 | 18 | 0 | 1.0e+03 | 11.45 |
| s10 | pard200-a | 2.11728929e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 2.40 |
| s10 | pard200-b | 2.23351624e+02 | yes | 1 | 45 | 249 | 249 | 17 | 22 | 1.0e+10 | 40.12 |
| s10 | pard200-c | 2.16018816e+02 | yes | 1 | 43 | 243 | 243 | 18 | 21 | 1.0e+10 | 39.73 |
| s10 | pard200-d | 2.14794034e+02 | yes | 1 | 42 | 229 | 229 | 12 | 17 | 1.0e+10 | 35.87 |
| s10 | pard200-e | 2.11868046e+02 | yes | 1 | 18 | 33 | 33 | 13 | 0 | 1.0e+03 | 2.56 |
| s10 | pard200-f | 2.07431760e+02 | yes | 1 | 18 | 38 | 38 | 18 | 0 | 1.0e+03 | 2.87 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s10 | pard200-g | 2.13879614e+02 | yes | 1 | 41 | 174 | 174 | 13 | 14 | 1.0e+10 | 27.35 |
| s10 | pard200-h | 2.13337694e+02 | yes | 1 | 19 | 34 | 34 | 13 | 0 | 1.0e+03 | 2.68 |
| s10 | pard200-i | 2.10095280e+02 | yes | 1 | 18 | 34 | 34 | 14 | 0 | 1.0e+03 | 2.65 |
| s10 | pard200-j | 2.09683630e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 2.40 |
| s10 | pard300-a | 3.08238811e+02 | yes | 1 | 29 | 45 | 45 | 16 | 6 | 1.0e+06 | 9.06 |
| s10 | pard300-b | 3.11593651e+02 | yes | 1 | 27 | 47 | 47 | 18 | 6 | 1.0e+06 | 9.61 |
| s10 | pard300-c | 3.10135403e+02 | yes | 1 | 45 | 255 | 255 | 11 | 20 | 1.0e+10 | 106.43 |
| s10 | pard300-d | 3.09641147e+02 | yes | 1 | 32 | 140 | 140 | 13 | 8 | 1.0e+11 | 53.83 |
| s10 | pard300-e | 3.09632448e+02 | yes | 1 | 29 | 41 | 41 | 10 | 8 | 1.0e+06 | 8.99 |
| s10 | pard300-f | 3.09129093e+02 | yes | 1 | 29 | 43 | 43 | 14 | 6 | 1.0e+05 | 8.82 |
| s10 | pard300-g | 3.10442616e+02 | yes | 1 | 44 | 212 | 212 | 9 | 21 | 1.0e+11 | 89.52 |
| s10 | pard300-h | 3.08544390e+02 | yes | 1 | 32 | 45 | 45 | 13 | 9 | 1.0e+06 | 9.48 |
| s10 | pard300-i | 3.10855259e+02 | yes | 1 | 21 | 34 | 34 | 13 | 3 | 1.0e+06 | 7.05 |
| s10 | pard300-j | 3.13764363e+02 | yes | 1 | 29 | 49 | 49 | 18 | 8 | 1.0e+07 | 10.42 |
| s10 | pard400-a | 4.08640413e+02 | yes | 1 | 18 | 39 | 39 | 19 | 0 | 1.0e+04 | 14.55 |
| s10 | pard400-b | 4.59822052e+02 | yes | 1 | 36 | 180 | 180 | 18 | 12 | 1.0e+12 | 142.10 |
| s10 | pard400-c | 4.30049521e+02 | yes | 1 | 46 | 257 | 257 | 19 | 22 | 1.0e+10 | 199.49 |
| s10 | pard400-d | 4.08553376e+02 | yes | 1 | 23 | 46 | 46 | 21 | 1 | 1.0e+04 | 17.00 |
| s10 | pard400-e | 4.10185224e+02 | yes | 1 | 28 | 103 | 103 | 17 | 4 | 1.0e+10 | 69.32 |
| s10 | pard400-f | 4.40077310e+02 | yes | 1 | 56 | 324 | 324 | 20 | 29 | 1.0e+11 | 266.52 |
| s10 | pard400-g | 4.11544272e+02 | yes | 1 | 26 | 47 | 47 | 19 | 0 | 1.0e+03 | 18.17 |
| s10 | pard400-h | 4.07702857e+02 | yes | 1 | 40 | 201 | 201 | 22 | 15 | 1.0e+10 | 149.31 |
| s10 | pard400-i | 4.08814052e+02 | yes | 1 | 26 | 46 | 46 | 20 | 0 | 1.0e+03 | 18.07 |
| s10 | pard400-j | 4.08747800e+02 | yes | 1 | 24 | 48 | 48 | 22 | 1 | 1.0e+04 | 18.05 |
| s20 | orl200-005-a | 4.15988198e+01 | yes | 1 | 28 | 46 | 46 | 16 | 6 | 1.0e+05 | 9.53 |
| s20 | orl200-005-b | 4.14029671e+01 | yes | 1 | 27 | 44 | 44 | 15 | 4 | 1.0e+04 | 8.98 |
| s20 | orl200-005-c | 4.16944265e+01 | yes | 1 | 33 | 129 | 129 | 17 | 9 | 1.0e+09 | 51.50 |
| s20 | orl200-005-d | 4.18419594e+01 | yes | 1 | 37 | 52 | 52 | 13 | 15 | 1.0e+05 | 11.99 |
| s20 | orl200-005-e | 4.16007504e+01 | yes | 1 | 30 | 48 | 48 | 16 | 8 | 1.0e+05 | 10.29 |
| s20 | orl200-005-f | 4.16172725e+01 | yes | 1 | 30 | 91 | 91 | 17 | 9 | 1.0e+09 | 33.90 |
| s20 | orl200-005-g | 4.11564740e+01 | yes | 1 | 35 | 125 | 125 | 18 | 9 | 1.0e+09 | 48.74 |
| s20 | orl200-005-h | 4.15577498e+01 | yes | 1 | 59 | 318 | 318 | 16 | 33 | 1.0e+09 | 142.04 |
| s20 | orl200-005-i | 4.24868937e+01 | yes | 1 | 27 | 49 | 49 | 20 | 4 | 1.0e+05 | 9.82 |
| s20 | orl200-005-j | 4.08361286e+01 | yes | 1 | 22 | 42 | 42 | 18 | 4 | 1.0e+05 | 8.68 |
| s20 | orl200-05-a | 3.09688721e+01 | yes | 1 | 20 | 51 | 51 | 29 | 1 | 1.0e+03 | 9.50 |
| s20 | orl200-05-b | 3.08569521e+01 | yes | 1 | 21 | 48 | 48 | 25 | 0 | 1.0e+02 | 9.29 |
| s20 | orl200-05-c | 3.10386982e+01 | yes | 1 | 19 | 40 | 40 | 19 | 1 | 1.0e+03 | 7.38 |
| s20 | orl200-05-d | 3.35391258e+01 | yes | 1 | 60 | 290 | 290 | 26 | 36 | 1.0e+09 | 126.67 |
| s20 | orl200-05-e | 3.47865084e+01 | yes | 1 | 47 | 256 | 256 | 34 | 23 | 1.0e+10 | 118.48 |
| s20 | orl200-05-f | 3.18981946e+01 | yes | 1 | 51 | 290 | 290 | 25 | 30 | 1.0e+10 | 140.94 |
| s20 | orl200-05-g | 3.13769525e+01 | yes | 1 | 22 | 45 | 45 | 21 | 0 | 1.0e+02 | 8.85 |
| s20 | orl200-05-h | 3.04982148e+01 | yes | 1 | 20 | 45 | 45 | 23 | 1 | 1.0e+03 | 8.47 |
| s20 | orl200-05-i | 3.10965406e+01 | yes | 1 | 19 | 39 | 39 | 18 | 1 | 1.0e+03 | 7.27 |
| s20 | orl200-05-j | 3.17601829e+01 | yes | 1 | 63 | 355 | 355 | 25 | 40 | 1.0e+09 | 157.40 |
| s20 | orl300-005-a | 6.52458869e+01 | yes | 1 | 70 | 446 | 446 | 26 | 51 | 1.0e+10 | 600.15 |
| s20 | orl300-005-b | 5.96419188e+01 | yes | 1 | 22 | 107 | 107 | 17 | 4 | 1.0e+09 | 115.81 |
| s20 | orl300-005-c | 5.97672274e+01 | yes | 1 | 13 | 34 | 34 | 19 | 2 | 1.0e+04 | 18.55 |
| s20 | orl300-005-d | 6.16274814e+01 | yes | 1 | 71 | 440 | 440 | 19 | 51 | 1.0e+10 | 571.84 |
| s20 | orl300-005-e | 5.89448192e+01 | yes | 1 | 11 | 33 | 33 | 20 | 0 | 1.0e+03 | 18.04 |
| s20 | orl300-005-f | 5.98192622e+01 | yes | 1 | 13 | 32 | 32 | 17 | 2 | 1.0e+04 | 17.95 |
| s20 | orl300-005-g | 5.95657972e+01 | yes | 1 | 11 | 32 | 32 | 19 | 0 | 1.0e+03 | 17.81 |
| s20 | orl300-005-h | 5.93516293e+01 | yes | 1 | 11 | 35 | 35 | 22 | 0 | 1.0e+03 | 19.35 |
| s20 | orl300-005-i | 5.85760511e+01 | yes | 1 | 11 | 33 | 33 | 20 | 0 | 1.0e+03 | 18.28 |
| s20 | orl300-005-j | 5.96075700e+01 | yes | 1 | 11 | 31 | 31 | 18 | 0 | 1.0e+03 | 17.20 |
| s20 | orl300-05-a | 5.00201626e+01 | yes | 1 | 49 | 309 | 309 | 42 | 31 | 1.0e+10 | 391.59 |
| s20 | orl300-05-b | 4.61014147e+01 | yes | 1 | 34 | 205 | 205 | 34 | 16 | 1.0e+10 | 244.22 |
| s20 | orl300-05-c | 4.58989961e+01 | yes | 1 | 35 | 73 | 73 | 36 | 22 | 1.0e+06 | 45.73 |
| s20 | orl300-05-d | 4.74151811e+01 | yes | 1 | 64 | 374 | 374 | 41 | 45 | 1.0e+10 | 441.48 |
| s20 | orl300-05-e | 4.58646009e+01 | yes | 1 | 26 | 64 | 64 | 38 | 14 | 1.0e+05 | 36.62 |
| s20 | orl300-05-f | 4.57020460e+01 | yes | 1 | 30 | 64 | 64 | 34 | 17 | 1.0e+06 | 37.34 |
| s20 | orl300-05-g | 5.40674674e+01 | yes | 1 | 47 | 286 | 286 | 44 | 29 | 1.0e+10 | 359.25 |
| s20 | orl300-05-h | 4.61979547e+01 | yes | 1 | 62 | 101 | 101 | 39 | 48 | 1.0e+06 | 68.80 |
| s20 | orl300-05-i | 5.84299729e+01 | yes | 1 | 24 | 159 | 159 | 52 | 4 | 1.0e+10 | 167.91 |
| s20 | orl300-05-j | 4.83316749e+01 | yes | 1 | 53 | 342 | 342 | 47 | 35 | 1.0e+10 | 400.90 |
| s20 | orl400-005-a | 8.12595539e+01 | yes | 1 | 43 | 242 | 242 | 22 | 26 | 1.0e+10 | 604.40 |
| s20 | orl400-005-b | 8.48845563e+01 | yes | 1 | 43 | 252 | 252 | 22 | 26 | 1.0e+10 | 624.51 |
| s20 | orl400-005-c | 7.65697104e+01 | yes | 1 | 16 | 37 | 37 | 19 | 4 | 1.0e+05 | 42.91 |
| s20 | orl400-005-d | 7.71409879e+01 | yes | 1 | 33 | 152 | 152 | 18 | 15 | 1.0e+09 | 333.75 |
| s20 | orl400-005-e | 7.67585990e+01 | yes | 1 | 22 | 42 | 42 | 18 | 9 | 1.0e+06 | 51.36 |
| s20 | orl400-005-f | 8.06889123e+01 | no | 1 | 46 | 244 | 244 | 21 | 28 | 1.0e+10 | 605.95 |
| s20 | orl400-005-g | 7.64426294e+01 | yes | 1 | 35 | 149 | 149 | 17 | 16 | 1.0e+09 | 325.90 |
| s20 | orl400-005-h | 7.76838684e+01 | yes | 1 | 31 | 50 | 50 | 19 | 18 | 1.0e+06 | 61.85 |
| s20 | orl400-005-i | 7.68604677e+01 | yes | 1 | 37 | 185 | 185 | 17 | 18 | 1.0e+09 | 413.94 |
| s20 | orl400-005-j | 8.05698311e+01 | no | 1 | 46 | 248 | 248 | 22 | 28 | 1.0e+10 | 618.50 |
| s20 | orl400-05-a | 5.73165430e+01 | no | 1 | 43 | 250 | 250 | 29 | 27 | 1.0e+10 | 609.26 |
| s20 | orl400-05-b | 5.60763873e+01 | yes | 1 | 37 | 175 | 175 | 29 | 18 | 1.0e+10 | 374.65 |
| s20 | orl400-05-c | 5.72239099e+01 | yes | 1 | 45 | 252 | 252 | 27 | 28 | 1.0e+10 | 600.55 |
| s20 | orl400-05-d | 6.13167315e+01 | yes | 1 | 41 | 251 | 251 | 33 | 25 | 1.0e+10 | 600.73 |
| s20 | orl400-05-e | 5.97944680e+01 | no | 1 | 42 | 277 | 277 | 42 | 27 | 1.0e+09 | 602.27 |
| s20 | orl400-05-f | 5.55421172e+01 | yes | 1 | 11 | 45 | 45 | 32 | 0 | 1.0e+03 | 46.65 |
| s20 | orl400-05-g | 6.26663853e+01 | no | 1 | 39 | 252 | 252 | 34 | 25 | 1.0e+10 | 607.66 |
| s20 | orl400-05-h | 5.65029970e+01 | yes | 1 | 24 | 99 | 99 | 28 | 8 | 1.0e+09 | 188.68 |
| s20 | orl400-05-i | 5.54747479e+01 | yes | 1 | 11 | 44 | 44 | 31 | 0 | 1.0e+03 | 45.86 |

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| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s20 | orl400-05-j | 5.56938908e+01 | yes | 1 | 11 | 40 | 40 | 27 | 0 | 1.0e+03 | 41.97 |
| s20 | pard200-a | 1.11628863e+02 | yes | 1 | 14 | 37 | 37 | 21 | 0 | 1.0e+03 | 8.26 |
| s20 | pard200-b | 1.20788868e+02 | yes | 1 | 52 | 316 | 316 | 28 | 31 | 1.0e+10 | 155.50 |
| s20 | pard200-c | 1.15387138e+02 | yes | 1 | 43 | 251 | 251 | 26 | 22 | 1.0e+10 | 120.29 |
| s20 | pard200-d | 1.14330082e+02 | yes | 1 | 67 | 417 | 417 | 26 | 45 | 1.0e+10 | 210.43 |
| s20 | pard200-e | 1.11437594e+02 | yes | 1 | 14 | 38 | 38 | 22 | 0 | 1.0e+03 | 8.46 |
| s20 | pard200-f | 1.09175617e+02 | yes | 1 | 14 | 42 | 42 | 26 | 0 | 1.0e+03 | 9.31 |
| s20 | pard200-g | 1.14500386e+02 | yes | 1 | 60 | 335 | 335 | 23 | 37 | 1.0e+10 | 167.22 |
| s20 | pard200-h | 1.12710817e+02 | yes | 1 | 14 | 36 | 36 | 20 | 0 | 1.0e+03 | 8.12 |
| s20 | pard200-i | 1.10058766e+02 | yes | 1 | 14 | 37 | 37 | 21 | 0 | 1.0e+03 | 8.31 |
| s20 | pard200-j | 1.10553736e+02 | yes | 1 | 14 | 33 | 33 | 17 | 0 | 1.0e+03 | 7.44 |
| s20 | pard300-a | 1.58895482e+02 | yes | 1 | 48 | 77 | 77 | 29 | 31 | 1.0e+06 | 56.54 |
| s20 | pard300-b | 1.60472359e+02 | yes | 1 | 32 | 69 | 69 | 37 | 17 | 1.0e+06 | 48.45 |
| s20 | pard300-c | 1.60091866e+02 | yes | 1 | 55 | 330 | 330 | 36 | 33 | 1.0e+10 | 433.85 |
| s20 | pard300-d | 1.59272334e+02 | yes | 1 | 38 | 78 | 78 | 38 | 21 | 1.0e+07 | 54.53 |
| s20 | pard300-e | 1.60417804e+02 | yes | 1 | 37 | 74 | 74 | 37 | 20 | 1.0e+06 | 52.94 |
| s20 | pard300-f | 1.60079423e+02 | yes | 1 | 36 | 66 | 66 | 30 | 19 | 1.0e+06 | 46.98 |
| s20 | pard300-g | 1.62174465e+02 | yes | 1 | 53 | 322 | 322 | 28 | 31 | 1.0e+10 | 426.47 |
| s20 | pard300-h | 1.59487437e+02 | yes | 1 | 38 | 68 | 68 | 30 | 21 | 1.0e+06 | 47.86 |
| s20 | pard300-i | 1.59905240e+02 | yes | 1 | 25 | 65 | 65 | 32 | 8 | 1.0e+08 | 49.43 |
| s20 | pard300-j | 1.61886834e+02 | yes | 1 | 42 | 82 | 82 | 40 | 25 | 1.0e+06 | 58.14 |
| s20 | pard400-a | 2.08784654e+02 | yes | 1 | 18 | 50 | 50 | 30 | 0 | 1.0e+03 | 60.78 |
| s20 | pard400-b | 2.54620846e+02 | yes | 1 | 42 | 232 | 232 | 34 | 18 | 1.0e+11 | 581.92 |
| s20 | pard400-c | 2.32653738e+02 | no | 1 | 39 | 246 | 246 | 33 | 21 | 1.0e+10 | 600.09 |
| s20 | pard400-d | 2.09373423e+02 | yes | 1 | 18 | 52 | 52 | 32 | 0 | 1.0e+03 | 63.04 |
| s20 | pard400-e | 2.10863668e+02 | yes | 1 | 28 | 118 | 118 | 26 | 4 | 1.0e+09 | 239.61 |
| s20 | pard400-f | 2.41381360e+02 | yes | 1 | 37 | 239 | 239 | 35 | 19 | 1.0e+11 | 601.22 |
| s20 | pard400-g | 2.11152336e+02 | yes | 1 | 18 | 48 | 48 | 28 | 2 | 1.0e+04 | 57.15 |
| s20 | pard400-h | 2.09833743e+02 | yes | 1 | 46 | 271 | 271 | 34 | 23 | 1.0e+10 | 632.75 |
| s20 | pard400-i | 2.09667482e+02 | yes | 1 | 18 | 47 | 47 | 29 | 0 | 1.0e+03 | 57.42 |
| s20 | pard400-j | 2.09225713e+02 | yes | 1 | 18 | 48 | 48 | 30 | 0 | 1.0e+03 | 57.97 |

Table 10: Mean-variance portfolios, Telescopic $AL_0$.

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.44478796e+02 | yes | 1 | 16 | 23 | 23 | 5 | 0 | 1.0e+03 | 0.54 |
| s5 | orl200-005-b | 1.44752841e+02 | yes | 1 | 16 | 23 | 23 | 5 | 0 | 1.0e+03 | 0.51 |
| s5 | orl200-005-c | 1.56019936e+02 | yes | 1 | 24 | 46 | 46 | 4 | 0 | 1.0e+08 | 1.13 |
| s5 | orl200-005-d | 1.45944775e+02 | yes | 1 | 16 | 23 | 23 | 5 | 0 | 1.0e+03 | 0.51 |
| s5 | orl200-005-e | 1.45995504e+02 | yes | 1 | 16 | 22 | 22 | 4 | 0 | 1.0e+03 | 0.48 |
| s5 | orl200-005-f | 1.62839529e+02 | yes | 1 | 28 | 46 | 46 | 5 | 0 | 1.0e+08 | 1.09 |
| s5 | orl200-005-g | 1.64453882e+02 | yes | 1 | 29 | 41 | 41 | 5 | 0 | 1.0e+08 | 0.87 |
| s5 | orl200-005-h | 1.78502942e+02 | yes | 1 | 26 | 40 | 40 | 5 | 0 | 1.0e+08 | 0.97 |
| s5 | orl200-005-i | 1.47829260e+02 | yes | 1 | 16 | 21 | 21 | 3 | 0 | 1.0e+03 | 0.47 |
| s5 | orl200-005-j | 1.45955697e+02 | yes | 1 | 16 | 22 | 22 | 4 | 0 | 1.0e+03 | 0.49 |
| s5 | orl200-05-a | 1.04232888e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 0.56 |
| s5 | orl200-05-b | 1.03706536e+02 | yes | 1 | 14 | 25 | 25 | 9 | 0 | 1.0e+03 | 0.54 |
| s5 | orl200-05-c | 1.05604532e+02 | yes | 1 | 14 | 21 | 21 | 5 | 0 | 1.0e+03 | 0.45 |
| s5 | orl200-05-d | 1.49325796e+02 | yes | 1 | 18 | 56 | 56 | 7 | 0 | 1.0e+09 | 1.34 |
| s5 | orl200-05-e | 1.39098872e+02 | yes | 1 | 21 | 83 | 83 | 11 | 0 | 1.0e+09 | 1.92 |
| s5 | orl200-05-f | 1.25475774e+02 | yes | 1 | 26 | 51 | 51 | 9 | 0 | 1.0e+08 | 1.35 |
| s5 | orl200-05-g | 1.05788540e+02 | yes | 1 | 14 | 22 | 22 | 6 | 0 | 1.0e+03 | 0.48 |
| s5 | orl200-05-h | 1.04958865e+02 | yes | 1 | 14 | 23 | 23 | 7 | 0 | 1.0e+03 | 0.52 |
| s5 | orl200-05-i | 1.04862808e+02 | yes | 1 | 14 | 22 | 22 | 6 | 0 | 1.0e+03 | 0.48 |
| s5 | orl200-05-j | 1.48258366e+02 | yes | 1 | 21 | 34 | 34 | 7 | 0 | 1.0e+08 | 0.87 |
| s5 | orl300-005-a | 3.63953476e+02 | yes | 1 | 21 | 72 | 72 | 8 | 0 | 1.0e+09 | 4.02 |
| s5 | orl300-005-b | 2.73775319e+02 | yes | 1 | 21 | 68 | 68 | 5 | 0 | 1.0e+09 | 5.06 |
| s5 | orl300-005-c | 2.16314165e+02 | yes | 1 | 19 | 26 | 26 | 5 | 0 | 1.0e+03 | 1.45 |
| s5 | orl300-005-d | 2.79455686e+02 | yes | 1 | 24 | 38 | 38 | 5 | 0 | 1.0e+08 | 2.00 |
| s5 | orl300-005-e | 2.34059272e+02 | yes | 1 | 29 | 52 | 52 | 5 | 0 | 1.0e+08 | 3.53 |
| s5 | orl300-005-f | 2.16634153e+02 | yes | 1 | 19 | 27 | 27 | 6 | 0 | 1.0e+03 | 1.52 |
| s5 | orl300-005-g | 2.17340809e+02 | yes | 1 | 19 | 29 | 29 | 8 | 0 | 1.0e+03 | 1.61 |
| s5 | orl300-005-h | 2.16074126e+02 | yes | 1 | 19 | 26 | 26 | 5 | 0 | 1.0e+03 | 1.47 |
| s5 | orl300-005-i | 2.15382371e+02 | yes | 1 | 19 | 25 | 25 | 4 | 0 | 1.0e+03 | 1.40 |
| s5 | orl300-005-j | 2.15237468e+02 | yes | 1 | 19 | 26 | 26 | 5 | 0 | 1.0e+03 | 1.45 |
| s5 | orl300-05-a | 2.46152979e+02 | yes | 1 | 23 | 40 | 40 | 7 | 0 | 1.0e+08 | 2.15 |
| s5 | orl300-05-b | 1.94343401e+02 | yes | 1 | 25 | 50 | 50 | 11 | 0 | 1.0e+08 | 2.64 |
| s5 | orl300-05-c | 1.69066728e+02 | yes | 1 | 17 | 26 | 26 | 7 | 0 | 1.0e+03 | 1.38 |
| s5 | orl300-05-d | 1.72026183e+02 | yes | 1 | 17 | 28 | 28 | 9 | 0 | 1.0e+03 | 1.49 |
| s5 | orl300-05-e | 1.73660285e+02 | yes | 1 | 17 | 30 | 30 | 11 | 0 | 1.0e+03 | 1.58 |
| s5 | orl300-05-f | 1.64877334e+02 | yes | 1 | 16 | 31 | 31 | 13 | 0 | 1.0e+03 | 1.66 |
| s5 | orl300-05-g | 2.45531513e+02 | yes | 1 | 20 | 71 | 71 | 14 | 0 | 1.0e+09 | 3.96 |
| s5 | orl300-05-h | 1.69360660e+02 | yes | 1 | 17 | 31 | 31 | 12 | 0 | 1.0e+03 | 1.66 |
| s5 | orl300-05-i | 2.04572698e+02 | yes | 1 | 25 | 104 | 104 | 13 | 0 | 1.0e+10 | 7.36 |
| s5 | orl300-05-j | 2.04138708e+02 | yes | 1 | 20 | 91 | 91 | 17 | 0 | 1.0e+09 | 6.23 |
| s5 | orl400-005-a | 3.24052453e+02 | yes | 1 | 23 | 60 | 60 | 6 | 0 | 1.0e+09 | 6.47 |
| s5 | orl400-005-b | 4.15025207e+02 | yes | 1 | 25 | 70 | 70 | 5 | 0 | 1.0e+09 | 9.04 |
| s5 | orl400-005-c | 2.85906306e+02 | yes | 1 | 16 | 22 | 22 | 5 | 0 | 1.0e+05 | 2.30 |
| s5 | orl400-005-d | 2.92679271e+02 | yes | 1 | 22 | 28 | 28 | 4 | 0 | 1.0e+03 | 2.98 |
| s5 | orl400-005-e | 2.92296991e+02 | yes | 1 | 15 | 19 | 19 | 3 | 0 | 1.0e+04 | 2.00 |
| s5 | orl400-005-f | 3.87617230e+02 | yes | 1 | 22 | 62 | 62 | 4 | 0 | 1.0e+09 | 6.55 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s5 | orl400-005-g | 3.28759945e+02 | yes | 1 | 22 | 69 | 69 | 6 | 0 | 1.0e+10 | 10.16 |
| s5 | orl400-005-h | 2.88315485e+02 | yes | 1 | 22 | 28 | 28 | 4 | 0 | 1.0e+03 | 2.96 |
| s5 | orl400-005-i | 2.91513561e+02 | yes | 1 | 24 | 61 | 61 | 5 | 0 | 1.0e+09 | 7.44 |
| s5 | orl400-005-j | 3.84241006e+02 | yes | 1 | 20 | 48 | 48 | 6 | 0 | 1.0e+09 | 5.19 |
| s5 | orl400-05-a | 3.04294111e+02 | yes | 1 | 20 | 60 | 60 | 10 | 0 | 1.0e+09 | 7.97 |
| s5 | orl400-05-b | 2.03716920e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 3.20 |
| s5 | orl400-05-c | 2.93139832e+02 | yes | 1 | 26 | 58 | 58 | 10 | 0 | 1.0e+08 | 7.19 |
| s5 | orl400-05-d | 2.70654719e+02 | yes | 1 | 23 | 66 | 66 | 11 | 0 | 1.0e+09 | 7.05 |
| s5 | orl400-05-e | 2.63601296e+02 | yes | 1 | 20 | 65 | 65 | 14 | 0 | 1.0e+09 | 6.92 |
| s5 | orl400-05-f | 2.26939749e+02 | yes | 1 | 25 | 107 | 107 | 13 | 0 | 1.0e+09 | 11.10 |
| s5 | orl400-05-g | 3.36693329e+02 | yes | 1 | 20 | 81 | 81 | 12 | 0 | 1.0e+10 | 9.98 |
| s5 | orl400-05-h | 2.79264154e+02 | yes | 1 | 21 | 75 | 75 | 13 | 0 | 1.0e+09 | 8.19 |
| s5 | orl400-05-i | 2.03750796e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 3.14 |
| s5 | orl400-05-j | 2.03915488e+02 | yes | 1 | 18 | 32 | 32 | 12 | 0 | 1.0e+03 | 3.30 |
| s5 | pard200-a | 4.11202153e+02 | yes | 1 | 26 | 36 | 36 | 8 | 0 | 1.0e+03 | 0.88 |
| s5 | pard200-b | 5.59874200e+02 | yes | 1 | 23 | 81 | 81 | 11 | 0 | 1.0e+09 | 2.20 |
| s5 | pard200-c | 6.02346919e+02 | yes | 1 | 22 | 69 | 69 | 12 | 0 | 1.0e+09 | 1.70 |
| s5 | pard200-d | 5.27621261e+02 | yes | 1 | 22 | 59 | 59 | 7 | 0 | 1.0e+09 | 1.35 |
| s5 | pard200-e | 4.11101246e+02 | yes | 1 | 26 | 36 | 36 | 8 | 0 | 1.0e+03 | 0.88 |
| s5 | pard200-f | 4.06353714e+02 | yes | 1 | 26 | 40 | 40 | 12 | 0 | 1.0e+03 | 0.99 |
| s5 | pard200-g | 4.79419132e+02 | yes | 1 | 27 | 91 | 91 | 8 | 0 | 1.0e+09 | 2.60 |
| s5 | pard200-h | 4.12107151e+02 | yes | 1 | 27 | 37 | 37 | 8 | 0 | 1.0e+03 | 0.91 |
| s5 | pard200-i | 4.10460364e+02 | yes | 1 | 26 | 37 | 37 | 9 | 0 | 1.0e+03 | 0.92 |
| s5 | pard200-j | 4.08608545e+02 | yes | 1 | 26 | 35 | 35 | 7 | 0 | 1.0e+03 | 0.86 |
| s5 | pard300-a | 6.13136793e+02 | yes | 1 | 13 | 20 | 20 | 5 | 0 | 1.0e+04 | 1.27 |
| s5 | pard300-b | 6.11377943e+02 | yes | 1 | 11 | 17 | 17 | 5 | 0 | 1.0e+05 | 1.05 |
| s5 | pard300-c | 6.42064561e+02 | yes | 1 | 18 | 61 | 61 | 6 | 0 | 1.0e+11 | 4.11 |
| s5 | pard300-d | 6.16827207e+02 | yes | 1 | 22 | 78 | 78 | 5 | 0 | 1.0e+09 | 5.23 |
| s5 | pard300-e | 6.22784947e+02 | yes | 1 | 13 | 17 | 17 | 4 | 0 | 1.0e+04 | 1.09 |
| s5 | pard300-f | 6.05916252e+02 | yes | 1 | 12 | 19 | 19 | 5 | 0 | 1.0e+04 | 1.22 |
| s5 | pard300-g | 6.65196745e+02 | yes | 1 | 22 | 94 | 94 | 4 | 0 | 1.0e+09 | 3.90 |
| s5 | pard300-h | 6.13220111e+02 | yes | 1 | 13 | 20 | 20 | 5 | 0 | 1.0e+04 | 1.27 |
| s5 | pard300-i | 6.22277754e+02 | yes | 1 | 13 | 22 | 22 | 6 | 0 | 1.0e+04 | 1.40 |
| s5 | pard300-j | 6.24159164e+02 | yes | 1 | 13 | 22 | 22 | 9 | 0 | 1.0e+04 | 1.41 |
| s5 | pard400-a | 8.10044923e+02 | yes | 1 | 14 | 29 | 29 | 13 | 0 | 1.0e+04 | 3.48 |
| s5 | pard400-b | 1.27517935e+03 | yes | 1 | 24 | 95 | 95 | 13 | 0 | 1.0e+10 | 9.98 |
| s5 | pard400-c | 1.10043101e+03 | yes | 1 | 20 | 85 | 85 | 13 | 0 | 1.0e+10 | 10.58 |
| s5 | pard400-d | 8.09775397e+02 | yes | 1 | 13 | 27 | 27 | 13 | 0 | 1.0e+06 | 3.09 |
| s5 | pard400-e | 8.11833079e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+04 | 3.07 |
| s5 | pard400-f | 1.39542422e+03 | yes | 1 | 22 | 104 | 104 | 16 | 0 | 1.0e+10 | 12.89 |
| s5 | pard400-g | 8.15923971e+02 | yes | 1 | 14 | 27 | 27 | 11 | 0 | 1.0e+04 | 3.18 |
| s5 | pard400-h | 1.02880540e+03 | yes | 1 | 20 | 84 | 84 | 15 | 0 | 1.0e+10 | 9.68 |
| s5 | pard400-i | 8.09978142e+02 | yes | 1 | 14 | 28 | 28 | 12 | 0 | 1.0e+04 | 3.33 |
| s5 | pard400-j | 8.13108561e+02 | yes | 1 | 14 | 27 | 27 | 11 | 0 | 1.0e+04 | 3.27 |
| s10 | orl200-005-a | 7.61496766e+01 | yes | 1 | 12 | 21 | 21 | 9 | 0 | 1.0e+03 | 1.32 |
| s10 | orl200-005-b | 7.56955044e+01 | yes | 1 | 12 | 23 | 23 | 9 | 0 | 1.0e+03 | 1.41 |
| s10 | orl200-005-c | 9.23897790e+01 | yes | 1 | 19 | 34 | 34 | 9 | 0 | 1.0e+08 | 3.33 |
| s10 | orl200-005-d | 7.72798102e+01 | yes | 1 | 12 | 20 | 20 | 8 | 0 | 1.0e+03 | 1.22 |
| s10 | orl200-005-e | 7.60156996e+01 | yes | 1 | 12 | 21 | 21 | 8 | 0 | 1.0e+03 | 1.31 |
| s10 | orl200-005-f | 8.99755663e+01 | yes | 1 | 21 | 36 | 36 | 9 | 0 | 1.0e+08 | 3.64 |
| s10 | orl200-005-g | 7.98758426e+01 | yes | 1 | 20 | 35 | 35 | 9 | 0 | 1.0e+08 | 3.40 |
| s10 | orl200-005-h | 8.20118662e+01 | yes | 1 | 22 | 46 | 46 | 9 | 0 | 1.0e+08 | 4.97 |
| s10 | orl200-005-i | 7.76781751e+01 | yes | 1 | 12 | 21 | 21 | 7 | 0 | 1.0e+03 | 1.30 |
| s10 | orl200-005-j | 7.60515628e+01 | yes | 1 | 12 | 23 | 23 | 9 | 0 | 1.0e+03 | 1.42 |
| s10 | orl200-05-a | 5.51779119e+01 | yes | 1 | 11 | 33 | 33 | 20 | 0 | 1.0e+03 | 1.94 |
| s10 | orl200-05-b | 5.53711422e+01 | yes | 1 | 11 | 26 | 26 | 13 | 0 | 1.0e+03 | 1.56 |
| s10 | orl200-05-c | 5.56710544e+01 | yes | 1 | 11 | 23 | 23 | 10 | 0 | 1.0e+03 | 1.38 |
| s10 | orl200-05-d | 7.61958692e+01 | yes | 1 | 17 | 30 | 30 | 13 | 0 | 1.0e+08 | 2.61 |
| s10 | orl200-05-e | 7.11186023e+01 | yes | 1 | 19 | 67 | 67 | 17 | 0 | 1.0e+09 | 8.00 |
| s10 | orl200-05-f | 8.37635791e+01 | yes | 1 | 18 | 40 | 40 | 15 | 0 | 1.0e+08 | 3.73 |
| s10 | orl200-05-g | 5.60047775e+01 | yes | 1 | 11 | 28 | 28 | 15 | 0 | 1.0e+03 | 1.67 |
| s10 | orl200-05-h | 5.48324489e+01 | yes | 1 | 11 | 25 | 25 | 12 | 0 | 1.0e+03 | 1.50 |
| s10 | orl200-05-i | 5.53284241e+01 | yes | 1 | 11 | 28 | 28 | 15 | 0 | 1.0e+03 | 1.68 |
| s10 | orl200-05-j | 7.70624357e+01 | yes | 1 | 18 | 40 | 40 | 14 | 0 | 1.0e+08 | 3.65 |
| s10 | orl300-005-a | 2.07798159e+02 | yes | 1 | 24 | 54 | 54 | 15 | 0 | 1.0e+08 | 14.93 |
| s10 | orl300-005-b | 1.33835368e+02 | yes | 1 | 22 | 44 | 44 | 10 | 0 | 1.0e+08 | 11.69 |
| s10 | orl300-005-c | 1.11718335e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 4.21 |
| s10 | orl300-005-d | 1.22899311e+02 | yes | 1 | 24 | 43 | 43 | 10 | 0 | 1.0e+08 | 11.57 |
| s10 | orl300-005-e | 1.24954791e+02 | yes | 1 | 21 | 36 | 36 | 10 | 0 | 1.0e+08 | 8.98 |
| s10 | orl300-005-f | 1.11966557e+02 | yes | 1 | 14 | 25 | 25 | 9 | 0 | 1.0e+03 | 4.07 |
| s10 | orl300-005-g | 1.12179720e+02 | yes | 1 | 14 | 27 | 27 | 11 | 0 | 1.0e+03 | 4.40 |
| s10 | orl300-005-h | 1.11664060e+02 | yes | 1 | 14 | 27 | 27 | 11 | 0 | 1.0e+03 | 4.44 |
| s10 | orl300-005-i | 1.10603384e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 4.24 |
| s10 | orl300-005-j | 1.11603076e+02 | yes | 1 | 14 | 26 | 26 | 10 | 0 | 1.0e+03 | 4.25 |
| s10 | orl300-05-a | 1.01154694e+02 | yes | 1 | 23 | 58 | 58 | 18 | 0 | 1.0e+08 | 15.86 |
| s10 | orl300-05-b | 1.04080569e+02 | yes | 1 | 22 | 57 | 57 | 22 | 0 | 1.0e+08 | 14.26 |
| s10 | orl300-05-c | 8.67406735e+01 | yes | 1 | 13 | 34 | 34 | 19 | 0 | 1.0e+03 | 5.39 |
| s10 | orl300-05-d | 1.11656386e+02 | yes | 1 | 19 | 40 | 40 | 19 | 0 | 1.0e+08 | 8.69 |
| s10 | orl300-05-e | 9.03615370e+01 | yes | 1 | 13 | 29 | 29 | 16 | 0 | 1.0e+03 | 4.56 |
| s10 | orl300-05-f | 8.53400808e+01 | yes | 1 | 13 | 41 | 41 | 28 | 0 | 1.0e+03 | 6.53 |
| s10 | orl300-05-g | 1.14926786e+02 | yes | 1 | 20 | 91 | 91 | 24 | 0 | 1.0e+09 | 28.13 |
| s10 | orl300-05-h | 8.79673391e+01 | yes | 1 | 13 | 40 | 40 | 25 | 0 | 1.0e+03 | 6.36 |
| s10 | orl300-05-i | 1.14779315e+02 | yes | 1 | 21 | 97 | 97 | 24 | 0 | 1.0e+10 | 32.52 |

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| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s10 | orl300-05-j | 1.46469312e+02 | yes | 1 | 20 | 55 | 55 | 26 | 0 | 1.0e+08 | 12.13 |
| s10 | orl400-005-a | 1.91968029e+02 | yes | 1 | 25 | 47 | 47 | 12 | 0 | 1.0e+08 | 24.16 |
| s10 | orl400-005-b | 2.24605971e+02 | yes | 1 | 25 | 44 | 44 | 10 | 0 | 1.0e+08 | 22.75 |
| s10 | orl400-005-c | 1.57541379e+02 | yes | 1 | 27 | 58 | 58 | 9 | 0 | 1.0e+08 | 32.27 |
| s10 | orl400-005-d | 1.58263150e+02 | yes | 1 | 24 | 44 | 44 | 9 | 0 | 1.0e+08 | 22.61 |
| s10 | orl400-005-e | 1.48458881e+02 | yes | 1 | 13 | 23 | 23 | 8 | 0 | 1.0e+04 | 7.68 |
| s10 | orl400-005-f | 2.04236680e+02 | yes | 1 | 22 | 56 | 56 | 9 | 0 | 1.0e+08 | 30.94 |
| s10 | orl400-005-g | 1.47128718e+02 | yes | 1 | 24 | 38 | 38 | 8 | 0 | 1.0e+08 | 17.73 |
| s10 | orl400-005-h | 1.49463588e+02 | yes | 1 | 16 | 27 | 27 | 9 | 0 | 1.0e+03 | 8.72 |
| s10 | orl400-005-i | 1.47978492e+02 | yes | 1 | 25 | 44 | 44 | 10 | 0 | 1.0e+08 | 21.69 |
| s10 | orl400-005-j | 2.19233390e+02 | yes | 1 | 24 | 49 | 49 | 12 | 0 | 1.0e+08 | 25.48 |
| s10 | orl400-05-a | 1.53838895e+02 | yes | 1 | 23 | 60 | 60 | 17 | 0 | 1.0e+08 | 29.07 |
| s10 | orl400-05-b | 1.05064925e+02 | yes | 1 | 11 | 32 | 32 | 19 | 0 | 1.0e+05 | 9.98 |
| s10 | orl400-05-c | 1.61290401e+02 | yes | 1 | 20 | 43 | 43 | 17 | 0 | 1.0e+08 | 18.65 |
| s10 | orl400-05-d | 1.21763266e+02 | yes | 1 | 21 | 84 | 84 | 19 | 0 | 1.0e+09 | 51.27 |
| s10 | orl400-05-e | 1.53702236e+02 | yes | 1 | 23 | 55 | 55 | 24 | 0 | 1.0e+08 | 25.01 |
| s10 | orl400-05-f | 1.16412323e+02 | yes | 1 | 20 | 75 | 75 | 18 | 0 | 1.0e+09 | 43.64 |
| s10 | orl400-05-g | 1.65891115e+02 | yes | 1 | 21 | 50 | 50 | 19 | 0 | 1.0e+08 | 23.22 |
| s10 | orl400-05-h | 1.50194736e+02 | yes | 1 | 24 | 58 | 58 | 17 | 0 | 1.0e+08 | 27.20 |
| s10 | orl400-05-i | 1.04714575e+02 | yes | 1 | 14 | 34 | 34 | 18 | 0 | 1.0e+03 | 10.40 |
| s10 | orl400-05-j | 1.04792437e+02 | yes | 1 | 14 | 34 | 34 | 18 | 0 | 1.0e+03 | 10.40 |
| s10 | pard200-a | 2.11728929e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 2.13 |
| s10 | pard200-b | 3.21229924e+02 | yes | 1 | 21 | 76 | 76 | 17 | 0 | 1.0e+09 | 9.01 |
| s10 | pard200-c | 2.92802690e+02 | yes | 1 | 21 | 81 | 81 | 18 | 0 | 1.0e+09 | 10.10 |
| s10 | pard200-d | 3.52515706e+02 | yes | 1 | 24 | 59 | 59 | 12 | 0 | 1.0e+08 | 6.25 |
| s10 | pard200-e | 2.11868046e+02 | yes | 1 | 18 | 33 | 33 | 13 | 0 | 1.0e+03 | 2.26 |
| s10 | pard200-f | 2.07431760e+02 | yes | 1 | 18 | 38 | 38 | 18 | 0 | 1.0e+03 | 2.59 |
| s10 | pard200-g | 2.78492335e+02 | yes | 1 | 29 | 60 | 60 | 13 | 0 | 1.0e+08 | 6.63 |
| s10 | pard200-h | 2.13337694e+02 | yes | 1 | 19 | 34 | 34 | 13 | 0 | 1.0e+03 | 2.35 |
| s10 | pard200-i | 2.10095280e+02 | yes | 1 | 18 | 34 | 34 | 14 | 0 | 1.0e+03 | 2.36 |
| s10 | pard200-j | 2.09683630e+02 | yes | 1 | 18 | 31 | 31 | 11 | 0 | 1.0e+03 | 2.12 |
| s10 | pard300-a | 3.19738995e+02 | yes | 1 | 23 | 34 | 34 | 11 | 0 | 1.0e+03 | 6.18 |
| s10 | pard300-b | 3.24193237e+02 | yes | 1 | 23 | 39 | 39 | 14 | 0 | 1.0e+03 | 7.16 |
| s10 | pard300-c | 4.05576807e+02 | yes | 1 | 26 | 122 | 122 | 11 | 0 | 1.0e+09 | 41.83 |
| s10 | pard300-d | 3.30440342e+02 | yes | 1 | 26 | 89 | 89 | 13 | 0 | 1.0e+09 | 28.72 |
| s10 | pard300-e | 3.21618676e+02 | yes | 1 | 23 | 32 | 32 | 7 | 0 | 1.0e+03 | 6.04 |
| s10 | pard300-f | 3.18854079e+02 | yes | 1 | 23 | 33 | 33 | 10 | 0 | 1.0e+03 | 6.00 |
| s10 | pard300-g | 3.38388847e+02 | yes | 1 | 24 | 71 | 71 | 9 | 0 | 1.0e+09 | 23.49 |
| s10 | pard300-h | 3.26518010e+02 | yes | 1 | 23 | 31 | 31 | 8 | 0 | 1.0e+03 | 5.70 |
| s10 | pard300-i | 3.13625033e+02 | yes | 1 | 17 | 30 | 30 | 13 | 0 | 1.0e+05 | 5.75 |
| s10 | pard300-j | 3.34251279e+02 | yes | 1 | 23 | 37 | 37 | 12 | 0 | 1.0e+03 | 6.84 |
| s10 | pard400-a | 4.08640413e+02 | yes | 1 | 18 | 39 | 39 | 19 | 0 | 1.0e+04 | 13.96 |
| s10 | pard400-b | 6.16948906e+02 | yes | 1 | 26 | 123 | 123 | 18 | 0 | 1.0e+10 | 85.54 |
| s10 | pard400-c | 4.87994169e+02 | yes | 1 | 24 | 85 | 85 | 19 | 0 | 1.0e+09 | 50.24 |
| s10 | pard400-d | 4.08780085e+02 | yes | 1 | 26 | 49 | 49 | 21 | 0 | 1.0e+03 | 17.16 |
| s10 | pard400-e | 4.25035730e+02 | yes | 1 | 24 | 61 | 61 | 17 | 0 | 1.0e+09 | 32.28 |
| s10 | pard400-f | 7.75479632e+02 | yes | 1 | 29 | 132 | 132 | 20 | 0 | 1.0e+09 | 79.45 |
| s10 | pard400-g | 4.11544272e+02 | yes | 1 | 26 | 47 | 47 | 19 | 0 | 1.0e+03 | 16.34 |
| s10 | pard400-h | 4.97898147e+02 | yes | 1 | 27 | 107 | 107 | 22 | 0 | 1.0e+09 | 65.53 |
| s10 | pard400-i | 4.08814052e+02 | yes | 1 | 26 | 46 | 46 | 20 | 0 | 1.0e+03 | 16.20 |
| s10 | pard400-j | 4.10055987e+02 | yes | 1 | 26 | 48 | 48 | 20 | 0 | 1.0e+03 | 16.97 |
| s20 | orl200-005-a | 4.27313336e+01 | yes | 1 | 26 | 40 | 40 | 12 | 0 | 1.0e+02 | 7.37 |
| s20 | orl200-005-b | 4.35030178e+01 | yes | 1 | 26 | 38 | 38 | 10 | 0 | 1.0e+02 | 7.07 |
| s20 | orl200-005-c | 4.32326757e+01 | yes | 1 | 23 | 43 | 43 | 17 | 0 | 1.0e+08 | 10.31 |
| s20 | orl200-005-d | 4.27473527e+01 | yes | 1 | 26 | 39 | 39 | 11 | 0 | 1.0e+02 | 7.20 |
| s20 | orl200-005-e | 4.26755702e+01 | yes | 1 | 26 | 42 | 42 | 14 | 0 | 1.0e+02 | 7.82 |
| s20 | orl200-005-f | 4.33821524e+01 | yes | 1 | 23 | 51 | 51 | 17 | 0 | 1.0e+08 | 14.00 |
| s20 | orl200-005-g | 4.35934280e+01 | yes | 1 | 24 | 45 | 45 | 18 | 0 | 1.0e+08 | 10.72 |
| s20 | orl200-005-h | 5.11175942e+01 | yes | 1 | 23 | 42 | 42 | 16 | 0 | 1.0e+08 | 10.38 |
| s20 | orl200-005-i | 4.54158547e+01 | yes | 1 | 27 | 43 | 43 | 14 | 0 | 1.0e+02 | 7.93 |
| s20 | orl200-005-j | 4.10006287e+01 | yes | 1 | 17 | 37 | 37 | 18 | 0 | 1.0e+04 | 6.97 |
| s20 | orl200-05-a | 3.10678273e+01 | yes | 1 | 21 | 48 | 48 | 25 | 0 | 1.0e+02 | 8.34 |
| s20 | orl200-05-b | 3.08569521e+01 | yes | 1 | 21 | 48 | 48 | 25 | 0 | 1.0e+02 | 8.36 |
| s20 | orl200-05-c | 3.10550472e+01 | yes | 1 | 21 | 42 | 42 | 19 | 0 | 1.0e+02 | 7.31 |
| s20 | orl200-05-d | 4.30326899e+01 | yes | 1 | 26 | 52 | 52 | 26 | 0 | 1.0e+07 | 12.96 |
| s20 | orl200-05-e | 4.11660468e+01 | yes | 1 | 24 | 75 | 75 | 34 | 0 | 1.0e+08 | 21.25 |
| s20 | orl200-05-f | 3.97595256e+01 | yes | 1 | 20 | 51 | 51 | 25 | 0 | 1.0e+08 | 13.02 |
| s20 | orl200-05-g | 3.13769525e+01 | yes | 1 | 22 | 45 | 45 | 21 | 0 | 1.0e+02 | 7.83 |
| s20 | orl200-05-h | 3.05903450e+01 | yes | 1 | 21 | 43 | 43 | 20 | 0 | 1.0e+02 | 7.51 |
| s20 | orl200-05-i | 3.11143775e+01 | yes | 1 | 21 | 41 | 41 | 18 | 0 | 1.0e+02 | 7.14 |
| s20 | orl200-05-j | 4.28838767e+01 | yes | 1 | 21 | 50 | 50 | 25 | 0 | 1.0e+08 | 11.98 |
| s20 | orl300-005-a | 8.55354127e+01 | yes | 1 | 18 | 59 | 59 | 26 | 0 | 1.0e+08 | 47.08 |
| s20 | orl300-005-b | 6.15351880e+01 | yes | 1 | 17 | 43 | 43 | 17 | 0 | 1.0e+08 | 32.58 |
| s20 | orl300-005-c | 5.98011327e+01 | yes | 1 | 11 | 32 | 32 | 19 | 0 | 1.0e+03 | 16.54 |
| s20 | orl300-005-d | 8.00874188e+01 | yes | 1 | 16 | 39 | 39 | 19 | 0 | 1.0e+08 | 27.77 |
| s20 | orl300-005-e | 5.89448192e+01 | yes | 1 | 11 | 33 | 33 | 20 | 0 | 1.0e+03 | 17.13 |
| s20 | orl300-005-f | 5.98662838e+01 | yes | 1 | 11 | 30 | 30 | 17 | 0 | 1.0e+03 | 15.51 |
| s20 | orl300-005-g | 5.95657972e+01 | yes | 1 | 11 | 32 | 32 | 19 | 0 | 1.0e+03 | 16.56 |
| s20 | orl300-005-h | 5.93516293e+01 | yes | 1 | 11 | 35 | 35 | 22 | 0 | 1.0e+03 | 18.10 |
| s20 | orl300-005-i | 5.85760511e+01 | yes | 1 | 11 | 33 | 33 | 20 | 0 | 1.0e+03 | 17.06 |
| s20 | orl300-005-j | 5.96075700e+01 | yes | 1 | 11 | 31 | 31 | 18 | 0 | 1.0e+03 | 15.96 |
| s20 | orl300-05-a | 5.88073628e+01 | yes | 1 | 20 | 76 | 76 | 42 | 0 | 1.0e+08 | 56.80 |
| s20 | orl300-05-b | 5.34390433e+01 | yes | 1 | 17 | 62 | 62 | 34 | 0 | 1.0e+08 | 43.21 |

*(continued)*

| Param. | Instance | $f$ | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| s20 | orl300-05-c | 4.74092142e+01 | yes | 1 | 11 | 47 | 47 | 34 | 0 | 1.0e+03 | 23.59 |
| s20 | orl300-05-d | 6.37233278e+01 | yes | 1 | 16 | 66 | 66 | 41 | 0 | 1.0e+08 | 44.75 |
| s20 | orl300-05-e | 4.65444186e+01 | yes | 1 | 11 | 49 | 49 | 38 | 0 | 1.0e+03 | 24.60 |
| s20 | orl300-05-f | 4.72205246e+01 | yes | 1 | 11 | 45 | 45 | 34 | 0 | 1.0e+03 | 22.56 |
| s20 | orl300-05-g | 6.61269071e+01 | yes | 1 | 20 | 79 | 79 | 44 | 0 | 1.0e+08 | 60.56 |
| s20 | orl300-05-h | 4.91239553e+01 | yes | 1 | 11 | 49 | 49 | 38 | 0 | 1.0e+03 | 24.55 |
| s20 | orl300-05-i | 6.08432142e+01 | yes | 1 | 19 | 110 | 110 | 52 | 0 | 1.0e+10 | 99.26 |
| s20 | orl300-05-j | 6.27174664e+01 | yes | 1 | 16 | 69 | 69 | 47 | 0 | 1.0e+08 | 45.21 |
| s20 | orl400-005-a | 1.04572884e+02 | yes | 1 | 19 | 83 | 83 | 22 | 0 | 1.0e+09 | 161.32 |
| s20 | orl400-005-b | 1.07188512e+02 | yes | 1 | 23 | 84 | 84 | 22 | 0 | 1.0e+08 | 156.32 |
| s20 | orl400-005-c | 7.69113271e+01 | yes | 1 | 10 | 31 | 31 | 19 | 0 | 1.0e+04 | 32.81 |
| s20 | orl400-005-d | 8.34863467e+01 | yes | 1 | 21 | 47 | 47 | 18 | 0 | 1.0e+08 | 71.21 |
| s20 | orl400-005-e | 7.75418212e+01 | yes | 1 | 10 | 30 | 30 | 18 | 0 | 1.0e+04 | 31.75 |
| s20 | orl400-005-f | 1.28058481e+02 | yes | 1 | 20 | 60 | 60 | 21 | 0 | 1.0e+08 | 98.02 |
| s20 | orl400-005-g | 8.07264752e+01 | yes | 1 | 19 | 40 | 40 | 17 | 0 | 1.0e+08 | 56.15 |
| s20 | orl400-005-h | 7.83979728e+01 | yes | 1 | 12 | 30 | 30 | 18 | 0 | 1.0e+03 | 31.22 |
| s20 | orl400-005-i | 8.94903088e+01 | yes | 1 | 19 | 60 | 60 | 17 | 0 | 1.0e+08 | 101.28 |
| s20 | orl400-005-j | 9.42230525e+01 | yes | 1 | 23 | 87 | 87 | 23 | 0 | 1.0e+09 | 167.65 |
| s20 | orl400-05-a | 7.25613092e+01 | yes | 1 | 19 | 65 | 65 | 29 | 0 | 1.0e+08 | 97.57 |
| s20 | orl400-05-b | 6.28145424e+01 | yes | 1 | 17 | 51 | 51 | 29 | 0 | 1.0e+08 | 65.66 |
| s20 | orl400-05-c | 8.03915926e+01 | yes | 1 | 18 | 51 | 51 | 27 | 0 | 1.0e+08 | 69.34 |
| s20 | orl400-05-d | 7.21241907e+01 | yes | 1 | 19 | 74 | 74 | 33 | 0 | 1.0e+08 | 117.34 |
| s20 | orl400-05-e | 6.93785745e+01 | yes | 1 | 17 | 75 | 75 | 42 | 0 | 1.0e+08 | 106.45 |
| s20 | orl400-05-f | 5.55421172e+01 | yes | 1 | 11 | 45 | 45 | 32 | 0 | 1.0e+03 | 44.45 |
| s20 | orl400-05-g | 7.92532473e+01 | yes | 1 | 15 | 60 | 60 | 34 | 0 | 1.0e+08 | 85.66 |
| s20 | orl400-05-h | 5.74301775e+01 | yes | 1 | 19 | 63 | 63 | 28 | 0 | 1.0e+08 | 93.26 |
| s20 | orl400-05-i | 5.54747479e+01 | yes | 1 | 11 | 44 | 44 | 31 | 0 | 1.0e+03 | 43.49 |
| s20 | orl400-05-j | 5.56938908e+01 | yes | 1 | 11 | 40 | 40 | 27 | 0 | 1.0e+03 | 39.59 |
| s20 | pard200-a | 1.11628863e+02 | yes | 1 | 14 | 37 | 37 | 21 | 0 | 1.0e+03 | 7.64 |
| s20 | pard200-b | 1.55861727e+02 | yes | 1 | 21 | 96 | 96 | 28 | 0 | 1.0e+09 | 36.09 |
| s20 | pard200-c | 1.37173491e+02 | yes | 1 | 22 | 86 | 86 | 26 | 0 | 1.0e+08 | 29.59 |
| s20 | pard200-d | 1.63618740e+02 | yes | 1 | 20 | 64 | 64 | 26 | 0 | 1.0e+08 | 20.55 |
| s20 | pard200-e | 1.11437594e+02 | yes | 1 | 14 | 38 | 38 | 22 | 0 | 1.0e+03 | 7.83 |
| s20 | pard200-f | 1.09175617e+02 | yes | 1 | 14 | 42 | 42 | 26 | 0 | 1.0e+03 | 8.69 |
| s20 | pard200-g | 1.53524068e+02 | yes | 1 | 22 | 70 | 70 | 23 | 0 | 1.0e+08 | 22.83 |
| s20 | pard200-h | 1.12710817e+02 | yes | 1 | 14 | 36 | 36 | 20 | 0 | 1.0e+03 | 7.50 |
| s20 | pard200-i | 1.10058766e+02 | yes | 1 | 14 | 37 | 37 | 21 | 0 | 1.0e+03 | 7.69 |
| s20 | pard200-j | 1.10553736e+02 | yes | 1 | 14 | 33 | 33 | 17 | 0 | 1.0e+03 | 6.83 |
| s20 | pard300-a | 1.68432460e+02 | yes | 1 | 17 | 36 | 36 | 19 | 0 | 1.0e+03 | 20.86 |
| s20 | pard300-b | 1.63922726e+02 | yes | 1 | 14 | 51 | 51 | 37 | 0 | 1.0e+05 | 30.69 |
| s20 | pard300-c | 1.90394713e+02 | yes | 1 | 20 | 87 | 87 | 36 | 0 | 1.0e+09 | 77.80 |
| s20 | pard300-d | 1.73038118e+02 | yes | 1 | 17 | 45 | 45 | 26 | 0 | 1.0e+03 | 26.22 |
| s20 | pard300-e | 1.73334453e+02 | yes | 1 | 17 | 41 | 41 | 24 | 0 | 1.0e+03 | 24.07 |
| s20 | pard300-f | 1.68933518e+02 | yes | 1 | 17 | 36 | 36 | 19 | 0 | 1.0e+03 | 21.08 |
| s20 | pard300-g | 1.93383662e+02 | yes | 1 | 22 | 81 | 81 | 28 | 0 | 1.0e+09 | 76.42 |
| s20 | pard300-h | 1.70241843e+02 | yes | 1 | 17 | 35 | 35 | 18 | 0 | 1.0e+03 | 20.34 |
| s20 | pard300-i | 1.62063225e+02 | yes | 1 | 13 | 46 | 46 | 32 | 0 | 1.0e+05 | 28.48 |
| s20 | pard300-j | 1.77294731e+02 | yes | 1 | 17 | 42 | 42 | 25 | 0 | 1.0e+03 | 24.59 |
| s20 | pard400-a | 2.08784654e+02 | yes | 1 | 18 | 50 | 50 | 30 | 0 | 1.0e+03 | 57.29 |
| s20 | pard400-b | 3.02836042e+02 | yes | 1 | 23 | 117 | 117 | 34 | 0 | 1.0e+10 | 251.13 |
| s20 | pard400-c | 2.62397973e+02 | yes | 1 | 20 | 87 | 87 | 33 | 0 | 1.0e+09 | 158.78 |
| s20 | pard400-d | 2.09373423e+02 | yes | 1 | 18 | 52 | 52 | 32 | 0 | 1.0e+03 | 59.60 |
| s20 | pard400-e | 2.14149502e+02 | yes | 1 | 27 | 75 | 75 | 26 | 0 | 1.0e+08 | 124.46 |
| s20 | pard400-f | 3.03618319e+02 | yes | 1 | 24 | 121 | 121 | 35 | 0 | 1.0e+09 | 241.62 |
| s20 | pard400-g | 2.11176855e+02 | yes | 1 | 18 | 48 | 48 | 28 | 0 | 1.0e+03 | 54.67 |
| s20 | pard400-h | 2.58268876e+02 | yes | 1 | 29 | 92 | 92 | 34 | 0 | 1.0e+08 | 154.33 |
| s20 | pard400-i | 2.09667482e+02 | yes | 1 | 18 | 47 | 47 | 29 | 0 | 1.0e+03 | 53.90 |
| s20 | pard400-j | 2.09225713e+02 | yes | 1 | 18 | 48 | 48 | 30 | 0 | 1.0e+03 | 54.77 |

Table 11: Mean-variance portfolios, Algencan.

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.45297585e+02 | yes | 11 | 486 | 1.47 |
| s5 | orl200-005-b | 1.46098716e+02 | yes | 9 | 307 | 0.87 |
| s5 | orl200-005-c | 1.46512617e+02 | yes | 11 | 495 | 1.46 |
| s5 | orl200-005-d | 1.46206350e+02 | yes | 11 | 488 | 1.53 |
| s5 | orl200-005-e | 1.44667351e+02 | yes | 13 | 321 | 0.97 |
| s5 | orl200-005-f | 1.49879062e+02 | yes | 17 | 412 | 1.17 |
| s5 | orl200-005-g | 1.44067350e+02 | yes | 11 | 483 | 1.51 |
| s5 | orl200-005-h | 1.49520443e+02 | yes | 17 | 355 | 1.13 |
| s5 | orl200-005-i | 1.47074703e+02 | yes | 11 | 484 | 1.52 |
| s5 | orl200-005-j | 1.47725160e+02 | yes | 17 | 521 | 1.81 |
| s5 | orl200-05-a | 1.04589723e+02 | yes | 10 | 441 | 1.38 |
| s5 | orl200-05-b | 1.05106816e+02 | yes | 10 | 438 | 1.32 |
| s5 | orl200-05-c | 1.06610652e+02 | yes | 10 | 636 | 2.08 |
| s5 | orl200-05-d | 1.44344320e+02 | yes | 20 | 483 | 1.52 |
| s5 | orl200-05-e | 1.27059496e+02 | yes | 17 | 553 | 1.46 |
| s5 | orl200-05-f | 1.65262502e+02 | yes | 12 | 675 | 2.12 |
| s5 | orl200-05-g | 1.05918900e+02 | yes | 10 | 636 | 1.90 |
| s5 | orl200-05-h | 1.05928903e+02 | yes | 10 | 298 | 0.84 |
| s5 | orl200-05-i | 1.05099382e+02 | yes | 10 | 279 | 0.78 |

*(continued)*

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s5 | orl200-05-j | 1.29379348e+02 | yes | 13 | 456 | 1.56 |
| s5 | orl300-005-a | 4.35621425e+02 | yes | 15 | 1046 | 7.20 |
| s5 | orl300-005-b | 2.93397907e+02 | yes | 19 | 1249 | 9.95 |
| s5 | orl300-005-c | 2.17948650e+02 | yes | 10 | 354 | 2.17 |
| s5 | orl300-005-d | 3.23953152e+02 | yes | 13 | 412 | 2.76 |
| s5 | orl300-005-e | 3.28215945e+02 | yes | 26 | 1334 | 9.81 |
| s5 | orl300-005-f | 2.17111446e+02 | yes | 14 | 913 | 6.85 |
| s5 | orl300-005-g | 2.17900907e+02 | yes | 12 | 927 | 7.12 |
| s5 | orl300-005-h | 2.17295408e+02 | yes | 10 | 358 | 2.34 |
| s5 | orl300-005-i | 2.16011182e+02 | yes | 11 | 1211 | 9.49 |
| s5 | orl300-005-j | 2.17514765e+02 | yes | 15 | 914 | 6.70 |
| s5 | orl300-05-a | 3.21291223e+02 | no | 26 | 1399 | 9.44 |
| s5 | orl300-05-b | 1.78986828e+02 | yes | 13 | 787 | 5.24 |
| s5 | orl300-05-c | 1.66748413e+02 | yes | 11 | 711 | 5.14 |
| s5 | orl300-05-d | 1.68403866e+02 | yes | 26 | 956 | 6.69 |
| s5 | orl300-05-e | 1.68133978e+02 | yes | 26 | 1540 | 11.37 |
| s5 | orl300-05-f | 1.66092181e+02 | yes | 16 | 434 | 2.97 |
| s5 | orl300-05-g | 2.08734427e+02 | yes | 19 | 644 | 3.10 |
| s5 | orl300-05-h | 1.67246220e+02 | yes | 12 | 709 | 5.14 |
| s5 | orl300-05-i | 3.42157701e+02 | no | 29 | 1311 | 6.92 |
| s5 | orl300-05-j | 2.07200883e+02 | yes | 17 | 972 | 5.90 |
| s5 | orl400-005-a | 6.86345447e+02 | no | 24 | 983 | 13.48 |
| s5 | orl400-005-b | 4.30685068e+02 | no | 20 | 562 | 6.40 |
| s5 | orl400-005-c | 3.72325131e+02 | yes | 18 | 542 | 6.84 |
| s5 | orl400-005-d | 1.07118825e+01 | no | 23 | 967 | 14.82 |
| s5 | orl400-005-e | 2.85181612e+02 | yes | 17 | 1215 | 17.08 |
| s5 | orl400-005-f | 3.50183662e+02 | yes | 15 | 549 | 7.01 |
| s5 | orl400-005-g | 2.86232192e+02 | yes | 10 | 522 | 6.30 |
| s5 | orl400-005-h | 2.88950143e+02 | yes | 12 | 487 | 5.74 |
| s5 | orl400-005-i | 2.87027326e+02 | yes | 12 | 490 | 5.86 |
| s5 | orl400-005-j | 3.18208610e+02 | yes | 20 | 671 | 7.18 |
| s5 | orl400-05-a | 2.38783713e+02 | yes | 15 | 1000 | 11.91 |
| s5 | orl400-05-b | 2.55928399e+02 | yes | 26 | 1283 | 16.84 |
| s5 | orl400-05-c | 2.66818047e+02 | yes | 15 | 1353 | 18.05 |
| s5 | orl400-05-d | 5.81799932e+02 | no | 23 | 871 | 10.54 |
| s5 | orl400-05-e | 4.16289159e+02 | no | 12 | 1223 | 16.17 |
| s5 | orl400-05-f | 2.07267528e+02 | yes | 15 | 1214 | 16.87 |
| s5 | orl400-05-g | 2.43172825e+02 | yes | 20 | 1443 | 17.11 |
| s5 | orl400-05-h | 2.18838171e+02 | yes | 12 | 788 | 10.33 |
| s5 | orl400-05-i | 2.05035254e+02 | yes | 10 | 439 | 4.94 |
| s5 | orl400-05-j | 2.04513392e+02 | yes | 9 | 447 | 5.05 |
| s5 | pard200-a | 4.11201775e+02 | yes | 9 | 284 | 0.80 |
| s5 | pard200-b | 6.11231148e+02 | yes | 15 | 494 | 1.20 |
| s5 | pard200-c | 5.39486508e+02 | yes | 16 | 594 | 1.24 |
| s5 | pard200-d | 5.59516543e+02 | yes | 15 | 295 | 0.91 |
| s5 | pard200-e | 4.11100866e+02 | yes | 11 | 403 | 1.20 |
| s5 | pard200-f | 4.06547231e+02 | yes | 11 | 279 | 0.78 |
| s5 | pard200-g | 6.65452492e+02 | yes | 19 | 354 | 0.88 |
| s5 | pard200-h | 4.12106762e+02 | yes | 11 | 289 | 0.81 |
| s5 | pard200-i | 4.10459987e+02 | yes | 9 | 269 | 0.74 |
| s5 | pard200-j | 4.08608174e+02 | yes | 11 | 264 | 0.74 |
| s5 | pard300-a | 6.09443489e+02 | yes | 12 | 638 | 4.66 |
| s5 | pard300-b | 6.11376010e+02 | yes | 11 | 569 | 4.27 |
| s5 | pard300-c | 7.43299033e+02 | yes | 19 | 440 | 2.96 |
| s5 | pard300-d | 6.83525557e+02 | yes | 18 | 461 | 3.65 |
| s5 | pard300-e | 6.08917126e+02 | yes | 19 | 655 | 4.93 |
| s5 | pard300-f | 6.05914409e+02 | yes | 12 | 392 | 2.55 |
| s5 | pard300-g | 6.42041039e+02 | yes | 23 | 735 | 4.81 |
| s5 | pard300-h | 6.08758883e+02 | yes | 12 | 635 | 4.55 |
| s5 | pard300-i | 6.12146893e+02 | yes | 12 | 645 | 4.72 |
| s5 | pard300-j | 6.14773992e+02 | yes | 17 | 655 | 5.01 |
| s5 | pard400-a | 8.07588715e+02 | yes | 21 | 559 | 7.71 |
| s5 | pard400-b | 2.31494067e+03 | no | 26 | 2154 | 25.55 |
| s5 | pard400-c | 9.47561327e+02 | yes | 19 | 724 | 8.73 |
| s5 | pard400-d | 8.06716029e+02 | yes | 13 | 1313 | 18.54 |
| s5 | pard400-e | 8.09807120e+02 | yes | 22 | 603 | 7.07 |
| s5 | pard400-f | 2.55200624e+03 | no | 25 | 1044 | 12.36 |
| s5 | pard400-g | 8.14443672e+02 | yes | 23 | 592 | 8.43 |
| s5 | pard400-h | 9.19225186e+02 | yes | 19 | 931 | 13.07 |
| s5 | pard400-i | 8.08687441e+02 | yes | 18 | 527 | 7.05 |
| s5 | pard400-j | 8.09548282e+02 | yes | 23 | 1322 | 19.58 |
| s10 | orl200-005-a | 7.63997903e+01 | yes | 10 | 432 | 1.32 |
| s10 | orl200-005-b | 7.57594950e+01 | yes | 8 | 429 | 1.30 |
| s10 | orl200-005-c | 7.81742952e+01 | yes | 13 | 275 | 0.86 |
| s10 | orl200-005-d | 7.65159110e+01 | yes | 10 | 447 | 1.33 |
| s10 | orl200-005-e | 7.64304449e+01 | yes | 10 | 251 | 0.65 |
| s10 | orl200-005-f | 9.24176331e+01 | yes | 14 | 456 | 1.52 |
| s10 | orl200-005-g | 8.09211428e+01 | yes | 13 | 434 | 1.42 |
| s10 | orl200-005-h | 7.68832894e+01 | yes | 13 | 448 | 1.49 |
| s10 | orl200-005-i | 7.77757454e+01 | yes | 10 | 276 | 0.81 |
| s10 | orl200-005-j | 7.60183626e+01 | yes | 10 | 442 | 1.34 |
| s10 | orl200-05-a | 5.58378583e+01 | yes | 9 | 294 | 0.84 |
| s10 | orl200-05-b | 5.53010504e+01 | yes | 9 | 276 | 0.77 |

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| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s10 | orl200-05-c | 5.63303482e+01 | yes | 9 | 636 | 1.97 |
| s10 | orl200-05-d | 8.26814937e+01 | no | 14 | 669 | 1.99 |
| s10 | orl200-05-e | 8.65590945e+01 | no | 15 | 483 | 1.34 |
| s10 | orl200-05-f | 6.48906034e+01 | yes | 11 | 784 | 2.22 |
| s10 | orl200-05-g | 5.60198471e+01 | yes | 9 | 264 | 0.76 |
| s10 | orl200-05-h | 5.55054866e+01 | yes | 9 | 457 | 1.37 |
| s10 | orl200-05-i | 5.61767353e+01 | yes | 9 | 275 | 0.75 |
| s10 | orl200-05-j | 7.26327974e+01 | yes | 14 | 696 | 2.11 |
| s10 | orl300-005-a | 4.01949529e+02 | no | 15 | 581 | 2.71 |
| s10 | orl300-005-b | 1.14084170e+02 | yes | 13 | 364 | 2.59 |
| s10 | orl300-005-c | 1.12175770e+02 | yes | 11 | 331 | 2.01 |
| s10 | orl300-005-d | 1.23495109e+02 | yes | 15 | 501 | 2.67 |
| s10 | orl300-005-e | 1.13044908e+02 | yes | 13 | 357 | 2.52 |
| s10 | orl300-005-f | 1.12501925e+02 | yes | 11 | 350 | 2.06 |
| s10 | orl300-005-g | 1.12638930e+02 | yes | 11 | 353 | 2.11 |
| s10 | orl300-005-h | 1.12160541e+02 | yes | 11 | 347 | 2.19 |
| s10 | orl300-005-i | 1.11057014e+02 | yes | 11 | 373 | 2.24 |
| s10 | orl300-005-j | 1.12046142e+02 | yes | 11 | 343 | 2.14 |
| s10 | orl300-05-a | 1.66019585e+02 | no | 14 | 527 | 2.58 |
| s10 | orl300-05-b | 9.11549021e+01 | yes | 18 | 775 | 4.95 |
| s10 | orl300-05-c | 8.60907863e+01 | yes | 9 | 653 | 4.47 |
| s10 | orl300-05-d | 9.67228160e+01 | yes | 13 | 397 | 2.72 |
| s10 | orl300-05-e | 8.55520631e+01 | yes | 10 | 355 | 2.27 |
| s10 | orl300-05-f | 8.64305479e+01 | yes | 10 | 355 | 2.15 |
| s10 | orl300-05-g | 2.10661340e+02 | no | 20 | 579 | 2.67 |
| s10 | orl300-05-h | 8.66299363e+01 | yes | 11 | 662 | 4.82 |
| s10 | orl300-05-i | 1.43951221e+02 | no | 22 | 619 | 2.80 |
| s10 | orl300-05-j | 1.32154121e+02 | no | 15 | 1103 | 8.02 |
| s10 | orl400-005-a | 3.51640956e+02 | no | 20 | 554 | 5.98 |
| s10 | orl400-005-b | 2.02986979e+02 | yes | 18 | 1112 | 11.73 |
| s10 | orl400-005-c | 1.49996877e+02 | yes | 13 | 462 | 6.16 |
| s10 | orl400-005-d | 2.07761916e+02 | yes | 18 | 492 | 6.96 |
| s10 | orl400-005-e | 1.48565298e+02 | yes | 19 | 472 | 5.40 |
| s10 | orl400-005-f | 2.26763319e+02 | yes | 13 | 584 | 6.94 |
| s10 | orl400-005-g | 1.68540762e+02 | yes | 17 | 488 | 6.62 |
| s10 | orl400-005-h | 1.48022552e+02 | yes | 10 | 461 | 5.08 |
| s10 | orl400-005-i | 1.46519638e+02 | yes | 14 | 458 | 5.64 |
| s10 | orl400-005-j | 1.95641717e+02 | yes | 14 | 1426 | 16.89 |
| s10 | orl400-05-a | 1.23322849e+02 | yes | 12 | 464 | 5.56 |
| s10 | orl400-05-b | 1.19713486e+02 | yes | 12 | 459 | 6.20 |
| s10 | orl400-05-c | 1.31745465e+02 | yes | 15 | 519 | 5.86 |
| s10 | orl400-05-d | 1.86903660e+02 | no | 20 | 693 | 6.36 |
| s10 | orl400-05-e | 1.71152491e+02 | no | 15 | 586 | 5.96 |
| s10 | orl400-05-f | 1.05970725e+02 | yes | 11 | 453 | 5.05 |
| s10 | orl400-05-g | 1.77915599e+02 | yes | 12 | 520 | 6.15 |
| s10 | orl400-05-h | 1.42645042e+02 | yes | 15 | 593 | 7.60 |
| s10 | orl400-05-i | 1.05623447e+02 | yes | 11 | 464 | 5.21 |
| s10 | orl400-05-j | 1.05470215e+02 | yes | 11 | 432 | 4.91 |
| s10 | pard200-a | 2.11728689e+02 | yes | 11 | 258 | 0.69 |
| s10 | pard200-b | 6.86807054e+02 | no | 18 | 392 | 0.89 |
| s10 | pard200-c | 3.37087679e+02 | no | 18 | 497 | 1.03 |
| s10 | pard200-d | 3.50589562e+02 | yes | 16 | 317 | 0.83 |
| s10 | pard200-e | 2.11873711e+02 | yes | 13 | 253 | 0.68 |
| s10 | pard200-f | 2.07509480e+02 | yes | 13 | 253 | 0.69 |
| s10 | pard200-g | 2.33751326e+02 | yes | 17 | 298 | 0.84 |
| s10 | pard200-h | 2.13337441e+02 | yes | 13 | 252 | 0.70 |
| s10 | pard200-i | 2.10232816e+02 | yes | 11 | 274 | 0.74 |
| s10 | pard200-j | 2.09683396e+02 | yes | 13 | 255 | 0.67 |
| s10 | pard300-a | 3.08487282e+02 | yes | 11 | 357 | 2.19 |
| s10 | pard300-b | 3.11840345e+02 | yes | 10 | 384 | 2.40 |
| s10 | pard300-c | 3.33681223e+02 | yes | 21 | 493 | 2.74 |
| s10 | pard300-d | 3.09122075e+02 | yes | 9 | 370 | 2.27 |
| s10 | pard300-e | 3.09632022e+02 | yes | 11 | 376 | 2.35 |
| s10 | pard300-f | 3.09476208e+02 | yes | 11 | 941 | 7.07 |
| s10 | pard300-g | 3.45326188e+02 | yes | 17 | 416 | 2.63 |
| s10 | pard300-h | 3.08750524e+02 | yes | 9 | 419 | 2.74 |
| s10 | pard300-i | 3.10100013e+02 | yes | 13 | 651 | 4.68 |
| s10 | pard300-j | 3.13352316e+02 | yes | 9 | 632 | 4.48 |
| s10 | pard400-a | 4.08052631e+02 | yes | 16 | 837 | 11.72 |
| s10 | pard400-b | 1.15071773e+03 | no | 21 | 1070 | 11.95 |
| s10 | pard400-c | 4.66514009e+02 | yes | 17 | 923 | 11.88 |
| s10 | pard400-d | 4.08913631e+02 | yes | 14 | 843 | 11.73 |
| s10 | pard400-e | 4.30029820e+02 | yes | 19 | 860 | 11.34 |
| s10 | pard400-f | 2.55200860e+03 | no | 25 | 918 | 10.63 |
| s10 | pard400-g | 4.11988478e+02 | yes | 18 | 843 | 11.56 |
| s10 | pard400-h | 4.45979960e+02 | yes | 21 | 891 | 11.64 |
| s10 | pard400-i | 4.08833761e+02 | yes | 18 | 837 | 11.45 |
| s10 | pard400-j | 4.09028380e+02 | yes | 18 | 1235 | 17.73 |
| s20 | orl200-005-a | 4.16274482e+01 | yes | 10 | 423 | 1.46 |
| s20 | orl200-005-b | 4.20976059e+01 | yes | 7 | 498 | 2.69 |
| s20 | orl200-005-c | 4.20263591e+01 | yes | 12 | 419 | 1.38 |
| s20 | orl200-005-d | 4.27702698e+01 | yes | 9 | 500 | 2.88 |
| s20 | orl200-005-e | 4.16905895e+01 | yes | 9 | 255 | 0.77 |

*(continued)*

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s20 | orl200-005-f | 4.48267013e+01 | yes | 12 | 245 | 0.76 |
| s20 | orl200-005-g | 4.23631372e+01 | yes | 11 | 615 | 3.36 |
| s20 | orl200-005-h | 4.45885030e+01 | yes | 16 | 396 | 1.52 |
| s20 | orl200-005-i | 4.25027691e+01 | yes | 9 | 232 | 0.64 |
| s20 | orl200-005-j | 4.10268061e+01 | yes | 12 | 279 | 0.91 |
| s20 | orl200-05-a | 3.11367912e+01 | yes | 10 | 389 | 1.24 |
| s20 | orl200-05-b | 3.09942577e+01 | yes | 10 | 444 | 1.48 |
| s20 | orl200-05-c | 3.12197834e+01 | yes | 10 | 609 | 2.02 |
| s20 | orl200-05-d | 4.67517899e+01 | no | 15 | 540 | 1.45 |
| s20 | orl200-05-e | 4.11495516e+01 | yes | 14 | 739 | 1.64 |
| s20 | orl200-05-f | 3.65334348e+01 | yes | 11 | 579 | 1.56 |
| s20 | orl200-05-g | 3.14686176e+01 | yes | 10 | 422 | 1.36 |
| s20 | orl200-05-h | 3.05838380e+01 | yes | 10 | 425 | 1.34 |
| s20 | orl200-05-i | 3.12066361e+01 | yes | 10 | 423 | 1.30 |
| s20 | orl200-05-j | 4.48164115e+01 | yes | 27 | 489 | 1.56 |
| s20 | orl300-005-a | 1.14398852e+02 | no | 15 | 848 | 9.81 |
| s20 | orl300-005-b | 6.08144229e+01 | yes | 10 | 653 | 5.88 |
| s20 | orl300-005-c | 5.99558526e+01 | yes | 10 | 359 | 2.37 |
| s20 | orl300-005-d | 7.77080267e+01 | yes | 14 | 486 | 2.70 |
| s20 | orl300-005-e | 5.92589334e+01 | yes | 9 | 374 | 3.08 |
| s20 | orl300-005-f | 6.00826872e+01 | yes | 10 | 355 | 2.33 |
| s20 | orl300-005-g | 5.96184043e+01 | yes | 10 | 363 | 2.36 |
| s20 | orl300-005-h | 5.95338520e+01 | yes | 10 | 344 | 2.39 |
| s20 | orl300-005-i | 5.87133511e+01 | yes | 10 | 358 | 2.34 |
| s20 | orl300-005-j | 5.99597411e+01 | yes | 10 | 364 | 2.34 |
| s20 | orl300-05-a | 8.85358893e+01 | no | 18 | 1008 | 7.99 |
| s20 | orl300-05-b | 4.98032759e+01 | yes | 11 | 666 | 8.95 |
| s20 | orl300-05-c | 4.59657307e+01 | yes | 8 | 365 | 2.39 |
| s20 | orl300-05-d | 5.92009884e+01 | yes | 11 | 892 | 9.97 |
| s20 | orl300-05-e | 4.58813655e+01 | yes | 9 | 359 | 2.24 |
| s20 | orl300-05-f | 4.64829001e+01 | yes | 9 | 755 | 10.73 |
| s20 | orl300-05-g | 1.70865184e+02 | no | 16 | 538 | 2.66 |
| s20 | orl300-05-h | 4.73068413e+01 | yes | 9 | 690 | 9.50 |
| s20 | orl300-05-i | 8.88497895e+01 | no | 18 | 984 | 7.42 |
| s20 | orl300-05-j | 7.26397571e+01 | no | 12 | 689 | 4.85 |
| s20 | orl400-005-a | 1.00240563e+02 | no | 12 | 617 | 6.37 |
| s20 | orl400-005-b | 1.62648066e+02 | no | 17 | 615 | 6.66 |
| s20 | orl400-005-c | 7.66161864e+01 | yes | 10 | 472 | 5.95 |
| s20 | orl400-005-d | 8.20073903e+01 | yes | 11 | 482 | 6.95 |
| s20 | orl400-005-e | 8.02637348e+01 | yes | 12 | 670 | 9.69 |
| s20 | orl400-005-f | 1.18853340e+02 | yes | 18 | 558 | 6.48 |
| s20 | orl400-005-g | 8.95311601e+01 | yes | 12 | 465 | 6.24 |
| s20 | orl400-005-h | 7.79350317e+01 | yes | 11 | 477 | 5.86 |
| s20 | orl400-005-i | 8.68537953e+01 | yes | 12 | 473 | 5.99 |
| s20 | orl400-005-j | 1.08721941e+02 | yes | 12 | 917 | 11.28 |
| s20 | orl400-05-a | 6.99935571e+01 | yes | 13 | 868 | 23.94 |
| s20 | orl400-05-b | 5.92544978e+01 | yes | 11 | 494 | 6.11 |
| s20 | orl400-05-c | 7.50658846e+01 | no | 13 | 653 | 7.57 |
| s20 | orl400-05-d | 1.24012415e+02 | no | 18 | 698 | 6.77 |
| s20 | orl400-05-e | 1.43074490e+02 | no | 18 | 997 | 25.59 |
| s20 | orl400-05-f | 5.81984825e+01 | yes | 12 | 463 | 5.49 |
| s20 | orl400-05-g | 1.08908129e+02 | no | 13 | 649 | 6.24 |
| s20 | orl400-05-h | 5.85149932e+01 | yes | 10 | 897 | 26.18 |
| s20 | orl400-05-i | 5.56466750e+01 | yes | 9 | 459 | 5.46 |
| s20 | orl400-05-j | 5.58327187e+01 | yes | 9 | 451 | 5.10 |
| s20 | pard200-a | 1.11652743e+02 | yes | 10 | 248 | 0.78 |
| s20 | pard200-b | 2.70532105e+02 | no | 19 | 394 | 0.90 |
| s20 | pard200-c | 1.74155945e+02 | no | 16 | 341 | 0.84 |
| s20 | pard200-d | 1.63990856e+02 | yes | 13 | 515 | 1.21 |
| s20 | pard200-e | 1.11497357e+02 | yes | 12 | 251 | 0.68 |
| s20 | pard200-f | 1.09175600e+02 | yes | 12 | 267 | 0.77 |
| s20 | pard200-g | 1.70639828e+02 | no | 16 | 366 | 0.89 |
| s20 | pard200-h | 1.12710798e+02 | yes | 12 | 248 | 0.71 |
| s20 | pard200-i | 1.10088161e+02 | yes | 10 | 226 | 0.62 |
| s20 | pard200-j | 1.10553718e+02 | yes | 12 | 264 | 0.72 |
| s20 | pard300-a | 1.58911522e+02 | yes | 26 | 945 | 7.15 |
| s20 | pard300-b | 1.60511865e+02 | yes | 12 | 347 | 2.24 |
| s20 | pard300-c | 1.92156883e+02 | yes | 17 | 730 | 4.69 |
| s20 | pard300-d | 1.59566066e+02 | yes | 11 | 358 | 2.25 |
| s20 | pard300-e | 1.60569197e+02 | yes | 26 | 936 | 7.11 |
| s20 | pard300-f | 1.60218528e+02 | yes | 13 | 674 | 4.77 |
| s20 | pard300-g | 2.32039746e+02 | no | 17 | 505 | 2.80 |
| s20 | pard300-h | 1.59486874e+02 | yes | 15 | 555 | 3.77 |
| s20 | pard300-i | 1.63309059e+02 | yes | 20 | 384 | 2.89 |
| s20 | pard300-j | 1.61886707e+02 | yes | 11 | 359 | 2.38 |
| s20 | pard400-a | 2.08804276e+02 | yes | 14 | 815 | 11.34 |
| s20 | pard400-b | 5.22089222e+02 | no | 25 | 1125 | 12.05 |
| s20 | pard400-c | 3.13415907e+02 | no | 18 | 1827 | 24.67 |
| s20 | pard400-d | 2.09430898e+02 | yes | 17 | 1211 | 17.36 |
| s20 | pard400-e | 2.25962426e+02 | yes | 25 | 1255 | 17.49 |
| s20 | pard400-f | 4.43645420e+02 | no | 20 | 1042 | 11.92 |
| s20 | pard400-g | 2.11208819e+02 | yes | 12 | 822 | 11.14 |
| s20 | pard400-h | 2.40861311e+02 | yes | 13 | 852 | 11.58 |

*(continued)*

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s20 | pard400-i | 2.09667204e+02 | yes | 17 | 839 | 11.56 |
| s20 | pard400-j | 2.09327524e+02 | yes | 9 | 801 | 10.53 |

Table 12: Mean-variance portfolios, Scholtes.

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.46614995e+02 | yes | 18 | 844 | 3.77 |
| s5 | orl200-005-b | 1.46098663e+02 | yes | 18 | 768 | 3.42 |
| s5 | orl200-005-c | 1.53124755e+02 | yes | 28 | 691 | 3.40 |
| s5 | orl200-005-d | 1.47240903e+02 | yes | 18 | 812 | 3.63 |
| s5 | orl200-005-e | 1.44667772e+02 | yes | 16 | 803 | 3.43 |
| s5 | orl200-005-f | 1.54948791e+02 | yes | 25 | 700 | 3.18 |
| s5 | orl200-005-g | 1.53554038e+02 | yes | 26 | 773 | 3.47 |
| s5 | orl200-005-h | 1.51891541e+02 | yes | 23 | 632 | 3.04 |
| s5 | orl200-005-i | 1.47074764e+02 | yes | 18 | 828 | 3.61 |
| s5 | orl200-005-j | 1.46478953e+02 | yes | 27 | 910 | 4.57 |
| s5 | orl200-05-a | 1.06302662e+02 | yes | 15 | 781 | 3.51 |
| s5 | orl200-05-b | 1.05106871e+02 | yes | 17 | 836 | 3.65 |
| s5 | orl200-05-c | 1.06610709e+02 | yes | 17 | 829 | 3.71 |
| s5 | orl200-05-d | 1.21415536e+02 | yes | 33 | 1040 | 2.94 |
| s5 | orl200-05-e | 1.33096174e+02 | yes | 49 | 1203 | 4.02 |
| s5 | orl200-05-f | 1.16034872e+02 | yes | 35 | 1202 | 4.30 |
| s5 | orl200-05-g | 1.05918956e+02 | yes | 17 | 812 | 3.64 |
| s5 | orl200-05-h | 1.06413268e+02 | yes | 15 | 688 | 3.23 |
| s5 | orl200-05-i | 1.05099052e+02 | yes | 23 | 804 | 3.63 |
| s5 | orl200-05-j | 1.11784918e+02 | yes | 24 | 789 | 3.68 |
| s5 | orl300-005-a | 2.50650856e+02 | yes | 66 | 2511 | 20.46 |
| s5 | orl300-005-b | 2.23150276e+02 | yes | 26 | 945 | 9.82 |
| s5 | orl300-005-c | 2.17986574e+02 | yes | 32 | 1057 | 10.75 |
| s5 | orl300-005-d | 2.33118404e+02 | yes | 37 | 863 | 9.11 |
| s5 | orl300-005-e | 2.18044139e+02 | yes | 44 | 1876 | 18.18 |
| s5 | orl300-005-f | 2.17110664e+02 | yes | 30 | 984 | 10.22 |
| s5 | orl300-005-g | 2.17901350e+02 | yes | 40 | 1625 | 15.92 |
| s5 | orl300-005-h | 2.17294940e+02 | yes | 23 | 1001 | 10.28 |
| s5 | orl300-005-i | 2.16011946e+02 | yes | 23 | 819 | 8.84 |
| s5 | orl300-005-j | 2.16576705e+02 | yes | 19 | 1090 | 10.72 |
| s5 | orl300-05-a | 1.76140513e+02 | yes | 53 | 1584 | 7.87 |
| s5 | orl300-05-b | 1.69643814e+02 | yes | 39 | 1030 | 14.35 |
| s5 | orl300-05-c | 1.67462861e+02 | yes | 24 | 1109 | 11.77 |
| s5 | orl300-05-d | 1.75665355e+02 | yes | 31 | 813 | 8.04 |
| s5 | orl300-05-e | 1.67668572e+02 | yes | 16 | 739 | 7.71 |
| s5 | orl300-05-f | 1.66092886e+02 | yes | 18 | 756 | 7.91 |
| s5 | orl300-05-g | 1.97177672e+02 | yes | 52 | 1553 | 7.88 |
| s5 | orl300-05-h | 1.66312911e+02 | yes | 25 | 1040 | 10.40 |
| s5 | orl300-05-i | 1.89289666e+02 | yes | 63 | 1767 | 6.40 |
| s5 | orl300-05-j | 1.81810687e+02 | yes | 33 | 643 | 5.98 |
| s5 | orl400-005-a | 3.10540040e+02 | yes | 48 | 2902 | 52.14 |
| s5 | orl400-005-b | 3.02942795e+02 | yes | 51 | 1032 | 21.90 |
| s5 | orl400-005-c | 2.88838766e+02 | yes | 25 | 2559 | 43.02 |
| s5 | orl400-005-d | 3.15951861e+02 | yes | 77 | 2078 | 62.85 |
| s5 | orl400-005-e | 2.88664504e+02 | yes | 24 | 1011 | 17.84 |
| s5 | orl400-005-f | 3.07733262e+02 | yes | 36 | 1023 | 24.33 |
| s5 | orl400-005-g | 2.87874259e+02 | yes | 32 | 1639 | 29.65 |
| s5 | orl400-005-h | 2.88951641e+02 | yes | 45 | 1553 | 37.61 |
| s5 | orl400-005-i | 2.97035484e+02 | yes | 39 | 1044 | 21.62 |
| s5 | orl400-005-j | 2.95979238e+02 | yes | 36 | 1064 | 21.28 |
| s5 | orl400-05-a | 2.13494493e+02 | yes | 22 | 1017 | 20.06 |
| s5 | orl400-05-b | 2.10090003e+02 | yes | 27 | 1271 | 21.33 |
| s5 | orl400-05-c | 2.18840449e+02 | yes | 35 | 1046 | 25.52 |
| s5 | orl400-05-d | 2.22251609e+02 | yes | 35 | 1040 | 22.02 |
| s5 | orl400-05-e | 2.22528583e+02 | yes | 55 | 1350 | 30.22 |
| s5 | orl400-05-f | 2.07267768e+02 | yes | 18 | 1013 | 17.46 |
| s5 | orl400-05-g | 2.31914866e+02 | yes | 35 | 1629 | 35.64 |
| s5 | orl400-05-h | 2.84515988e+02 | yes | 73 | 2087 | 73.59 |
| s5 | orl400-05-i | 2.05035938e+02 | yes | 22 | 918 | 15.82 |
| s5 | orl400-05-j | 2.05458514e+02 | yes | 39 | 1774 | 42.50 |
| s5 | pard200-a | 4.11875512e+02 | yes | 28 | 1098 | 5.11 |
| s5 | pard200-b | 4.48389977e+02 | yes | 59 | 1419 | 4.49 |
| s5 | pard200-c | 4.50483162e+02 | yes | 61 | 1922 | 5.53 |
| s5 | pard200-d | 4.24579284e+02 | yes | 55 | 1561 | 5.40 |
| s5 | pard200-e | 4.11101250e+02 | yes | 34 | 1373 | 5.41 |
| s5 | pard200-f | 4.06674855e+02 | yes | 43 | 1288 | 5.21 |
| s5 | pard200-g | 4.33500695e+02 | yes | 42 | 874 | 4.29 |
| s5 | pard200-h | 4.12107151e+02 | yes | 37 | 1191 | 4.75 |
| s5 | pard200-i | 4.10460371e+02 | yes | 38 | 1214 | 5.34 |
| s5 | pard200-j | 4.08608549e+02 | yes | 47 | 2077 | 7.48 |
| s5 | pard300-a | 6.09445377e+02 | yes | 34 | 1200 | 10.53 |
| s5 | pard300-b | 6.12214038e+02 | yes | 29 | 933 | 8.94 |
| s5 | pard300-c | 6.33814013e+02 | yes | 41 | 992 | 11.01 |
| s5 | pard300-d | 6.83523208e+02 | yes | 79 | 1094 | 18.28 |
| s5 | pard300-e | 6.08919005e+02 | yes | 49 | 2411 | 21.46 |

*(continued)*

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s5 | pard300-f | 6.05913228e+02 | yes | 30 | 1221 | 11.66 |
| s5 | pard300-g | 6.48078124e+02 | yes | 34 | 785 | 7.63 |
| s5 | pard300-h | 6.08760758e+02 | yes | 31 | 858 | 8.18 |
| s5 | pard300-i | 6.21015171e+02 | yes | 39 | 954 | 9.64 |
| s5 | pard300-j | 6.14775938e+02 | yes | 26 | 812 | 7.57 |
| s5 | pard400-a | 8.07587265e+02 | yes | 36 | 1642 | 29.97 |
| s5 | pard400-b | 9.14009176e+02 | yes | 92 | 2665 | 23.63 |
| s5 | pard400-c | 8.58535561e+02 | yes | 62 | 1277 | 25.50 |
| s5 | pard400-d | 8.13562928e+02 | yes | 46 | 2758 | 54.76 |
| s5 | pard400-e | 8.09801566e+02 | yes | 75 | 2182 | 49.57 |
| s5 | pard400-f | 9.22445980e+02 | yes | 77 | 2592 | 27.33 |
| s5 | pard400-g | 8.13577455e+02 | yes | 37 | 1500 | 25.80 |
| s5 | pard400-h | 8.44561048e+02 | yes | 42 | 1409 | 35.78 |
| s5 | pard400-i | 8.08690288e+02 | yes | 39 | 1176 | 22.30 |
| s5 | pard400-j | 8.11026252e+02 | yes | 49 | 2353 | 40.76 |
| s10 | orl200-005-a | 7.66308906e+01 | yes | 20 | 776 | 2.96 |
| s10 | orl200-005-b | 7.70875316e+01 | yes | 34 | 826 | 3.56 |
| s10 | orl200-005-c | 8.08866644e+01 | yes | 45 | 1249 | 4.88 |
| s10 | orl200-005-d | 7.68312392e+01 | yes | 26 | 683 | 2.83 |
| s10 | orl200-005-e | 7.64304488e+01 | yes | 17 | 482 | 1.83 |
| s10 | orl200-005-f | 8.03940890e+01 | yes | 21 | 572 | 2.23 |
| s10 | orl200-005-g | 7.79327380e+01 | yes | 22 | 376 | 1.56 |
| s10 | orl200-005-h | 8.12670576e+01 | yes | 24 | 494 | 2.13 |
| s10 | orl200-005-i | 7.78408353e+01 | yes | 38 | 683 | 2.87 |
| s10 | orl200-005-j | 7.61799956e+01 | yes | 20 | 846 | 3.29 |
| s10 | orl200-05-a | 5.63203738e+01 | yes | 19 | 531 | 2.20 |
| s10 | orl200-05-b | 5.63054938e+01 | yes | 31 | 803 | 3.24 |
| s10 | orl200-05-c | 5.65578592e+01 | yes | 18 | 747 | 2.89 |
| s10 | orl200-05-d | 6.31322255e+01 | yes | 60 | 1898 | 5.66 |
| s10 | orl200-05-e | 6.47536225e+01 | yes | 66 | 1905 | 4.95 |
| s10 | orl200-05-f | 6.03994716e+01 | yes | 39 | 766 | 3.93 |
| s10 | orl200-05-g | 5.63344139e+01 | yes | 42 | 1046 | 4.11 |
| s10 | orl200-05-h | 5.56899861e+01 | yes | 25 | 532 | 2.27 |
| s10 | orl200-05-i | 5.64756931e+01 | yes | 16 | 378 | 1.53 |
| s10 | orl200-05-j | 5.95335525e+01 | yes | 24 | 642 | 2.50 |
| s10 | orl300-005-a | 1.29758385e+02 | yes | 71 | 1608 | 16.57 |
| s10 | orl300-005-b | 1.16835920e+02 | yes | 45 | 1217 | 12.56 |
| s10 | orl300-005-c | 1.12212867e+02 | yes | 46 | 1489 | 14.24 |
| s10 | orl300-005-d | 1.27665858e+02 | yes | 42 | 1383 | 14.83 |
| s10 | orl300-005-e | 1.11650591e+02 | yes | 32 | 1535 | 12.72 |
| s10 | orl300-005-f | 1.15508594e+02 | yes | 42 | 1343 | 12.67 |
| s10 | orl300-005-g | 1.12761031e+02 | yes | 36 | 1185 | 10.12 |
| s10 | orl300-005-h | 1.12160605e+02 | yes | 36 | 1591 | 16.27 |
| s10 | orl300-005-i | 1.11399282e+02 | yes | 58 | 1753 | 15.99 |
| s10 | orl300-005-j | 1.12046206e+02 | yes | 33 | 1771 | 14.81 |
| s10 | orl300-05-a | 9.56942703e+01 | yes | 58 | 2014 | 8.67 |
| s10 | orl300-05-b | 8.87713546e+01 | yes | 42 | 2144 | 18.85 |
| s10 | orl300-05-c | 8.63982138e+01 | yes | 17 | 1353 | 12.10 |
| s10 | orl300-05-d | 9.20508324e+01 | yes | 38 | 1620 | 17.29 |
| s10 | orl300-05-e | 8.55520842e+01 | yes | 32 | 1535 | 14.53 |
| s10 | orl300-05-f | 8.62800140e+01 | yes | 31 | 1040 | 10.33 |
| s10 | orl300-05-g | 1.03012105e+02 | yes | 80 | 2035 | 12.94 |
| s10 | orl300-05-h | 8.66299587e+01 | yes | 15 | 1289 | 11.51 |
| s10 | orl300-05-i | 1.07557591e+02 | yes | 98 | 2456 | 14.09 |
| s10 | orl300-05-j | 9.40289900e+01 | yes | 54 | 1611 | 18.09 |
| s10 | orl400-005-a | 1.58541720e+02 | yes | 41 | 2010 | 31.93 |
| s10 | orl400-005-b | 1.63942192e+02 | yes | 44 | 1591 | 30.89 |
| s10 | orl400-005-c | 1.46501341e+02 | yes | 46 | 1587 | 27.76 |
| s10 | orl400-005-d | 1.48878594e+02 | yes | 51 | 2241 | 46.22 |
| s10 | orl400-005-e | 1.49677238e+02 | yes | 37 | 1847 | 31.68 |
| s10 | orl400-005-f | 1.59029540e+02 | yes | 41 | 2062 | 32.64 |
| s10 | orl400-005-g | 1.47970237e+02 | yes | 37 | 1710 | 29.07 |
| s10 | orl400-005-h | 1.48272901e+02 | yes | 29 | 1441 | 22.36 |
| s10 | orl400-005-i | 1.50513394e+02 | yes | 37 | 1706 | 30.16 |
| s10 | orl400-005-j | 1.56953560e+02 | yes | 44 | 1923 | 55.95 |
| s10 | orl400-05-a | 1.10656562e+02 | yes | 35 | 1916 | 32.22 |
| s10 | orl400-05-b | 1.08861011e+02 | yes | 33 | 2020 | 32.76 |
| s10 | orl400-05-c | 1.12020311e+02 | yes | 38 | 1399 | 27.09 |
| s10 | orl400-05-d | 1.19238375e+02 | yes | 54 | 2077 | 37.93 |
| s10 | orl400-05-e | 1.16457414e+02 | yes | 46 | 2556 | 72.20 |
| s10 | orl400-05-f | 1.05970837e+02 | yes | 14 | 1235 | 19.75 |
| s10 | orl400-05-g | 1.16949616e+02 | yes | 47 | 1888 | 52.75 |
| s10 | orl400-05-h | 1.29024185e+02 | yes | 61 | 1836 | 56.71 |
| s10 | orl400-05-i | 1.05411161e+02 | yes | 15 | 1333 | 20.93 |
| s10 | orl400-05-j | 1.05067104e+02 | yes | 15 | 1136 | 18.79 |
| s10 | pard200-a | 2.12161162e+02 | yes | 51 | 919 | 3.75 |
| s10 | pard200-b | 2.41909698e+02 | yes | 72 | 1862 | 5.55 |
| s10 | pard200-c | 2.34487147e+02 | yes | 70 | 1965 | 5.83 |
| s10 | pard200-d | 2.23739805e+02 | yes | 61 | 1017 | 3.78 |
| s10 | pard200-e | 2.12334460e+02 | yes | 40 | 1162 | 4.11 |
| s10 | pard200-f | 2.07509710e+02 | yes | 44 | 1232 | 4.32 |
| s10 | pard200-g | 2.25607002e+02 | yes | 56 | 1073 | 5.05 |
| s10 | pard200-h | 2.13337694e+02 | yes | 40 | 1088 | 3.77 |

*(continued)*

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s10 | pard200-i | 2.10233054e+02 | yes | 38 | 1088 | 3.97 |
| s10 | pard200-j | 2.10331937e+02 | yes | 40 | 738 | 2.71 |
| s10 | pard300-a | 3.08555798e+02 | yes | 46 | 1490 | 13.08 |
| s10 | pard300-b | 3.11840779e+02 | yes | 39 | 1483 | 12.76 |
| s10 | pard300-c | 3.26950711e+02 | yes | 54 | 1053 | 10.74 |
| s10 | pard300-d | 3.09122496e+02 | yes | 45 | 1150 | 10.33 |
| s10 | pard300-e | 3.23155116e+02 | yes | 39 | 1090 | 9.91 |
| s10 | pard300-f | 3.09476205e+02 | yes | 43 | 1521 | 13.03 |
| s10 | pard300-g | 3.43016164e+02 | yes | 47 | 1012 | 10.84 |
| s10 | pard300-h | 3.08750149e+02 | yes | 50 | 1351 | 12.58 |
| s10 | pard300-i | 3.29909259e+02 | yes | 44 | 960 | 9.68 |
| s10 | pard300-j | 3.13352755e+02 | yes | 43 | 1811 | 16.26 |
| s10 | pard400-a | 4.08054534e+02 | yes | 44 | 1605 | 29.47 |
| s10 | pard400-b | 4.95495211e+02 | yes | 97 | 3129 | 38.22 |
| s10 | pard400-c | 4.45053996e+02 | yes | 63 | 1463 | 33.54 |
| s10 | pard400-d | 4.15948062e+02 | yes | 48 | 2031 | 34.60 |
| s10 | pard400-e | 4.10184738e+02 | yes | 82 | 2228 | 51.60 |
| s10 | pard400-f | 4.83997618e+02 | yes | 89 | 2042 | 25.03 |
| s10 | pard400-g | 4.11990524e+02 | yes | 51 | 2358 | 38.68 |
| s10 | pard400-h | 4.27752919e+02 | yes | 52 | 2619 | 43.10 |
| s10 | pard400-i | 4.08835697e+02 | yes | 35 | 1779 | 28.12 |
| s10 | pard400-j | 4.09030315e+02 | yes | 46 | 1665 | 27.92 |
| s20 | orl200-005-a | 4.17480965e+01 | yes | 43 | 1784 | 7.64 |
| s20 | orl200-005-b | 4.15481954e+01 | yes | 41 | 1826 | 7.34 |
| s20 | orl200-005-c | 4.30617943e+01 | yes | 51 | 1813 | 7.10 |
| s20 | orl200-005-d | 4.20075231e+01 | yes | 45 | 1868 | 8.09 |
| s20 | orl200-005-e | 4.16905897e+01 | yes | 44 | 1720 | 7.06 |
| s20 | orl200-005-f | 4.38364759e+01 | yes | 55 | 2122 | 9.60 |
| s20 | orl200-005-g | 4.28155402e+01 | yes | 55 | 1726 | 7.81 |
| s20 | orl200-005-h | 4.45927887e+01 | yes | 45 | 1588 | 7.33 |
| s20 | orl200-005-i | 4.25780473e+01 | yes | 46 | 1604 | 6.63 |
| s20 | orl200-005-j | 4.10267794e+01 | yes | 50 | 1516 | 7.49 |
| s20 | orl200-05-a | 3.17459868e+01 | yes | 49 | 1798 | 8.24 |
| s20 | orl200-05-b | 3.10535902e+01 | yes | 47 | 1645 | 7.68 |
| s20 | orl200-05-c | 3.12902733e+01 | yes | 40 | 1543 | 7.34 |
| s20 | orl200-05-d | 3.49523780e+01 | yes | 56 | 1557 | 7.19 |
| s20 | orl200-05-e | 3.77940241e+01 | yes | 67 | 2337 | 8.64 |
| s20 | orl200-05-f | 3.33762529e+01 | yes | 50 | 2013 | 9.51 |
| s20 | orl200-05-g | 3.19024438e+01 | yes | 61 | 2090 | 9.98 |
| s20 | orl200-05-h | 3.09750918e+01 | yes | 49 | 2258 | 10.15 |
| s20 | orl200-05-i | 3.14766661e+01 | yes | 43 | 1797 | 8.36 |
| s20 | orl200-05-j | 3.37357826e+01 | yes | 54 | 2011 | 10.23 |
| s20 | orl300-005-a | 7.31090880e+01 | yes | 59 | 2377 | 25.94 |
| s20 | orl300-005-b | 6.20658281e+01 | yes | 53 | 3692 | 38.98 |
| s20 | orl300-005-c | 5.99590641e+01 | yes | 48 | 2120 | 24.41 |
| s20 | orl300-005-d | 6.88775363e+01 | yes | 51 | 3166 | 34.09 |
| s20 | orl300-005-e | 5.92393283e+01 | yes | 43 | 2517 | 27.28 |
| s20 | orl300-005-f | 6.00247501e+01 | yes | 52 | 2066 | 21.21 |
| s20 | orl300-005-g | 5.96473698e+01 | yes | 47 | 1998 | 21.06 |
| s20 | orl300-005-h | 5.93891326e+01 | yes | 47 | 2847 | 29.14 |
| s20 | orl300-005-i | 5.87133552e+01 | yes | 45 | 1601 | 16.32 |
| s20 | orl300-005-j | 5.97548897e+01 | yes | 36 | 1732 | 18.00 |
| s20 | orl300-05-a | 5.44390838e+01 | yes | 69 | 2370 | 19.28 |
| s20 | orl300-05-b | 4.96064333e+01 | yes | 57 | 2862 | 30.26 |
| s20 | orl300-05-c | 4.67901354e+01 | yes | 58 | 2708 | 29.51 |
| s20 | orl300-05-d | 4.94309008e+01 | yes | 60 | 2098 | 24.31 |
| s20 | orl300-05-e | 4.58813668e+01 | yes | 50 | 2991 | 31.30 |
| s20 | orl300-05-f | 4.58873180e+01 | yes | 36 | 1438 | 14.66 |
| s20 | orl300-05-g | 5.90129924e+01 | yes | 65 | 3083 | 28.61 |
| s20 | orl300-05-h | 4.66450014e+01 | yes | 49 | 2230 | 23.58 |
| s20 | orl300-05-i | 5.88650307e+01 | yes | 87 | 9520 | 43.76 |
| s20 | orl300-05-j | 5.20467766e+01 | yes | 57 | 2602 | 28.58 |
| s20 | orl400-005-a | 8.35656092e+01 | yes | 58 | 2447 | 55.38 |
| s20 | orl400-005-b | 8.89165320e+01 | yes | 61 | 3044 | 79.68 |
| s20 | orl400-005-c | 7.66511988e+01 | yes | 49 | 2524 | 50.93 |
| s20 | orl400-005-d | 8.01996529e+01 | yes | 63 | 2728 | 62.14 |
| s20 | orl400-005-e | 7.93760832e+01 | yes | 54 | 2446 | 59.18 |
| s20 | orl400-005-f | 8.37027590e+01 | yes | 62 | 3808 | 82.51 |
| s20 | orl400-005-g | 7.74608186e+01 | yes | 63 | 3990 | 82.89 |
| s20 | orl400-005-h | 7.78750923e+01 | yes | 58 | 2602 | 53.66 |
| s20 | orl400-005-i | 7.92090247e+01 | yes | 57 | 3801 | 86.58 |
| s20 | orl400-005-j | 8.79478545e+01 | yes | 60 | 2295 | 50.68 |
| s20 | orl400-05-a | 6.05419383e+01 | yes | 46 | 2800 | 63.66 |
| s20 | orl400-05-b | 5.78052175e+01 | yes | 56 | 2670 | 56.95 |
| s20 | orl400-05-c | 6.14446511e+01 | yes | 51 | 2283 | 44.27 |
| s20 | orl400-05-d | 6.42960838e+01 | yes | 62 | 3462 | 86.31 |
| s20 | orl400-05-e | 6.35521557e+01 | yes | 46 | 2245 | 50.89 |
| s20 | orl400-05-f | 5.69322109e+01 | yes | 58 | 2347 | 65.52 |
| s20 | orl400-05-g | 6.38043099e+01 | yes | 64 | 3728 | 87.34 |
| s20 | orl400-05-h | 5.69678633e+01 | yes | 37 | 1564 | 30.67 |
| s20 | orl400-05-i | 5.57283445e+01 | yes | 55 | 3094 | 66.49 |
| s20 | orl400-05-j | 5.60517300e+01 | yes | 49 | 2778 | 62.09 |
| s20 | pard200-a | 1.11652762e+02 | yes | 51 | 1832 | 7.27 |

*(continued)*

| Param. | Instance | $f$ | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| s20 | pard200-b | 1.32305369e+02 | yes | 66 | 2220 | 9.86 |
| s20 | pard200-c | 1.28120997e+02 | yes | 64 | 2279 | 10.01 |
| s20 | pard200-d | 1.22889749e+02 | yes | 66 | 1743 | 7.76 |
| s20 | pard200-e | 1.11481090e+02 | yes | 52 | 2493 | 9.79 |
| s20 | pard200-f | 1.09232243e+02 | yes | 37 | 1453 | 5.94 |
| s20 | pard200-g | 1.24873586e+02 | yes | 62 | 2177 | 9.66 |
| s20 | pard200-h | 1.12829699e+02 | yes | 60 | 2066 | 8.04 |
| s20 | pard200-i | 1.10088180e+02 | yes | 44 | 1795 | 7.28 |
| s20 | pard200-j | 1.10553737e+02 | yes | 49 | 1975 | 7.74 |
| s20 | pard300-a | 1.59290097e+02 | yes | 55 | 2055 | 22.40 |
| s20 | pard300-b | 1.60472356e+02 | yes | 50 | 2309 | 23.41 |
| s20 | pard300-c | 1.73075433e+02 | yes | 55 | 1753 | 17.85 |
| s20 | pard300-d | 1.59341577e+02 | yes | 52 | 2920 | 28.63 |
| s20 | pard300-e | 1.60440916e+02 | yes | 51 | 3057 | 30.70 |
| s20 | pard300-f | 1.60113881e+02 | yes | 49 | 2111 | 21.48 |
| s20 | pard300-g | 1.76070030e+02 | yes | 57 | 2264 | 22.33 |
| s20 | pard300-h | 1.59487435e+02 | yes | 51 | 2432 | 23.29 |
| s20 | pard300-i | 1.65736166e+02 | yes | 59 | 1875 | 20.01 |
| s20 | pard300-j | 1.61886832e+02 | yes | 51 | 2536 | 24.84 |
| s20 | pard400-a | 2.08783895e+02 | yes | 50 | 2488 | 51.60 |
| s20 | pard400-b | 2.76530335e+02 | yes | 81 | 3387 | 38.23 |
| s20 | pard400-c | 2.38582808e+02 | yes | 62 | 2912 | 74.63 |
| s20 | pard400-d | 2.12424931e+02 | yes | 63 | 2911 | 60.08 |
| s20 | pard400-e | 2.16500379e+02 | yes | 80 | 2990 | 77.53 |
| s20 | pard400-f | 2.63031710e+02 | yes | 73 | 3007 | 63.02 |
| s20 | pard400-g | 2.11175459e+02 | yes | 50 | 2523 | 52.95 |
| s20 | pard400-h | 2.19152376e+02 | yes | 52 | 1939 | 39.99 |
| s20 | pard400-i | 2.09783686e+02 | yes | 55 | 3337 | 72.35 |
| s20 | pard400-j | 2.09308848e+02 | yes | 55 | 2710 | 52.28 |

Table 13: Mean-variance portfolios, CPLEX.

| Param. | Instance | $f$ | verif. | status | time |
|---|---|---|---|---|---|
| s5 | orl200-005-a | 1.44478797e+02 | yes | limit | 581.40 |
| s5 | orl200-005-b | 1.44752841e+02 | yes | limit | 576.89 |
| s5 | orl200-005-c | 1.45931212e+02 | yes | limit | 573.28 |
| s5 | orl200-005-d | 1.45944776e+02 | yes | limit | 579.06 |
| s5 | orl200-005-e | 1.44667772e+02 | yes | limit | 582.98 |
| s5 | orl200-005-f | 1.46729562e+02 | yes | limit | 581.62 |
| s5 | orl200-005-g | 1.43822936e+02 | yes | limit | 577.83 |
| s5 | orl200-005-h | 1.44658017e+02 | yes | limit | 578.66 |
| s5 | orl200-005-i | 1.46590198e+02 | yes | limit | 575.20 |
| s5 | orl200-005-j | 1.44989330e+02 | yes | limit | 583.90 |
| s5 | orl200-05-a | 1.03956421e+02 | yes | limit | 585.59 |
| s5 | orl200-05-b | 1.03706536e+02 | yes | limit | 576.28 |
| s5 | orl200-05-c | 1.05032685e+02 | yes | limit | 583.03 |
| s5 | orl200-05-d | 1.07882428e+02 | yes | limit | 582.25 |
| s5 | orl200-05-e | 1.09886329e+02 | yes | limit | 584.34 |
| s5 | orl200-05-f | 1.07582428e+02 | yes | limit | 578.26 |
| s5 | orl200-05-g | 1.05666768e+02 | yes | limit | 577.63 |
| s5 | orl200-05-h | 1.04362620e+02 | yes | limit | 578.52 |
| s5 | orl200-05-i | 1.04384505e+02 | yes | limit | 579.45 |
| s5 | orl200-05-j | 1.07436471e+02 | yes | limit | 575.62 |
| s5 | orl300-005-a | 2.27648253e+02 | yes | limit | 578.17 |
| s5 | orl300-005-b | 2.17850390e+02 | yes | limit | 579.97 |
| s5 | orl300-005-c | 2.16314166e+02 | yes | limit | 575.86 |
| s5 | orl300-005-d | 2.18625448e+02 | yes | limit | 577.87 |
| s5 | orl300-005-e | 2.16381600e+02 | yes | limit | 577.67 |
| s5 | orl300-005-f | 2.16633166e+02 | yes | limit | 581.21 |
| s5 | orl300-005-g | 2.17340811e+02 | yes | limit | 577.03 |
| s5 | orl300-005-h | 2.16074128e+02 | yes | limit | 576.78 |
| s5 | orl300-005-i | 2.14630111e+02 | yes | limit | 578.07 |
| s5 | orl300-005-j | 2.15237470e+02 | yes | limit | 580.73 |
| s5 | orl300-05-a | 1.67216383e+02 | yes | limit | 580.87 |
| s5 | orl300-05-b | 1.66373239e+02 | yes | limit | 578.23 |
| s5 | orl300-05-c | 1.63675063e+02 | yes | limit | 582.71 |
| s5 | orl300-05-d | 1.66117410e+02 | yes | limit | 582.57 |
| s5 | orl300-05-e | 1.65033501e+02 | yes | limit | 577.61 |
| s5 | orl300-05-f | 1.64351584e+02 | yes | limit | 575.50 |
| s5 | orl300-05-g | 1.78144375e+02 | yes | solved | 559.99 |
| s5 | orl300-05-h | 1.65493058e+02 | yes | limit | 578.47 |
| s5 | orl300-05-i | 1.79358393e+02 | yes | solved | 20.71 |
| s5 | orl300-05-j | 1.70246896e+02 | yes | limit | 579.11 |
| s5 | orl400-005-a | 2.90253868e+02 | yes | limit | 581.05 |
| s5 | orl400-005-b | 2.92392616e+02 | yes | limit | 581.38 |
| s5 | orl400-005-c | 2.85700472e+02 | yes | limit | 581.98 |
| s5 | orl400-005-d | 2.88941392e+02 | yes | limit | 584.34 |
| s5 | orl400-005-e | 2.84871560e+02 | yes | limit | 581.88 |
| s5 | orl400-005-f | 2.88839497e+02 | yes | limit | 582.76 |
| s5 | orl400-005-g | 2.85633327e+02 | yes | limit | 582.26 |
| s5 | orl400-005-h | 2.87947041e+02 | yes | limit | 580.37 |

*(continued)*

| Param. | Instance | $f$ | verif. | status | time |
|---|---|---|---|---|---|
| s5 | orl400-005-i | 2.85713840e+02 | yes | limit | 583.60 |
| s5 | orl400-005-j | 2.89317752e+02 | yes | limit | 583.87 |
| s5 | orl400-05-a | 2.05111993e+02 | yes | limit | 583.37 |
| s5 | orl400-05-b | 2.03716923e+02 | yes | limit | 583.36 |
| s5 | orl400-05-c | 2.06947066e+02 | yes | limit | 584.25 |
| s5 | orl400-05-d | 2.07601973e+02 | yes | limit | 578.29 |
| s5 | orl400-05-e | 2.08684408e+02 | yes | limit | 576.60 |
| s5 | orl400-05-f | 2.04318038e+02 | yes | limit | 576.01 |
| s5 | orl400-05-g | 2.09312659e+02 | yes | limit | 576.65 |
| s5 | orl400-05-h | 2.06804887e+02 | yes | limit | 579.64 |
| s5 | orl400-05-i | 2.03750799e+02 | yes | limit | 578.41 |
| s5 | orl400-05-j | 2.03915490e+02 | yes | limit | 580.62 |
| s5 | pard200-a | 4.11202161e+02 | yes | limit | 579.72 |
| s5 | pard200-b | 4.27582003e+02 | yes | limit | 582.72 |
| s5 | pard200-c | 4.16406591e+02 | yes | limit | 581.65 |
| s5 | pard200-d | 4.18421157e+02 | yes | limit | 579.10 |
| s5 | pard200-e | 4.11101254e+02 | yes | limit | 589.64 |
| s5 | pard200-f | 4.06353721e+02 | yes | limit | 584.68 |
| s5 | pard200-g | 4.14218895e+02 | yes | limit | 584.36 |
| s5 | pard200-h | 4.12107155e+02 | yes | limit | 576.56 |
| s5 | pard200-i | 4.10460372e+02 | yes | limit | 583.37 |
| s5 | pard200-j | 4.08608553e+02 | yes | limit | 588.41 |
| s5 | pard300-a | 6.07510957e+02 | yes | limit | 579.35 |
| s5 | pard300-b | 6.11377947e+02 | yes | limit | 583.73 |
| s5 | pard300-c | 6.09122795e+02 | yes | limit | 581.58 |
| s5 | pard300-d | 6.09501816e+02 | yes | limit | 582.22 |
| s5 | pard300-e | 6.08592539e+02 | yes | limit | 574.65 |
| s5 | pard300-f | 6.05916263e+02 | yes | limit | 580.44 |
| s5 | pard300-g | 6.08012443e+02 | yes | limit | 584.01 |
| s5 | pard300-h | 6.06957995e+02 | yes | limit | 581.91 |
| s5 | pard300-i | 6.09905955e+02 | yes | limit | 582.28 |
| s5 | pard300-j | 6.14775965e+02 | yes | limit | 585.42 |
| s5 | pard400-a | 8.06319091e+02 | yes | limit | 577.64 |
| s5 | pard400-b | 8.71834149e+02 | yes | solved | 364.98 |
| s5 | pard400-c | 8.35408422e+02 | yes | limit | 577.69 |
| s5 | pard400-d | 8.06718931e+02 | yes | limit | 576.64 |
| s5 | pard400-e | 8.09807156e+02 | yes | limit | 577.99 |
| s5 | pard400-f | 8.36114291e+02 | yes | limit | 575.45 |
| s5 | pard400-g | 8.13538700e+02 | yes | limit | 580.22 |
| s5 | pard400-h | 8.06711775e+02 | yes | limit | 574.99 |
| s5 | pard400-i | 8.06944484e+02 | yes | limit | 577.80 |
| s5 | pard400-j | 8.08559255e+02 | yes | limit | 579.01 |
| s10 | orl200-005-a | 7.60759544e+01 | yes | limit | 585.44 |
| s10 | orl200-005-b | 7.56584964e+01 | yes | limit | 583.98 |
| s10 | orl200-005-c | 7.62656589e+01 | yes | limit | 580.83 |
| s10 | orl200-005-d | 7.65159289e+01 | yes | limit | 581.23 |
| s10 | orl200-005-e | 7.59115624e+01 | yes | limit | 579.04 |
| s10 | orl200-005-f | 7.67797847e+01 | yes | limit | 580.45 |
| s10 | orl200-005-g | 7.48246682e+01 | yes | limit | 579.18 |
| s10 | orl200-005-h | 7.57541924e+01 | yes | limit | 589.24 |
| s10 | orl200-005-i | 7.75547617e+01 | yes | limit | 582.61 |
| s10 | orl200-005-j | 7.52761395e+01 | yes | limit | 579.58 |
| s10 | orl200-05-a | 5.51779123e+01 | yes | limit | 589.13 |
| s10 | orl200-05-b | 5.49726738e+01 | yes | limit | 575.21 |
| s10 | orl200-05-c | 5.56710549e+01 | yes | limit | 576.81 |
| s10 | orl200-05-d | 5.79842542e+01 | yes | limit | 584.48 |
| s10 | orl200-05-e | 5.98302877e+01 | yes | limit | 582.49 |
| s10 | orl200-05-f | 5.70928375e+01 | yes | limit | 588.46 |
| s10 | orl200-05-g | 5.60047780e+01 | yes | limit | 583.11 |
| s10 | orl200-05-h | 5.48324494e+01 | yes | limit | 583.92 |
| s10 | orl200-05-i | 5.52765893e+01 | yes | limit | 580.37 |
| s10 | orl200-05-j | 5.69448105e+01 | yes | limit | 584.40 |
| s10 | orl300-005-a | 1.18998406e+02 | yes | limit | 567.97 |
| s10 | orl300-005-b | 1.12600877e+02 | yes | limit | 571.90 |
| s10 | orl300-005-c | 1.11718336e+02 | yes | limit | 572.49 |
| s10 | orl300-005-d | 1.13667719e+02 | yes | limit | 572.16 |
| s10 | orl300-005-e | 1.11160654e+02 | yes | limit | 569.14 |
| s10 | orl300-005-f | 1.11966558e+02 | yes | limit | 575.68 |
| s10 | orl300-005-g | 1.12176032e+02 | yes | limit | 571.34 |
| s10 | orl300-005-h | 1.11664061e+02 | yes | limit | 571.66 |
| s10 | orl300-005-i | 1.10603385e+02 | yes | limit | 570.70 |
| s10 | orl300-005-j | 1.11553486e+02 | yes | limit | 568.35 |
| s10 | orl300-05-a | 8.92321939e+01 | yes | limit | 572.16 |
| s10 | orl300-05-b | 8.57425117e+01 | yes | limit | 576.37 |
| s10 | orl300-05-c | 8.49634613e+01 | yes | limit | 575.92 |
| s10 | orl300-05-d | 8.72678012e+01 | yes | limit | 573.48 |
| s10 | orl300-05-e | 8.52480666e+01 | yes | limit | 573.14 |
| s10 | orl300-05-f | 8.51078230e+01 | yes | limit | 577.34 |
| s10 | orl300-05-g | 9.53868005e+01 | yes | limit | 571.55 |
| s10 | orl300-05-h | 8.60724301e+01 | yes | limit | 567.73 |
| s10 | orl300-05-i | 9.90417372e+01 | yes | limit | 569.57 |
| s10 | orl300-05-j | 8.83196930e+01 | yes | limit | 568.35 |
| s10 | orl400-005-a | 1.49215839e+02 | yes | limit | 582.32 |

*(continued)*

| Param. | Instance | $f$ | verif. | status | time |
|---|---|---|---|---|---|
| s10 | orl400-005-b | 1.52044408e+02 | yes | limit | 576.32 |
| s10 | orl400-005-c | 1.45929081e+02 | yes | limit | 583.00 |
| s10 | orl400-005-d | 1.47291720e+02 | yes | limit | 593.52 |
| s10 | orl400-005-e | 1.45847513e+02 | yes | limit | 595.41 |
| s10 | orl400-005-f | 1.48964203e+02 | yes | limit | 595.21 |
| s10 | orl400-005-g | 1.45898451e+02 | yes | limit | 595.33 |
| s10 | orl400-005-h | 1.47911912e+02 | yes | limit | 595.44 |
| s10 | orl400-005-i | 1.45745463e+02 | yes | limit | 595.29 |
| s10 | orl400-005-j | 1.49317624e+02 | yes | limit | 595.23 |
| s10 | orl400-05-a | 1.05921018e+02 | yes | limit | 595.28 |
| s10 | orl400-05-b | 1.05064926e+02 | yes | limit | 599.19 |
| s10 | orl400-05-c | 1.06520789e+02 | yes | limit | 599.10 |
| s10 | orl400-05-d | 1.09053584e+02 | yes | limit | 599.00 |
| s10 | orl400-05-e | 1.08553575e+02 | yes | limit | 599.13 |
| s10 | orl400-05-f | 1.04936787e+02 | yes | limit | 599.24 |
| s10 | orl400-05-g | 1.09688160e+02 | yes | limit | 599.23 |
| s10 | orl400-05-h | 1.06707150e+02 | yes | limit | 599.02 |
| s10 | orl400-05-i | 1.04714576e+02 | yes | limit | 599.25 |
| s10 | orl400-05-j | 1.04792437e+02 | yes | limit | 594.11 |
| s10 | pard200-a | 2.11728933e+02 | yes | limit | 581.63 |
| s10 | pard200-b | 2.23351624e+02 | yes | limit | 581.06 |
| s10 | pard200-c | 2.13491641e+02 | yes | limit | 581.14 |
| s10 | pard200-d | 2.14794034e+02 | yes | limit | 583.75 |
| s10 | pard200-e | 2.11866913e+02 | yes | limit | 568.24 |
| s10 | pard200-f | 2.07431763e+02 | yes | limit | 569.86 |
| s10 | pard200-g | 2.12922478e+02 | yes | limit | 571.66 |
| s10 | pard200-h | 2.13337696e+02 | yes | limit | 568.58 |
| s10 | pard200-i | 2.10095284e+02 | yes | limit | 575.19 |
| s10 | pard200-j | 2.09683634e+02 | yes | limit | 568.07 |
| s10 | pard300-a | 3.08238810e+02 | yes | limit | 576.15 |
| s10 | pard300-b | 3.11016364e+02 | yes | limit | 571.44 |
| s10 | pard300-c | 3.10135403e+02 | yes | limit | 577.22 |
| s10 | pard300-d | 3.09095354e+02 | yes | limit | 572.71 |
| s10 | pard300-e | 3.09632447e+02 | yes | limit | 574.80 |
| s10 | pard300-f | 3.09129093e+02 | yes | limit | 580.57 |
| s10 | pard300-g | 3.10569723e+02 | yes | limit | 582.87 |
| s10 | pard300-h | 3.08544389e+02 | yes | limit | 584.41 |
| s10 | pard300-i | 3.09970447e+02 | yes | limit | 579.60 |
| s10 | pard300-j | 3.12995189e+02 | yes | limit | 587.55 |
| s10 | pard400-a | 4.07878567e+02 | yes | limit | 593.23 |
| s10 | pard400-b | 4.52663101e+02 | yes | limit | 593.47 |
| s10 | pard400-c | 4.26931962e+02 | yes | limit | 593.57 |
| s10 | pard400-d | 4.08553369e+02 | yes | limit | 593.90 |
| s10 | pard400-e | 4.09769587e+02 | yes | limit | 593.70 |
| s10 | pard400-f | 4.34470230e+02 | yes | limit | 593.68 |
| s10 | pard400-g | 4.11544280e+02 | yes | limit | 593.66 |
| s10 | pard400-h | 4.07229545e+02 | yes | limit | 596.93 |
| s10 | pard400-i | 4.08814059e+02 | yes | limit | 598.41 |
| s10 | pard400-j | 4.08730708e+02 | yes | limit | 598.38 |
| s20 | orl200-005-a | 4.15914867e+01 | yes | limit | 598.04 |
| s20 | orl200-005-b | 4.13974047e+01 | yes | limit | 598.08 |
| s20 | orl200-005-c | 4.16573048e+01 | yes | limit | 598.21 |
| s20 | orl200-005-d | 4.18419590e+01 | yes | limit | 598.35 |
| s20 | orl200-005-e | 4.15847338e+01 | yes | limit | 598.23 |
| s20 | orl200-005-f | 4.15350876e+01 | yes | limit | 594.93 |
| s20 | orl200-005-g | 4.11635704e+01 | yes | limit | 593.26 |
| s20 | orl200-005-h | 4.15577498e+01 | yes | limit | 593.01 |
| s20 | orl200-005-i | 4.24868936e+01 | yes | limit | 593.25 |
| s20 | orl200-005-j | 4.08361285e+01 | yes | limit | 593.64 |
| s20 | orl200-05-a | 3.09311173e+01 | yes | limit | 593.09 |
| s20 | orl200-05-b | 3.08419396e+01 | yes | limit | 594.02 |
| s20 | orl200-05-c | 3.10574243e+01 | yes | limit | 593.82 |
| s20 | orl200-05-d | 3.31562409e+01 | yes | limit | 599.78 |
| s20 | orl200-05-e | 3.47865084e+01 | yes | limit | 599.65 |
| s20 | orl200-05-f | 3.18981946e+01 | yes | limit | 599.51 |
| s20 | orl200-05-g | 3.13769528e+01 | yes | limit | 599.53 |
| s20 | orl200-05-h | 3.04982147e+01 | yes | limit | 599.45 |
| s20 | orl200-05-i | 3.11114955e+01 | yes | limit | 599.53 |
| s20 | orl200-05-j | 3.17601829e+01 | yes | limit | 599.56 |
| s20 | orl300-005-a | 6.46607386e+01 | yes | limit | 599.88 |
| s20 | orl300-005-b | 5.95497375e+01 | yes | limit | 599.84 |
| s20 | orl300-005-c | 5.97672268e+01 | yes | limit | 599.88 |
| s20 | orl300-005-d | 6.13739823e+01 | yes | limit | 600.01 |
| s20 | orl300-005-e | 5.89448201e+01 | yes | limit | 599.93 |
| s20 | orl300-005-f | 5.98192621e+01 | yes | limit | 599.88 |
| s20 | orl300-005-g | 5.95602187e+01 | yes | limit | 599.98 |
| s20 | orl300-005-h | 5.93684489e+01 | yes | limit | 599.87 |
| s20 | orl300-005-i | 5.85760519e+01 | yes | limit | 598.64 |
| s20 | orl300-005-j | 5.96052892e+01 | yes | limit | 598.07 |
| s20 | orl300-05-a | 5.00201625e+01 | yes | limit | 598.49 |
| s20 | orl300-05-b | 4.60828317e+01 | yes | limit | 598.57 |
| s20 | orl300-05-c | 4.58386905e+01 | yes | limit | 598.39 |
| s20 | orl300-05-d | 4.72711859e+01 | yes | limit | 598.36 |

*(continued)*

| Param. | Instance | $f$ | verif. | status | time |
|---|---|---|---|---|---|
| s20 | orl300-05-e | 4.58537427e+01 | yes | limit | 598.23 |
| s20 | orl300-05-f | 4.57075788e+01 | yes | limit | 597.32 |
| s20 | orl300-05-g | 5.40324301e+01 | yes | limit | 598.34 |
| s20 | orl300-05-h | 4.62002096e+01 | yes | limit | 598.06 |
| s20 | orl300-05-i | 5.82722182e+01 | yes | solved | 19.16 |
| s20 | orl300-05-j | 4.82056862e+01 | yes | limit | 598.23 |
| s20 | orl400-005-a | 7.85713676e+01 | yes | limit | 597.54 |
| s20 | orl400-005-b | 8.14346395e+01 | yes | limit | 597.65 |
| s20 | orl400-005-c | 7.65340060e+01 | yes | limit | 599.73 |
| s20 | orl400-005-d | 7.71221826e+01 | yes | limit | 599.66 |
| s20 | orl400-005-e | 7.67267225e+01 | yes | limit | 599.84 |
| s20 | orl400-005-f | 7.87709739e+01 | yes | limit | 599.91 |
| s20 | orl400-005-g | 7.64176991e+01 | yes | limit | 599.61 |
| s20 | orl400-005-h | 7.77242787e+01 | yes | limit | 599.88 |
| s20 | orl400-005-i | 7.67921770e+01 | yes | limit | 599.68 |
| s20 | orl400-005-j | 7.98928104e+01 | yes | limit | 599.88 |
| s20 | orl400-05-a | 5.67136952e+01 | yes | limit | 599.72 |
| s20 | orl400-05-b | 5.61032042e+01 | yes | limit | 600.03 |
| s20 | orl400-05-c | 5.68597953e+01 | yes | limit | 600.00 |
| s20 | orl400-05-d | 5.91366847e+01 | yes | limit | 599.87 |
| s20 | orl400-05-e | 5.87070126e+01 | yes | limit | 599.88 |
| s20 | orl400-05-f | 5.55407203e+01 | yes | limit | 599.97 |
| s20 | orl400-05-g | 5.90228998e+01 | yes | limit | 599.86 |
| s20 | orl400-05-h | 5.65029967e+01 | yes | limit | 600.04 |
| s20 | orl400-05-i | 5.54680678e+01 | yes | limit | 599.95 |
| s20 | orl400-05-j | 5.56949121e+01 | yes | limit | 599.69 |
| s20 | pard200-a | 1.11628864e+02 | yes | limit | 599.70 |
| s20 | pard200-b | 1.20788867e+02 | yes | limit | 599.84 |
| s20 | pard200-c | 1.14611593e+02 | yes | limit | 599.96 |
| s20 | pard200-d | 1.13925443e+02 | yes | limit | 599.89 |
| s20 | pard200-e | 1.11437595e+02 | yes | limit | 600.13 |
| s20 | pard200-f | 1.09175618e+02 | yes | limit | 600.06 |
| s20 | pard200-g | 1.14500386e+02 | yes | limit | 599.90 |
| s20 | pard200-h | 1.12710819e+02 | yes | limit | 600.08 |
| s20 | pard200-i | 1.10058767e+02 | yes | limit | 600.03 |
| s20 | pard200-j | 1.10553737e+02 | yes | limit | 600.10 |
| s20 | pard300-a | 1.58895482e+02 | yes | limit | 598.04 |
| s20 | pard300-b | 1.60472358e+02 | yes | limit | 598.15 |
| s20 | pard300-c | 1.60028646e+02 | yes | limit | 598.55 |
| s20 | pard300-d | 1.59272334e+02 | yes | limit | 598.39 |
| s20 | pard300-e | 1.60417804e+02 | yes | limit | 596.82 |
| s20 | pard300-f | 1.60045536e+02 | yes | limit | 597.43 |
| s20 | pard300-g | 1.62114120e+02 | yes | limit | 597.35 |
| s20 | pard300-h | 1.59487437e+02 | yes | limit | 597.34 |
| s20 | pard300-i | 1.59837967e+02 | yes | limit | 597.50 |
| s20 | pard300-j | 1.61871807e+02 | yes | limit | 597.73 |
| s20 | pard400-a | 2.08784658e+02 | yes | limit | 599.74 |
| s20 | pard400-b | 2.54620846e+02 | yes | limit | 599.77 |
| s20 | pard400-c | 2.22357775e+02 | yes | limit | 599.64 |
| s20 | pard400-d | 2.09373427e+02 | yes | limit | 599.68 |
| s20 | pard400-e | 2.10883030e+02 | yes | limit | 599.70 |
| s20 | pard400-f | 2.34753822e+02 | yes | limit | 599.56 |
| s20 | pard400-g | 2.11152335e+02 | yes | limit | 599.39 |
| s20 | pard400-h | 2.09310450e+02 | yes | limit | 599.45 |
| s20 | pard400-i | 2.09667486e+02 | yes | limit | 599.55 |
| s20 | pard400-j | 2.09225717e+02 | yes | limit | 599.45 |

# 3 S&P 500 portfolios (Section 7.3.1, Table 5)

Table 14: S&P 500 portfolios, CPS AL.

| Param. | Instance | ret | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 3.66549936e-01 | yes | 1 | 11 | 23 | 23 | 1 | 0 | 1.0e+04 | 1.73 |
| p1 u0.2 s0.20 | sp500 | 5.19493976e-01 | yes | 1 | 13 | 27 | 27 | 2 | 0 | 1.0e+03 | 1.43 |
| p1 u0.2 s0.25 | sp500 | 6.34022133e-01 | yes | 1 | 18 | 33 | 33 | 3 | 0 | 1.0e+02 | 1.36 |
| p1 u1 s0.15 | sp500 | 3.66565139e-01 | yes | 1 | 11 | 22 | 22 | 1 | 0 | 1.0e+04 | 2.00 |
| p1 u1 s0.20 | sp500 | 5.20209447e-01 | yes | 1 | 12 | 29 | 29 | 1 | 1 | 1.0e+04 | 1.78 |
| p1 u1 s0.25 | sp500 | 6.35405598e-01 | yes | 1 | 17 | 31 | 31 | 2 | 0 | 1.0e+02 | 1.43 |
| p2 u0.2 s0.15 | sp500 | 4.06597063e-01 | yes | 1 | 12 | 34 | 34 | 3 | 2 | 1.0e+05 | 5.89 |
| p2 u0.2 s0.20 | sp500 | 5.61280215e-01 | yes | 1 | 10 | 24 | 24 | 0 | 1 | 1.0e+04 | 2.38 |
| p2 u0.2 s0.25 | sp500 | 6.62011565e-01 | yes | 1 | 12 | 28 | 28 | 2 | 1 | 1.0e+03 | 2.25 |
| p2 u1 s0.15 | sp500 | 4.06597063e-01 | yes | 1 | 12 | 34 | 34 | 3 | 2 | 1.0e+05 | 6.32 |
| p2 u1 s0.20 | sp500 | 5.61280215e-01 | yes | 1 | 10 | 23 | 23 | 0 | 1 | 1.0e+04 | 2.69 |
| p2 u1 s0.25 | sp500 | 6.62766859e-01 | yes | 1 | 12 | 29 | 29 | 2 | 1 | 1.0e+03 | 2.46 |
| p3 u0.2 s0.15 | sp500 | 4.17746642e-01 | yes | 1 | 15 | 47 | 47 | 7 | 4 | 1.0e+05 | 13.33 |
| p3 u0.2 s0.20 | sp500 | 5.67724336e-01 | yes | 1 | 11 | 23 | 23 | 3 | 0 | 1.0e+03 | 2.73 |
| p3 u0.2 s0.25 | sp500 | 6.69596340e-01 | yes | 1 | 14 | 28 | 28 | 2 | 0 | 1.0e+02 | 2.45 |
| p3 u1 s0.15 | sp500 | 4.17746642e-01 | yes | 1 | 15 | 47 | 47 | 7 | 4 | 1.0e+05 | 14.18 |

*(continued)*

| Param. | Instance | ret | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p3 u1 s0.20 | sp500 | 5.67724336e-01 | yes | 1 | 11 | 23 | 23 | 3 | 0 | 1.0e+03 | 3.11 |
| p3 u1 s0.25 | sp500 | 6.69596340e-01 | yes | 1 | 14 | 29 | 29 | 0 | 0 | 1.0e+02 | 2.65 |

Table 15: S&P 500 portfolios, Telescopic AL.

| Param. | Instance | ret | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 3.66549936e-01 | yes | 1 | 11 | 23 | 23 | 1 | 0 | 1.0e+04 | 1.55 |
| p1 u0.2 s0.20 | sp500 | 5.19493976e-01 | yes | 1 | 13 | 27 | 27 | 2 | 0 | 1.0e+03 | 1.31 |
| p1 u0.2 s0.25 | sp500 | 6.34022133e-01 | yes | 1 | 18 | 33 | 33 | 3 | 0 | 1.0e+02 | 1.21 |
| p1 u1 s0.15 | sp500 | 3.66565139e-01 | yes | 1 | 11 | 22 | 22 | 1 | 0 | 1.0e+04 | 1.74 |
| p1 u1 s0.20 | sp500 | 5.20101878e-01 | yes | 1 | 12 | 26 | 26 | 1 | 0 | 1.0e+03 | 1.49 |
| p1 u1 s0.25 | sp500 | 6.35405598e-01 | yes | 1 | 17 | 31 | 31 | 2 | 0 | 1.0e+02 | 1.28 |
| p2 u0.2 s0.15 | sp500 | 4.01500326e-01 | yes | 1 | 10 | 25 | 25 | 3 | 0 | 1.0e+04 | 3.74 |
| p2 u0.2 s0.20 | sp500 | 5.57389521e-01 | yes | 1 | 11 | 21 | 21 | 0 | 0 | 1.0e+03 | 1.86 |
| p2 u0.2 s0.25 | sp500 | 6.59625780e-01 | yes | 1 | 14 | 25 | 25 | 2 | 0 | 1.0e+02 | 1.79 |
| p2 u1 s0.15 | sp500 | 4.01500326e-01 | yes | 1 | 10 | 25 | 25 | 3 | 0 | 1.0e+04 | 3.92 |
| p2 u1 s0.20 | sp500 | 5.57389521e-01 | yes | 1 | 11 | 21 | 21 | 0 | 0 | 1.0e+03 | 2.15 |
| p2 u1 s0.25 | sp500 | 6.59625780e-01 | yes | 1 | 14 | 25 | 25 | 2 | 0 | 1.0e+02 | 1.98 |
| p3 u0.2 s0.15 | sp500 | 4.14444718e-01 | yes | 1 | 11 | 30 | 30 | 7 | 0 | 1.0e+04 | 6.61 |
| p3 u0.2 s0.20 | sp500 | 5.67724336e-01 | yes | 1 | 11 | 23 | 23 | 3 | 0 | 1.0e+03 | 2.59 |
| p3 u0.2 s0.25 | sp500 | 6.69596340e-01 | yes | 1 | 14 | 28 | 28 | 2 | 0 | 1.0e+02 | 2.33 |
| p3 u1 s0.15 | sp500 | 4.14444718e-01 | yes | 1 | 11 | 30 | 30 | 7 | 0 | 1.0e+04 | 6.97 |
| p3 u1 s0.20 | sp500 | 5.67724336e-01 | yes | 1 | 11 | 23 | 23 | 3 | 0 | 1.0e+03 | 2.91 |
| p3 u1 s0.25 | sp500 | 6.69596340e-01 | yes | 1 | 14 | 29 | 29 | 0 | 0 | 1.0e+02 | 2.49 |

Table 16: S&P 500 portfolios, CPS $AL_0$.

| Param. | Instance | ret | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 3.67318890e-01 | yes | 1 | 24 | 145 | 145 | 37 | 8 | 1.0e+06 | 7.33 |
| p1 u0.2 s0.20 | sp500 | 5.18580298e-01 | yes | 1 | 15 | 76 | 76 | 28 | 1 | 1.0e+04 | 2.33 |
| p1 u0.2 s0.25 | sp500 | 6.34022156e-01 | yes | 1 | 20 | 82 | 82 | 20 | 2 | 1.0e+04 | 2.44 |
| p1 u1 s0.15 | sp500 | 2.22060460e-01 | no | 1 | 23 | 131 | 131 | 24 | 0 | 1.0e+21 | 20.18 |
| p1 u1 s0.20 | sp500 | 5.23803092e-01 | yes | 1 | 20 | 77 | 77 | 19 | 5 | 1.0e+05 | 4.11 |
| p1 u1 s0.25 | sp500 | 6.35858402e-01 | yes | 1 | 16 | 69 | 69 | 18 | 3 | 1.0e+04 | 3.02 |
| p2 u0.2 s0.15 | sp500 | 4.06661211e-01 | yes | 1 | 21 | 132 | 132 | 43 | 8 | 1.0e+06 | 21.87 |
| p2 u0.2 s0.20 | sp500 | 5.61280221e-01 | yes | 1 | 16 | 84 | 84 | 47 | 3 | 1.0e+05 | 6.98 |
| p2 u0.2 s0.25 | sp500 | 6.62266364e-01 | yes | 1 | 19 | 77 | 77 | 34 | 2 | 1.0e+04 | 4.48 |
| p2 u1 s0.15 | sp500 | 4.06705414e-01 | yes | 1 | 22 | 130 | 130 | 39 | 9 | 1.0e+06 | 24.37 |
| p2 u1 s0.20 | sp500 | 5.61280184e-01 | yes | 1 | 15 | 84 | 84 | 44 | 3 | 1.0e+05 | 8.82 |
| p2 u1 s0.25 | sp500 | 6.62011527e-01 | yes | 1 | 19 | 74 | 74 | 29 | 2 | 1.0e+04 | 4.88 |
| p3 u0.2 s0.15 | sp500 | 4.17684899e-01 | yes | 1 | 16 | 101 | 101 | 62 | 3 | 1.0e+05 | 18.86 |
| p3 u0.2 s0.20 | sp500 | 5.67724324e-01 | yes | 1 | 18 | 104 | 104 | 42 | 4 | 1.0e+05 | 12.09 |
| p3 u0.2 s0.25 | sp500 | 6.69655017e-01 | yes | 1 | 16 | 74 | 74 | 42 | 1 | 1.0e+03 | 4.80 |
| p3 u1 s0.15 | sp500 | 4.17221038e-01 | yes | 1 | 19 | 97 | 97 | 65 | 5 | 1.0e+05 | 22.26 |
| p3 u1 s0.20 | sp500 | 5.67724324e-01 | yes | 1 | 18 | 90 | 90 | 43 | 4 | 1.0e+05 | 11.72 |
| p3 u1 s0.25 | sp500 | 6.69786811e-01 | yes | 1 | 17 | 69 | 69 | 47 | 1 | 1.0e+03 | 4.99 |

Table 17: S&P 500 portfolios, Telescopic $AL_0$.

| Param. | Instance | ret | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 3.32307181e-01 | yes | 1 | 18 | 73 | 73 | 37 | 0 | 1.0e+04 | 2.37 |
| p1 u0.2 s0.20 | sp500 | 5.02215632e-01 | yes | 1 | 15 | 71 | 71 | 28 | 0 | 1.0e+03 | 1.90 |
| p1 u0.2 s0.25 | sp500 | 6.21022710e-01 | yes | 1 | 22 | 63 | 63 | 18 | 0 | 1.0e+02 | 1.61 |
| p1 u1 s0.15 | sp500 | 2.22060460e-01 | no | 1 | 23 | 131 | 131 | 24 | 0 | 1.0e+21 | 20.17 |
| p1 u1 s0.20 | sp500 | 4.84184187e-01 | yes | 1 | 16 | 48 | 48 | 19 | 0 | 1.0e+03 | 1.86 |
| p1 u1 s0.25 | sp500 | 6.05068996e-01 | yes | 1 | 13 | 47 | 47 | 18 | 0 | 1.0e+03 | 1.59 |
| p2 u0.2 s0.15 | sp500 | 3.69063247e-01 | yes | 1 | 14 | 70 | 70 | 42 | 0 | 1.0e+04 | 6.92 |
| p2 u0.2 s0.20 | sp500 | 5.43110981e-01 | yes | 1 | 13 | 61 | 61 | 45 | 0 | 1.0e+03 | 4.01 |
| p2 u0.2 s0.25 | sp500 | 6.59194922e-01 | yes | 1 | 21 | 66 | 66 | 34 | 0 | 1.0e+02 | 3.12 |
| p2 u1 s0.15 | sp500 | 3.68986996e-01 | yes | 1 | 14 | 69 | 69 | 39 | 0 | 1.0e+04 | 7.58 |
| p2 u1 s0.20 | sp500 | 5.37851664e-01 | yes | 1 | 13 | 61 | 61 | 43 | 0 | 1.0e+03 | 4.67 |
| p2 u1 s0.25 | sp500 | 6.59194921e-01 | yes | 1 | 21 | 64 | 64 | 28 | 0 | 1.0e+02 | 3.37 |
| p3 u0.2 s0.15 | sp500 | 4.10179884e-01 | yes | 1 | 13 | 84 | 84 | 61 | 0 | 1.0e+04 | 12.45 |
| p3 u0.2 s0.20 | sp500 | 5.57439598e-01 | yes | 1 | 14 | 73 | 73 | 40 | 0 | 1.0e+03 | 6.06 |
| p3 u0.2 s0.25 | sp500 | 6.69132374e-01 | yes | 1 | 19 | 71 | 71 | 42 | 0 | 1.0e+02 | 4.26 |
| p3 u1 s0.15 | sp500 | 4.04581937e-01 | yes | 1 | 13 | 72 | 72 | 64 | 0 | 1.0e+04 | 12.09 |
| p3 u1 s0.20 | sp500 | 5.57439597e-01 | yes | 1 | 14 | 66 | 66 | 42 | 0 | 1.0e+03 | 6.26 |
| p3 u1 s0.25 | sp500 | 6.69132375e-01 | yes | 1 | 19 | 65 | 65 | 47 | 0 | 1.0e+02 | 4.29 |

Table 18: S&P 500 portfolios, Algencan.

| Param. | Instance | ret | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 4.66970850e-02 | no | 23 | 1477 | 36.12 |
| p1 u0.2 s0.20 | sp500 | 4.63526256e-01 | yes | 13 | 739 | 12.69 |

*(continued)*

| Param. | Instance | ret | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| p1 u0.2 s0.25 | sp500 | 6.08488761e-01 | yes | 9 | 258 | 0.96 |
| p1 u1 s0.15 | sp500 | 4.66641006e-02 | no | 24 | 1076 | 25.75 |
| p1 u1 s0.20 | sp500 | 4.79065719e-01 | yes | 9 | 259 | 1.11 |
| p1 u1 s0.25 | sp500 | 6.10553358e-01 | yes | 7 | 172 | 0.71 |
| p2 u0.2 s0.15 | sp500 | 3.59224231e-01 | yes | 9 | 357 | 1.77 |
| p2 u0.2 s0.20 | sp500 | 5.37990481e-01 | no | 9 | 207 | 0.97 |
| p2 u0.2 s0.25 | sp500 | 6.53894895e-01 | no | 9 | 192 | 0.63 |
| p2 u1 s0.15 | sp500 | 3.64006605e-01 | no | 9 | 276 | 1.06 |
| p2 u1 s0.20 | sp500 | 5.43088902e-01 | no | 8 | 195 | 0.71 |
| p2 u1 s0.25 | sp500 | 6.59176565e-01 | no | 9 | 163 | 0.71 |
| p3 u0.2 s0.15 | sp500 | 3.92348295e-01 | no | 8 | 439 | 3.51 |
| p3 u0.2 s0.20 | sp500 | 5.54750021e-01 | no | 7 | 179 | 0.67 |
| p3 u0.2 s0.25 | sp500 | 6.65797727e-01 | no | 10 | 132 | 0.63 |
| p3 u1 s0.15 | sp500 | 3.93417917e-01 | no | 9 | 359 | 1.73 |
| p3 u1 s0.20 | sp500 | 5.56788691e-01 | yes | 7 | 159 | 0.59 |
| p3 u1 s0.25 | sp500 | 6.67411936e-01 | no | 10 | 144 | 0.53 |

Table 19: S&P 500 portfolios, Scholtes.

| Param. | Instance | ret | verif. | out | inner | time |
|---|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 3.33478299e-01 | no | 135 | 6069 | 154.71 |
| p1 u0.2 s0.20 | sp500 | 5.19493992e-01 | yes | 23 | 494 | 1.61 |
| p1 u0.2 s0.25 | sp500 | 6.25245375e-01 | yes | 28 | 427 | 1.32 |
| p1 u1 s0.15 | sp500 | 3.44968339e-01 | yes | 39 | 1873 | 27.62 |
| p1 u1 s0.20 | sp500 | 5.20101916e-01 | yes | 27 | 554 | 1.71 |
| p1 u1 s0.25 | sp500 | 6.25573901e-01 | yes | 72 | 1958 | 4.12 |
| p2 u0.2 s0.15 | sp500 | 3.96775993e-01 | yes | 28 | 786 | 2.44 |
| p2 u0.2 s0.20 | sp500 | 5.61280221e-01 | yes | 26 | 485 | 1.49 |
| p2 u0.2 s0.25 | sp500 | 6.62266396e-01 | yes | 25 | 389 | 1.16 |
| p2 u1 s0.15 | sp500 | 3.97207218e-01 | yes | 23 | 551 | 1.78 |
| p2 u1 s0.20 | sp500 | 5.61280221e-01 | yes | 26 | 515 | 1.51 |
| p2 u1 s0.25 | sp500 | 6.62766867e-01 | yes | 26 | 296 | 0.92 |
| p3 u0.2 s0.15 | sp500 | 4.16522112e-01 | yes | 27 | 698 | 2.13 |
| p3 u0.2 s0.20 | sp500 | 5.67724324e-01 | yes | 22 | 401 | 1.21 |
| p3 u0.2 s0.25 | sp500 | 6.69596368e-01 | yes | 25 | 359 | 1.06 |
| p3 u1 s0.15 | sp500 | 4.16522112e-01 | yes | 27 | 675 | 2.09 |
| p3 u1 s0.20 | sp500 | 5.67724324e-01 | yes | 22 | 355 | 1.10 |
| p3 u1 s0.25 | sp500 | 6.69596368e-01 | yes | 23 | 322 | 0.97 |

Table 20: S&P 500 portfolios, CPLEX.

| Param. | Instance | ret | verif. | status | time |
|---|---|---|---|---|---|
| p1 u0.2 s0.15 | sp500 | 3.69217027e-01 | no | limit | 599.58 |
| p1 u0.2 s0.20 | sp500 | 5.23439670e-01 | no | solved | 69.82 |
| p1 u0.2 s0.25 | sp500 | 6.34022161e-01 | yes | solved | 24.05 |
| p1 u1 s0.15 | sp500 | 3.69036467e-01 | no | limit | 599.55 |
| p1 u1 s0.20 | sp500 | 5.23803092e-01 | yes | solved | 71.35 |
| p1 u1 s0.25 | sp500 | 6.35858403e-01 | yes | solved | 20.41 |
| p2 u0.2 s0.15 | sp500 | 4.06661250e-01 | no | limit | 599.52 |
| p2 u0.2 s0.20 | sp500 | 5.61280225e-01 | no | solved | 19.05 |
| p2 u0.2 s0.25 | sp500 | 6.62766870e-01 | yes | solved | 23.14 |
| p2 u1 s0.15 | sp500 | 4.05875154e-01 | yes | limit | 599.62 |
| p2 u1 s0.20 | sp500 | 5.61280224e-01 | yes | solved | 40.01 |
| p2 u1 s0.25 | sp500 | 6.62766872e-01 | no | solved | 22.66 |
| p3 u0.2 s0.15 | sp500 | 4.17540280e-01 | no | limit | 599.54 |
| p3 u0.2 s0.20 | sp500 | 5.67724352e-01 | no | solved | 113.36 |
| p3 u0.2 s0.25 | sp500 | 6.70752418e-01 | no | solved | 43.00 |
| p3 u1 s0.15 | sp500 | 4.17314738e-01 | yes | limit | 600.06 |
| p3 u1 s0.20 | sp500 | 5.67720022e-01 | no | solved | 74.57 |
| p3 u1 s0.25 | sp500 | 6.70752425e-01 | no | solved | 33.12 |

# 4 Sparse PCA (Section 7.3.2, Table 6)

Table 21: Sparse PCA, CPS AL.

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p5 | spca100_t1_1 | 2.12552192e+00 | yes | 1 | 2 | 11 | 11 | 3 | 0 | 1.0e+01 | 0.05 |
| p5 | spca100_t1_2 | 1.90711553e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 1.0e+01 | 0.03 |
| p5 | spca100_t1_3 | 1.97720831e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.0e+01 | 0.03 |
| p5 | spca100_t1_4 | 2.06646608e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.04 |
| p5 | spca100_t1_5 | 1.93173821e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.0e+01 | 0.05 |
| p5 | spca100_t3_1 | 3.89167652e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.9e+01 | 0.03 |
| p5 | spca100_t3_2 | 3.18772149e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.7e+01 | 0.03 |
| p5 | spca100_t3_3 | 2.98798763e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.3e+01 | 0.03 |

*(continued)*

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p5 | spca100_t3_4 | 2.94309411e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 1.2e+01 | 0.04 |
| p5 | spca100_t3_5 | 3.35615169e+00 | yes | 1 | 2 | 10 | 10 | 0 | 0 | 1.8e+01 | 0.03 |
| p5 | spca200_t1_1 | 1.89495504e+00 | yes | 1 | 2 | 12 | 12 | 5 | 0 | 1.0e+01 | 0.20 |
| p5 | spca200_t1_2 | 1.86461586e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.0e+01 | 0.11 |
| p5 | spca200_t1_3 | 1.88004497e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.0e+01 | 0.12 |
| p5 | spca200_t1_4 | 1.86105274e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.12 |
| p5 | spca200_t1_5 | 1.66820645e+00 | yes | 1 | 2 | 11 | 11 | 3 | 0 | 1.0e+01 | 0.16 |
| p5 | spca200_t3_1 | 2.92838567e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.2e+01 | 0.12 |
| p5 | spca200_t3_2 | 3.02106092e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 1.3e+01 | 0.11 |
| p5 | spca200_t3_3 | 2.90146289e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.1e+01 | 0.11 |
| p5 | spca200_t3_4 | 3.05963084e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.4e+01 | 0.12 |
| p5 | spca200_t3_5 | 3.25671615e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.4e+01 | 0.12 |
| p5 | spca50_t1_1 | 2.27074672e+00 | yes | 1 | 2 | 10 | 10 | 1 | 0 | 1.0e+01 | 0.01 |
| p5 | spca50_t1_2 | 2.67941234e+00 | yes | 1 | 2 | 10 | 10 | 1 | 0 | 1.4e+01 | 0.01 |
| p5 | spca50_t1_3 | 2.39623853e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.1e+01 | 0.01 |
| p5 | spca50_t1_4 | 2.51791258e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.1e+01 | 0.01 |
| p5 | spca50_t1_5 | 2.43172161e+00 | yes | 1 | 6 | 23 | 23 | 3 | 2 | 1.0e+02 | 0.01 |
| p5 | spca50_t3_1 | 3.58973064e+00 | yes | 1 | 2 | 10 | 10 | 1 | 0 | 1.7e+01 | 0.01 |
| p5 | spca50_t3_2 | 2.29362549e+00 | yes | 1 | 4 | 17 | 17 | 2 | 1 | 1.0e+01 | 0.01 |
| p5 | spca50_t3_3 | 3.30379233e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.6e+01 | 0.01 |
| p5 | spca50_t3_4 | 4.07647981e+00 | yes | 1 | 4 | 15 | 15 | 0 | 1 | 2.2e+01 | 0.01 |
| p5 | spca50_t3_5 | 3.09840245e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 1.7e+01 | 0.01 |
| p10 | spca100_t1_1 | 2.58373666e+00 | yes | 1 | 6 | 19 | 19 | 2 | 2 | 1.0e+02 | 0.09 |
| p10 | spca100_t1_2 | 2.43457247e+00 | yes | 1 | 6 | 23 | 23 | 5 | 2 | 1.0e+02 | 0.07 |
| p10 | spca100_t1_3 | 2.53608995e+00 | yes | 1 | 4 | 15 | 15 | 2 | 1 | 1.1e+01 | 0.06 |
| p10 | spca100_t1_4 | 2.41117793e+00 | yes | 1 | 2 | 12 | 12 | 4 | 0 | 1.0e+01 | 0.06 |
| p10 | spca100_t1_5 | 2.33782808e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.06 |
| p10 | spca100_t3_1 | 5.82539277e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 4.8e+01 | 0.05 |
| p10 | spca100_t3_2 | 4.17619663e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.1e+01 | 0.04 |
| p10 | spca100_t3_3 | 4.17965865e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.9e+01 | 0.05 |
| p10 | spca100_t3_4 | 4.03765557e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.8e+01 | 0.06 |
| p10 | spca100_t3_5 | 4.47988840e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 3.6e+01 | 0.05 |
| p10 | spca200_t1_1 | 1.99739297e+00 | yes | 1 | 2 | 13 | 13 | 5 | 0 | 1.0e+01 | 0.27 |
| p10 | spca200_t1_2 | 2.21212527e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.19 |
| p10 | spca200_t1_3 | 2.31930443e+00 | yes | 1 | 2 | 12 | 12 | 4 | 0 | 1.0e+01 | 0.21 |
| p10 | spca200_t1_4 | 2.24945927e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 1.0e+01 | 0.20 |
| p10 | spca200_t1_5 | 2.04564629e+00 | yes | 1 | 2 | 12 | 12 | 4 | 0 | 1.0e+01 | 0.24 |
| p10 | spca200_t3_1 | 4.05989266e+00 | yes | 1 | 2 | 10 | 10 | 0 | 0 | 2.7e+01 | 0.20 |
| p10 | spca200_t3_2 | 4.47638879e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 3.2e+01 | 0.20 |
| p10 | spca200_t3_3 | 3.99708695e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.7e+01 | 0.19 |
| p10 | spca200_t3_4 | 4.17717002e+00 | yes | 1 | 2 | 10 | 10 | 0 | 0 | 2.8e+01 | 0.23 |
| p10 | spca200_t3_5 | 4.50747534e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 3.2e+01 | 0.20 |
| p10 | spca50_t1_1 | 2.91456724e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.7e+01 | 0.01 |
| p10 | spca50_t1_2 | 3.45293455e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 2.7e+01 | 0.01 |
| p10 | spca50_t1_3 | 3.00103629e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 2.1e+01 | 0.01 |
| p10 | spca50_t1_4 | 3.00435147e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.8e+01 | 0.01 |
| p10 | spca50_t1_5 | 2.98509063e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.9e+01 | 0.01 |
| p10 | spca50_t3_1 | 4.62597554e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 3.4e+01 | 0.01 |
| p10 | spca50_t3_2 | 2.86451129e+00 | yes | 1 | 4 | 15 | 15 | 3 | 1 | 1.5e+01 | 0.02 |
| p10 | spca50_t3_3 | 4.53926862e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.3e+01 | 0.01 |
| p10 | spca50_t3_4 | 6.10057045e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 5.4e+01 | 0.01 |
| p10 | spca50_t3_5 | 4.06658644e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 3.2e+01 | 0.01 |
| p20 | spca100_t1_1 | 3.24034574e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 2.0e+01 | 0.14 |
| p20 | spca100_t1_2 | 2.93528853e+00 | yes | 1 | 2 | 13 | 13 | 6 | 0 | 1.8e+01 | 0.13 |
| p20 | spca100_t1_3 | 3.13290493e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 2.0e+01 | 0.10 |
| p20 | spca100_t1_4 | 2.91008334e+00 | yes | 1 | 2 | 16 | 16 | 9 | 0 | 1.6e+01 | 0.15 |
| p20 | spca100_t1_5 | 2.97489943e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 1.7e+01 | 0.14 |
| p20 | spca100_t3_1 | 6.24935848e+00 | yes | 1 | 2 | 8 | 8 | 2 | 0 | 5.6e+01 | 0.12 |
| p20 | spca100_t3_2 | 4.67831184e+00 | yes | 1 | 2 | 7 | 7 | 1 | 0 | 4.0e+01 | 0.09 |
| p20 | spca100_t3_3 | 4.67207582e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 3.6e+01 | 0.13 |
| p20 | spca100_t3_4 | 4.53539908e+00 | yes | 1 | 4 | 12 | 12 | 1 | 1 | 3.8e+01 | 0.14 |
| p20 | spca100_t3_5 | 4.87124440e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 4.4e+01 | 0.11 |
| p20 | spca200_t1_1 | 2.53479070e+00 | yes | 1 | 12 | 55 | 55 | 8 | 5 | 1.0e+03 | 1.61 |
| p20 | spca200_t1_2 | 2.64632110e+00 | yes | 1 | 7 | 34 | 34 | 9 | 2 | 1.1e+02 | 1.03 |
| p20 | spca200_t1_3 | 2.74499631e+00 | yes | 1 | 2 | 13 | 13 | 6 | 0 | 1.2e+01 | 0.56 |
| p20 | spca200_t1_4 | 2.65949961e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 1.3e+01 | 0.48 |
| p20 | spca200_t1_5 | 2.45744090e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.50 |
| p20 | spca200_t3_1 | 4.40564230e+00 | yes | 1 | 7 | 23 | 23 | 3 | 2 | 3.2e+02 | 1.06 |
| p20 | spca200_t3_2 | 4.90590458e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 3.9e+01 | 0.49 |
| p20 | spca200_t3_3 | 4.38934252e+00 | yes | 1 | 4 | 14 | 14 | 2 | 1 | 3.3e+01 | 0.68 |
| p20 | spca200_t3_4 | 4.53703721e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.4e+01 | 0.52 |
| p20 | spca200_t3_5 | 4.85200585e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.8e+01 | 0.56 |
| p20 | spca50_t1_1 | 3.60079112e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 3.0e+01 | 0.02 |
| p20 | spca50_t1_2 | 3.77866616e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 3.5e+01 | 0.02 |
| p20 | spca50_t1_3 | 3.41083383e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 3.0e+01 | 0.02 |
| p20 | spca50_t1_4 | 3.45020392e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 2.9e+01 | 0.02 |
| p20 | spca50_t1_5 | 3.49997629e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 3.1e+01 | 0.02 |
| p20 | spca50_t3_1 | 5.27230201e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 4.8e+01 | 0.02 |
| p20 | spca50_t3_2 | 3.51817906e+00 | yes | 1 | 2 | 14 | 14 | 7 | 0 | 2.7e+01 | 0.03 |
| p20 | spca50_t3_3 | 5.30122435e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 4.8e+01 | 0.02 |
| p20 | spca50_t3_4 | 6.60009731e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 6.4e+01 | 0.02 |
| p20 | spca50_t3_5 | 4.57476638e+00 | yes | 1 | 4 | 14 | 14 | 2 | 1 | 4.2e+01 | 0.03 |

Table 22: Sparse PCA, Telescopic AL.

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p5 | spca100_t1_1 | 2.12552192e+00 | yes | 1 | 2 | 11 | 11 | 3 | 0 | 1.0e+01 | 0.03 |
| p5 | spca100_t1_2 | 1.90711553e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 1.0e+01 | 0.02 |
| p5 | spca100_t1_3 | 1.97720831e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.0e+01 | 0.02 |
| p5 | spca100_t1_4 | 2.06646608e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.03 |
| p5 | spca100_t1_5 | 1.93173821e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.0e+01 | 0.03 |
| p5 | spca100_t3_1 | 3.89167652e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.9e+01 | 0.02 |
| p5 | spca100_t3_2 | 3.18772149e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.7e+01 | 0.02 |
| p5 | spca100_t3_3 | 2.98798763e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.3e+01 | 0.02 |
| p5 | spca100_t3_4 | 2.94309411e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 1.2e+01 | 0.03 |
| p5 | spca100_t3_5 | 3.35615169e+00 | yes | 1 | 2 | 10 | 10 | 0 | 0 | 1.8e+01 | 0.02 |
| p5 | spca200_t1_1 | 1.89495504e+00 | yes | 1 | 2 | 12 | 12 | 5 | 0 | 1.0e+01 | 0.16 |
| p5 | spca200_t1_2 | 1.86461586e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.0e+01 | 0.08 |
| p5 | spca200_t1_3 | 1.88004497e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.0e+01 | 0.09 |
| p5 | spca200_t1_4 | 1.86105274e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.09 |
| p5 | spca200_t1_5 | 1.66820645e+00 | yes | 1 | 2 | 11 | 11 | 3 | 0 | 1.0e+01 | 0.13 |
| p5 | spca200_t3_1 | 2.92838567e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.2e+01 | 0.08 |
| p5 | spca200_t3_2 | 3.02106092e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 1.3e+01 | 0.07 |
| p5 | spca200_t3_3 | 2.90146289e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.1e+01 | 0.07 |
| p5 | spca200_t3_4 | 3.05963084e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.4e+01 | 0.07 |
| p5 | spca200_t3_5 | 3.25671615e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 1.4e+01 | 0.08 |
| p5 | spca50_t1_1 | 2.27074672e+00 | yes | 1 | 2 | 10 | 10 | 1 | 0 | 1.0e+01 | 0.01 |
| p5 | spca50_t1_2 | 2.67941234e+00 | yes | 1 | 2 | 10 | 10 | 1 | 0 | 1.4e+01 | 0.01 |
| p5 | spca50_t1_3 | 2.39623853e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.1e+01 | 0.01 |
| p5 | spca50_t1_4 | 2.51791258e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.1e+01 | 0.01 |
| p5 | spca50_t1_5 | 2.37414863e+00 | yes | 1 | 2 | 11 | 11 | 3 | 0 | 1.0e+01 | 0.01 |
| p5 | spca50_t3_1 | 3.58973064e+00 | yes | 1 | 2 | 10 | 10 | 1 | 0 | 1.7e+01 | 0.01 |
| p5 | spca50_t3_2 | 2.24548704e+00 | yes | 1 | 2 | 11 | 11 | 2 | 0 | 1.0e+01 | 0.01 |
| p5 | spca50_t3_3 | 3.30379233e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.6e+01 | 0.01 |
| p5 | spca50_t3_4 | 4.04475763e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.2e+01 | 0.01 |
| p5 | spca50_t3_5 | 3.09840245e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 1.7e+01 | 0.01 |
| p10 | spca100_t1_1 | 2.57032335e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.0e+01 | 0.05 |
| p10 | spca100_t1_2 | 2.39599308e+00 | yes | 1 | 2 | 12 | 12 | 5 | 0 | 1.0e+01 | 0.04 |
| p10 | spca100_t1_3 | 2.50867697e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.1e+01 | 0.03 |
| p10 | spca100_t1_4 | 2.41117793e+00 | yes | 1 | 2 | 12 | 12 | 4 | 0 | 1.0e+01 | 0.04 |
| p10 | spca100_t1_5 | 2.33782808e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.05 |
| p10 | spca100_t3_1 | 5.82539277e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 4.8e+01 | 0.03 |
| p10 | spca100_t3_2 | 4.17619663e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.1e+01 | 0.03 |
| p10 | spca100_t3_3 | 4.17965865e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.9e+01 | 0.03 |
| p10 | spca100_t3_4 | 4.03765557e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.8e+01 | 0.04 |
| p10 | spca100_t3_5 | 4.47988840e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 3.6e+01 | 0.03 |
| p10 | spca200_t1_1 | 1.99739297e+00 | yes | 1 | 2 | 13 | 13 | 5 | 0 | 1.0e+01 | 0.21 |
| p10 | spca200_t1_2 | 2.21212527e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.12 |
| p10 | spca200_t1_3 | 2.31930443e+00 | yes | 1 | 2 | 12 | 12 | 4 | 0 | 1.0e+01 | 0.16 |
| p10 | spca200_t1_4 | 2.24945927e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 1.0e+01 | 0.14 |
| p10 | spca200_t1_5 | 2.04564629e+00 | yes | 1 | 2 | 12 | 12 | 4 | 0 | 1.0e+01 | 0.17 |
| p10 | spca200_t3_1 | 4.05989266e+00 | yes | 1 | 2 | 10 | 10 | 0 | 0 | 2.7e+01 | 0.14 |
| p10 | spca200_t3_2 | 4.47638879e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 3.2e+01 | 0.12 |
| p10 | spca200_t3_3 | 3.99708695e+00 | yes | 1 | 2 | 9 | 9 | 0 | 0 | 2.7e+01 | 0.13 |
| p10 | spca200_t3_4 | 4.17717002e+00 | yes | 1 | 2 | 10 | 10 | 0 | 0 | 2.8e+01 | 0.15 |
| p10 | spca200_t3_5 | 4.50747534e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 3.2e+01 | 0.13 |
| p10 | spca50_t1_1 | 2.91456724e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.7e+01 | 0.01 |
| p10 | spca50_t1_2 | 3.45293455e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 2.7e+01 | 0.01 |
| p10 | spca50_t1_3 | 3.00103629e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 2.1e+01 | 0.01 |
| p10 | spca50_t1_4 | 3.00435147e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.8e+01 | 0.01 |
| p10 | spca50_t1_5 | 2.98509063e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 1.9e+01 | 0.01 |
| p10 | spca50_t3_1 | 4.62597554e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 3.4e+01 | 0.01 |
| p10 | spca50_t3_2 | 2.85331815e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.5e+01 | 0.01 |
| p10 | spca50_t3_3 | 4.53926862e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.3e+01 | 0.01 |
| p10 | spca50_t3_4 | 6.10057045e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 5.4e+01 | 0.01 |
| p10 | spca50_t3_5 | 4.06658644e+00 | yes | 1 | 2 | 7 | 7 | 0 | 0 | 3.2e+01 | 0.01 |
| p20 | spca100_t1_1 | 3.24034574e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 2.0e+01 | 0.10 |
| p20 | spca100_t1_2 | 2.93528853e+00 | yes | 1 | 2 | 13 | 13 | 6 | 0 | 1.8e+01 | 0.10 |
| p20 | spca100_t1_3 | 3.13290493e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 2.0e+01 | 0.08 |
| p20 | spca100_t1_4 | 2.91008334e+00 | yes | 1 | 2 | 16 | 16 | 9 | 0 | 1.6e+01 | 0.13 |
| p20 | spca100_t1_5 | 2.97489943e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 1.7e+01 | 0.10 |
| p20 | spca100_t3_1 | 6.24935848e+00 | yes | 1 | 2 | 8 | 8 | 2 | 0 | 5.6e+01 | 0.09 |
| p20 | spca100_t3_2 | 4.67831184e+00 | yes | 1 | 2 | 7 | 7 | 1 | 0 | 4.0e+01 | 0.07 |
| p20 | spca100_t3_3 | 4.67207582e+00 | yes | 1 | 2 | 11 | 11 | 4 | 0 | 3.6e+01 | 0.10 |
| p20 | spca100_t3_4 | 4.52874063e+00 | yes | 1 | 2 | 7 | 7 | 1 | 0 | 3.8e+01 | 0.07 |
| p20 | spca100_t3_5 | 4.87124440e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 4.4e+01 | 0.08 |
| p20 | spca200_t1_1 | 2.38015907e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.0e+01 | 0.51 |
| p20 | spca200_t1_2 | 2.53979734e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 1.1e+01 | 0.29 |
| p20 | spca200_t1_3 | 2.74499631e+00 | yes | 1 | 2 | 13 | 13 | 6 | 0 | 1.2e+01 | 0.44 |
| p20 | spca200_t1_4 | 2.65949961e+00 | yes | 1 | 2 | 10 | 10 | 2 | 0 | 1.3e+01 | 0.34 |
| p20 | spca200_t1_5 | 2.45744090e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 1.0e+01 | 0.37 |
| p20 | spca200_t3_1 | 4.39663532e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.2e+01 | 0.38 |
| p20 | spca200_t3_2 | 4.90590458e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 3.9e+01 | 0.36 |
| p20 | spca200_t3_3 | 4.38174360e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.3e+01 | 0.38 |
| p20 | spca200_t3_4 | 4.53703721e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.4e+01 | 0.39 |
| p20 | spca200_t3_5 | 4.85200585e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 3.8e+01 | 0.43 |
| p20 | spca50_t1_1 | 3.60079112e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 3.0e+01 | 0.01 |
| p20 | spca50_t1_2 | 3.77866616e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 3.5e+01 | 0.01 |

*(continued)*

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p20 | spca50_t1_3 | 3.41083383e+00 | yes | 1 | 2 | 10 | 10 | 3 | 0 | 3.0e+01 | 0.02 |
| p20 | spca50_t1_4 | 3.45020392e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 2.9e+01 | 0.01 |
| p20 | spca50_t1_5 | 3.49997629e+00 | yes | 1 | 2 | 8 | 8 | 0 | 0 | 3.1e+01 | 0.01 |
| p20 | spca50_t3_1 | 5.27230201e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 4.8e+01 | 0.02 |
| p20 | spca50_t3_2 | 3.51817906e+00 | yes | 1 | 2 | 14 | 14 | 7 | 0 | 2.7e+01 | 0.02 |
| p20 | spca50_t3_3 | 5.30122435e+00 | yes | 1 | 2 | 9 | 9 | 1 | 0 | 4.8e+01 | 0.02 |
| p20 | spca50_t3_4 | 6.60009731e+00 | yes | 1 | 2 | 8 | 8 | 1 | 0 | 6.4e+01 | 0.02 |
| p20 | spca50_t3_5 | 4.57004427e+00 | yes | 1 | 2 | 9 | 9 | 2 | 0 | 4.2e+01 | 0.01 |

Table 23: Sparse PCA, CPS $AL_0$.

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p5 | spca100_t1_1 | 2.00925347e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.4e+01 | 0.03 |
| p5 | spca100_t1_2 | 1.95890584e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.3e+01 | 0.02 |
| p5 | spca100_t1_3 | 2.10168765e+00 | yes | 1 | 2 | 14 | 14 | 2 | 0 | 1.5e+01 | 0.02 |
| p5 | spca100_t1_4 | 1.95282002e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.3e+01 | 0.02 |
| p5 | spca100_t1_5 | 1.87862692e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.4e+01 | 0.02 |
| p5 | spca100_t3_1 | 3.85100736e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.9e+01 | 0.02 |
| p5 | spca100_t3_2 | 3.18772149e+00 | yes | 1 | 2 | 13 | 13 | 3 | 0 | 1.5e+01 | 0.02 |
| p5 | spca100_t3_3 | 2.98798763e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.5e+01 | 0.02 |
| p5 | spca100_t3_4 | 2.05444300e+00 | yes | 1 | 2 | 16 | 16 | 2 | 0 | 1.4e+01 | 0.02 |
| p5 | spca100_t3_5 | 3.35615169e+00 | yes | 1 | 2 | 12 | 12 | 3 | 0 | 1.6e+01 | 0.02 |
| p5 | spca200_t1_1 | 1.76296100e+00 | yes | 1 | 2 | 15 | 15 | 2 | 0 | 1.3e+01 | 0.08 |
| p5 | spca200_t1_2 | 1.86461586e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.3e+01 | 0.08 |
| p5 | spca200_t1_3 | 1.79307770e+00 | yes | 1 | 2 | 13 | 13 | 1 | 0 | 1.3e+01 | 0.07 |
| p5 | spca200_t1_4 | 1.87399358e+00 | yes | 1 | 2 | 15 | 15 | 0 | 0 | 1.4e+01 | 0.08 |
| p5 | spca200_t1_5 | 1.73377041e+00 | yes | 1 | 4 | 21 | 21 | 4 | 1 | 1.3e+01 | 0.09 |
| p5 | spca200_t3_1 | 2.92838567e+00 | yes | 1 | 2 | 16 | 16 | 3 | 0 | 1.4e+01 | 0.09 |
| p5 | spca200_t3_2 | 3.02106092e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.7e+01 | 0.09 |
| p5 | spca200_t3_3 | 2.90146289e+00 | yes | 1 | 2 | 14 | 14 | 0 | 0 | 1.5e+01 | 0.08 |
| p5 | spca200_t3_4 | 3.05963084e+00 | yes | 1 | 2 | 14 | 14 | 5 | 0 | 1.6e+01 | 0.09 |
| p5 | spca200_t3_5 | 3.25671615e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.7e+01 | 0.08 |
| p5 | spca50_t1_1 | 2.19482009e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.4e+01 | 0.00 |
| p5 | spca50_t1_2 | 2.65755457e+00 | yes | 1 | 2 | 16 | 16 | 4 | 0 | 1.5e+01 | 0.01 |
| p5 | spca50_t1_3 | 2.00330467e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.4e+01 | 0.01 |
| p5 | spca50_t1_4 | 2.51791258e+00 | yes | 1 | 2 | 15 | 15 | 3 | 0 | 1.4e+01 | 0.01 |
| p5 | spca50_t1_5 | 2.38248674e+00 | yes | 1 | 2 | 13 | 13 | 2 | 0 | 1.5e+01 | 0.01 |
| p5 | spca50_t3_1 | 3.58973064e+00 | yes | 1 | 3 | 18 | 18 | 4 | 0 | 1.9e+01 | 0.01 |
| p5 | spca50_t3_2 | 2.17141003e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.4e+01 | 0.01 |
| p5 | spca50_t3_3 | 3.30660407e+00 | yes | 1 | 2 | 15 | 15 | 7 | 0 | 1.6e+01 | 0.01 |
| p5 | spca50_t3_4 | 4.08457005e+00 | yes | 1 | 2 | 14 | 14 | 2 | 0 | 2.1e+01 | 0.01 |
| p5 | spca50_t3_5 | 3.12029574e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.6e+01 | 0.01 |
| p10 | spca100_t1_1 | 2.43133894e+00 | yes | 1 | 2 | 17 | 17 | 8 | 0 | 1.4e+01 | 0.07 |
| p10 | spca100_t1_2 | 2.36476665e+00 | yes | 1 | 2 | 15 | 15 | 6 | 0 | 1.3e+01 | 0.04 |
| p10 | spca100_t1_3 | 2.50995970e+00 | yes | 1 | 4 | 18 | 18 | 5 | 1 | 1.5e+01 | 0.05 |
| p10 | spca100_t1_4 | 2.36384426e+00 | yes | 1 | 7 | 34 | 34 | 6 | 2 | 1.3e+02 | 0.07 |
| p10 | spca100_t1_5 | 2.23061315e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.4e+01 | 0.04 |
| p10 | spca100_t3_1 | 5.82539277e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.9e+01 | 0.07 |
| p10 | spca100_t3_2 | 4.16799758e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.5e+01 | 0.05 |
| p10 | spca100_t3_3 | 4.17965865e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.5e+01 | 0.06 |
| p10 | spca100_t3_4 | 4.03765557e+00 | yes | 1 | 2 | 18 | 18 | 10 | 0 | 1.4e+01 | 0.06 |
| p10 | spca100_t3_5 | 4.47988840e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.6e+01 | 0.06 |
| p10 | spca200_t1_1 | 2.11505380e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.3e+01 | 0.17 |
| p10 | spca200_t1_2 | 2.21212527e+00 | yes | 1 | 2 | 16 | 16 | 8 | 0 | 1.3e+01 | 0.18 |
| p10 | spca200_t1_3 | 2.08417668e+00 | yes | 1 | 2 | 14 | 14 | 6 | 0 | 1.3e+01 | 0.15 |
| p10 | spca200_t1_4 | 2.13354838e+00 | yes | 1 | 2 | 14 | 14 | 6 | 0 | 1.4e+01 | 0.15 |
| p10 | spca200_t1_5 | 2.03871014e+00 | yes | 1 | 2 | 13 | 13 | 5 | 0 | 1.3e+01 | 0.15 |
| p10 | spca200_t3_1 | 4.05989266e+00 | yes | 1 | 2 | 16 | 16 | 3 | 0 | 1.4e+01 | 0.25 |
| p10 | spca200_t3_2 | 4.47638879e+00 | yes | 1 | 2 | 15 | 15 | 2 | 0 | 1.7e+01 | 0.28 |
| p10 | spca200_t3_3 | 3.99708695e+00 | yes | 1 | 2 | 15 | 15 | 3 | 0 | 1.5e+01 | 0.23 |
| p10 | spca200_t3_4 | 4.17717002e+00 | yes | 1 | 2 | 16 | 16 | 5 | 0 | 1.6e+01 | 0.27 |
| p10 | spca200_t3_5 | 4.50747534e+00 | yes | 1 | 2 | 15 | 15 | 2 | 0 | 1.7e+01 | 0.26 |
| p10 | spca50_t1_1 | 2.91114446e+00 | yes | 1 | 3 | 18 | 18 | 7 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t1_2 | 3.45293455e+00 | yes | 1 | 2 | 15 | 15 | 6 | 0 | 1.5e+01 | 0.01 |
| p10 | spca50_t1_3 | 3.00277896e+00 | yes | 1 | 5 | 31 | 31 | 13 | 1 | 1.4e+02 | 0.02 |
| p10 | spca50_t1_4 | 3.00435147e+00 | yes | 1 | 2 | 17 | 17 | 5 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t1_5 | 2.98509063e+00 | yes | 1 | 2 | 17 | 17 | 6 | 0 | 1.5e+01 | 0.01 |
| p10 | spca50_t3_1 | 4.62597554e+00 | yes | 1 | 2 | 13 | 13 | 3 | 0 | 1.9e+01 | 0.01 |
| p10 | spca50_t3_2 | 2.76710752e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t3_3 | 4.53926862e+00 | yes | 1 | 5 | 29 | 29 | 10 | 1 | 1.6e+02 | 0.02 |
| p10 | spca50_t3_4 | 6.10057045e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 2.1e+01 | 0.02 |
| p10 | spca50_t3_5 | 4.06658644e+00 | yes | 1 | 6 | 27 | 27 | 6 | 2 | 1.6e+02 | 0.02 |
| p20 | spca100_t1_1 | 3.07546965e+00 | yes | 1 | 2 | 23 | 23 | 15 | 0 | 1.4e+01 | 0.20 |
| p20 | spca100_t1_2 | 2.88713502e+00 | yes | 1 | 2 | 24 | 24 | 16 | 0 | 1.3e+01 | 0.19 |
| p20 | spca100_t1_3 | 3.13275811e+00 | yes | 1 | 2 | 25 | 25 | 17 | 0 | 1.5e+01 | 0.21 |
| p20 | spca100_t1_4 | 2.93796123e+00 | yes | 1 | 2 | 23 | 23 | 14 | 0 | 1.3e+01 | 0.20 |
| p20 | spca100_t1_5 | 2.99656719e+00 | yes | 1 | 2 | 26 | 26 | 18 | 0 | 1.4e+01 | 0.20 |
| p20 | spca100_t3_1 | 6.24935848e+00 | yes | 1 | 2 | 17 | 17 | 7 | 0 | 1.9e+01 | 0.22 |
| p20 | spca100_t3_2 | 4.68391622e+00 | yes | 1 | 3 | 20 | 20 | 10 | 0 | 1.5e+01 | 0.21 |
| p20 | spca100_t3_3 | 4.67059657e+00 | yes | 1 | 5 | 24 | 24 | 10 | 1 | 1.5e+01 | 0.26 |
| p20 | spca100_t3_4 | 4.54129222e+00 | yes | 1 | 6 | 39 | 39 | 20 | 1 | 1.4e+02 | 0.35 |

*(continued)*

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p20 | spca100_t3_5 | 4.87124440e+00 | yes | 1 | 2 | 16 | 16 | 9 | 0 | 1.6e+01 | 0.17 |
| p20 | spca200_t1_1 | 2.62290026e+00 | yes | 1 | 6 | 43 | 43 | 15 | 1 | 1.3e+03 | 1.21 |
| p20 | spca200_t1_2 | 2.64632110e+00 | yes | 1 | 10 | 48 | 48 | 13 | 3 | 1.3e+02 | 1.40 |
| p20 | spca200_t1_3 | 2.73936903e+00 | yes | 1 | 6 | 36 | 36 | 17 | 1 | 1.3e+02 | 1.09 |
| p20 | spca200_t1_4 | 2.65103259e+00 | yes | 1 | 6 | 39 | 39 | 17 | 1 | 1.4e+03 | 1.16 |
| p20 | spca200_t1_5 | 2.42233428e+00 | yes | 1 | 5 | 33 | 33 | 14 | 1 | 1.3e+01 | 1.01 |
| p20 | spca200_t3_1 | 4.40336873e+00 | yes | 1 | 3 | 19 | 19 | 10 | 0 | 1.4e+01 | 0.94 |
| p20 | spca200_t3_2 | 4.90927200e+00 | yes | 1 | 2 | 17 | 17 | 9 | 0 | 1.7e+01 | 0.97 |
| p20 | spca200_t3_3 | 4.38879831e+00 | yes | 1 | 8 | 30 | 30 | 6 | 2 | 1.5e+02 | 1.36 |
| p20 | spca200_t3_4 | 4.53703721e+00 | yes | 1 | 5 | 24 | 24 | 9 | 1 | 1.6e+01 | 1.18 |
| p20 | spca200_t3_5 | 4.85200585e+00 | yes | 1 | 6 | 25 | 25 | 10 | 1 | 1.7e+02 | 1.33 |
| p20 | spca50_t1_1 | 3.61215702e+00 | yes | 1 | 2 | 18 | 18 | 9 | 0 | 1.4e+01 | 0.03 |
| p20 | spca50_t1_2 | 3.78790878e+00 | yes | 1 | 2 | 21 | 21 | 12 | 0 | 1.5e+01 | 0.03 |
| p20 | spca50_t1_3 | 3.39197930e+00 | yes | 1 | 2 | 26 | 26 | 18 | 0 | 1.4e+01 | 0.04 |
| p20 | spca50_t1_4 | 3.45665564e+00 | yes | 1 | 2 | 19 | 19 | 10 | 0 | 1.4e+01 | 0.03 |
| p20 | spca50_t1_5 | 3.51679064e+00 | yes | 1 | 4 | 24 | 24 | 9 | 1 | 1.5e+01 | 0.04 |
| p20 | spca50_t3_1 | 5.27230201e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.9e+01 | 0.03 |
| p20 | spca50_t3_2 | 3.46448233e+00 | yes | 1 | 2 | 23 | 23 | 13 | 0 | 1.4e+01 | 0.04 |
| p20 | spca50_t3_3 | 5.30122435e+00 | yes | 1 | 2 | 19 | 19 | 12 | 0 | 1.6e+01 | 0.04 |
| p20 | spca50_t3_4 | 6.60009731e+00 | yes | 1 | 2 | 16 | 16 | 8 | 0 | 2.1e+01 | 0.03 |
| p20 | spca50_t3_5 | 4.57200621e+00 | yes | 1 | 3 | 19 | 19 | 8 | 0 | 1.6e+01 | 0.04 |

Table 24: Sparse PCA, Telescopic $AL_0$.

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p5 | spca100_t1_1 | 2.00925347e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.4e+01 | 0.01 |
| p5 | spca100_t1_2 | 1.95890584e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.3e+01 | 0.01 |
| p5 | spca100_t1_3 | 2.10168765e+00 | yes | 1 | 2 | 14 | 14 | 2 | 0 | 1.5e+01 | 0.01 |
| p5 | spca100_t1_4 | 1.95282002e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.3e+01 | 0.01 |
| p5 | spca100_t1_5 | 1.87862692e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.4e+01 | 0.01 |
| p5 | spca100_t3_1 | 3.85100736e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.9e+01 | 0.01 |
| p5 | spca100_t3_2 | 3.18772149e+00 | yes | 1 | 2 | 13 | 13 | 3 | 0 | 1.5e+01 | 0.01 |
| p5 | spca100_t3_3 | 2.98798763e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.5e+01 | 0.01 |
| p5 | spca100_t3_4 | 2.05444300e+00 | yes | 1 | 2 | 16 | 16 | 2 | 0 | 1.4e+01 | 0.01 |
| p5 | spca100_t3_5 | 3.35615169e+00 | yes | 1 | 2 | 12 | 12 | 3 | 0 | 1.6e+01 | 0.01 |
| p5 | spca200_t1_1 | 1.76296100e+00 | yes | 1 | 2 | 15 | 15 | 2 | 0 | 1.3e+01 | 0.04 |
| p5 | spca200_t1_2 | 1.86461586e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.3e+01 | 0.04 |
| p5 | spca200_t1_3 | 1.79307770e+00 | yes | 1 | 2 | 13 | 13 | 1 | 0 | 1.3e+01 | 0.04 |
| p5 | spca200_t1_4 | 1.87399358e+00 | yes | 1 | 2 | 15 | 15 | 0 | 0 | 1.4e+01 | 0.04 |
| p5 | spca200_t1_5 | 1.72435692e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.3e+01 | 0.04 |
| p5 | spca200_t3_1 | 2.92838567e+00 | yes | 1 | 2 | 16 | 16 | 3 | 0 | 1.4e+01 | 0.05 |
| p5 | spca200_t3_2 | 3.02106092e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.7e+01 | 0.05 |
| p5 | spca200_t3_3 | 2.90146289e+00 | yes | 1 | 2 | 14 | 14 | 0 | 0 | 1.5e+01 | 0.05 |
| p5 | spca200_t3_4 | 3.05963084e+00 | yes | 1 | 2 | 14 | 14 | 5 | 0 | 1.6e+01 | 0.05 |
| p5 | spca200_t3_5 | 3.25671615e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.7e+01 | 0.05 |
| p5 | spca50_t1_1 | 2.19482009e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.4e+01 | 0.00 |
| p5 | spca50_t1_2 | 2.65755457e+00 | yes | 1 | 2 | 16 | 16 | 4 | 0 | 1.5e+01 | 0.00 |
| p5 | spca50_t1_3 | 2.00330467e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.4e+01 | 0.00 |
| p5 | spca50_t1_4 | 2.51791258e+00 | yes | 1 | 2 | 15 | 15 | 3 | 0 | 1.4e+01 | 0.00 |
| p5 | spca50_t1_5 | 2.38248674e+00 | yes | 1 | 2 | 13 | 13 | 2 | 0 | 1.5e+01 | 0.00 |
| p5 | spca50_t3_1 | 3.58973064e+00 | yes | 1 | 3 | 18 | 18 | 4 | 0 | 1.9e+01 | 0.00 |
| p5 | spca50_t3_2 | 2.17141003e+00 | yes | 1 | 2 | 13 | 13 | 4 | 0 | 1.4e+01 | 0.00 |
| p5 | spca50_t3_3 | 3.30660407e+00 | yes | 1 | 2 | 15 | 15 | 7 | 0 | 1.6e+01 | 0.00 |
| p5 | spca50_t3_4 | 4.08457005e+00 | yes | 1 | 2 | 14 | 14 | 2 | 0 | 2.1e+01 | 0.00 |
| p5 | spca50_t3_5 | 3.12029574e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.6e+01 | 0.00 |
| p10 | spca100_t1_1 | 2.43133894e+00 | yes | 1 | 2 | 17 | 17 | 8 | 0 | 1.4e+01 | 0.04 |
| p10 | spca100_t1_2 | 2.36476665e+00 | yes | 1 | 2 | 15 | 15 | 6 | 0 | 1.3e+01 | 0.03 |
| p10 | spca100_t1_3 | 2.49794593e+00 | yes | 1 | 2 | 13 | 13 | 5 | 0 | 1.5e+01 | 0.03 |
| p10 | spca100_t1_4 | 2.28352109e+00 | yes | 1 | 2 | 15 | 15 | 5 | 0 | 1.3e+01 | 0.03 |
| p10 | spca100_t1_5 | 2.23061315e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.4e+01 | 0.03 |
| p10 | spca100_t3_1 | 5.82539277e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 1.9e+01 | 0.05 |
| p10 | spca100_t3_2 | 4.16799758e+00 | yes | 1 | 2 | 14 | 14 | 4 | 0 | 1.5e+01 | 0.04 |
| p10 | spca100_t3_3 | 4.17965865e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.5e+01 | 0.04 |
| p10 | spca100_t3_4 | 4.03765557e+00 | yes | 1 | 2 | 18 | 18 | 10 | 0 | 1.4e+01 | 0.04 |
| p10 | spca100_t3_5 | 4.47988840e+00 | yes | 1 | 2 | 15 | 15 | 4 | 0 | 1.6e+01 | 0.04 |
| p10 | spca200_t1_1 | 2.11505380e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.3e+01 | 0.11 |
| p10 | spca200_t1_2 | 2.21212527e+00 | yes | 1 | 2 | 16 | 16 | 8 | 0 | 1.3e+01 | 0.11 |
| p10 | spca200_t1_3 | 2.08417668e+00 | yes | 1 | 2 | 14 | 14 | 6 | 0 | 1.3e+01 | 0.10 |
| p10 | spca200_t1_4 | 2.13354838e+00 | yes | 1 | 2 | 14 | 14 | 6 | 0 | 1.4e+01 | 0.10 |
| p10 | spca200_t1_5 | 2.03871014e+00 | yes | 1 | 2 | 13 | 13 | 5 | 0 | 1.3e+01 | 0.09 |
| p10 | spca200_t3_1 | 4.05989266e+00 | yes | 1 | 2 | 16 | 16 | 3 | 0 | 1.4e+01 | 0.19 |
| p10 | spca200_t3_2 | 4.47638879e+00 | yes | 1 | 2 | 15 | 15 | 2 | 0 | 1.7e+01 | 0.20 |
| p10 | spca200_t3_3 | 3.99708695e+00 | yes | 1 | 2 | 15 | 15 | 3 | 0 | 1.5e+01 | 0.17 |
| p10 | spca200_t3_4 | 4.17717002e+00 | yes | 1 | 2 | 16 | 16 | 5 | 0 | 1.6e+01 | 0.19 |
| p10 | spca200_t3_5 | 4.50747534e+00 | yes | 1 | 2 | 15 | 15 | 2 | 0 | 1.7e+01 | 0.18 |
| p10 | spca50_t1_1 | 2.91114446e+00 | yes | 1 | 3 | 18 | 18 | 7 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t1_2 | 3.45293455e+00 | yes | 1 | 2 | 15 | 15 | 6 | 0 | 1.5e+01 | 0.01 |
| p10 | spca50_t1_3 | 2.58985875e+00 | yes | 1 | 3 | 18 | 18 | 7 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t1_4 | 3.00435147e+00 | yes | 1 | 2 | 17 | 17 | 5 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t1_5 | 2.98509063e+00 | yes | 1 | 2 | 17 | 17 | 6 | 0 | 1.5e+01 | 0.01 |
| p10 | spca50_t3_1 | 4.62597554e+00 | yes | 1 | 2 | 13 | 13 | 3 | 0 | 1.9e+01 | 0.01 |

*(continued)*

| Param. | Instance | val | verif. | $k$ | calls | it-T | it-G | swaps | CPS | $\rho$ | time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p10 | spca50_t3_2 | 2.76710752e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.4e+01 | 0.01 |
| p10 | spca50_t3_3 | 4.28226325e+00 | yes | 1 | 3 | 21 | 21 | 8 | 0 | 1.6e+01 | 0.01 |
| p10 | spca50_t3_4 | 6.10057045e+00 | yes | 1 | 2 | 14 | 14 | 3 | 0 | 2.1e+01 | 0.01 |
| p10 | spca50_t3_5 | 4.00103883e+00 | yes | 1 | 2 | 16 | 16 | 6 | 0 | 1.6e+01 | 0.01 |
| p20 | spca100_t1_1 | 3.07546965e+00 | yes | 1 | 2 | 23 | 23 | 15 | 0 | 1.4e+01 | 0.16 |
| p20 | spca100_t1_2 | 2.88713502e+00 | yes | 1 | 2 | 24 | 24 | 16 | 0 | 1.3e+01 | 0.16 |
| p20 | spca100_t1_3 | 3.13275811e+00 | yes | 1 | 2 | 25 | 25 | 17 | 0 | 1.5e+01 | 0.18 |
| p20 | spca100_t1_4 | 2.93796123e+00 | yes | 1 | 2 | 23 | 23 | 14 | 0 | 1.3e+01 | 0.17 |
| p20 | spca100_t1_5 | 2.99656719e+00 | yes | 1 | 2 | 26 | 26 | 18 | 0 | 1.4e+01 | 0.17 |
| p20 | spca100_t3_1 | 6.24935848e+00 | yes | 1 | 2 | 17 | 17 | 7 | 0 | 1.9e+01 | 0.18 |
| p20 | spca100_t3_2 | 4.68391622e+00 | yes | 1 | 3 | 20 | 20 | 10 | 0 | 1.5e+01 | 0.19 |
| p20 | spca100_t3_3 | 4.65724775e+00 | yes | 1 | 3 | 19 | 19 | 10 | 0 | 1.5e+01 | 0.17 |
| p20 | spca100_t3_4 | 4.47545932e+00 | yes | 1 | 3 | 27 | 27 | 17 | 0 | 1.4e+01 | 0.24 |
| p20 | spca100_t3_5 | 4.87124440e+00 | yes | 1 | 2 | 16 | 16 | 9 | 0 | 1.6e+01 | 0.14 |
| p20 | spca200_t1_1 | 2.45541543e+00 | yes | 1 | 3 | 22 | 22 | 9 | 0 | 1.3e+01 | 0.64 |
| p20 | spca200_t1_2 | 2.54559467e+00 | yes | 1 | 3 | 22 | 22 | 10 | 0 | 1.3e+01 | 0.66 |
| p20 | spca200_t1_3 | 2.63995225e+00 | yes | 1 | 3 | 21 | 21 | 11 | 0 | 1.3e+01 | 0.62 |
| p20 | spca200_t1_4 | 2.57086514e+00 | yes | 1 | 3 | 24 | 24 | 12 | 0 | 1.4e+01 | 0.70 |
| p20 | spca200_t1_5 | 2.41656923e+00 | yes | 1 | 3 | 27 | 27 | 14 | 0 | 1.3e+01 | 0.73 |
| p20 | spca200_t3_1 | 4.40336873e+00 | yes | 1 | 3 | 19 | 19 | 10 | 0 | 1.4e+01 | 0.83 |
| p20 | spca200_t3_2 | 4.90927200e+00 | yes | 1 | 2 | 17 | 17 | 9 | 0 | 1.7e+01 | 0.84 |
| p20 | spca200_t3_3 | 4.36233521e+00 | yes | 1 | 3 | 16 | 16 | 5 | 0 | 1.5e+01 | 0.69 |
| p20 | spca200_t3_4 | 4.53225376e+00 | yes | 1 | 3 | 19 | 19 | 9 | 0 | 1.6e+01 | 0.82 |
| p20 | spca200_t3_5 | 4.84370843e+00 | yes | 1 | 3 | 17 | 17 | 9 | 0 | 1.7e+01 | 0.79 |
| p20 | spca50_t1_1 | 3.61215702e+00 | yes | 1 | 2 | 18 | 18 | 9 | 0 | 1.4e+01 | 0.02 |
| p20 | spca50_t1_2 | 3.78790878e+00 | yes | 1 | 2 | 21 | 21 | 12 | 0 | 1.5e+01 | 0.03 |
| p20 | spca50_t1_3 | 3.39197930e+00 | yes | 1 | 2 | 26 | 26 | 18 | 0 | 1.4e+01 | 0.03 |
| p20 | spca50_t1_4 | 3.45665564e+00 | yes | 1 | 2 | 19 | 19 | 10 | 0 | 1.4e+01 | 0.03 |
| p20 | spca50_t1_5 | 3.49136131e+00 | yes | 1 | 2 | 17 | 17 | 8 | 0 | 1.5e+01 | 0.02 |
| p20 | spca50_t3_1 | 5.27230201e+00 | yes | 1 | 2 | 16 | 16 | 7 | 0 | 1.9e+01 | 0.03 |
| p20 | spca50_t3_2 | 3.46448233e+00 | yes | 1 | 2 | 23 | 23 | 13 | 0 | 1.4e+01 | 0.03 |
| p20 | spca50_t3_3 | 5.30122435e+00 | yes | 1 | 2 | 19 | 19 | 12 | 0 | 1.6e+01 | 0.03 |
| p20 | spca50_t3_4 | 6.60009731e+00 | yes | 1 | 2 | 16 | 16 | 8 | 0 | 2.1e+01 | 0.03 |
| p20 | spca50_t3_5 | 4.57200621e+00 | yes | 1 | 3 | 19 | 19 | 8 | 0 | 1.6e+01 | 0.03 |

Table 25: Sparse PCA, Truncated power.

| Param. | Instance | val | verif. |
|---|---|---|---|
| p5 | spca100_t1_1 | 1.95755120e+00 | yes |
| p5 | spca100_t1_2 | 1.66908349e+00 | yes |
| p5 | spca100_t1_3 | 1.83062450e+00 | yes |
| p5 | spca100_t1_4 | 1.60470261e+00 | yes |
| p5 | spca100_t1_5 | 1.84627754e+00 | yes |
| p5 | spca100_t3_1 | 3.89167652e+00 | yes |
| p5 | spca100_t3_2 | 3.18772149e+00 | yes |
| p5 | spca100_t3_3 | 2.98798763e+00 | yes |
| p5 | spca100_t3_4 | 2.78989830e+00 | yes |
| p5 | spca100_t3_5 | 3.35615169e+00 | yes |
| p5 | spca200_t1_1 | 1.53888223e+00 | yes |
| p5 | spca200_t1_2 | 1.76961649e+00 | yes |
| p5 | spca200_t1_3 | 1.84332363e+00 | yes |
| p5 | spca200_t1_4 | 1.76366313e+00 | yes |
| p5 | spca200_t1_5 | 1.50125054e+00 | yes |
| p5 | spca200_t3_1 | 2.83182692e+00 | yes |
| p5 | spca200_t3_2 | 3.02106092e+00 | yes |
| p5 | spca200_t3_3 | 2.77438070e+00 | yes |
| p5 | spca200_t3_4 | 3.05963084e+00 | yes |
| p5 | spca200_t3_5 | 3.25671615e+00 | yes |
| p5 | spca50_t1_1 | 2.10826042e+00 | yes |
| p5 | spca50_t1_2 | 2.70319702e+00 | yes |
| p5 | spca50_t1_3 | 2.28615153e+00 | yes |
| p5 | spca50_t1_4 | 2.51791258e+00 | yes |
| p5 | spca50_t1_5 | 2.17700501e+00 | yes |
| p5 | spca50_t3_1 | 3.41561937e+00 | yes |
| p5 | spca50_t3_2 | 2.07488018e+00 | yes |
| p5 | spca50_t3_3 | 3.27649047e+00 | yes |
| p5 | spca50_t3_4 | 4.04475763e+00 | yes |
| p5 | spca50_t3_5 | 3.09840245e+00 | yes |
| p10 | spca100_t1_1 | 2.39159459e+00 | yes |
| p10 | spca100_t1_2 | 2.17141942e+00 | yes |
| p10 | spca100_t1_3 | 2.40674031e+00 | yes |
| p10 | spca100_t1_4 | 2.12379476e+00 | yes |
| p10 | spca100_t1_5 | 2.26950139e+00 | yes |
| p10 | spca100_t3_1 | 5.82539277e+00 | yes |
| p10 | spca100_t3_2 | 4.17619663e+00 | yes |
| p10 | spca100_t3_3 | 4.17965865e+00 | yes |
| p10 | spca100_t3_4 | 4.03765557e+00 | yes |
| p10 | spca100_t3_5 | 4.47988840e+00 | yes |
| p10 | spca200_t1_1 | 1.85190975e+00 | yes |
| p10 | spca200_t1_2 | 2.17534946e+00 | yes |
| p10 | spca200_t1_3 | 2.24383061e+00 | yes |

*(continued)*

| Param. | Instance | val | verif. |
|---|---|---|---|
| p10 | spca200_t1_4 | 2.17738081e+00 | yes |
| p10 | spca200_t1_5 | 1.91168503e+00 | yes |
| p10 | spca200_t3_1 | 4.05989266e+00 | yes |
| p10 | spca200_t3_2 | 4.47638879e+00 | yes |
| p10 | spca200_t3_3 | 3.99708695e+00 | yes |
| p10 | spca200_t3_4 | 4.17717002e+00 | yes |
| p10 | spca200_t3_5 | 4.50747534e+00 | yes |
| p10 | spca50_t1_1 | 2.84838584e+00 | yes |
| p10 | spca50_t1_2 | 3.43562163e+00 | yes |
| p10 | spca50_t1_3 | 2.95984711e+00 | yes |
| p10 | spca50_t1_4 | 2.95434473e+00 | yes |
| p10 | spca50_t1_5 | 2.92907523e+00 | yes |
| p10 | spca50_t3_1 | 4.62136329e+00 | yes |
| p10 | spca50_t3_2 | 2.64063361e+00 | yes |
| p10 | spca50_t3_3 | 4.51916143e+00 | yes |
| p10 | spca50_t3_4 | 6.10057045e+00 | yes |
| p10 | spca50_t3_5 | 4.06658644e+00 | yes |
| p20 | spca100_t1_1 | 3.21892688e+00 | yes |
| p20 | spca100_t1_2 | 2.83800691e+00 | yes |
| p20 | spca100_t1_3 | 3.11469526e+00 | yes |
| p20 | spca100_t1_4 | 2.68779966e+00 | yes |
| p20 | spca100_t1_5 | 2.95098818e+00 | yes |
| p20 | spca100_t3_1 | 6.24565103e+00 | yes |
| p20 | spca100_t3_2 | 4.67831184e+00 | yes |
| p20 | spca100_t3_3 | 4.64927935e+00 | yes |
| p20 | spca100_t3_4 | 4.53442972e+00 | yes |
| p20 | spca100_t3_5 | 4.86462310e+00 | yes |
| p20 | spca200_t1_1 | 2.27374811e+00 | yes |
| p20 | spca200_t1_2 | 2.50824150e+00 | yes |
| p20 | spca200_t1_3 | 2.61920810e+00 | yes |
| p20 | spca200_t1_4 | 2.60080030e+00 | yes |
| p20 | spca200_t1_5 | 2.34384347e+00 | yes |
| p20 | spca200_t3_1 | 4.39663532e+00 | yes |
| p20 | spca200_t3_2 | 4.90067663e+00 | yes |
| p20 | spca200_t3_3 | 4.38225642e+00 | yes |
| p20 | spca200_t3_4 | 4.52926315e+00 | yes |
| p20 | spca200_t3_5 | 4.84933491e+00 | yes |
| p20 | spca50_t1_1 | 3.59065758e+00 | yes |
| p20 | spca50_t1_2 | 3.77942873e+00 | yes |
| p20 | spca50_t1_3 | 3.38658876e+00 | yes |
| p20 | spca50_t1_4 | 3.43814882e+00 | yes |
| p20 | spca50_t1_5 | 3.49997629e+00 | yes |
| p20 | spca50_t3_1 | 5.26679015e+00 | yes |
| p20 | spca50_t3_2 | 3.37825989e+00 | yes |
| p20 | spca50_t3_3 | 5.29488478e+00 | yes |
| p20 | spca50_t3_4 | 6.59085221e+00 | yes |
| p20 | spca50_t3_5 | 4.55777029e+00 | yes |