An appendix to the paper

Exact and Asymptotically Exact Solutions for a Class of Assortment Problems

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1. Enforcing the master problem formulation

If constraint (16) is not included in formulation (15), the pricing problem may yield unfeasible assortment patterns. However, as noted in §4.1, this constraint increases the pricing complexity, and is therefore unpractical.

To limit the amount of unfeasible columns generated, one can observe that, due to (9), knapsack constraints of the form

$$\sum_{S \subseteq J} |S| x_{iS} \leq p \qquad\qquad i \in I \tag{28}$$

are valid inequalities for the restricted master problem (RMP).

This addition introduces in the pricing problem a penalty proportional to the current optimal dual variable ω_i^* associated with (28) and the number of resource types in the assortment pattern: the objective of (15) transforms to

$$\min \quad \sum_{j \in J} x_j (c_{ij} y_{ij} + \mu_{ij}^* + \omega_i^*)$$

and patterns with a large number of resource types are therefore discouraged from being selected.

Another enforcement of the master problem formulation can be done as follows. A subset $\mathcal{C}$ of assortment patterns S is a *cover* if

$$|\bigcup_{S \in \mathcal{C}} S| > p$$

and is said minimal if $\mathcal{C} - \{S\}$ is not a cover for any $S \in \mathcal{C}$. A cover inequality has the form

$$\sum_{i \in I} \sum_{S \in \mathcal{C}} x_{iS} \leq |p| - 1 \tag{29}$$

For any solution $\bar{\mathbf{x}}$ of the current RMP, separating the most violated cover inequality means solving:

$$\begin{aligned} z_{min} = \min \sum_{i \in I} \sum_{S \subseteq J} (1 - \bar{x}_{iS}) \xi_{iS} & \qquad (30) \\ \sum_{i \in I} \sum_{S \ni j} \xi_{iS} &\geq \xi_j \qquad j \in \tilde{J} \\ \sum_{j \in \tilde{J}} \xi_j &\geq \tilde{p} + 1 \\ \xi_{iS}, \xi_j \in \{0, 1\} & \end{aligned}$$

where the ξ_{iS} choose the patterns $S \subseteq \tilde{J}$ forming the (minimal) cover $\mathcal{C}$. Clearly $z_{min} \geq 1$ if and only if $\bar{\mathbf{x}}$ violates no cover inequalities.

Here, $\tilde{J} \subseteq J$ is the (usually very small) set of resource types that appear in the assortment patterns associated with fractional variables of $\bar{\mathbf{x}}$, and $\tilde{p} = p - |\bigcup\{S : x_{iS} = 1\}|$. In fact $\bar{x}_{iS} = 1$ makes the corresponding cost coefficient in (30) equal to 0, hence one can fix $\xi_j = 1$ for all resource types in the assortment pattern S. On the other hand, $\bar{x}_{iS} = 0$ implies that if the optimal ξ_{iS} of (30) is 1, no violated cover inequality exists.

A minimal cover $\mathcal{C}$ has associated a dual variable $\pi_{\mathcal{C}}$ which does not affect the pricing problem of §4.1. Including any new variable added by pricing to the RMP into any of the current cover inequalities would in fact destroy its minimality. (It is easy to see that all the cover inequalities are valid at any node of the enumeration tree.)

In the additional tests described in §6, cover inequalities were separated by program (30) using a general MIP solver. At most 100 cover cuts (29) were added at each node of the enumeration tree after the column generation process is completed; a maximum of 5000 cover cuts were allowed on the whole.

2. Additional tests on code configuration

Four further configurations were tested, each one differing from B by a single, distinct detail:

C_6: with bound (21) instead of (22);

C_7: with knapsack cuts (28);

C_8: with cover cuts (29);

C_9: RMP initialized by both program (25) and dummy variable (§6.1) at root.

Knapsack cuts (28) are useless in A-instances, and of little help in R-instances, where the infeasible columns generated are, on the average, 0.49. However, infeasible columns tend to increase as p decreases, reaching a peak of 22 for $p = 5$. In a test supplement done for $p = 2$, 3188 infeasible columns were on average priced in without cuts, and 2996 (-6.02%) with cuts, at the expense of a slight increase of CPU time ($+0.9\%$).

Cover cuts (29) show a similar behavior. For A-instances, very few cuts of this type are added (0.03 on average, maximum 6). Separation time is negligible, but so is the reduction of the number of columns generated and of visited nodes. For R-instances the number of cover cuts generated rises (6.1 on average, maximum 304). Separation makes the computation time increase by 2.63%, without however reducing columns and nodes. Instead, a positive effect can again be observed for small values of p: for $p = 2$, 283.87 cover cuts were separated on average (with a peak of 2077), with a slight CPU time improvement (-0.75%) due to -3.86% columns generated and -6.46% nodes explored.

Bound (22) is almost useless for A-instances, but is effective for R-instances. In this case it is responsible of reducing the total computation time by 2.79% on average (for $p = 2$, a mean reduction of 3.33% has been observed).

Finally, an increase of CPU time ($+8.05\%$ on average), mainly due to more columns generated ($+2.35\%$ on average), has been observed for A-instances when the dummy variable is added at root. The effect of this choice is however negligible for R-instances.

3. Computational results exploded (Benchmark configuration)

Table 1: Results of the benchmark configuration on R-instances with $p = 15$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20R500_0$	0.523	1071	78	702	11	5	1215.569	1215.341	1200.619	1242.637	0.015
$20R500_1$	0.097	963	13	163	1	0	1598.950	1598.950	1584.962	1639.189	0.000
$20R500_2$	0.079	952	9	122	1	0	1397.780	1397.780	1383.410	1431.194	0.000
$20R500_3$	0.448	1008	49	547	9	3	1175.512	1175.384	1161.917	1212.832	0.016
$20R500_4$	0.113	975	14	207	1	0	1353.441	1353.441	1340.177	1392.073	0.000
$20R500_5$	0.179	982	19	249	3	1	1178.589	1178.569	1164.951	1194.754	0.016
$20R500_6$	0.221	1013	25	365	3	1	1469.282	1469.174	1454.094	1508.517	0.016
$20R500_7$	0.113	990	14	201	1	0	1050.533	1050.533	1039.076	1078.681	0.016
$20R500_8$	0.209	1010	29	301	3	1	2070.717	2070.717	2053.067	2104.126	0.000
$20R500_9$	0.127	995	19	267	1	0	1335.759	1335.759	1320.126	1375.681	0.016
$25R500_0$	0.525	1604	61	721	9	2	2102.192	2102.050	2081.302	2126.471	0.016
$25R500_1$	0.195	1505	17	293	1	0	2017.670	2017.670	1994.804	2057.398	0.015
$25R500_2$	0.483	1587	34	657	3	1	2054.880	2054.832	2037.221	2113.381	0.031
$25R500_3$	0.270	1539	23	368	1	0	1697.567	1697.567	1679.735	1724.544	0.031
$25R500_4$	0.226	1514	17	303	1	0	2619.668	2619.668	2600.226	2678.214	0.015
$25R500_5$	0.766	1591	78	1106	19	4	1500.425	1500.110	1480.690	1532.121	0.015
$25R500_6$	0.464	1570	40	617	9	2	1823.315	1823.230	1804.732	1860.344	0.015
$25R500_7$	0.223	1451	19	346	1	0	1902.904	1902.904	1885.720	1931.781	0.015
$25R500_8$	0.449	1585	46	747	5	2	1803.164	1802.946	1779.653	1838.273	0.031
$25R500_9$	0.180	1423	14	227	1	0	2357.647	2357.647	2344.921	2382.518	0.015
$30R500_0$	5.054	2539	214	3844	49	11	2006.952	2006.613	1975.135	2043.853	0.031
$30R500_1$	1.632	2342	111	1809	17	5	1828.210	1827.629	1802.603	1869.873	0.032
$30R500_2$	0.494	2197	27	526	1	0	2446.791	2446.791	2420.749	2501.833	0.031
$30R500_3$	2.252	2402	99	1815	21	4	2336.160	2335.741	2308.707	2414.291	0.031
$30R500_4$	2.642	2487	121	2297	15	4	2178.362	2177.925	2150.665	2227.577	0.032
$30R500_5$	2.292	2320	152	2654	33	10	2343.573	2343.116	2321.073	2386.739	0.031
$30R500_6$	2.776	2419	109	2221	15	5	2404.339	2403.900	2379.242	2453.761	0.016
$30R500_7$	0.639	2224	24	502	1	0	2561.974	2561.974	2535.758	2616.207	0.016
$30R500_8$	2.596	2389	212	2827	39	10	1978.161	1978.014	1954.579	2011.744	0.031
$30R500_9$	3.958	2486	226	3985	39	9	1943.948	1943.324	1915.793	1978.551	0.047

Table 2: Results of the benchmark configuration on R-instances with $p = 10$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20R500_0$	1.562	1308	145	1769	25	8	1222.489	1221.522	1201.875	1247.414	0.015
$20R500_1$	0.381	1114	48	626	5	2	1605.886	1605.307	1585.373	1647.129	0.016
$20R500_2$	0.196	1055	23	313	1	0	1403.436	1403.436	1383.793	1433.580	0.015
$20R500_3$	0.559	1127	77	942	13	5	1182.185	1181.889	1163.046	1217.670	0.016
$20R500_4$	0.144	1028	21	305	1	0	1361.184	1361.184	1341.458	1396.025	0.016
$20R500_5$	2.304	1279	293	3101	73	7	1184.556	1183.903	1166.182	1196.435	0.015
$20R500_6$	4.685	1516	451	4928	99	16	1480.303	1478.551	1455.543	1516.061	0.015
$20R500_7$	1.385	1242	156	1916	29	8	1055.619	1055.029	1039.735	1079.852	0.015
$20R500_8$	1.412	1277	129	1598	19	6	2080.097	2079.177	2055.368	2110.730	0.015
$20R500_9$	0.578	1174	66	850	7	2	1343.762	1343.419	1321.582	1383.166	0.015
$25R500_0$	1.242	1827	83	1530	9	3	2114.689	2114.150	2084.308	2139.791	0.031
$25R500_1$	0.469	1651	39	639	5	1	2027.692	2027.645	1998.385	2067.257	0.015
$25R500_2$	2.859	2027	148	2597	19	6	2062.700	2062.407	2037.737	2121.759	0.015
$25R500_3$	0.498	1697	34	560	1	0	1706.215	1706.215	1682.447	1735.545	0.031
$25R500_4$	0.509	1694	36	645	1	0	2635.219	2635.219	2605.940	2691.977	0.015
$25R500_5$	1.852	1846	109	1883	17	5	1508.962	1508.417	1483.881	1540.297	0.015
$25R500_6$	3.492	2087	174	2899	17	6	1835.263	1834.541	1806.887	1875.327	0.031
$25R500_7$	0.427	1581	30	566	1	0	1912.937	1912.937	1890.637	1941.273	0.031
$25R500_8$	0.672	1728	62	820	3	1	1815.411	1815.183	1781.413	1848.271	0.031
$25R500_9$	0.483	1552	35	617	3	1	2364.245	2364.096	2346.333	2389.894	0.031
$30R500_0$	51.293	4062	920	14712	177	17	2021.848	2020.267	1980.676	2061.868	0.032
$30R500_1$	1.415	2493	47	1156	5	1	1840.748	1840.651	1806.421	1882.990	0.032
$30R500_2$	1.251	2435	33	803	1	0	2465.736	2465.736	2431.255	2531.328	0.078
$30R500_3$	9.830	3212	188	4117	25	9	2350.518	2349.488	2313.900	2433.106	0.078
$30R500_4$	41.981	4679	1181	14807	111	28	2196.381	2195.284	2162.008	2243.797	0.032
$30R500_5$	13.906	3255	721	8408	93	12	2358.514	2357.526	2326.935	2403.694	0.032
$30R500_6$	2.199	2630	51	1249	1	0	2415.583	2415.583	2383.331	2471.894	0.032
$30R500_7$	45.154	3818	1134	16041	221	28	2581.153	2579.821	2541.355	2630.495	0.031
$30R500_8$	2.464	2610	83	1869	5	2	1989.994	1989.912	1962.356	2026.506	0.031
$30R500_9$	41.119	4020	899	14942	157	27	1962.249	1960.644	1920.784	2001.313	0.032

Table 3: Results of the benchmark configuration on R-instances with $p = 5$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20R500_0$	8.688	2357	378	4809	35	14	1244.396	1242.432	1213.800	1273.761	0.015
$20R500_1$	3.838	2084	216	2789	17	7	1640.531	1637.820	1599.598	1687.332	0.078
$20R500_2$	1.147	1489	102	1550	7	3	1430.143	1428.957	1395.360	1464.559	0.015
$20R500_3$	0.946	1440	52	937	1	0	1207.883	1207.883	1175.410	1245.120	0.016
$20R500_4$	4.529	2033	332	4302	29	9	1394.766	1392.662	1359.646	1423.948	0.031
$20R500_5$	3.849	1999	228	3184	15	6	1207.117	1205.463	1177.501	1218.101	0.016
$20R500_6$	8.104	2420	445	5767	41	10	1509.327	1505.110	1469.072	1549.227	0.015
$20R500_7$	2.695	1813	180	2520	17	6	1070.984	1070.441	1048.724	1091.669	0.000
$20R500_8$	0.502	1282	38	576	1	0	2105.437	2105.437	2072.309	2137.229	0.031
$20R500_9$	12.876	2636	449	6337	61	11	1381.303	1376.425	1339.832	1414.086	0.047
$25R500_0$	7.533	3045	243	4435	11	5	2155.505	2154.546	2108.478	2191.124	0.031
$25R500_1$	1.379	2158	63	1330	1	0	2066.345	2066.345	2016.907	2111.494	0.031
$25R500_2$	11.930	3508	279	5074	19	5	2091.699	2090.333	2049.166	2155.968	0.109
$25R500_3$	8.667	3132	244	4472	13	5	1740.165	1738.948	1701.560	1780.039	0.094
$25R500_4$	51.639	5198	1365	14872	87	12	2701.257	2693.818	2648.120	2750.844	0.015
$25R500_5$	6.810	2871	161	3075	9	4	1541.911	1540.914	1499.721	1578.168	0.172
$25R500_6$	181.328	6817	1531	22297	191	49	1879.082	1871.862	1827.672	1915.957	0.015
$25R500_7$	9.929	3325	509	7260	37	12	1948.769	1946.222	1916.645	1975.656	0.047
$25R500_8$	11.642	3199	303	5499	25	11	1852.302	1850.699	1800.376	1885.123	0.062
$25R500_9$	0.775	1818	54	872	1	0	2389.073	2389.073	2360.878	2411.923	0.031
$30R500_0$	347.244	9758	1600	22199	105	22	2071.104	2066.477	2003.861	2125.169	0.985
$30R500_1$	308.939	8989	1836	30657	163	22	1887.027	1881.096	1829.370	1928.906	0.140
$30R500_2$	4.087	3420	100	2518	1	0	2525.092	2525.092	2471.726	2604.159	0.109
$30R500_3$	227.076	8108	772	17344	77	25	2407.238	2401.546	2343.444	2479.154	0.094
$30R500_4$	479.842	10773	2312	36121	149	22	2249.671	2244.036	2199.553	2293.660	0.485
$30R500_5$	8.850	3892	189	4158	7	2	2415.108	2414.650	2363.994	2460.641	0.047
$30R500_6$	1117.826	12405	2421	41303	259	50	2476.814	2469.702	2414.200	2536.506	0.140
$30R500_7$	13.592	4455	253	5389	11	3	2643.452	2642.693	2587.964	2706.929	0.203
$30R500_8$	8.111	3830	173	3829	5	2	2032.386	2030.050	1988.868	2071.935	0.047
$30R500_9$	193.513	7815	1185	20978	87	29	2021.719	2015.013	1956.568	2065.576	0.891

Table 4: Results of the benchmark configuration on R-instances with $p = 2$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20R500_0$	93.803	6909	861	9996	33	16	1308.409	1304.211	1249.501	1335.654	0.047
$20R500_1$	0.882	1777	81	1426	1	0	1721.400	1721.400	1666.149	1769.880	0.016
$20R500_2$	1.211	1824	87	1321	1	0	1507.626	1507.626	1459.040	1535.841	0.015
$20R500_3$	5.051	2723	215	3135	5	2	1293.924	1293.471	1224.811	1315.046	0.015
$20R500_4$	16.548	3914	351	5899	13	6	1496.940	1486.459	1426.250	1523.062	0.047
$20R500_5$	1.180	1927	90	1546	1	0	1278.456	1278.456	1235.111	1286.610	0.015
$20R500_6$	39.638	5282	606	7635	23	11	1612.368	1596.576	1529.437	1618.987	0.016
$20R500_7$	36.368	4851	541	6217	17	8	1125.562	1122.548	1071.414	1140.516	0.031
$20R500_8$	18.419	3971	371	4786	9	4	2213.260	2209.322	2148.903	2246.878	0.047
$20R500_9$	20.281	4226	341	5511	11	5	1468.634	1464.957	1399.765	1498.194	0.062
$25R500_0$	310.665	10018	1265	16954	31	15	2304.744	2282.347	2179.362	2340.428	0.422
$25R500_1$	163.663	8574	766	13547	17	8	2221.557	2203.048	2108.377	2253.127	0.469
$25R500_2$	5.272	3296	104	2353	1	0	2192.100	2192.100	2098.757	2242.188	0.032
$25R500_3$	111.108	7629	676	7883	19	9	1850.554	1849.506	1770.434	1890.336	0.047
$25R500_4$	240.887	10216	1036	15188	23	11	2885.089	2865.909	2776.944	2922.392	0.312
$25R500_5$	133.467	8120	780	15198	11	5	1659.239	1648.262	1563.359	1706.550	1.140
$25R500_6$	213.160	8845	990	12859	21	10	2002.099	1978.603	1896.055	2038.539	0.297
$25R500_7$	10.751	3497	131	2930	1	0	2037.149	2037.149	1970.995	2092.259	0.922
$25R500_8$	5.273	3341	139	2775	1	0	1954.676	1954.676	1853.280	1993.033	0.094
$25R500_9$	16.592	4291	371	6581	1	0	2532.666	2532.666	2486.270	2543.218	0.031
$30R500_0$	620.511	15886	1702	24401	41	20	2226.573	2209.190	2096.427	2261.010	2.047
$30R500_1$	705.968	16451	1787	23620	41	20	2017.397	2006.927	1903.080	2065.862	0.719
$30R500_2$	25.832	5810	185	5167	1	0	2692.845	2692.845	2578.769	2779.468	0.984
$30R500_3$	1599.971	25469	3336	33065	65	32	2557.027	2531.054	2418.607	2606.880	0.532
$30R500_4$	365.206	11126	993	21702	7	3	2380.875	2375.422	2295.193	2430.217	0.157
$30R500_5$	424.742	13745	1085	20187	25	12	2620.107	2611.636	2495.606	2678.984	2.235
$30R500_6$	598.281	17479	1742	23002	51	25	2650.641	2641.872	2536.639	2702.533	1.031
$30R500_7$	596.309	18657	1441	21642	39	19	2843.355	2831.211	2719.896	2888.737	0.094
$30R500_8$	645.790	18074	1439	31242	27	13	2189.728	2173.029	2080.453	2227.793	0.656
$30R500_9$	307.006	11703	755	17018	15	7	2178.855	2177.622	2073.915	2222.244	0.157

Table 5: Results of the benchmark configuration on A-instances with $p = 15$ and $\Delta = 100$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A100_0$	0.140	3807	6	48	1	0	685.580	685.580	605.600	704.788	0.047
$20A100_1$	0.203	4878	6	48	1	0	973.779	973.779	888.718	1002.949	0.078
$20A100_2$	0.453	4777	39	281	1	0	897.058	897.058	806.029	928.049	0.062
$20A100_3$	0.312	4673	20	255	1	0	732.474	732.474	640.852	756.178	0.062
$20A100_4$	0.219	3625	14	203	1	0	874.318	874.318	789.307	906.078	0.063
$20A100_5$	0.110	2674	7	49	1	0	821.398	821.398	720.640	839.222	0.047
$20A100_6$	0.281	3946	17	208	1	0	886.940	886.940	840.551	904.154	0.063
$20A100_7$	0.203	4410	9	140	1	0	789.507	789.507	690.842	824.302	0.062
$20A100_8$	0.156	4267	6	46	1	0	696.705	696.705	598.152	707.822	0.062
$20A100_9$	0.110	2741	6	53	1	0	949.772	949.772	866.030	978.900	0.032
$25A100_0$	0.344	7299	12	179	1	0	971.409	971.409	840.059	991.710	0.093
$25A100_1$	1.078	9359	38	454	1	0	1143.101	1143.101	1040.518	1177.696	0.125
$25A100_2$	0.938	8459	28	424	1	0	1294.925	1294.925	1199.279	1337.368	0.172
$25A100_3$	0.422	7194	12	216	1	0	819.918	819.918	732.396	843.270	0.093
$25A100_4$	0.906	7047	45	584	1	0	1121.624	1121.624	1050.192	1165.475	0.141
$25A100_5$	0.625	7767	20	347	1	0	1264.470	1264.470	1146.695	1290.021	0.109
$25A100_6$	1.172	10763	36	428	1	0	834.394	834.394	712.858	865.010	0.141
$25A100_7$	0.265	6644	7	82	1	0	1209.840	1209.840	1107.605	1243.528	0.094
$25A100_8$	0.453	7215	17	203	1	0	1254.264	1254.264	1143.621	1285.637	0.109
$25A100_9$	0.312	8456	6	58	1	0	1046.395	1046.395	946.575	1055.249	0.110
$30A100_0$	1.953	11425	47	802	1	0	1298.743	1298.743	1166.412	1327.961	0.188
$30A100_1$	0.594	9429	19	259	1	0	1103.210	1103.210	967.535	1140.135	0.140
$30A100_2$	1.000	12522	21	338	1	0	1202.128	1202.128	1093.692	1230.918	0.203
$30A100_3$	1.781	11216	61	691	1	0	1090.222	1090.222	970.679	1118.249	0.187
$30A100_4$	1.203	10405	31	575	1	0	962.928	962.928	846.436	989.543	0.219
$30A100_5$	1.063	10383	33	476	1	0	1276.360	1276.360	1151.407	1306.636	0.172
$30A100_6$	3.282	16526	68	1095	1	0	950.313	950.313	840.689	973.222	0.328
$30A100_7$	1.328	10493	40	538	1	0	1342.514	1342.514	1236.047	1380.192	0.172
$30A100_8$	1.250	10729	40	564	1	0	1281.656	1281.656	1152.775	1313.986	0.156
$30A100_9$	1.563	9371	79	756	1	0	1188.332	1188.332	1045.188	1217.638	0.172

Table 6: Results of the benchmark configuration on A-instances with $p = 10$ and $\Delta = 100$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A100_0$	0.172	3818	8	101	1	0	685.804	685.804	606.257	704.788	0.047
$20A100_1$	0.531	5070	33	345	1	0	980.120	980.120	890.360	1007.761	0.093
$20A100_2$	0.640	4873	52	451	1	0	902.887	902.887	808.089	932.255	0.078
$20A100_3$	0.562	4816	37	468	1	0	736.861	736.861	642.084	758.736	0.078
$20A100_4$	0.735	3885	41	554	1	0	880.154	880.154	792.048	912.977	0.063
$20A100_5$	0.141	2702	16	134	1	0	822.566	822.566	721.657	839.446	0.032
$20A100_6$	1.031	4204	120	803	5	2	893.108	892.850	844.687	909.888	0.078
$20A100_7$	0.812	4614	115	425	1	0	793.882	793.882	691.126	828.283	0.062
$20A100_8$	0.219	4298	11	140	1	0	697.388	697.388	598.533	707.945	0.062
$20A100_9$	0.203	2821	24	213	1	0	953.004	953.004	868.285	980.916	0.047
$25A100_0$	0.797	7486	44	442	1	0	975.938	975.938	842.670	996.301	0.140
$25A100_1$	2.485	9677	99	1034	1	0	1151.677	1151.677	1045.488	1185.284	0.188
$25A100_2$	2.687	8841	83	1018	1	0	1307.714	1307.714	1207.774	1348.719	0.187
$25A100_3$	0.766	7356	36	370	1	0	823.781	823.781	735.140	848.027	0.125
$25A100_4$	2.282	7498	139	941	1	0	1130.386	1130.386	1054.583	1173.696	0.156
$25A100_5$	1.281	7982	45	713	1	0	1271.066	1271.066	1150.397	1296.027	0.125
$25A100_6$	2.766	11120	107	865	1	0	840.693	840.693	715.315	870.314	0.172
$25A100_7$	0.578	6780	27	357	1	0	1213.520	1213.520	1110.728	1248.816	0.125
$25A100_8$	1.157	7370	71	701	1	0	1260.558	1260.558	1150.494	1294.819	0.140
$25A100_9$	0.750	8595	37	300	1	0	1048.878	1048.878	949.505	1057.080	0.125
$30A100_0$	5.157	11988	161	1633	1	0	1313.312	1313.312	1174.675	1342.404	0.313
$30A100_1$	0.969	9500	47	342	1	0	1106.899	1106.899	970.942	1143.755	0.156
$30A100_2$	2.281	12742	64	721	1	0	1207.266	1207.266	1100.509	1234.530	0.234
$30A100_3$	10.141	12005	214	2959	3	1	1098.919	1098.917	974.561	1125.123	0.282
$30A100_4$	7.829	11163	336	2580	9	3	972.231	972.020	850.417	998.796	0.203
$30A100_5$	2.407	10727	70	1101	1	0	1287.455	1287.455	1157.980	1314.622	0.219
$30A100_6$	7.234	17048	91	1504	1	0	957.768	957.768	845.363	982.254	0.406
$30A100_7$	2.703	10848	96	1000	1	0	1354.870	1354.870	1244.771	1389.978	0.219
$30A100_8$	2.063	10962	54	950	1	0	1287.447	1287.447	1155.549	1318.368	0.188
$30A100_9$	2.313	9725	78	1103	1	0	1196.095	1196.095	1051.755	1224.253	0.172

Table 7: Results of the benchmark configuration on A-instances with $p = 5$ and $\Delta = 100$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A100_0$	0.328	3902	26	308	1	0	690.928	690.928	614.593	710.304	0.062
$20A100_1$	2.015	5508	109	1049	1	0	999.348	999.348	902.439	1029.595	0.109
$20A100_2$	1.890	5380	117	1587	1	0	923.436	923.436	824.711	960.102	0.125
$20A100_3$	2.187	5298	98	1124	1	0	753.373	753.373	651.479	773.978	0.188
$20A100_4$	7.719	5367	387	3744	9	3	900.900	900.487	807.388	936.657	0.078
$20A100_5$	0.719	2991	154	926	3	1	833.496	833.419	733.891	847.536	0.047
$20A100_6$	1.062	4447	70	781	1	0	912.882	912.882	857.638	929.737	0.078
$20A100_7$	2.000	5214	112	1266	1	0	809.210	809.210	703.442	849.505	0.093
$20A100_8$	0.500	4481	50	390	1	0	706.667	706.667	605.681	718.554	0.078
$20A100_9$	1.766	3426	203	1794	3	1	972.808	972.644	881.969	999.764	0.063
$25A100_0$	2.922	8153	116	1501	1	0	996.754	996.754	859.630	1023.837	0.187
$25A100_1$	19.735	11337	209	3274	1	0	1178.538	1178.538	1065.075	1214.605	0.531
$25A100_2$	21.704	11101	274	4309	1	0	1350.631	1350.631	1233.536	1387.995	0.422
$25A100_3$	9.125	8737	366	2638	3	1	848.701	848.687	747.922	873.324	0.219
$25A100_4$	4.000	8175	158	1981	1	0	1161.475	1161.475	1075.819	1202.766	0.234
$25A100_5$	3.578	8814	159	1621	1	0	1304.233	1304.233	1176.276	1334.436	0.234
$25A100_6$	7.891	12021	157	2083	1	0	855.569	855.569	728.735	884.723	0.297
$25A100_7$	2.000	7172	154	1062	1	0	1231.295	1231.295	1125.185	1264.802	0.141
$25A100_8$	4.454	8610	204	1952	1	0	1293.592	1293.592	1176.562	1325.173	0.218
$25A100_9$	2.391	8956	148	1423	1	0	1066.872	1066.872	966.539	1072.308	0.172
$30A100_0$	30.484	14566	295	5287	1	0	1351.849	1351.849	1204.477	1380.791	0.406
$30A100_1$	5.891	10265	252	3006	1	0	1124.112	1124.112	987.739	1162.576	0.187
$30A100_2$	26.094	15520	835	5006	5	1	1242.392	1242.326	1124.858	1265.677	0.390
$30A100_3$	47.578	15129	625	6486	3	1	1132.314	1132.037	991.108	1160.342	0.453
$30A100_4$	11.938	12123	238	3562	1	0	1000.445	1000.445	865.918	1029.003	0.547
$30A100_5$	6.110	11502	161	2477	1	0	1321.558	1321.558	1183.520	1343.434	0.265
$30A100_6$	126.687	21898	869	10308	3	1	983.470	983.448	861.321	1012.679	0.906
$30A100_7$	62.094	16170	1609	10726	25	6	1398.532	1397.295	1272.958	1427.232	0.281
$30A100_8$	6.516	11909	186	2142	1	0	1310.284	1310.284	1174.020	1338.060	0.203
$30A100_9$	7.875	10933	175	2839	1	0	1219.463	1219.463	1073.800	1248.626	0.328

Table 8: Results of the benchmark configuration on A-instances with $p = 15$ and $\Delta = 500$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A500_0$	1.125	4537	64	593	1	0	3263.108	3263.108	3211.780	3301.692	0.047
$20A500_1$	0.610	3702	30	328	1	0	4087.651	4087.651	4027.649	4157.076	0.047
$20A500_2$	1.079	4471	63	443	1	0	3756.168	3756.168	3679.625	3796.597	0.063
$20A500_3$	1.391	5750	71	504	1	0	2660.881	2660.881	2586.428	2700.426	0.094
$20A500_4$	0.812	4249	42	400	1	0	2831.135	2831.135	2757.893	2883.193	0.078
$20A500_5$	0.406	3314	25	275	1	0	3135.443	3135.443	3074.316	3197.673	0.047
$20A500_6$	0.375	3248	24	307	1	0	3530.330	3530.330	3451.406	3577.870	0.047
$20A500_7$	2.032	5858	93	652	1	0	3031.764	3031.764	2965.779	3072.982	0.078
$20A500_8$	0.407	3488	39	299	1	0	3417.586	3417.586	3337.080	3467.150	0.047
$20A500_9$	0.922	4717	36	361	1	0	3641.247	3641.247	3588.201	3712.105	0.078
$25A500_0$	13.000	12466	115	2161	1	0	4006.766	4006.766	3906.522	4072.446	0.250
$25A500_1$	8.860	9393	220	1797	7	2	5266.982	5266.762	5193.226	5334.584	0.172
$25A500_2$	0.922	5408	40	483	1	0	4088.946	4088.946	4017.501	4130.573	0.078
$25A500_3$	3.437	10647	76	719	1	0	5186.294	5186.294	5130.970	5259.608	0.156
$25A500_4$	2.094	8290	72	656	1	0	4040.912	4040.912	3964.050	4096.792	0.125
$25A500_5$	4.203	12465	79	839	1	0	4030.906	4030.906	3964.712	4083.066	0.172
$25A500_6$	2.672	9048	62	722	1	0	4746.136	4746.136	4661.071	4831.464	0.188
$25A500_7$	3.328	11683	55	812	1	0	3879.252	3879.252	3797.845	3913.105	0.203
$25A500_8$	5.406	9506	110	1331	1	0	4761.528	4761.528	4661.332	4839.657	0.297
$25A500_9$	15.297	8923	314	3162	9	4	6103.305	6102.592	6005.576	6170.648	0.157
$30A500_0$	10.078	16754	113	1585	1	0	6133.404	6133.404	6024.263	6189.377	0.312
$30A500_1$	3.375	11258	60	870	1	0	8000.788	8000.788	7896.254	8090.658	0.219
$30A500_2$	2.859	8400	65	1153	1	0	5603.431	5603.431	5515.665	5692.387	0.156
$30A500_3$	5.828	13047	119	1251	1	0	6263.390	6263.390	6154.585	6338.480	0.250
$30A500_4$	16.625	17015	216	2149	1	0	5426.545	5426.545	5318.490	5519.621	0.375
$30A500_5$	4.125	10710	80	1143	1	0	5871.283	5871.283	5758.910	5952.179	0.250
$30A500_6$	6.016	11255	95	1493	1	0	6041.001	6041.001	5943.459	6126.398	0.282
$30A500_7$	6.047	12025	112	1356	1	0	6024.311	6024.311	5919.468	6092.800	0.344
$30A500_8$	40.265	15708	768	6181	23	7	6333.130	6332.471	6235.540	6391.051	0.391
$30A500_9$	4.468	12583	74	1103	1	0	3591.532	3591.532	3507.390	3648.311	0.218

Table 9: Results of the benchmark configuration on A-instances with $p = 10$ and $\Delta = 500$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A500_0$	4.406	5058	219	1533	5	2	3275.919	3275.832	3219.976	3309.022	0.062
$20A500_1$	1.547	4034	78	829	1	0	4111.939	4111.939	4040.124	4175.510	0.063
$20A500_2$	2.094	4664	107	929	1	0	3788.861	3788.861	3696.349	3824.218	0.078
$20A500_3$	2.454	6012	107	845	1	0	2677.293	2677.293	2596.472	2720.807	0.157
$20A500_4$	1.640	4547	69	876	1	0	2847.225	2847.225	2772.202	2901.989	0.062
$20A500_5$	2.375	3845	175	1421	5	2	3151.647	3151.285	3084.061	3213.166	0.063
$20A500_6$	0.750	3469	46	611	1	0	3553.832	3553.832	3469.588	3598.039	0.063
$20A500_7$	3.734	6240	138	1185	1	0	3048.733	3048.733	2979.329	3094.968	0.110
$20A500_8$	0.735	3643	59	581	1	0	3428.446	3428.446	3342.609	3470.358	0.047
$20A500_9$	2.281	5096	122	786	1	0	3669.244	3669.244	3603.779	3734.049	0.093
$25A500_0$	84.000	16449	1096	8556	13	5	4045.568	4044.272	3934.433	4116.692	0.516
$25A500_1$	11.407	10071	228	2810	3	1	5294.620	5294.554	5213.281	5364.840	0.203
$25A500_2$	1.907	5733	79	809	1	0	4104.878	4104.878	4026.658	4151.981	0.141
$25A500_3$	9.609	11514	223	1821	1	0	5219.005	5219.005	5152.695	5296.802	0.329
$25A500_4$	4.110	8729	108	1260	1	0	4070.739	4070.739	3982.308	4124.420	0.156
$25A500_5$	12.344	13176	253	2410	1	0	4063.074	4063.074	3991.593	4117.883	0.344
$25A500_6$	5.079	9480	107	1254	1	0	4786.928	4786.928	4698.439	4878.007	0.203
$25A500_7$	7.313	12264	136	1573	1	0	3908.181	3908.181	3822.675	3945.768	0.391
$25A500_8$	21.375	10751	200	2956	1	0	4806.744	4806.744	4693.040	4880.946	0.219
$25A500_9$	21.266	9769	415	3959	7	2	6151.023	6150.443	6046.671	6215.024	0.171
$30A500_0$	18.265	17685	145	2666	1	0	6191.655	6191.655	6072.594	6249.923	0.796
$30A500_1$	8.016	12011	155	2038	1	0	8076.900	8076.900	7971.574	8163.416	0.282
$30A500_2$	4.032	8821	91	1500	1	0	5642.909	5642.909	5548.471	5741.144	0.203
$30A500_3$	206.500	21439	2968	21011	49	10	6324.135	6321.764	6201.017	6394.265	0.375
$30A500_4$	49.234	19145	279	4982	1	0	5467.803	5467.803	5353.818	5559.708	0.375
$30A500_5$	9.454	11422	139	2223	1	0	5923.802	5923.802	5804.416	6007.934	0.281
$30A500_6$	11.844	11987	159	2294	1	0	6107.116	6107.116	5999.833	6187.919	0.282
$30A500_7$	7.297	12436	115	1570	1	0	6074.246	6074.246	5974.785	6146.011	0.313
$30A500_8$	9.938	14548	133	1959	1	0	6376.886	6376.886	6275.732	6439.377	0.375
$30A500_9$	24.656	13695	415	2872	3	1	3616.687	3616.634	3527.081	3677.246	0.234

Table 10: Results of the benchmark configuration on A-instances with $p = 5$ and $\Delta = 500$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A500_0$	11.281	6276	334	2862	3	1	3336.866	3336.838	3266.415	3368.034	0.109
$20A500_1$	8.406	5241	191	2309	1	0	4190.971	4190.971	4103.290	4251.480	0.094
$20A500_2$	16.656	6429	442	3176	3	1	3864.517	3863.904	3768.885	3901.349	0.125
$20A500_3$	21.781	8625	443	4477	3	1	2731.320	2730.672	2638.156	2779.085	0.125
$20A500_4$	11.797	6457	176	2971	1	0	2922.880	2922.880	2827.059	2972.510	0.093
$20A500_5$	3.891	4548	129	1949	1	0	3231.672	3231.672	3138.133	3294.912	0.078
$20A500_6$	1.610	3981	78	1158	1	0	3630.408	3630.408	3544.593	3679.819	0.063
$20A500_7$	7.187	7134	217	1981	1	0	3108.995	3108.995	3036.280	3167.008	0.125
$20A500_8$	1.015	3852	82	691	1	0	3499.478	3499.478	3409.283	3524.699	0.063
$20A500_9$	7.484	6382	241	2283	1	0	3762.206	3762.206	3679.071	3821.381	0.125
$25A500_1$	12.094	10994	207	2909	1	0	5389.726	5389.726	5289.437	5450.474	0.235
$25A500_2$	4.359	6362	203	1707	1	0	4164.845	4164.845	4078.276	4214.858	0.141
$25A500_3$	132.532	18535	1289	11540	9	4	5355.085	5352.946	5259.727	5418.740	0.437
$25A500_4$	326.469	20111	1976	21268	33	14	4177.920	4172.802	4069.522	4230.620	0.312
$25A500_6$	36.360	12746	334	5279	1	0	4911.794	4911.794	4792.144	5014.993	0.719
$25A500_7$	18.031	14060	227	3511	1	0	4005.809	4005.809	3902.033	4049.538	0.547
$25A500_8$	33.719	12391	293	4685	1	0	4919.340	4919.340	4796.037	5000.955	0.328
$25A500_9$	64.204	11537	280	5373	1	0	6301.938	6301.938	6163.959	6349.600	0.281
$30A500_1$	27.281	14474	419	4859	1	0	8293.942	8293.942	8189.434	8370.675	0.563
$30A500_2$	30.063	11482	501	6621	3	1	5807.038	5805.812	5681.175	5889.638	0.296
$30A500_5$	39.610	13545	285	4854	1	0	6067.706	6067.706	5927.143	6159.149	0.437
$30A500_9$	36.625	16207	376	5263	1	0	3705.621	3705.621	3603.251	3778.538	0.422

Table 11: Results of the benchmark configuration on A-instances with $p = 15$ and $\Delta = 1000$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A1000_0$	3.234	6961	65	635	1	0	6883.022	6883.022	6820.671	6942.726	0.109
$20A1000_1$	2.750	5769	48	675	1	0	8918.100	8918.100	8844.451	8979.760	0.094
$20A1000_2$	2.594	5429	73	707	1	0	5951.605	5951.605	5891.000	6009.190	0.094
$20A1000_3$	1.453	4271	50	417	1	0	9188.685	9188.685	9127.055	9246.680	0.063
$20A1000_4$	2.516	5396	77	573	1	0	7683.044	7683.044	7619.430	7771.124	0.094
$20A1000_5$	1.406	4447	52	482	1	0	6119.637	6119.637	6044.068	6170.552	0.062
$20A1000_6$	2.359	5194	118	611	1	0	6954.153	6954.153	6882.621	7003.431	0.078
$20A1000_7$	0.750	4486	26	336	1	0	5925.984	5925.984	5867.481	5986.433	0.078
$20A1000_8$	5.719	7976	118	1080	1	0	4598.323	4598.323	4536.734	4671.843	0.140
$20A1000_9$	1.407	3806	44	510	1	0	6989.577	6989.577	6923.939	7032.769	0.063
$25A1000_0$	5.391	8438	67	1186	1	0	8332.951	8332.951	8244.605	8401.429	0.156
$25A1000_1$	3.078	6146	51	846	1	0	9643.857	9643.857	9562.220	9710.740	0.093
$25A1000_2$	2.453	6161	74	654	1	0	9543.894	9543.894	9473.048	9598.301	0.110
$25A1000_3$	6.188	9858	110	1138	1	0	9101.981	9101.981	9015.463	9177.337	0.219
$25A1000_4$	5.485	9963	107	907	1	0	7816.358	7816.358	7721.121	7879.562	0.172
$25A1000_5$	4.532	7719	123	1262	3	1	8385.696	8385.673	8284.168	8473.923	0.140
$25A1000_6$	2.094	6741	61	592	1	0	9552.449	9552.449	9469.900	9640.136	0.125
$25A1000_7$	8.266	10910	88	1352	1	0	7724.630	7724.630	7651.881	7806.386	0.157
$25A1000_8$	5.782	8496	110	1139	1	0	9143.829	9143.829	9070.315	9216.792	0.125
$25A1000_9$	7.688	9224	114	1333	1	0	8190.873	8190.873	8108.173	8262.778	0.172
$30A1000_0$	6.563	11576	91	1062	1	0	11738.716	11738.716	11637.305	11832.216	0.282
$30A1000_1$	7.422	10841	226	1317	3	1	14149.879	14149.626	14076.960	14219.668	0.234
$30A1000_2$	41.281	14750	340	3882	3	1	9086.772	9086.470	8995.326	9181.104	0.265
$30A1000_3$	13.734	12504	173	2046	1	0	10984.299	10984.299	10902.900	11055.858	0.250
$30A1000_4$	4.610	8823	125	1083	1	0	11654.641	11654.641	11550.883	11718.606	0.156
$30A1000_5$	23.141	13613	221	3436	3	1	8222.090	8221.929	8143.708	8285.047	0.281
$30A1000_6$	11.156	13890	87	1604	1	0	10010.111	10010.111	9913.486	10088.774	0.312
$30A1000_7$	10.079	11577	212	1950	3	1	10684.085	10683.930	10577.247	10799.758	0.235
$30A1000_8$	5.907	10801	88	1208	1	0	9140.488	9140.488	9064.157	9212.894	0.204
$30A1000_9$	4.672	9850	118	1027	1	0	9699.154	9699.154	9607.361	9767.276	0.219

Table 12: Results of the benchmark configuration on A-instances with $p = 10$ and $\Delta = 1000$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A1000_0$	35.265	10049	1006	5062	9	4	6923.620	6922.762	6852.816	6981.601	0.156
$20A1000_1$	6.500	6343	146	1483	1	0	8979.326	8979.326	8898.752	9045.883	0.110
$20A1000_2$	3.875	5841	96	1079	1	0	5977.979	5977.979	5908.167	6040.466	0.094
$20A1000_3$	2.953	4557	81	835	1	0	9237.007	9237.007	9170.108	9292.190	0.062
$20A1000_4$	4.078	5713	90	1007	1	0	7725.328	7725.328	7657.197	7818.493	0.078
$20A1000_5$	2.531	4676	91	812	1	0	6155.793	6155.793	6075.209	6210.230	0.062
$20A1000_6$	4.297	5588	155	1117	1	0	7007.637	7007.637	6912.466	7054.010	0.093
$20A1000_7$	1.828	4848	71	732	1	0	5952.942	5952.942	5885.432	6012.635	0.078
$20A1000_8$	12.891	8903	172	2102	1	0	4624.732	4624.732	4556.020	4701.433	0.203
$20A1000_9$	3.688	4299	159	1181	3	1	7042.994	7042.814	6967.937	7091.395	0.063
$25A1000_0$	8.454	8995	121	1743	1	0	8380.401	8380.401	8290.699	8465.762	0.187
$25A1000_1$	3.907	6447	65	996	1	0	9719.174	9719.174	9621.983	9791.803	0.141
$25A1000_2$	4.860	6654	91	1239	1	0	9627.939	9627.939	9547.563	9672.490	0.125
$25A1000_3$	9.141	10383	120	1733	1	0	9158.944	9158.944	9061.382	9250.694	0.375
$25A1000_4$	13.079	10709	191	2294	1	0	7859.196	7859.196	7752.936	7926.309	0.234
$25A1000_5$	6.094	8230	125	1637	1	0	8441.475	8441.475	8337.456	8534.179	0.250
$25A1000_6$	4.735	7219	114	1346	1	0	9618.026	9618.026	9534.521	9722.141	0.172
$25A1000_7$	14.891	11614	184	2216	1	0	7764.793	7764.793	7690.104	7843.998	0.187
$25A1000_8$	27.672	10656	512	4238	3	1	9219.512	9219.504	9128.311	9295.407	0.218
$25A1000_9$	10.625	9695	146	1773	1	0	8240.374	8240.374	8155.015	8318.602	0.188
$30A1000_0$	16.141	12830	131	2518	1	0	11850.143	11850.143	11733.092	11943.516	0.516
$30A1000_1$	5.078	10902	89	1011	1	0	14209.772	14209.772	14135.937	14288.884	0.219
$30A1000_2$	103.531	17706	715	7897	5	2	9140.372	9140.270	9039.931	9241.146	0.343
$30A1000_3$	17.313	13181	235	2441	1	0	11068.963	11068.963	10988.534	11143.241	0.328
$30A1000_4$	8.563	9316	211	2081	1	0	11750.760	11750.760	11642.507	11821.271	0.234
$30A1000_5$	146.500	19725	1821	14414	15	4	8283.818	8283.029	8199.695	8348.349	0.375
$30A1000_7$	14.234	12323	159	2891	1	0	10765.149	10765.149	10654.659	10886.022	0.281
$30A1000_8$	9.016	11154	157	1804	1	0	9190.626	9190.626	9109.721	9259.443	0.204
$30A1000_9$	26.438	11953	305	4440	7	2	9770.427	9769.890	9659.041	9835.069	0.250

Table 13: Results of the benchmark configuration on A-instances with $p = 5$ and $\Delta = 1000$.

Instance	CPU (sec.)	Cols	RMP solved	Col. gen. calls	Nodes	Tree depth	Best Int.	root LB	GG value	p-median opt.	p-median CPU (sec.)
$20A1000_0$	24.782	9643	297	3674	1	0	7089.932	7089.932	6987.903	7149.297	0.234
$20A1000_1$	17.297	8124	306	3349	1	0	9144.752	9144.752	9051.589	9206.117	0.141
$20A1000_2$	28.953	8931	482	5024	5	1	6085.316	6084.756	5999.367	6144.121	0.157
$20A1000_3$	52.906	8460	1002	7533	15	7	9460.151	9456.591	9365.449	9509.541	0.125
$20A1000_4$	8.969	6586	173	1976	1	0	7898.616	7898.616	7813.205	8015.628	0.141
$20A1000_5$	8.047	5744	167	2224	1	0	6310.995	6310.995	6206.982	6352.936	0.093
$20A1000_6$	8.625	6353	224	2222	1	0	7145.485	7145.485	7037.357	7202.502	0.125
$20A1000_7$	4.703	5641	150	1812	1	0	6045.702	6045.702	5953.372	6095.143	0.093
$20A1000_8$	337.719	20219	1430	16280	17	5	4742.934	4739.262	4638.058	4805.192	0.531
$20A1000_9$	5.063	4686	206	1491	1	0	7179.718	7179.718	7106.084	7226.424	0.078
$25A1000_0$	138.485	17795	1395	14722	9	3	8618.191	8613.077	8507.139	8690.026	0.843
$25A1000_1$	103.422	13123	1121	13262	9	4	9957.178	9954.933	9843.829	10042.412	0.391
$25A1000_2$	48.515	10637	806	7981	9	3	9845.379	9843.185	9755.715	9889.995	0.203
$25A1000_3$	24.032	12030	406	3592	1	0	9347.777	9347.777	9234.890	9419.453	0.281
$25A1000_4$	20.391	11895	281	3101	1	0	8030.454	8030.454	7907.886	8087.831	0.328
$25A1000_5$	92.844	14250	897	10360	9	4	8627.436	8626.678	8510.935	8707.711	0.265
$25A1000_6$	18.969	9195	226	3831	1	0	9936.300	9936.300	9834.014	10026.957	0.203
$25A1000_8$	53.125	12525	382	6426	1	0	9487.144	9487.144	9395.781	9575.925	0.687
$25A1000_9$	68.235	13939	476	6964	1	0	8471.278	8471.278	8367.187	8576.359	3.141
$30A1000_1$	27.234	13296	300	4397	1	0	14546.394	14546.394	14462.885	14643.456	0.532
$30A1000_4$	16.000	10455	206	3507	1	0	12050.527	12050.527	11930.244	12110.023	0.235
$30A1000_8$	30.766	13598	383	4836	1	0	9387.358	9387.358	9270.422	9462.739	0.422
$30A1000_9$	121.125	16776	698	10828	5	1	9983.462	9983.349	9856.128	10045.482	0.797