弊社販売の集合被覆最適化ソルバーOptCover で採用のアルゴリズム：赤枠の Yagiura et al. アルゴリズム

テスト環境：2.7 gigahertz Intel Core i7 processor and 16 gigabytes memory

計算時間：全ての実験での計算時間は図 1 の計算時間と同様

図 1 ：Reduced benchmark instances for SCP

Instance	z_{LP}	z_{best}	Reduced		Presolved		Yagiura et al.	Time limit (seconds)
			#cst.	#var.	#cst.	#var.	#free var.	
*G.1–5 (5)	149.48	166.4	1000.0	441.8	1000.0	441.8	339.0	600
*H.1–5 (5)	45.67	59.8	1000.0	236.2	1000.0	236.2	174.6	600
*I.1–5 (5)	138.97	158.4	1000.0	721.6	1000.0	721.6	479.4	1200
*J.1–5 (5)	104.78	129.4	1000.0	703.6	1000.0	703.6	429.6	1200
*K.1–5 (5)	276.67	313.8	2000.0	1434.2	2000.0	1434.2	959.4	1800
*L.1–5 (5)	209.34	259.0	2000.0	1421.0	2000.0	1421.0	856.4	1800
*M.1–5 (5)	415.78	551.6	5000.0	3245.2	5000.0	3245.2	1836.4	3600
*N.1–5 (5)	348.93	505.0	5000.0	4471.4	5000.0	4471.4	1660.6	3600
RAIL507	172.15	*174	507	2649	402	1019	394	600
RAIL516	183.00	*183	516	3788	350	3088	492	600
RAIL582	209.71	*211	582	2091	491	1493	513	600
RAIL2536	688.68	*691	2536	13,746	1391	5782	1598	3600
*RAIL2586	935.92	948	2586	13,349	2083	7377	2089	3600
*RAIL4284	1054.05	1066	4284	21,728	3189	14,565	2639	3600
*RAIL4872	1510.87	1532	4872	21,329	3577	11,404	3650	3600

図 2 ：SCP instance

Instance	CPLEX12.6	Gurobi5.6.3	SCIP3.1	LocalSolver3.1	Yagiura et al.	Proposed
*G.1–5 (5)	0.37%	0.49%	0.24%	45.80%	0.00%	0.00%
*H.1–5 (5)	1.92%	2.28%	1.93%	61.54%	0.00%	0.00%
*I.1–5 (5)	2.81%	2.72%	1.85%	41.38%	0.00%	0.50%
*J.1–5 (5)	8.37%	4.30%	3.59%	58.40%	0.00%	1.53%
*K.1–5 (5)	4.77%	4.38%	2.55%	51.22%	0.00%	1.26%
*L.1–5 (5)	9.57%	8.44%	3.52%	57.79%	0.00%	2.05%
*M.1–5 (5)	18.43%	10.10%	30.71%	71.08%	0.00%	2.65%
*N.1–5 (5)	33.13%	12.49%	42.32%	75.63%	0.00%	5.47%
RAIL507	0.00%	0.00%	0.00%	5.43%	0.00%	0.00%
RAIL516	0.00%	0.00%	0.00%	3.19%	0.00%	0.00%
RAIL582	0.00%	0.00%	0.00%	5.80%	0.00%	0.00%
RAIL2536	0.00%	0.00%	0.86%	3.50%	0.29%	0.72%
*RAIL2586	2.27%	2.17%	2.27%	5.39%	0.00%	1.56%
*RAIL4284	5.34%	1.57%	30.55%	6.50%	0.00%	2.12%
*RAIL4872	1.73%	1.73%	2.67%	5.61%	0.00%	1.80%
Avg. (all)	8.64%	4.92%	10.00%	49.99%	0.01%	1.56%
Avg. (with stars)	9.45%	5.38%	10.91%	54.22%	0.00%	1.69%

図 3 ：reduced SCP instance

Instance	CPLEX12.6	Gurobi5.6.3	SCIP3.1	LocalSolver3.1	Yagiura et al.	Proposed
*G.1–5 (5)	0.60%	0.24%	0.47%	3.78%	0.00%	0.00%
*H.1–5 (5)	1.92%	1.62%	1.62%	1.90%	0.00%	0.00%
*I.1–5 (5)	2.59%	1.64%	2.10%	1.74%	0.00%	0.00%
*J.1–5 (5)	4.43%	3.99%	3.42%	2.99%	0.15%	0.31%
*K.1–5 (5)	2.84%	2.48%	2.66%	2.18%	0.00%	0.63%
*L.1–5 (5)	4.77%	4.85%	3.13%	2.41%	0.00%	0.77%
*M.1–5 (5)	10.82%	4.56%	31.15%	4.89%	0.00%	1.01%
*N.1–5 (5)	15.95%	11.36%	34.17%	6.47%	0.00%	1.06%
RAIL507	0.00%	0.00%	0.00%	0.57%	0.00%	0.00%
RAIL516	0.00%	0.00%	0.00%	1.61%	0.00%	0.00%
RAIL582	0.00%	0.00%	0.00%	0.47%	0.00%	0.00%
RAIL2536	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%
*RAIL2586	0.84%	0.52%	0.73%	1.66%	0.00%	0.84%
*RAIL4284	0.47%	0.93%	0.74%	1.66%	0.00%	0.84%
*RAIL4872	0.84%	1.23%	1.10%	1.73%	0.00%	0.84%
Avg. (all)	4.72%	3.33%	8.43%	2.98%	0.02%	0.45%
Avg. (with stars)	5.16%	3.64%	9.21%	3.18%	0.02%	0.50%

実験結果は「Exploiting variable associations to configure efficient local search algorithms in large-scale binary integer programs, Shunji Umetani」から抜粋