To compare the effectiveness of the heuristic rules for selecting the set to be added to cover a point having no covering set, a randomly generated problem with 25 points and 100 sets was generated.

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50 iterations of subgradient optimization were performed, and after each iteration, the heuristic algorithm was applied 3 times:

- the least-cost set covering the point was added
- the reduced costs of the 4 least-cost sets were computed, and the set having the smallest reduced cost was added.
- like the second rule, but with zero used as the multiplier of any point already covered.

Best solution found

Random SCP (seed= 29155467)

Total cost = 44
Greatest Lower Bound = 42.81
Gap = 2.694 %

sets in the solution: 8

Set	Cost	# pts covered
1	3	6
2	3	3
3	4	8
4	4	3
6	5	6
7	5	3
18	9	3
22	11	5

# of points with multiple covers: 11

Pt	# times covered	multiplier
2	2	0.0000
6	2	0.0000
7	2	0.0000
14	2	0.0000
15	2	0.0000
17	2	0.2410
19	2	0.0000
20	3	0.0000
23	2	0.0000
24	2	0.8565
25	2	0.0000

Analysis of the Results

LUB= 44
# sets in best cover: 8
(sets are 1 2 3 4 6 7 18 22)
sets eliminated by penalty: 87

Heuristic set selection rule for add	Option	Frequency UB=LUB	Mean error	1st found LUB
original cost	(1)	14	3.50	13
reduced cost	(4,1)	28	2.12	6
recomputed reduced cost	(4,2)	24	1.90	13

Frequency of <

0	6	1
20	0	8
13	8	0

Frequency of =

0	24	36
24	0	34
36	34	0

i.e., the second rule outperformed the first in 20 instances, and the third in 8 instances!