Online Supplement for "A matheuristic for the multi-vehicle inventory routing problem"

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Computational results

Table 1: Computational results on small instances: comparison with the branch-and-cut algorithm [1]

low inv. cost

		% gap w.r.t. opt.			% gap w.r.t. UB		
	# opt. found	av.	max	# better than UB	av.	min	max
$H = 3$	62 (126)	0.23	5.01	51 (74)	-6.04	-29.17	6.26
$H = 6$	14 (38)	0.25	2.32	29 (82)	-0.72	-33.01	5.54
$m = 2$	22 (69)	0.20	2.01	2 (11)	0.24	-1.30	1.52
$m = 3$	29 (46)	0.31	5.01	17 (34)	-1.54	-12.84	5.96
$m = 4$	14 (27)	0.13	1.75	30 (53)	-3.00	-21.95	5.54
$m = 5$	11 (22)	0.30	1.71	31 (58)	-5.52	-33.01	6.26
All	76 (164)	0.23	5.01	80 (156)	-3.23	-33.01	6.26

high inv. cost

		% gap w.r.t. opt.			% gap w.r.t. UB		
	# opt. found	av.	max	# better than UB	av.	min	max
$H = 3$	52 (126)	0.16	2.78	56 (74)	-3.25	-11.97	4.14
$H = 6$	14 (42)	0.20	1.50	19 (78)	0.20	-7.19	5.25
$m = 2$	17 (73)	0.16	2.78	0 (7)	0.43	0.00	1.08
$m = 3$	23 (45)	0.16	2.02	17 (35)	-0.27	-5.35	3.25
$m = 4$	13 (27)	0.17	1.58	28 (53)	-1.67	-11.50	2.88
$m = 5$	13 (23)	0.24	1.50	30 (57)	-2.87	-11.97	5.25
All	66 (168)	0.17	2.78	75 (152)	-1.59	-11.97	5.25

Table 2: Computational results on small instances: comparison with the branch-price-and-cut algorithm [2]

low inv. cost

	# opt. found	% gap w.r.t. opt. av.	max	# better than UB	% gap w.r.t. UB av.	min	max
$H = 3$	56 (121)	0.81	7.18	41 (79)	-16.33	-49.56	9.58
$H = 6$	13 (30)	0.46	3.39	76 (90)	-34.59	-52.79	4.98
$m = 2$	18 (37)	0.00	0.00	36 (43)	-31.93	-49.95	2.01
$m = 3$	26 (35)	0.03	0.68	30 (45)	-25.34	-52.79	4.76
$m = 4$	13 (40)	1.25	6.66	28 (40)	-24.60	-49.90	4.89
$m = 5$	12 (39)	1.55	7.18	23 (41)	-21.62	-46.86	9.58
All	69 (151)	0.74	7.18	117 (169)	-26.24	-52.79	9.58

high inv. cost

	# opt. found	% gap w.r.t. opt. av.	max	# better than UB	% gap w.r.t. UB av.	min	max
$H = 3$	46 (133)	0.42	5.81	45 (67)	-13.51	-34.25	2.09
$H = 6$	12 (33)	0.52	4.28	66 (87)	-22.15	-37.20	4.21
$m = 2$	11 (38)	0.01	0.07	37 (42)	-17.42	-33.58	0.65
$m = 3$	21 (42)	0.10	0.91	26 (38)	-16.63	-37.09	2.09
$m = 4$	13 (41)	0.56	2.92	30 (39)	-19.78	-37.20	2.63
$m = 5$	13 (45)	1.01	5.81	18 (35)	-19.62	-33.44	4.21
All	58 (166)	0.44	5.81	111 (154)	-18.18	-37.20	4.21

References

[1] L. C. Coelho and G. Laporte. Improved solutions for inventory-routing problems through valid inequalties and input ordering. *International Journal of Production Economics*, 155:391–397, 2014.

[2] G. Desaulniers, J. Rakke, and L. C. Coelho. A branch-price-and-cut algorithm for the inventory-routing problem. *Transportation Science*, 2015.