

Computational results for Beasley's large problems. Option: k = 20, p = 5, r = 5

Pr. No.	Lb	Objective Value				Gap to Lb			
		HP	bfs	dfs	bs	HP	bfs	dfs	bs
capa1	19240822.45	19247166.00	19242536.31	19242536.31	19242536.31	0.033	0.009	0.009	0.009
capa2	18438046.54	18594257.87	18439832.00	18439832.00	18439832.00	0.847	0.010	0.010	0.010
capa3	17765201.95	17907533.52	17765201.95	17765201.95	17765201.95	0.801	0.000	0.000	0.000
capa4	17160439.01	17160612.23	17160809.04	17160809.04	17160809.04	0.001	0.002	0.002	0.002
capb1	13656379.58	13657994.99	13658413.01	13658413.01	13658413.01	0.012	0.015	0.015	0.015
capb2	13361927.45	13720471.92	13365455.33	13365455.33	13365496.70	2.683	0.026	0.026	0.027
capb3	13198556.43	13374673.25	13328011.80	13328011.80	13328011.80	1.334	0.981	0.981	0.981
capb4	13082516.50	13097933.52	13085407.10	13085407.10	13085407.10	0.118	0.022	0.022	0.022
capc1	11646596.97	11710752.16	11685611.34	11685611.34	11685611.34	0.551	0.335	0.335	0.335
capc2	11570340.29	11827419.33	11570437.68	11570437.68	11570437.68	2.222	0.001	0.001	0.001
capc3	11518743.74	11582710.22	11540012.26	11540012.26	11540012.26	0.555	0.185	0.185	0.185
capc4	11505767.39	11509395.65	11509395.65	11509395.65	11509395.65	0.032	0.032	0.032	0.032
Avg.						0.766	0.135	0.135	0.135

Computational results for Beasley's large problems. Option: k = 20, p = 10, r = 5

Pr. No.	Lb	Objective Value				Gap to Lb			
		HP	bfs	dfs	bs	HP	bfs	dfs	bs
capa1	19240822.45	19247166.00	19242536.31	19242536.31	19242536.31	0.033	0.009	0.009	0.009
capa2	18438046.54	18594257.87	18439832.00	18439832.00	18440211.71	0.847	0.010	0.010	0.012
capa3	17765201.95	17907533.52	17765201.95	17765201.95	17765201.95	0.801	0.000	0.000	0.000
capa4	17160439.01	17160612.23	17160809.04	17160809.04	17160809.04	0.001	0.002	0.002	0.002
capb1	13656379.58	13657994.99	13658413.01	13658413.01	13658413.01	0.012	0.015	0.015	0.015
capb2	13361927.45	13720471.92	13365455.33	13365455.33	13365496.70	2.683	0.026	0.026	0.027
capb3	13198556.43	13374673.25	13239067.70	13239067.70	13239067.70	1.334	0.307	0.307	0.307
capb4	13082516.50	13097933.52	13085407.10	13085407.10	13085407.10	0.118	0.022	0.022	0.022
capc1	11646596.97	11710752.16	11685611.34	11685611.34	11685611.34	0.551	0.335	0.335	0.335
capc2	11570340.29	11827419.33	11570437.68	11570437.68	11570437.68	2.222	0.001	0.001	0.001
capc3	11518743.74	11582710.22	11540012.26	11540012.26	11540012.26	0.555	0.185	0.185	0.185
capc4	11505767.39	11509395.65	11509395.65	11509395.65	11509395.65	0.032	0.032	0.032	0.032
Avg.						0.766	0.079	0.079	0.079

Time(sec.)s and best restarts for Beasley's large problems. k = 20, r = 5

Pr. No.	Time(sec.)						Best Restart					
	p=5			p=10			p=5			p=10		
	bfs	dfs	bs	bfs	dfs	bs	bfs	dfs	bs	bfs	dfs	bs
capa1	259.63	257.21	256.90	254.99	214.51	212.56	5	5	5	4	4	4
capa2	108.15	107.36	107.44	108.83	108.95	107.90	1	1	1	4	4	4
capa3	66.84	66.16	65.88	58.77	58.24	58.19	1	1	1	3	3	3
capa4	12.79	12.77	12.76	12.15	12.17	12.18	1	1	1	2	2	2
capb1	137.04	135.72	136.24	142.02	140.42	140.24	1	1	1	2	2	2
capb2	78.92	77.94	78.74	73.13	86.30	83.94	5	5	5	3	3	3
capb3	98.14	100.70	97.01	53.54	53.58	53.49	5	5	5	2	2	2
capb4	21.17	21.31	21.34	18.91	19.05	19.12	1	1	1	1	1	1
capc1	89.90	89.95	89.03	112.64	101.65	106.84	3	3	3	1	1	1
capc2	43.83	43.46	43.39	33.50	33.58	33.60	2	2	2	1	1	1
capc3	25.17	24.46	24.59	28.91	29.47	29.01	1	1	1	4	4	4
capc4	15.81	15.81	15.80	16.08	16.09	16.06	1	1	1	1	1	1
Avg.	79.78	79.40	79.09	76.12	72.83	72.76						

Computational results for Beasley's large problems. Option: k = 40, p = 5, r = 5

Pr. No.	Lb	Objective Value				Gap to Lb			
		HP	bfs	dfs	bs	HP	bfs	dfs	bs
capa1	19240822.45	19247166.00	19242536.31	19242536.31	19242536.31	0.033	0.009	0.009	0.009
capa2	18438046.54	18594257.87	18439832.00	18439832.00	18439832.00	0.847	0.010	0.010	0.010
capa3	17765201.95	17907533.52	17765201.95	17765201.95	17765201.95	0.801	0.000	0.000	0.000
capa4	17160439.01	17160612.23	17160809.04	17160809.04	17160809.04	0.001	0.002	0.002	0.002
capb1	13656379.58	13657994.99	13658413.01	13658413.01	13658413.01	0.012	0.015	0.015	0.015
capb2	13361927.45	13720471.92	13370796.77	13370796.77	13370796.77	2.683	0.066	0.066	0.066
capb3	13198556.43	13374673.25	13239067.70	13239067.70	13239067.70	1.334	0.307	0.307	0.307
capb4	13082516.50	13097933.52	13085407.10	13085407.10	13085407.10	0.118	0.022	0.022	0.022
capc1	11646596.97	11710752.16	11685611.34	11685611.34	11685611.34	0.551	0.335	0.335	0.335
capc2	11570340.29	11827419.33	11570437.68	11570437.68	11570437.68	2.222	0.001	0.001	0.001
capc3	11518743.74	11582710.22	11540012.26	11540012.26	11540012.26	0.555	0.185	0.185	0.185
capc4	11505767.39	11509395.65	11509395.65	11509395.65	11509395.65	0.032	0.032	0.032	0.032
Avg.						0.766	0.082	0.082	0.082

Computational results for Beasley's large problems. Option: k = 40, p = 10, r = 5

Pr. No.	Lb	Objective Value				Gap to Lb			
		HP	bfs	dfs	bs	HP	bfs	dfs	bs
capa1	19240822.45	19247166.00	19242536.31	19242536.31	19242536.31	0.033	0.009	0.009	0.009
capa2	18438046.54	18594257.87	18439832.00	18572269.74	18572269.74	0.847	0.010	0.728	0.728
capa3	17765201.95	17907533.52	17765201.95	17765201.95	17765201.95	0.801	0.000	0.000	0.000
capa4	17160439.01	17160612.23	17160809.04	17160809.04	17160809.04	0.001	0.002	0.002	0.002
capb1	13656379.58	13657994.99	13658413.01	13658413.01	13658413.01	0.012	0.015	0.015	0.015
capb2	13361927.45	13720471.92	13365496.70	13365455.33	13365455.33	2.683	0.027	0.026	0.026
capb3	13198556.43	13374673.25	13239067.70	13239067.70	13239067.70	1.334	0.307	0.307	0.307
capb4	13082516.50	13097933.52	13085407.10	13085407.10	13085407.10	0.118	0.022	0.022	0.022
capc1	11646596.97	11710752.16	11685611.34	11685611.34	11685611.34	0.551	0.335	0.335	0.335
capc2	11570340.29	11827419.33	11570437.68	11570437.68	11570437.68	2.222	0.001	0.001	0.001
capc3	11518743.74	11582710.22	11540012.26	11540012.26	11540012.26	0.555	0.185	0.185	0.185
capc4	11505767.39	11509395.65	11509395.65	11509395.65	11509395.65	0.032	0.032	0.032	0.032
Avg.						0.766	0.079	0.138	0.138

Time(sec.)s and best restarts for Beasley's large problems. k = 40, r = 5

Pr. No.	Time(sec.)						Best Restart					
	p=5			p=10			p=5			p=10		
	bfs	dfs	bs	bfs	dfs	bs	bfs	dfs	bs	bfs	dfs	bs
capa1	259.88	294.48	289.94	214.98	214.29	216.45	5	5	3	4	4	4
capa2	107.74	107.55	107.31	107.89	99.50	98.03	1	1	1	4	1	1
capa3	68.70	67.62	67.68	62.83	63.05	62.66	1	1	1	3	3	3
capa4	12.79	12.76	12.77	12.16	12.18	12.17	1	1	1	2	2	2
capb1	136.65	135.76	136.10	141.58	141.76	140.96	1	1	1	2	2	2
capb2	73.92	74.15	73.28	75.26	77.32	85.60	1	1	1	3	3	3
capb3	96.68	96.11	96.97	53.47	53.53	53.54	5	5	5	2	2	2
capb4	21.61	21.22	21.32	18.92	19.08	19.13	1	1	1	1	1	1
capc1	90.21	90.81	89.65	117.15	104.05	114.64	3	3	3	1	1	1
capc2	44.26	43.34	43.03	33.56	33.67	33.60	2	2	2	1	1	1
capc3	25.27	24.53	24.63	29.01	30.81	29.15	1	1	1	4	4	4
capc4	15.79	15.81	15.80	16.08	16.09	16.08	1	1	1	1	1	1
Avg.	79.46	82.01	81.54	73.57	72.11	73.50						

Computational results for Beasley's large problems. Option: k = 60, p = 5, r = 5

Pr. No.	Lb	Objective Value				Gap to Lb			
		HP	bfs	dfs	bs	HP	bfs	dfs	bs
capa1	19240822.45	19247166.00	19242536.31	19242536.31	19242536.31	0.033	0.009	0.009	0.009
capa2	18438046.54	18594257.87	18439832.00	18439832.00	18439832.00	0.847	0.010	0.010	0.010
capa3	17765201.95	17907533.52	17765201.95	17765201.95	17765201.95	0.801	0.000	0.000	0.000
capa4	17160439.01	17160612.23	17160809.04	17160809.04	17160809.04	0.001	0.002	0.002	0.002
capb1	13656379.58	13657994.99	13658413.01	13658413.01	13658413.01	0.012	0.015	0.015	0.015
capb2	13361927.45	13720471.92	13370796.77	13370796.77	13370796.77	2.683	0.066	0.066	0.066
capb3	13198556.43	13374673.25	13239067.70	13239615.81	13239067.70	1.334	0.307	0.311	0.307
capb4	13082516.50	13097933.52	13085407.10	13085407.10	13085407.10	0.118	0.022	0.022	0.022
capc1	11646596.97	11710752.16	11685611.34	11685611.34	11685611.34	0.551	0.335	0.335	0.335
capc2	11570340.29	11827419.33	11570437.68	11570437.68	11570437.68	2.222	0.001	0.001	0.001
capc3	11518743.74	11582710.22	11540012.26	11540012.26	11540012.26	0.555	0.185	0.185	0.185
capc4	11505767.39	11509395.65	11509395.65	11509395.65	11509395.65	0.032	0.032	0.032	0.032
Avg.						0.766	0.082	0.082	0.082

Computational results for Beasley's large problems. Option: k = 60, p = 10, r = 5

Pr. No.	Lb	Objective Value				Gap to Lb			
		HP	bfs	dfs	bs	HP	bfs	dfs	bs
capa1	19240822.45	19247166.00	19242536.31	19242536.31	19242536.31	0.033	0.009	0.009	0.009
capa2	18438046.54	18594257.87	18439832.00	18572269.74	18572269.74	0.847	0.010	0.728	0.728
capa3	17765201.95	17907533.52	17765201.95	17765201.95	17765201.95	0.801	0.000	0.000	0.000
capa4	17160439.01	17160612.23	17160809.04	17160809.04	17160809.04	0.001	0.002	0.002	0.002
capb1	13656379.58	13657994.99	13658413.01	13658413.01	13659530.03	0.012	0.015	0.015	0.023
capb2	13361927.45	13720471.92	13365455.33	13365455.33	13365455.33	2.683	0.026	0.026	0.026
capb3	13198556.43	13374673.25	13239067.70	13239067.70	13239067.70	1.334	0.307	0.307	0.307
capb4	13082516.50	13097933.52	13085407.10	13085407.10	13085407.10	0.118	0.022	0.022	0.022
capc1	11646596.97	11710752.16	11685611.34	11685611.34	11685611.34	0.551	0.335	0.335	0.335
capc2	11570340.29	11827419.33	11570437.68	11570437.68	11570437.68	2.222	0.001	0.001	0.001
capc3	11518743.74	11582710.22	11540012.26	11540012.26	11540012.26	0.555	0.185	0.185	0.185
capc4	11505767.39	11509395.65	11509395.65	11509395.65	11509395.65	0.032	0.032	0.032	0.032
Avg.						0.766	0.079	0.138	0.139

Time(sec.)s and best restarts for Beasley's large problems. k = 60, r = 5

Pr. No.	Time(sec.)						Best Restart					
	p=5			p=10			p=5			p=10		
	bfs	dfs	bs	bfs	dfs	bs	bfs	dfs	bs	bfs	dfs	bs
capa1	289.65	302.97	302.09	214.69	216.71	217.10	3	5	5	4	4	4
capa2	106.63	106.47	116.67	108.08	98.58	97.07	1	1	1	4	1	1
capa3	68.48	67.39	67.62	60.10	59.94	59.94	1	1	1	3	3	3
capa4	12.77	12.75	12.75	12.19	12.20	12.20	1	1	1	2	2	2
capb1	139.56	151.40	144.44	145.54	145.98	145.92	1	5	3	5	2	2
capb2	73.69	73.93	73.09	85.51	86.94	86.25	1	1	1	3	3	3
capb3	82.79	78.90	82.93	50.05	50.14	50.08	5	5	5	2	2	2
capb4	21.65	21.21	21.33	19.02	19.15	19.22	1	1	1	1	1	1
capc1	89.24	88.97	89.04	116.85	118.82	112.68	5	5	5	1	1	1
capc2	44.79	43.81	43.51	38.93	38.96	38.91	2	2	2	1	1	1
capc3	24.77	24.09	23.45	28.60	30.25	28.62	3	3	3	4	4	4
capc4	15.75	15.76	15.75	16.13	16.15	16.15	1	1	1	1	1	1
Avg.	80.81	82.30	82.72	74.64	74.48	73.68						