TABLE 1. Results for the IRPT-OU - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 3$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	403.42	403.42	0.00	0.05	**403.42**	**0.00**	6.29
abs2n5	435.55	435.55	0.00	0.02	**435.55**	**0.00**	6.44
abs3n5	1477.9	1477.9	0.00	0.02	**1477.9**	**0.00**	6.86
abs4n5	811.6	811.6	0.00	0.02	**811.6**	**0.00**	5.61
abs5n5	598.5	598.5	0.00	0.2	**598.5**	**0.00**	7.64
abs1n10	1555.97	1555.97	0.00	2.68	**1555.97**	**0.00**	25.98
abs2n10	1791.97	1792.14	0.01	4.72	**1792.14**	**0.01**	25.65
abs3n10	1414.45	1414.45	0.00	1.34	1418.35	0.28	24.46
abs4n10	1589	1589	0.00	1.53	1592.08	0.19	43.81
abs5n10	1729.03	1729.03	0.00	1.18	**1729.03**	**0.00**	27.91
abs1n15	1868.08	1868.2	0.01	8.01	1869.92	0.10	93.41
abs2n15	1799.19	1799.32	0.01	20.51	1821.5	1.24	59.81
abs3n15	2083.5	2083.5	0.00	5.72	**2083.5**	**0.00**	67.32
abs4n15	1768.37	1768.54	0.01	55.85	1777.68	0.53	115.58
abs5n15	1735.96	1736.13	0.01	7.82	1770.93	2.01	75.1
abs1n20	2111.2	2111.4	0.01	303.11	2181.68	3.34	226.12
abs2n20	2107.63	2107.85	0.01	270.84	2156.4	2.31	115.58
abs3n20	2368.33	2368.56	0.01	201.48	2446.22	3.29	135.33
abs4n20	2482.39	2482.64	0.01	951.5	2853.81	14.96	264.2
abs5n20	2301.67	2627.72	14.17	1060.99*	**2574.09**	**11.84**	175.22
abs1n25	2419.52	2491.58	2.98	3600	2723.09	12.55	468.76
abs2n25	2196.78	2416.78	10.01	3600	**2416.78**	**10.01**	288.1
abs3n25	2438.52	3055.47	25.30	1174.95*	**2946.49**	**20.83**	287.87
abs4n25	2644.68	2644.94	0.01	237.34	2809.97	6.25	566.61
abs5n25	2406.76	2941.66	22.22	822.73*	**2727.04**	**13.31**	334.21
abs1n30	2791.91	3594.42	28.74	1219.03*	3934.12	40.91	688.76
abs2n30	2731.55	3352.79	22.74	1599.76*	3686.85	34.97	450.11
abs3n30	3200.53	3268	2.11	3600	3492.05	9.11	473.99
abs4n30	2822.03	2822.31	0.01	167.22	3001.25	6.35	985
abs5n30	2518.92	2578.61	2.37	3600	2593.21	2.95	581.1
abs1n35	2674.14	3410.86	27.55	1636.51*	3413.06	27.63	862.51
abs2n35	2750.55	4050.83	47.27	1161.77*	**3426.5**	**24.58**	820.61
abs3n35	3156.77	4912	55.60	1465.55*	**4071.77**	**28.99**	744.67
abs4n35	2526.47	3412.11	35.05	1563.09*	**3041.2**	**20.37**	1070.35
abs5n35	2755.31	5798.41	110.44	870.64*	**3660.77**	**32.86**	977.45
abs1n40	2847.05	4397.81	54.47	1077.4*	**3590.06**	**26.10**	1749.51
abs2n40	2677.75	4426.09	65.29	1303.44*	**4057.71**	**51.53**	1444.81
abs3n40	2858.37	4218.64	47.59	1051.46*	**3952.64**	**38.28**	1280.53
abs4n40	2814.08	3185.24	13.19	3600	**3486.88**	**23.91**	1561.28
abs5n40	2943.5	6427.93	118.38	1769.30*	**3890.74**	**32.18**	1849.93
abs1n45	3131.23	4397.81	40.45	1077.40*	**4194.48**	**33.96**	2062.53
abs2n45	2891.89	4793.16	65.74	1844.69*	**4127.35**	**42.72**	2166.34
abs3n45	3332.12	4442.81	33.33	1489.38*	**4046.94**	**21.45**	2441.85
abs4n45	3124.94	4689.98	50.08	1220.59*	**4187.81**	**34.01**	2357
abs5n45	2972.11	4379.24	47.34	1923.16*	**3837.87**	**29.13**	2723.47
abs1n50	3102.19	8279.76	166.90	1646.65*	**4627.87**	**49.18**	2659.18
abs2n50	3479.7	5857.72	68.34	1348.19*	**4596.44**	**32.09**	2775.06
abs3n50	3349.33	5862.01	75.02	1391.51*	**4814.94**	**43.76**	2635.58
abs4n50	3751	4780.49	27.45	1555.00*	**4267.96**	**13.78**	3154.88
abs5n50	3200.86	7679.78	139.93	2112.26*	**4598.16**	**43.65**	3265.63
averages			28.40			**16.95**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit

time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

*: aborted prematurely with out-of-memory status

TABLE 2. Results for the IRPT-OU - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 3$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	1264.68	1264.68	0.00	0.08	**1264.68**	**0.00**	6.74
abs2n5	1215.1	1215.1	0.00	0.03	**1215.1**	**0.00**	6.54
abs3n5	2700.63	2700.63	0.00	0.03	**2700.63**	**0.00**	13
abs4n5	1374.54	1374.54	0.00	0.02	**1374.54**	**0.00**	6.87
abs5n5	1766.95	1766.95	0.00	0.19	**1766.95**	**0.00**	7.16
abs1n10	4346.14	4346.37	0.01	2.78	**4346.37**	**0.01**	25.4
abs2n10	4064.6	4064.91	0.01	4.82	**4064.91**	**0.01**	25.37
abs3n10	3560.61	3560.61	0.00	1.3	**3560.61**	**0.00**	47.2
abs4n10	3741.2	3741.2	0.00	1.56	**3741.2**	**0.00**	27.27
abs5n10	4506.63	4506.63	0.00	1.55	**4506.63**	**0.00**	25.39
abs1n15	5313.39	5313.91	0.01	9.96	5330.77	0.33	60.26
abs2n15	5111.27	5111.63	0.01	20.94	5185.14	1.45	63.63
abs3n15	5893.92	5894.51	0.01	5.31	**5894.51**	**0.01**	113.57
abs4n15	4574.78	4575.23	0.01	40	4718.36	3.14	71.98
abs5n15	4451.86	4452.29	0.01	27	**4452.29**	**0.01**	63.76
abs1n20	6656.3	6656.97	0.01	149.73	6697.4	0.62	123.86
abs2n20	6687.38	6688.05	0.01	501.72	6757.64	1.05	135.16
abs3n20	7116.31	7117.7	0.02	86.45	7193.38	1.08	219.96
abs4n20	6302.75	6303.39	0.01	1125.22	6382.71	1.27	126.62
abs5n20	7329.12	7619.91	3.97	1559.46*	**7605.69**	**3.77**	150.49
abs1n25	7637.86	7857.37	2.87	3600	7989.53	4.60	256.01
abs2n25	8056.15	8144.19	1.09	3600	8217.01	2.00	298.13
abs3n25	8795.79	9226.77	4.90	1040.78*	**9224.65**	**4.88**	615.94
abs4n25	8037.04	8037.85	0.01	654.55	8122.5	1.06	304.34
abs5n25	9585.88	9790.28	2.13	1608.23*	10216.5	6.58	276.73
abs1n30	11363.33	12253.99	7.84	1173.78*	12803.6	12.67	495.66
abs2n30	10242.24	11015.1	7.55	876.63*	**10727.4**	**4.74**	520.6
abs3n30	11607	11987.65	3.28	2048.46*	12196.7	5.08	652.61
abs4n30	9137.24	9138	0.01	90.56	9151.62	0.16	460.87
abs5n30	9312.08	9430.34	1.27	2623.48*	9456.55	1.55	477.87
abs1n35	10897.68	11762.54	7.94	3600	**11692.6**	**7.29**	740.74
abs2n35	9704.67	10525.81	8.46	1043.51*	**10309.4**	**6.23**	955.9
abs3n35	13117.51	14346.29	9.37	1392.86*	**13801.1**	**5.21**	1048.32
abs4n35	9584.75	10342.5	7.91	1052.61*	**10061.1**	**4.97**	1050.93
abs5n35	10173.45	11067.73	8.79	1022.67*	**10971**	**7.84**	854.51
abs1n40	12495.91	14600.99	16.85	1405.78*	**13394.2**	**7.19**	1210.87
abs2n40	10012.48	11795.18	17.80	1294.77*	**11338.7**	**13.25**	1614.09
abs3n40	12533.76	13579.84	8.35	1699.26*	**13332.6**	**6.37**	1361.27
abs4n40	10553.25	12026.21	13.96	1335.46*	**11389.7**	**7.93**	1395.97
abs5n40	12346.84	13585.76	10.03	1403.73*	**13360.6**	**8.21**	2306.02
abs1n45	13405.93	17873.64	33.33	1309.94*	**14139.3**	**5.47**	1729.56
abs2n45	12291.24	17670.52	43.77	1409.93*	**13475.8**	**9.64**	2167.07
abs3n45	14185.29	17545.85	23.69	1118.45*	**14864.1**	**4.79**	2106.52
abs4n45	12640.85	14802.9	17.10	1678.70*	**13479.3**	**6.63**	3047.63
abs5n45	12824.24	14450.5	12.68	1619.63*	**13648.2**	**6.43**	2169.29
abs1n50	13627.44	17599.87	29.15	2459.93*	**15087.5**	**10.71**	3134.47
abs2n50	13945.74	17171.48	23.13	1353.16*	**14649.8**	**5.05**	360
abs3n50	14159.08	16601.35	17.25	1820.37*	**15180.1**	**7.21**	2920.84
abs4n50	15821.14	16625.97	5.09	2651.43*	**16540.5**	**4.55**	3600
abs5n50	14538.68	18631.79	28.15	1763.14*	**16342.4**	**12.41**	3600
averages			7.56			**4.07**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit

time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

*: aborted prematurely with out-of-memory status

TABLE 3. Results for the IRPT-OU - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 6$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	2571.02	2571.02	0.00	0.33	**2571.02**	**0.00**	14.3
abs2n5	1904.36	1904.36	0.00	0.91	**1904.36**	**0.00**	13.85
abs3n5	4002.84	4003.19	0.01	0.04	**4003.19**	**0.01**	16.82
abs4n5	2502.57	2502.57	0.00	1.02	**2502.57**	**0.00**	20.07
abs5n5	1828.09	1828.09	0.00	4.49	**1828.09**	**0.00**	16.14
abs1n10	3305.14	4063.6	22.95	1033.79*	4208.6	27.33	58.56
abs2n10	3135.07	4397.55	40.27	865.38*	**4390.63**	**40.05**	80.45
abs3n10	3471.98	3682.98	6.08	3600	**3682.98**	**6.08**	62.77
abs4n10	3608.24	4024.1	11.53	3600	4074.75	12.93	98.93
abs5n10	4103.32	4103.74	0.01	2008.77	4120.82	0.43	50.78
abs1n15	3996.79	4675.04	16.97	1118.91*	**4633.86**	**15.94**	170.77
abs2n15	3686.22	5275.14	43.10	1009.01*	**4856.49**	**31.75**	184.82
abs3n15	4625.68	5755.8	24.43	1179.77*	**5706.32**	**23.36**	241.33
abs4n15	3264.35	4743.2	45.30	813.84*	**4599.73**	**40.91**	313.17
abs5n15	3830.77	4762.87	24.33	1026.82*	**4612.57**	**20.41**	130.34
abs1n20	3998.34	8266.39	106.75	1321.88*	**5368.02**	**34.26**	358.15
abs2n20	4155.49	5468.97	31.61	1921.86*	5796.29	39.49	472.73
abs3n20	4345.56	6477.09	49.05	1395.75*	**6073.73**	**39.77**	414.18
abs4n20	4816.81	7808.9	62.12	1108.85*	**6726.7**	**39.65**	766.94
abs5n20	4668.53	9072.67	94.34	1165.48*	**7416.88**	**58.87**	444.56
abs1n25	3837.32	9360.67	143.94	1697.63*	**6113.58**	**59.32**	715.73
abs2n25	4413.36	10412.96	135.94	2373.47*	**6289.73**	**42.52**	585.17
abs3n25	5042.47	11793.11	133.88	1520.64*	**7311.17**	**44.99**	999.88
abs4n25	5205.72	9374.41	80.08	1988.31*	**7071.64**	**35.84**	742.2
abs5n25	4707.82	11891.26	152.59	1591.23*	**7246.86**	**53.93**	982.87
abs1n30	5715.18	14707.94	157.35	1610.56*	**9678.23**	**69.34**	2023.78
abs2n30	5520.81	12912.75	133.89	1535.45*	**7455.09**	**35.04**	1812.99
abs3n30	6160.09	13548.36	119.94	1328.50*	**8298.56**	**34.71**	1710.66
abs4n30	5480.05	16317.82	197.77	2111.75*	**7237.08**	**32.06**	1641.95
abs5n30	4938.71	12102.23	145.05	1366.21*	**7236.77**	**46.53**	1062.49
averages			65.98			**29.52**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit

time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

*: aborted prematurely with out-of-memory status

TABLE 4. Results for the IRPT-OU - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 6$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	5112.33	5112.33	0.00	0.26	**5112.33**	**0.00**	14.47
abs2n5	4222.7	4222.7	0.00	0.94	**4222.7**	**0.00**	14.91
abs3n5	6167.86	6168.33	0.01	5.67	6175.37	0.12	15.68
abs4n5	4358.37	4358.75	0.01	0.8	**4358.75**	**0.01**	13.65
abs5n5	3935.2	3935.59	0.01	3.39	**3935.59**	**0.01**	16.21
abs1n10	7605.42	8486.31	11.58	879.73*	**8329.06**	**9.51**	60.98
abs2n10	6473.61	7821.87	20.83	739.13*	**7684.48**	**18.70**	62.06
abs3n10	7290.3	7440.54	2.06	3600	**7440.54**	**2.06**	52.53
abs4n10	7159.94	7690.1	7.40	1094.36*	7700.16	7.55	100.36
abs5n10	8946	8946.9	0.01	1074.38	9038.45	1.03	50.52
abs1n15	10583.7	11280.3	6.58	1124.36*	11323	6.99	138.2
abs2n15	10167.89	11619.41	14.28	1141.1*	**11196.1**	**10.11**	156.33
abs3n15	12175.34	13238.85	8.73	1127.72*	**13035.6**	**7.07**	166.47
abs4n15	8454.44	9935.18	17.51	891.32*	**9811.05**	**16.05**	165.66
abs5n15	8805.4	10052.29	14.16	1261.02*	**9772.85**	**10.99**	153.71
abs1n20	12150.24	18092.86	48.91	758.22*	**14070**	**15.80**	418.43
abs2n20	12603.9	14430.81	14.49	1416.83*	**14072.2**	**11.65**	333.85
abs3n20	11782.27	14301.45	21.38	1277.86*	**13168.5**	**11.77**	405.26
abs4n20	11943.74	18294.14	53.17	1369.90*	**14001.2**	**17.23**	447.15
abs5n20	13180.97	18772.02	42.42	1213.92*	**16079.7**	**21.99**	607.47
abs1n25	12334.86	19446.29	57.65	1607.11*	**14871.4**	**20.56**	795.34
abs2n25	13510.01	18382.25	36.06	1007.95*	**16404.5**	**21.42**	853.97
abs3n25	15339.1	24412.8	59.15	2105.59*	**17862.7**	**16.45**	1142.16
abs4n25	13964.71	17617.52	26.16	1532.37*	**15871.9**	**13.66**	669.59
abs5n25	16166.2	24177.3	49.55	1448.93*	**19328**	**19.56**	1071.32
abs1n30	20172.52	31638.5	56.84	2464.61*	**22584.8**	**11.96**	1818.34
abs2n30	17721.38	23734.23	33.93	2853.60*	**20882**	**17.84**	1878.78
abs3n30	21003.7	28328.33	34.87	1339.57*	**23764.9**	**13.15**	1859.32
abs4n30	15433.16	23211.63	50.40	1657.82*	**17087.4**	**10.72**	1459.47
abs5n30	16519.02	25144.04	52.21	1442.89*	**18141.8**	**9.82**	1574.53
averages			24.68			**10.79**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit
time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM
*: aborted prematurely with out-of-memory status

TABLE 5. Results for the IRPT-ML - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 3$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	403.42	403.42	0.00	0.39	**403.42**	**0.00**	5.18
abs2n5	435.55	435.55	0.00	0.24	**435.55**	**0.00**	5.47
abs3n5	1460.4	1460.4	0.00	0.45	1476.04	1.07	5.75
abs4n5	811.6	811.6	0.00	0.07	**811.6**	**0.00**	4.92
abs5n5	597.83	597.83	0.00	0.3	**597.83**	**0.00**	5.11
abs1n10	1547.22	1547.29	0.00	2.64	**1547.29**	**0.00**	15.37
abs2n10	1702.92	1703.08	0.01	5.8	**1703.08**	**0.01**	15.14
abs3n10	1414.45	1414.45	0.00	1.71	**1414.45**	**0.00**	15.38
abs4n10	1586.38	1586.52	0.01	1.6	**1586.52**	**0.01**	13.41
abs5n10	1635.2	1635.2	0.00	1.47	1683.23	2.94	13.34
abs1n15	1830.46	1830.64	0.01	6.72	1831	0.03	31.82
abs2n15	1783.76	1783.94	0.01	124.32	**1783.94**	**0.01**	28.51
abs3n15	2083.3	2083.5	0.01	5.57	**2083.57**	**0.01**	32.81
abs4n15	1768.36	1768.54	0.01	131.27	1816.96	2.75	31.1
abs5n15	1733.54	1733.71	0.01	19.43	**1733.71**	**0.01**	28.99
abs1n20	1998.89	1999.05	0.01	60.48	**1999.05**	**0.01**	52.68
abs2n20	2102.02	2102.23	0.01	445.75	2158.62	2.69	53.27
abs3n20	2321.78	2322.01	0.01	174.83	2328.19	0.28	53.4
abs4n20	2413.96	2441.35	1.13	3600	**2441.35**	**1.13**	71.88
abs5n20	2325.29	2525.57	8.61	1438.54*	**2525.57**	**8.61**	52.51
abs1n25	2276.53	2482.82	9.06	3600	**2482.82**	**9.06**	77.15
abs2n25	2178.82	2393.38	9.85	3600	2395.29	9.94	94.02
abs3n25	2390.14	3015.87	26.18	978.09*	**2770.31**	**15.91**	115.42
abs4n25	2599.92	2600.17	0.01	634.29	**2600.17**	**0.01**	73.71
abs5n25	2392.37	2794.69	16.82	789.82*	**2647.09**	**10.65**	99.92
abs1n30	2726.77	3692.2	35.41	1783.72*	**3238.33**	**18.76**	137.53
abs2n30	2694.36	3232.74	19.98	3600	**3021.25**	**12.13**	182.23
abs3n30	2961.52	3321.53	12.16	920.35*	3336.58	12.66	165.83
abs4n30	2765.25	2765.53	0.01	127.42	**2765.53**	**0.01**	154.69
abs5n30	2529.73	2568.26	1.52	3600	**2568.26**	**1.52**	185.76
abs1n35	2622.95	3391.19	29.29	1362.56*	**3304.26**	**25.97**	260.65
abs2n35	2779.1	3911.11	40.73	1021.51*	**3251.31**	**16.99**	226.55
abs3n35	3112.63	5531.21	77.70	1016.77*	**3871.63**	**24.38**	255.49
abs4n35	2491.44	3369.47	35.24	1524.17*	**2973.9**	**19.36**	236.09
abs5n35	2705.81	3970.49	46.74	1075.36*	**3839.75**	**41.91**	264.92
abs1n40	2846.23	7375.75	159.14	2003.16*	**3382.91**	**18.86**	327.63
abs2n40	2578.85	3761.29	45.85	1810.21*	**3323.06**	**28.86**	308.65
abs3n40	2905.18	3769.19	29.74	1181.98*	**3447.66**	**18.67**	331.87
abs4n40	2823.84	3358.77	18.94	2761.48*	**3279.74**	**16.14**	291.22
abs5n40	2845.16	4135.58	45.35	2205.33*	**3375.67**	**18.65**	485.32
abs1n45	3087.93	3878.68	25.61	1788.61*	**3484.22**	**12.83**	614.93
abs2n45	2862.79	5267.67	84.00	1994.33*	**4150.2**	**44.97**	470.52
abs3n45	3247.43	5139.83	58.27	1532.85*	**3846.21**	**18.44**	421.25
abs4n45	3123.63	5335.75	70.82	1317.15*	**3541.52**	**13.38**	434.88
abs5n45	2850.69	5933.04	108.13	1436.41*	**3465.94**	**21.58**	366.99
abs1n50	3119.2	11500.45	268.70	1812.45*	**3835.17**	**22.95**	872.09
abs2n50	3481.99	7069.69	103.04	2579.94*	**3982.64**	**14.38**	758.15
abs3n50	3423.73	11159.86	225.96	2728.25*	**4552.21**	**32.96**	903.15
abs4n50	3770.34	4263.94	13.09	3244.02*	**3994.57**	**5.95**	776.54
abs5n50	3187.08	11869.67	272.43	1142.89*	**3990.86**	**25.22**	491.6
averages			37.99			**11.05**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit

time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

*: aborted prematurely with out-of-memory status

TABLE 6. Results for the IRPT-ML - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 3$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	1264.68	1264.68	0.00	0.63	**1264.68**	**0.00**	6.12
abs2n5	1215.1	1215.1	0.00	0.83	**1215.1**	**0.00**	6.4
abs3n5	2683.35	2683.35	0.00	0.81	**2683.35**	**0.00**	5.37
abs4n5	1374.54	1374.54	0.00	0.64	**1374.54**	**0.00**	6.16
abs5n5	1763.67	1763.67	0.00	0.7	**1763.67**	**0.00**	5.9
abs1n10	4316.19	4316.61	0.01	2.24	4318.61	0.06	15.6
abs2n10	3972.6	3973	0.01	8.44	**3973**	**0.01**	15.24
abs3n10	3560.31	3560.61	0.01	2.17	**3560.61**	**0.01**	15.74
abs4n10	3739.86	3739.86	0.00	1.59	3742.02	0.06	16.7
abs5n10	4405.05	4405.05	0.00	1.45	4464.83	1.36	13.54
abs1n15	5278.99	5279.5	0.01	19.4	**5279.5**	**0.01**	33.24
abs2n15	5076.29	5076.77	0.01	42.83	**5076.77**	**0.01**	37.13
abs3n15	5894.51	5894.51	0.00	4.03	**5894.51**	**0.00**	32.74
abs4n15	4574.77	4575.23	0.01	84.52	4612.36	0.82	33.73
abs5n15	4446.06	4446.9	0.02	28.52	**4446.49**	**0.01**	32
abs1n20	6579.92	6580.57	0.01	72.09	**6580.57**	**0.01**	63.63
abs2n20	6659.47	6660.14	0.01	513.9	6805.57	2.19	55.93
abs3n20	7055.51	7056.22	0.01	152.97	**7056.22**	**0.01**	55.09
abs4n20	6185.67	6268.09	1.33	3600	6374.01	3.04	56.39
abs5n20	7283.53	7549.76	3.66	1332.16*	7529.95	3.38	57.66
abs1n25	7704.19	7842.1	1.79	3600	**7842.1**	**1.79**	79.05
abs2n25	7861.84	8335.32	6.02	1293.59*	**8125.86**	**3.36**	92.21
abs3n25	8670.59	9490.04	9.45	806.46*	**9084.56**	**4.77**	112.42
abs4n25	7985	7985.8	0.01	926.11	8001.15	0.20	79.81
abs5n25	9488.54	9917.79	4.52	854.32*	**9759.31**	**2.85**	92.84
abs1n30	11303.29	12277.66	8.62	954.42*	**11780.3**	**4.22**	159.95
abs2n30	10249.68	10963.87	6.97	951.63*	**10591.8**	**3.34**	172
abs3n30	11641.49	11870.68	1.97	2305.24*	11947.4	2.63	147.18
abs4n30	9083.77	9084.67	0.01	121.67	**9084.67**	**0.01**	146.11
abs5n30	9319.6	9383.49	0.69	3600	**9384.01**	**0.69**	170.45
abs1n35	10964.21	11771.05	7.36	1132.09*	**11455.3**	**4.48**	266.65
abs2n35	9669.46	10930.39	13.04	989.09*	**10173.3**	**5.21**	216.16
abs3n35	13078.73	13671.42	4.53	1056.92*	**13543.7**	**3.56**	332.01
abs4n35	9572.4	10099.24	5.50	1622.19*	**9979.83**	**4.26**	261.15
abs5n35	10162.19	11083.17	9.06	1156.73*	11395.2	12.13	336.39
abs1n40	12448.93	16084.59	29.20	1480.34*	**13029.9**	**4.67**	544.99
abs2n40	10034.03	11810.05	17.70	1720.45*	**10680.3**	**6.44**	354.6
abs3n40	12494.33	14353.74	14.88	863.89*	**13093.3**	**4.79**	415.84
abs4n40	10563.5	11368.9	7.62	3092.38*	**10995.4**	**4.09**	235.81
abs5n40	12325.85	18028.67	46.27	1060.97*	**13027.5**	**5.69**	252.96
abs1n45	13323.86	19759.24	48.30	1430.00*	**13604.9**	**2.11**	587.47
abs2n45	12217.37	14759.2	20.81	1543.79*	**13721.6**	**12.31**	563.6
abs3n45	14068.86	16369.23	16.35	1356.51*	**14667.1**	**4.25**	726.24
abs4n45	12608	14481.81	14.86	2785.15*	**13096.4**	**3.87**	823.41
abs5n45	12677.13	13742.65	8.41	3600	**13409.8**	**5.78**	439.09
abs1n50	13609.54	15423.99	13.33	3600	**14159.8**	**4.04**	941.37
abs2n50	13946.48	18389.65	31.86	1862.25*	**14374.2**	**3.07**	1187.11
abs3n50	14163.34	21597.18	52.49	1933.87*	**15003.9**	**5.93**	824.15
abs4n50	15791.82	16867.96	6.81	2279.21*	**16133.3**	**2.16**	862.84
abs5n50	14522.01	18444.44	27.01	2631.84*	**15349.7**	**5.70**	883.91
averages			8.81			**2.79**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit

time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

*: aborted prematurely with out-of-memory status

TABLE 7. Results for the IRPT-ML - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 6$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	2571.02	2571.02	0.00	0.75	2571.67	0.03	10.62
abs2n5	1901.87	1901.87	0.00	1.32	**1901.87**	**0.00**	11
abs3n5	3971.23	3971.5	0.01	5.2	**3971.5**	**0.01**	11.68
abs4n5	2502.57	2502.57	0.00	1.09	2504.68	0.08	9.16
abs5n5	1825.16	1825.31	0.01	4.77	1842.15	0.93	12.07
abs1n10	3270.79	4082.43	24.81	940.22*	4244.76	29.78	40.76
abs2n10	3059.62	4409.67	44.12	821.12*	**4245.11**	**38.75**	36.22
abs3n10	3383.4	3680.53	8.78	1861.55*	3682.09	8.83	33.48
abs4n10	3460.3	4038.63	16.71	1079.38*	4186.94	21.00	41.32
abs5n10	4045.11	4070.69	0.63	3600	4116.62	1.77	31.74
abs1n15	3815.5	4614.1	20.93	1025.05*	**4607.52**	**20.76**	83.09
abs2n15	2688.14	5016.88	86.63	1036.87*	**4875.59**	**81.37**	80.7
abs3n15	4586.36	5689.34	24.05	1183.73*	**5611.42**	**22.35**	76.69
abs4n15	3238.72	4967.92	53.39	822.05*	**4519.4**	**39.54**	77.72
abs5n15	3770.23	5285.75	40.20	815.59*	**4559.74**	**20.94**	85.21
abs1n20	3946.59	11228.88	184.52	1483.64*	**5218.72**	**32.23**	146.63
abs2n20	4141.17	6609.2	59.60	1091.49*	**5423.01**	**30.95**	165.34
abs3n20	4264.85	6229.84	46.07	1227.35*	**5773.66**	**35.38**	151.43
abs4n20	4906.78	11286.61	130.02	1895.21*	**6563.02**	**33.75**	216.22
abs5n20	4668.69	14046.67	200.87	1137.69*	**7125.74**	**52.63**	191.59
abs1n25	3844	8154.89	112.15	2162.00*	**6629.91**	**72.47**	267.8
abs2n25	4414.1	10757.72	143.71	1060.15*	**6124.79**	**38.76**	164.73
abs3n25	5149.34	16703.91	224.39	1853.31*	**7425.18**	**44.20**	239.05
abs4n25	5295.19	10739.35	102.81	1518.14*	**6873.24**	**29.80**	295.87
abs5n25	4695.94	22577.03	380.78	2253.39*	**6988.88**	**48.83**	509.09
abs1n30	5629.03	14991.49	166.32	1727.53*	**7579.22**	**34.65**	886.39
abs2n30	5535.06	16188.11	192.46	1541.90*	**7412.54**	**33.92**	700.83
abs3n30	6109.78	14414.26	135.92	2956.53*	**8493.64**	**39.02**	642.68
abs4n30	5448.08	14416.35	164.61	2987.49*	**7047.21**	**29.35**	492.52
abs5n30	5016.7	11473.18	128.70	2468.17*	**6801.87**	**35.58**	633.81
averages			89.77			**29.26**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit

time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

*: aborted prematurely with out-of-memory status

TABLE 8. Results for the IRPT-ML - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 6$ and transshipment cost $u_{ij} = 0.01$

Instance	LB	UB	gap (%)	time (s)	z(alns)	gap to LB (%)	time (s)
abs1n5	5112.33	5112.33	0.00	0.23	**5112.33**	**0.00**	12.75
abs2n5	4203.67	4203.84	0.00	0.88	**4203.84**	**0.00**	14.29
abs3n5	6104.2	6104.74	0.01	5.22	6117.22	0.21	12.28
abs4n5	4358.75	4358.75	0.00	0.47	4376.88	0.42	12.67
abs5n5	3930.9	3931.29	0.01	4.38	**3931.29**	**0.01**	14.46
abs1n10	7578.09	8380.19	10.58	1015.40*	**8231.27**	**8.62**	36.9
abs2n10	6280.14	7704.91	22.69	738.13*	**7520.2**	**19.75**	43.98
abs3n10	7235.8	7440.22	2.83	3600	**7440.5**	**2.83**	34.8
abs4n10	7209.67	7667.88	6.36	1213.97*	7683.7	6.57	40.93
abs5n10	8846.06	8883.59	0.42	3600	8932.97	0.98	32.97
abs1n15	10513.84	11243.64	6.94	941.82*	11366.9	8.11	90.85
abs2n15	10070.67	11641.73	15.60	620.95*	**11242**	**11.63**	89.78
abs3n15	12052.59	13122.48	8.88	985.66*	**13000.6**	**7.87**	75.87
abs4n15	8297.38	10130.56	22.09	733.68*	**9602.1**	**15.72**	97.41
abs5n15	8733.12	10176.12	16.52	783.17*	**9534.14**	**9.17**	88.36
abs1n20	12120.01	15939.59	31.51	863.40*	**13396.6**	**10.53**	204.31
abs2n20	12619.6	14801.27	17.29	795.02*	**14102.2**	**11.75**	189.54
abs3n20	11766.2	13379.64	13.71	1342.99*	**13310.7**	**13.13**	185.33
abs4n20	11901.02	18849.86	58.39	1285.33*	**13909.3**	**16.87**	171.59
abs5n20	13200.17	24218.41	83.47	1544.11*	**16041.4**	**21.52**	147.76
abs1n25	12341.86	17014.54	37.86	1664.80*	**14821.9**	**20.09**	332.33
abs2n25	13729.97	22863.21	66.52	2300.97*	**15504.3**	**12.92**	291.12
abs3n25	15353.9	27616.76	79.87	1594.66*	**17820.8**	**16.07**	392.52
abs4n25	14024.51	17582.21	25.37	1967.37*	**15448.9**	**10.16**	350.66
abs5n25	16219.27	24736.05	52.51	2157.40*	**18005**	**11.01**	280.92
abs1n30	20173.28	33850.17	67.80	2392.14*	**23164.5**	**14.83**	725.36
abs2n30	17670.31	27567.88	56.01	2762.35*	**20103.2**	**13.77**	913.78
abs3n30	20964.18	31589.5	50.68	1445.17*	**23109.2**	**10.23**	816.25
abs4n30	15566.26	25890.35	66.32	1980.70*	**16933**	**8.78**	596.67
abs5n30	16538.57	27179.34	64.34	1743.81*	**17867.6**	**8.04**	885.33
averages			29.49			**9.72**	

UB and LB are the upper bound and lower bound obtained after running CPLEX 12.2 with 1 hour-limit
time: run on an Intel Core2Duo 2.4GHz and 4 GB RAM
*: aborted prematurely with out-of-memory status

TABLE 9. Results for the IRP-OU - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 3$

Instance	z*	z(BPS)	gap (%)	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	1281.68	**1281.68**	**0.00%**	**1281.68**	**0.00%**	3	**1281.68**	**0.00%**	8.88
abs2n5	1176.63	**1176.63**	**0.00%**	**1176.63**	**0.00%**	3	**1176.63**	**0.00%**	10.06
abs3n5	2020.65	2178.94	7.83%	**2020.65**	**0.00%**	4	**2020.65**	**0.00%**	10.26
abs4n5	1449.43	**1449.43**	**0.00%**	**1449.43**	**0.00%**	2	**1449.43**	**0.00%**	9.36
abs5n5	1165.4	1242.07	6.58%	**1165.4**	**0.00%**	3	**1165.4**	**0.00%**	15.02
abs1n10	2167.37	2198.56	1.44%	**2167.37**	**0.00%**	14	**2167.37**	**0.00%**	34.9
abs2n10	2510.13	**2510.13**	**0.00%**	**2510.13**	**0.00%**	12	**2510.13**	**0.00%**	38.49
abs3n10	2099.68	**2099.68**	**0.00%**	**2099.68**	**0.00%**	13	**2099.68**	**0.00%**	32.53
abs4n10	2188.01	**2188.01**	**0.00%**	**2188.01**	**0.00%**	11	**2188.01**	**0.00%**	35.04
abs5n10	2178.15	2231.67	2.46%	**2178.45**	**0.01%**	14	**2178.15**	**0.00%**	35.49
abs1n15	2236.53	2271.68	1.57%	**2236.53**	**0.00%**	40	**2236.53**	**0.00%**	99.39
abs2n15	2506.21	**2506.21**	**0.00%**	**2506.21**	**0.00%**	41	**2506.21**	**0.00%**	85.49
abs3n15	2841.06	**2841.06**	**0.00%**	**2841.06**	**0.00%**	44	**2841.06**	**0.00%**	117.38
abs4n15	2430.07	2632.18	8.32%	**2430.07**	**0.00%**	43	**2430.07**	**0.00%**	100.72
abs5n15	2453.5	2524.95	2.91%	**2453.5**	**0.00%**	39	**2453.5**	**0.00%**	93.63
abs1n20	2793.29	**2793.29**	**0.00%**	**2793.29**	**0.00%**	75	2796.5	0.11%	223
abs2n20	2799.9	2873.51	2.63%	**2799.9**	**0.00%**	105	2809.51	0.34%	240.37
abs3n20	3101.6	3163.94	2.01%	3104.29	0.09%	101	**3101.6**	**0.00%**	259.48
abs4n20	3239.31	**3239.31**	**0.00%**	**3239.31**	**0.00%**	87	**3239.31**	**0.00%**	227.98
abs5n20	3330.99	3814.54	14.52%	**3330.99**	**0.00%**	153	**3330.99**	**0.00%**	247.98
abs1n25	3309.64	3624.49	9.51%	**3309.64**	**0.00%**	341	3311.23	0.05%	563.22
abs2n25	3495.97	3544.55	1.39%	**3495.97**	**0.00%**	214	**3495.97**	**0.00%**	800.72
abs3n25	3481.45	3622.7	4.06%	**3481.45**	**0.00%**	278	3483.45	0.06%	581.56
abs4n25	3272.74	**3272.74**	**0.00%**	**3272.74**	**0.00%**	295	**3272.74**	**0.00%**	450.59
abs5n25	3695.94	**3695.94**	**0.00%**	**3695.94**	**0.00%**	166	**3695.94**	**0.00%**	465.32
abs1n30	3918.76	4022.3	2.64%	**3918.76**	**0.00%**	326	**3918.76**	**0.00%**	884.87
abs2n30	3737.11	3874.22	3.67%	**3737.11**	**0.00%**	497	3743.68	0.18%	1242.37
abs3n30	3761.85	3931.85	4.52%	**3761.85**	**0.00%**	607	**3761.85**	**0.00%**	1159.04
abs4n30	3532.47	3676.9	4.09%	**3532.47**	**0.00%**	452	3534.45	0.06%	807.94
abs5n30	3265.89	3365.76	3.06%	**3269.76**	**0.12%**	693	**3269.76**	**0.12%**	1268.15
abs1n35	3694.48	3737.48	1.16%	**3694.48**	**0.00%**	908	**3694.48**	**0.00%**	1273.92
abs2n35	3796.8	3960.39	4.31%	**3796.8**	**0.00%**	704	3803.58	0.18%	1414.64
abs3n35	4351.09	4665.4	7.22%	4359.08	0.18%	532	**4355.72**	**0.11%**	1736.72
abs4n35	3766.39	3939.11	4.59%	**3766.39**	**0.00%**	1225	3774.84	0.22%	1297.2
abs5n35	3625.57	3807.86	5.03%	**3625.57**	**0.00%**	675	**3625.57**	**0.00%**	1473.93
abs1n40	4263.43	4732.75	11.01%	4274.71	0.26%	903	**4271.11**	**0.18%**	2277.27
abs2n40	4166.95	4415.23	5.96%	**4166.95**	**0.00%**	1539	4186.96	0.48%	2963.37
abs3n40	4337.3	4591.92	5.87%	4340.06	0.06%	1310	4352.5	0.35%	3005.97
abs4n40	3846.84	4000.81	4.00%	**3846.84**	**0.00%**	1441	3856.47	0.25%	2856.11
abs5n40	4013.98	4234.01	5.48%	**4013.98**	**0.00%**	650	4033.79	0.49%	2675.91
abs1n45	4369.38	4568.68	4.56%	**4369.38**	**0.00%**	1493	4372.54	0.07%	3600
abs2n45	4226.82	4655.8	10.15%	**4226.82**	**0.00%**	1224	4239.69	0.30%	3600
abs3n45	4317.08	4572.82	5.92%	**4317.08**	**0.00%**	1904	4346.74	0.69%	3600
abs4n45	4527.95	4962.14	9.59%	4559.36	0.69%	1292	**4537.86**	**0.22%**	3600
abs5n45	3911.82	4215.11	7.75%	**3911.82**	**0.00%**	1387	3919.82	0.20%	2664.01
abs1n50	4629.92	4884.83	5.51%	**4670.41**	**0.87%**	1782	4687.08	1.23%	2540.79
abs2n50	4919.75	5123.98	4.15%	**4919.75**	**0.00%**	2004	4934.71	0.30%	2467.76
abs3n50	4868.36	5269.43	8.24%	**4868.36**	**0.00%**	2648	4888.43	0.41%	2096.98
abs4n50	4972.25	5273.98	6.07%	**5014.17**	**0.84%**	1843	**5013.94**	**0.84%**	2671.83
abs5n50	4664.05	4901.19	5.08%	4687.16	0.50%	3126	**4682.18**	**0.39%**	3600
averages			4.10%		0.07%			0.16%	

BPS: Solution from Bertazzi, Palleta, Speranza (2002)
HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al. 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 10. Results for the IRP-OU - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 3$

Instance	z*	z(BPS)	gap (%)	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	2149.8	**2149.8**	**0.00%**	**2149.8**	**0.00%**	4	**2149.8**	**0.00%**	8.56
abs2n5	1959.05	**1959.05**	**0.00%**	**1959.05**	**0.00%**	4	**1959.05**	**0.00%**	8.96
abs3n5	3265.44	3408.48	4.38%	**3265.44**	**0.00%**	7	**3265.44**	**0.00%**	10.33
abs4n5	2034.44	**2034.44**	**0.00%**	**2034.44**	**0.00%**	2	**2034.44**	**0.00%**	9.13
abs5n5	2362.16	2413.72	2.18%	**2362.16**	**0.00%**	6	**2362.16**	**0.00%**	10.31
abs1n10	4970.62	5015.82	0.91%	**4970.62**	**0.00%**	15	**4970.62**	**0.00%**	31.34
abs2n10	4803.17	5142.58	7.07%	**4803.17**	**0.00%**	13	**4803.17**	**0.00%**	35.27
abs3n10	4289.84	**4289.84**	**0.00%**	**4289.84**	**0.00%**	13	**4289.84**	**0.00%**	35.16
abs4n10	4347.06	**4347.06**	**0.00%**	**4347.06**	**0.00%**	11	**4347.06**	**0.00%**	35.68
abs5n10	5041.62	5078.05	0.72%	**5044.44**	**0.06%**	14	**5044.44**	**0.06%**	35.66
abs1n15	5713.84	**5713.84**	**0.00%**	**5713.84**	**0.00%**	37	**5713.84**	**0.00%**	84.08
abs2n15	5821.04	5822.88	0.03%	5822.88	0.03%	41	**5821.04**	**0.00%**	99.24
abs3n15	6711.25	6894.43	2.73%	**6711.25**	**0.00%**	45	**6711.25**	**0.00%**	104.64
abs4n15	5227.56	5437.22	4.01%	**5227.56**	**0.00%**	49	5237.82	0.20%	98.78
abs5n15	5210.85	5424.97	4.11%	**5215.02**	**0.08%**	61	5219.39	0.16%	98.72
abs1n20	7353.82	7449.47	1.30%	**7353.82**	**0.00%**	108	**7353.82**	**0.00%**	168.71
abs2n20	7385.03	7450.67	0.89%	**7385.03**	**0.00%**	101	7409.21	0.33%	245.06
abs3n20	7903.97	7974.47	0.89%	7907.4	0.04%	96	**7903.97**	**0.00%**	199.62
abs4n20	7050.91	7601.67	7.81%	**7050.91**	**0.00%**	143	**7050.91**	**0.00%**	244.56
abs5n20	8405.83	8876.11	5.59%	**8405.83**	**0.00%**	73	8416.83	0.13%	263.29
abs1n25	8657.7	8985.82	3.79%	**8657.7**	**0.00%**	205	**8657.7**	**0.00%**	335.05
abs2n25	9266.87	9408.18	1.52%	**9266.87**	**0.00%**	164	**9266.87**	**0.00%**	502.56
abs3n25	9843.6	**9843.6**	**0.00%**	**9843.6**	**0.00%**	208	9845.6	0.02%	415.8
abs4n25	8677.86	**8677.86**	**0.00%**	**8677.86**	**0.00%**	342	8747.67	0.80%	442.01
abs5n25	10857.68	**10857.68**	**0.00%**	**10857.68**	**0.00%**	191	10862.4	0.04%	536.94
abs1n30	12635.55	12847.79	1.68%	**12635.55**	**0.00%**	345	12661.8	0.21%	1048.34
abs2n30	11351.36	11487.63	1.20%	**11351.36**	**0.00%**	273	11363.4	0.11%	953.91
abs3n30	12509.26	12679.26	1.36%	**12613.46**	**0.83%**	621	**12613.5**	**0.83%**	875.09
abs4n30	9928.35	10018.88	0.91%	**9928.35**	**0.00%**	573	9945.73	0.18%	637.57
abs5n30	10178.63	10270.81	0.91%	**10181.69**	**0.03%**	346	10188.9	0.10%	935.91
abs1n35	11984.69	12382.03	3.32%	**11984.69**	**0.00%**	600	**11984.7**	**0.00%**	1376.75
abs2n35	10706.91	10998.26	2.72%	**10706.91**	**0.00%**	1160	10773.1	0.62%	1403.08
abs3n35	14411.58	14732.69	2.23%	14478.78	0.47%	581	**14413.5**	**0.01%**	1567.35
abs4n35	10844.98	11001.99	1.45%	**10844.98**	**0.00%**	1202	10863.7	0.17%	2059.08
abs5n35	11195.87	11365.71	1.52%	**11195.87**	**0.00%**	624	11209.5	0.12%	1596.57
abs1n40	14006.57	14455.9	3.21%	**14006.57**	**0.00%**	931	14006.57	0.00%	2057.93
abs2n40	11722.58	11941.41	1.87%	**11722.58**	**0.00%**	996	11775.6	0.45%	3204.6
abs3n40	14107.14	14655.81	3.89%	**14107.14**	**0.00%**	2035	14109.2	0.01%	2654.68
abs4n40	11684.43	11763.03	0.67%	**11684.43**	**0.00%**	1276	11725.3	0.35%	2918.37
abs5n40	13536.57	13759.25	1.65%	**13536.57**	**0.00%**	1230	13603.1	0.49%	3003.25
abs1n45	14661.2	14867.01	1.40%	**14661.2**	**0.00%**	2099	14727.9	0.45%	3281.36
abs2n45	13675.96	14161.64	3.55%	**13675.96**	**0.00%**	1235	13700.8	0.18%	3600
abs3n45	15316.57	15564.91	1.62%	**15316.57**	**0.00%**	1416	15390	0.48%	2527.2
abs4n45	14096.84	14537.57	3.13%	14121.05	0.17%	1175	**14117.3**	**0.15%**	2474.87
abs5n45	13838.54	14215.84	2.73%	**13840.06**	**0.01%**	1747	14024.2	1.34%	3150.81
abs1n50	15235.83	15543.49	2.02%	**15235.83**	**0.00%**	3989	15310.9	0.49%	3600
abs2n50	15453.78	15630.97	1.15%	**15455.34**	**0.01%**	2412	15484.5	0.20%	3600
abs3n50	15747.73	16055.08	1.95%	15867.45	0.76%	2996	**15844.1**	**0.61%**	2683.44
abs4n50	17163.52	17450.53	1.67%	**17173.36**	**0.06%**	2169	17227.3	0.37%	2339.63
abs5n50	16143.06	16313.73	1.06%	**16143.06**	**0.00%**	2585	16522.5	2.35%	2699.38
averages			1.94%		0.05%			0.24%	

BPS: Solution from Bertazzi, Palleta, Speranza (2002)
HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 11. Results for the IRP-OU - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 6$

Instance	z*	z(BPS)	gap (%)	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	3335.24	3348.24	0.39	**3335.24**	**0.00**	16	**3335.24**	**0.00**	21.89
abs2n5	2722.33	**2722.33**	**0.00**	**2722.33**	**0.00**	23	**2722.33**	**0.00**	18.7
abs3n5	4776	4783.42	0.16	**4776**	**0.00**	17	**4776**	**0.00**	20.17
abs4n5	3246.66	3389.66	4.40	**3246.66**	**0.00**	21	**3246.66**	**0.00**	21.77
abs5n5	2419.67	2498.52	3.26	**2419.67**	**0.00**	12	**2419.67**	**0.00**	22.09
abs1n10	4499.24	4534.62	0.79	**4499.24**	**0.00**	78	**4499.24**	**0.00**	103.27
abs2n10	5236.97	**5236.98**	**0.00**	**5236.97**	**0.00**	105	**5236.98**	**0.00**	87.01
abs3n10	4652.52	**4652.53**	**0.00**	**4652.52**	**0.00**	67	**4652.53**	**0.00**	110.35
abs4n10	5104.9	5314.16	4.10	**5104.9**	**0.00**	73	**5104.9**	**0.00**	92.82
abs5n10	4670.75	4760.99	1.93	**4670.75**	**0.00**	61	**4670.75**	**0.00**	85.99
abs1n15	5462.67	5600.34	2.52	**5462.67**	**0.00**	415	**5462.67**	**0.00**	358.27
abs2n15	5494.73	5907.4	7.51	**5494.73**	**0.00**	360	**5494.73**	**0.00**	309.56
abs3n15	6060.37	6168.68	1.79	**6060.37**	**0.00**	276	6101.82	0.68	307.19
abs4n15	5504.64	6027.52	9.50	**5504.64**	**0.00**	380	5545.35	0.74	380.94
abs5n15	5309.47	5311.46	0.04	**5309.47**	**0.00**	256	**5309.47**	**0.00**	332.58
abs1n20	6490.17	6541.11	0.78	6501.26	0.17	559	**6490.17**	**0.00**	1130.63
abs2n20	6082.53	6348.07	4.37	**6093.54**	**0.18**	987	6181.05	1.62	656.74
abs3n20	6950.19	7186.46	3.40	**6953.78**	**0.05**	733	**6953.78**	**0.05**	632.68
abs4n20	7432.77	7729.58	3.99	**7432.77**	**0.00**	698	7453.78	0.28	640.29
abs5n20	7210.72	7369.9	2.21	**7210.72**	**0.00**	1212	**7210.72**	**0.00**	927.83
abs1n25	7095.85	7595.85	7.05	**7095.85**	**0.00**	1495	**7095.85**	**0.00**	1429.03
abs2n25	7484.83	8067.75	7.79	**7504.84**	**0.27**	1188	7570.46	1.14	1775.32
abs3n25	7728.75	7996.62	3.47	**7728.75**	**0.00**	3170	7733.76	0.06	2044.15
abs4n25	7509.01	8035.38	7.01	**7509.01**	**0.00**	1251	7527.16	0.24	1701.65
abs5n25	7452.27	7871.75	5.63	7518.61	0.89	1496	**7511.8**	**0.80**	1102.59
abs1n30	8319.58	8761.13	5.31	8349.59	0.36	2334	**8319.58**	**0.00**	2424.12
abs2n30	7761.52	8049.36	3.71	**7768.53**	**0.09**	3251	7778.27	0.22	2928.55
abs3n30	8214.54	8654.55	5.36	8365.82	1.84	3654	**8276.46**	**0.75**	3280.48
abs4n30	7574.79	8067.12	6.50	**7574.79**	**0.00**	5146	7665.8	1.20	2925.18
abs5n30	7366.46	7538.91	2.34	**7402.71**	**0.49**	2220	**7402.71**	**0.49**	3600
averages			3.51		0.14			0.28	

BPS: Solution from Bertazzi, Palleta, Speranza (2002)
HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al. 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 12. Results for the IRP-OU - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 6$

Instance	z*	z(BPS)	gap (%)	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	5942.82	**5942.82**	**0.00**	**5942.82**	**0.00**	17	**5942.82**	**0.00**	19.05
abs2n5	5045.91	5047.79	0.04	**5045.91**	**0.00**	20	**5045.91**	**0.00**	23.97
abs3n5	6956.28	6969.76	0.19	**6956.28**	**0.00**	16	**6956.28**	**0.00**	23.45
abs4n5	5163.42	5226.16	1.22	**5163.42**	**0.00**	29	5167.88	0.09	24.65
abs5n5	4581.66	4593.05	0.25	**4581.66**	**0.00**	17	**4581.66**	**0.00**	23
abs1n10	8870.15	8945.11	0.85	**8870.15**	**0.00**	78	**8870.15**	**0.00**	96.67
abs2n10	8569.73	8999.23	5.01	**8569.73**	**0.00**	66	**8569.73**	**0.00**	95.41
abs3n10	8509.81	**8509.81**	**0.00**	**8509.81**	**0.00**	129	**8509.81**	**0.00**	117.49
abs4n10	8792.29	8994.79	2.30	**8792.29**	**0.00**	112	**8792.29**	**0.00**	115.35
abs5n10	9620.07	9735.4	1.20	**9620.07**	**0.00**	67	**9620.07**	**0.00**	109.29
abs1n15	12118.83	**12118.83**	**0.00**	**12118.83**	**0.00**	266	**12118.83**	**0.00**	331.14
abs2n15	11932.1	12158.12	1.89	**11932.1**	**0.00**	305	12012.6	0.67	380.23
abs3n15	13554.15	**13554.15**	**0.00**	**13554.15**	**0.00**	369	13557	0.02	386.16
abs4n15	10618.55	10711.77	0.88	**10618.55**	**0.00**	285	**10618.55**	**0.00**	375.51
abs5n15	10385.54	10721.92	3.24	**10385.54**	**0.00**	220	**10385.54**	**0.00**	380.32
abs1n20	14702.95	15250.81	3.73	14722.95	0.14	507	**14702.95**	**0.00**	1044.56
abs2n20	14646.96	14785.04	0.94	**14670.34**	**0.16**	746	14719.8	0.50	703.16
abs3n20	14532.91	14764.08	1.59	14577.14	0.30	863	**14558.3**	**0.17**	961.49
abs4n20	14539.72	14590.96	0.35	**14539.72**	**0.00**	1084	**14539.72**	**0.00**	1189.16
abs5n20	15896.71	16506.45	3.84	15904	0.05	533	**15896.71**	**0.00**	1207.29
abs1n25	15581.47	15726.5	0.93	**15610.98**	**0.19**	1941	15668.4	0.56	2136.64
abs2n25	16823.16	17017.02	1.15	**16843.16**	**0.12**	1544	16891.4	0.41	1804.32
abs3n25	18098.02	18506.33	2.26	**18121.26**	**0.13**	2198	18168.5	0.39	2598.57
abs4n25	16303.69	17026.13	4.43	**16303.69**	**0.00**	1368	**16303.69**	**0.00**	2253.95
abs5n25	19047.7	19394.1	1.82	**19080.27**	**0.17**	1856	19085.4	0.20	2313.86
abs1n30	23183.99	23754.83	2.46	**23183.99**	**0.00**	2365	23206.5	0.10	3600
abs2n30	20090.29	20712.82	3.10	**20159.96**	**0.35**	2178	20232.7	0.71	2588.49
abs3n30	23382.73	23918.93	2.29	**23439.91**	**0.24**	3978	23478.7	0.41	3600
abs4n30	17649.53	18247.06	3.39	**17746.79**	**0.55**	5063	17772.6	0.70	3600
abs5n30	18979.93	19270.91	1.53	**18997.61**	**0.09**	2239	19071.1	0.48	3600
averages			1.70		0.08			0.18	

BPS: Solution from Bertazzi, Palleta, Speranza (2002)
HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 13. Results for the IRP-ML - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 3$

Instance	z*	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	1235.92	**1235.92**	**0.00**	2	**1235.92**	**0.00**	7.97
abs2n5	988.66	**988.66**	**0.00**	2	**988.66**	**0.00**	5.4
abs3n5	1758.02	**1758.02**	**0.00**	3	**1758.02**	**0.00**	5.77
abs4n5	1397.29	**1397.29**	**0.00**	4	**1397.29**	**0.00**	5.93
abs5n5	999.42	**999.42**	**0.00**	2	**999.42**	**0.00**	5.34
abs1n10	1743.07	**1743.07**	**0.00**	10	**1743.07**	**0.00**	28.44
abs2n10	2229.25	**2229.25**	**0.00**	10	**2229.25**	**0.00**	16.96
abs3n10	1871.14	**1871.14**	**0.00**	9	**1871.14**	**0.00**	15.43
abs4n10	1773	**1773**	**0.00**	8	**1773**	**0.00**	17.13
abs5n10	1938.18	**1938.18**	**0.00**	10	**1938.18**	**0.00**	14.98
abs1n15	2131.04	**2131.04**	**0.00**	30	**2131.04**	**0.00**	65.07
abs2n15	2131.58	**2131.58**	**0.00**	24	**2131.58**	**0.00**	45.52
abs3n15	2463.68	**2463.68**	**0.00**	25	**2463.68**	**0.00**	36.75
abs4n15	2151.94	**2151.94**	**0.00**	34	2155.94	0.19	37.66
abs5n15	2160.59	**2160.59**	**0.00**	21	**2160.59**	**0.00**	38.44
abs1n20	2267.32	**2267.32**	**0.00**	43	**2267.32**	**0.00**	92.04
abs2n20	2497.9	**2497.9**	**0.00**	72	2506.9	0.36	97.56
abs3n20	2590.48	**2590.48**	**0.00**	60	**2590.48**	**0.00**	88.99
abs4n20	3122.31	**3122.99**	**0.02**	90	3163.31	1.31	110.64
abs5n20	2849.9	**2849.9**	**0.00**	58	**2849.9**	**0.00**	101.03
abs1n25	2840.92	**2840.92**	**0.00**	107	**2840.92**	**0.00**	174.65
abs2n25	3014.56	**3014.56**	**0.00**	92	3024.56	0.33	176.37
abs3n25	3050.4	**3050.4**	**0.00**	100	**3050.4**	**0.00**	129.88
abs4n25	3078.67	**3078.67**	**0.00**	161	3107.01	0.92	184.02
abs5n25	2954.96	**2954.96**	**0.00**	104	2960.96	0.20	191.96
abs1n30	3427.78	**3427.78**	**0.00**	221	3454.78	0.79	440.05
abs2n30	3328.94	**3328.94**	**0.00**	190	3391.94	1.89	347.55
abs3n30	3471.86	**3471.86**	**0.00**	249	3502.86	0.89	288.86
abs4n30	3321.48	**3321.48**	**0.00**	436	3389.67	2.05	330.64
abs5n30	2914.6	**2914.6**	**0.00**	201	**2914.6**	**0.00**	250.14
abs1n35	3346.12	**3346.12**	**0.00**	446	3406.12	1.79	526.33
abs2n35	3541.71	**3541.71**	**0.00**	601	3559.71	0.51	733.01
abs3n35	3811.78	**3811.78**	**0.00**	340	3906.78	2.49	341.14
abs4n35	3229.34	**3229.34**	**0.00**	402	3233.34	0.12	487.55
abs5n35	3315.26	**3315.26**	**0.00**	284	3369.26	1.63	389.27
abs1n40	3702.14	**3702.14**	**0.00**	589	**3702.14**	**0.00**	671.49
abs2n40	3832.09	**3832.09**	**0.00**	546	3900.56	1.79	1075.83
abs3n40	3874.62	**3874.62**	**0.00**	471	**3874.62**	**0.00**	582.95
abs4n40	3534.8	**3534.8**	**0.00**	550	3579.8	1.27	565.63
abs5n40	3575.46	**3575.46**	**0.00**	450	3623.12	1.33	1074.06
abs1n45	3950.86	**3950.86**	**0.00**	939	**3950.86**	**0.00**	1216.39
abs2n45	3702.72	**3702.72**	**0.00**	700	**3702.72**	**0.00**	871.16
abs3n45	3968.04	**3968.04**	**0.00**	668	3995.04	0.68	1866.71
abs4n45	3998.26	**3998.26**	**0.00**	837	4039.39	1.03	1440.87
abs5n45	3717.54	**3717.54**	**0.00**	744	3753.31	0.96	1633.47
abs1n50	4047.18	**4047.18**	**0.00**	1009	4110.18	1.56	1120.51
abs2n50	4512.96	**4512.96**	**0.00**	1229	4556.98	0.98	1940.11
abs3n50	4451.44	**4451.44**	**0.00**	1112	**4451.44**	**0.00**	2317.85
abs4n50	4405.84	**4405.84**	**0.00**	1105	**4405.84**	**0.00**	1537.38
abs5n50	4218.37	**4218.37**	**0.00**	982	4307.7	2.12	1861.19
averages			0.00			0.54	

HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al. 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 14. Results for the IRP-ML - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 3$

Instance	z*	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	2108.34	**2108.34**	**0.00**	1	**2108.34**	**0.00**	5.68
abs2n5	1767.06	**1767.06**	**0.00**	1	**1767.06**	**0.00**	5.93
abs3n5	2973	**2973**	**0.00**	3	**2973**	**0.00**	6.23
abs4n5	1981.04	**1981.04**	**0.00**	4	**1981.04**	**0.00**	5.35
abs5n5	2170.04	**2170.04**	**0.00**	1	**2170.04**	**0.00**	5.89
abs1n10	4510.61	**4510.61**	**0.00**	10	**4510.61**	**0.00**	15.76
abs2n10	4504.61	**4504.61**	**0.00**	11	4511.51	0.15	17.55
abs3n10	4031.4	**4031.4**	**0.00**	9	**4031.4**	**0.00**	14.83
abs4n10	3933.46	**3933.46**	**0.00**	9	**3933.46**	**0.00**	18.86
abs5n10	4709.79	**4709.79**	**0.00**	10	**4709.79**	**0.00**	18.63
abs1n15	5589.7	**5589.7**	**0.00**	31	**5589.7**	**0.00**	50.2
abs2n15	5443.34	**5443.34**	**0.00**	38	5454.34	0.20	40.76
abs3n15	6300.86	**6300.86**	**0.00**	27	**6300.86**	**0.00**	54.46
abs4n15	4977.58	**4977.58**	**0.00**	44	4981.58	0.08	39.81
abs5n15	4867.53	**4867.53**	**0.00**	21	**4867.53**	**0.00**	46.48
abs1n20	6859.02	**6859.02**	**0.00**	44	**6859.02**	**0.00**	99.61
abs2n20	7087.74	**7087.74**	**0.00**	76	**7087.74**	**0.00**	90.98
abs3n20	7354.68	**7354.68**	**0.00**	68	**7354.68**	**0.00**	98.79
abs4n20	6952.79	**6957.78**	**0.07**	88	7027.51	1.07	100.58
abs5n20	7874.26	**7874.26**	**0.00**	57	7937.26	0.80	75.42
abs1n25	8227.86	**8227.86**	**0.00**	115	**8227.86**	**0.00**	210.02
abs2n25	8765.72	**8765.72**	**0.00**	102	8809.72	0.50	126.47
abs3n25	9382.42	**9382.42**	**0.00**	108	**9382.42**	**0.00**	148.92
abs4n25	8452.93	**8452.93**	**0.00**	165	8528.16	0.89	129.68
abs5n25	10081.42	**10081.42**	**0.00**	116	10087.4	0.06	206.71
abs1n30	12066.86	**12066.86**	**0.00**	234	**12066.9**	**0.00**	278.38
abs2n30	10941.32	**10941.32**	**0.00**	271	10992.5	0.47	295.38
abs3n30	12122.36	**12122.36**	**0.00**	245	12131.4	0.07	276.03
abs4n30	9687.1	**9687.1**	**0.00**	312	9736.04	0.51	349.48
abs5n30	9773.9	**9773.9**	**0.00**	209	9780.9	0.07	379.53
abs1n35	11659.88	**11659.88**	**0.00**	483	**11659.9**	**0.00**	519.62
abs2n35	10466.8	**10466.8**	**0.00**	448	10515.1	0.46	637.33
abs3n35	13776.46	**13776.46**	**0.00**	322	13908.5	0.96	621.28
abs4n35	10307.4	**10307.4**	**0.00**	447	10311.4	0.04	498.91
abs5n35	10847.82	**10847.82**	**0.00**	297	10965.8	1.09	600.54
abs1n40	13364.92	**13364.92**	**0.00**	624	13365.7	0.01	527.47
abs2n40	11317.85	**11317.85**	**0.00**	612	11533.2	1.90	859.44
abs3n40	13598.94	**13598.94**	**0.00**	544	13768.9	1.25	780.53
abs4n40	11353.39	**11353.39**	**0.00**	693	11425.6	0.64	645.41
abs5n40	13070.18	**13070.18**	**0.00**	523	**13070.18**	**0.00**	1195.34
abs1n45	14179.1	**14179.1**	**0.00**	958	14248.1	0.49	1491.94
abs2n45	13142.22	**13142.22**	**0.00**	746	**13142.2**	**0.00**	829.58
abs3n45	14843.6	**14843.6**	**0.00**	717	14970.6	0.86	1036.92
abs4n45	13574.5	**13574.5**	**0.00**	876	**13574.5**	**0.00**	1429.25
abs5n45	13587.26	**13587.26**	**0.00**	732	13705.1	0.87	1197.43
abs1n50	14577.3	**14577.3**	**0.00**	1092	14767.3	1.30	1588.94
abs2n50	15001.64	**15001.64**	**0.00**	1036	**15001.64**	**0.00**	2321.79
abs3n50	15279.49	**15279.49**	**0.00**	1342	15407.6	0.84	2288.75
abs4n50	16517	**16517**	**0.00**	1217	16587	0.42	1959.08
abs5n50	15678.67	**15678.67**	**0.00**	1041	15798.9	0.77	2390.51
averages			0.00			0.34	

HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al. 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 15. Results for the IRP-ML - low inventory cost ($h_i \in [0.01, 0.05]$), $H = 6$

Instance	z*	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	3187.3	**3187.3**	**0.00**	17	**3187.3**	**0.00**	12.01
abs2n5	2565.92	2566.47	0.02	19	**2565.92**	**0.00**	11.35
abs3n5	4489.83	**4489.83**	**0.00**	19	**4489.83**	**0.00**	13.99
abs4n5	3174.35	**3174.35**	**0.00**	14	**3174.35**	**0.00**	13.65
abs5n5	2267.1	**2267.1**	**0.00**	11	**2267.1**	**0.00**	13.51
abs1n10	4141.51	**4141.51**	**0.00**	69	4214.78	1.77	54.27
abs2n10	5044.63	**5046.13**	**0.03**	69	**5046.13**	**0.03**	52.6
abs3n10	4506.83	**4508.8**	**0.04**	71	**4508.8**	**0.04**	61.53
abs4n10	4823.53	**4823.53**	**0.00**	49	**4823.53**	**0.00**	55.04
abs5n10	4545.98	**4545.98**	**0.00**	65	**4545.98**	**0.00**	47.87
abs1n15	5389.08	**5391.17**	**0.04**	166	**5391.17**	**0.04**	121.33
abs2n15	5418.47	**5423.47**	**0.09**	245	5486.72	1.26	186.61
abs3n15	5897.68	**5897.68**	**0.00**	161	5901.36	0.06	160.55
abs4n15	5335.01	**5335.01**	**0.00**	203	5339.35	0.08	217.96
abs5n15	5052.51	**5074.68**	**0.44**	127	**5074.68**	**0.44**	117.62
abs1n20	6114.04	**6114.04**	**0.00**	475	6179.44	1.07	349.32
abs2n20	5957.31	**5958.29**	**0.02**	561	5961.37	0.07	446.55
abs3n20	6784.06	**6786.04**	**0.03**	429	6862.05	1.15	357.04
abs4n20	7309.54	**7394.84**	**1.17**	508	7448.89	1.91	351.66
abs5n20	6961.82	**6967.4**	**0.08**	309	6989.8	0.40	401.17
abs1n25	7052.06	**7064**	**0.17**	1678	7070.75	0.27	672.79
abs2n25	7231.75	**7254.38**	**0.31**	725	7264.84	0.46	808.32
abs3n25	7514.57	**7514.57**	**0.00**	1162	**7514.57**	**0.00**	773.75
abs4n25	7462.08	**7462.08**	**0.00**	744	**7462.08**	**0.00**	198.17
abs5n25	7048.4	**7059.9**	**0.16**	845	**7059.9**	**0.16**	546.33
abs1n30	8052.73	**8092.11**	**0.49**	1930	8102.64	0.62	1438.03
abs2n30	7629.99	**7631.21**	**0.02**	2602	7639.48	0.12	1710.08
abs3n30	8136.21	8137.33	0.01	2422	**8136.21**	**0.00**	1931.62
abs4n30	7502.49	**7502.49**	**0.00**	3712	7509.41	0.09	386.55
abs5n30	7228.63	**7265.35**	**0.51**	2003	7278.49	0.69	1609.11
averages			0.12			0.36	

HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al. 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM

TABLE 16. Results for the IRP-ML - high inventory cost ($h_i \in [0.1, 0.5]$), $H = 6$

Instance	z*	z(HAIR)	gap (%)	$time_1$ (s)	z(ALNS)	gap (%)	$time_2$ (s)
abs1n5	5789.35	**5789.35**	**0.00**	16	**5789.35**	**0.00**	13.19
abs2n5	4883.77	**4883.77**	**0.00**	14	**4883.77**	**0.00**	12.51
abs3n5	6643.29	**6643.29**	**0.00**	24	**6643.29**	**0.00**	11.81
abs4n5	5076.88	**5076.88**	**0.00**	22	**5076.88**	**0.00**	12.29
abs5n5	4377.71	**4377.71**	**0.00**	13	**4377.71**	**0.00**	11.18
abs1n10	8480.17	**8480.17**	**0.00**	86	**8480.17**	**0.00**	69.24
abs2n10	8347.44	8356.35	0.11	79	**8347.44**	**0.00**	49.63
abs3n10	8321.68	8360.05	0.46	107	**8321.68**	**0.00**	54.53
abs4n10	8474.26	**8474.26**	**0.00**	77	8493.26	0.22	57.84
abs5n10	9386.03	**9386.03**	**0.00**	82	**9386.03**	**0.00**	50.1
abs1n15	12052.56	**12052.56**	**0.00**	179	12192.5	1.16	148.48
abs2n15	11823.55	11825.87	0.02	243	**11823.55**	**0.00**	155.75
abs3n15	13305.71	**13305.71**	**0.00**	270	**13305.71**	**0.00**	185.46
abs4n15	10479.29	**10494.11**	**0.14**	239	**10494.11**	**0.14**	173.15
abs5n15	10054.09	**10070.56**	**0.16**	201	10147.4	0.93	110.85
abs1n20	14266.53	**14301**	**0.24**	450	14346.4	0.56	339.59
abs2n20	14477.84	**14551.58**	**0.51**	392	14686.7	1.44	291.46
abs3n20	14319.35	**14328.68**	**0.07**	426	14382.5	0.44	303.5
abs4n20	14390.27	**14417**	**0.19**	398	14586.4	1.36	417.46
abs5n20	15556.7	**15563.44**	**0.04**	341	15919.8	2.33	388.54
abs1n25	15487.66	**15555.79**	**0.44**	805	15802	2.03	747.94
abs2n25	16502.46	**16516.45**	**0.08**	795	**16516.45**	**0.08**	609.68
abs3n25	17833.35	**17833.35**	**0.00**	894	**17833.35**	**0.00**	746.24
abs4n25	16193.96	**16316.37**	**0.76**	1070	16426.8	1.44	922.49
abs5n25	18552.42	**18570.92**	**0.10**	1570	18686.49	0.72	489.17
abs1n30	22837.94	**22874.4**	**0.16**	1922	22981.2	0.63	1609.67
abs2n30	19876.76	**19997.28**	**0.61**	1850	20032.7	0.78	1342.76
abs3n30	23096.93	**23198.29**	**0.44**	2192	23741	2.79	1720.75
abs4n30	17509.82	**17550.33**	**0.23**	1952	17705.3	1.12	1696.01
abs5n30	18731.81	**18770.28**	**0.21**	1694	18856.7	0.67	1620.1
averages			0.17			0.63	

HAIR: Solution from the Hybrid Approach to Inventory Routing (Archetti et al. 2011)
$time_1$: run on an Intel Dual Core 1.86GHz and 3.2 GB RAM
$time_2$: run on an Intel Core2Duo 2.4GHz and 4 GB RAM