

Table 2: Experimental results

Instance	CPLEX				Matheuristics best obj.			Matheuristics t_{best}		
	Best obj.	FFS	LB	t_{best}	VNB	VNDS	VINS	VNB	VNDS	VINS
<i>P50_1</i>	31530	73282	30398.95	3299.7	31530	31543	31530	1872.8	305.4	2524.7
<i>P50_2</i>	30628	76055	29368.9	3329.2	30641	30628	30641	2052.0	1504.4	394.3
<i>P50_3</i>	32564	73427	30721.4	3304.8	32577	32577	32577	1932.7	2809.9	360.6
<i>P50_4</i>	27611	74487	26393.3	3303.4	28316	27624	27624	670.0	1847.1	1801.9
<i>P50_5</i>	28513	73611	28460.2	3260.4	28513	28513	28513	1328.4	1894.9	360.3
<i>Average np=50</i>	30169.2	74172.4	29068.55	3299.5	30315.4	30177	30177	1571.2	1672.3	1088.4
<i>P70_1</i>	47133	111141	45349.2	3253.6	47957	48714	47146	2712.6	661.4	361.4
<i>P70_2</i>	44624	106880	42550.004	3431.7	44624	44650	44637	2633.0	309.4	1852.7
<i>P70_3</i>	43551	106320	41353.8	3396.5	43564	43577	42701	2990.2	629.9	2528.0
<i>P70_4</i>	42833	100491	40751.9	3446.9	43577	43577	42859	1297.5	310.9	361.0
<i>P70_5</i>	44611	98739	41871.1	3321.1	44637	43069	43069	2973.1	969.3	3512.1
<i>Average np=70</i>	44550.4	104714.2	42375.2008	3370.0	44871.8	44717.4	44082.4	2521.3	576.2	1723.0
<i>P100_1</i>	65898	150081	62834.2	3585.1	65898	65924	65898	2867.9	322.4	2171.8
<i>P100_2</i>	61440	148658	58350.9	3548.9	60590	61492	60603	2352.6	319.3	1441.5
<i>P100_3</i>	58786	140452	55537.2	3317.9	58812	57936	58799	2426.4	328.8	2573.9
<i>P100_4</i>	64628	146854	61209.9	3474.9	65359	64654	63778	2459.1	3600.0	2161.8
<i>P100_5</i>	62718	153559	60751.4	3269.7	64299	65175	63594	3352.4	669.9	2162.9
<i>Average np=100</i>	62694	147920.8	59736.72	3439.3	62991.6	63036.2	62534.4	2691.7	1048.1	2102.4
<i>P120_1</i>	68350	172560	65301.8	3560.2	68363	68376	68376	3455.2	3356.0	420.2
<i>P120_2</i>	79316	185483	74939.4	3494.8	78492	78505	78479	2694.3	378.9	3600.0
<i>P120_3</i>	75462	180973	72707.1	3394.9	77043	76206	75462	3520.4	367.6	2173.4
<i>P120_4</i>	72243	200513	69002.2	3442.1	73093	72269	72269	2807.0	3416.0	2163.2
<i>P120_5</i>	73500	184607	70048.1	3318.1	73526	73539	73539	2531.7	946.0	2883.8
<i>Average np=120</i>	73774.2	184827.2	70399.72	3442.0	74103.4	73779	73625	3001.7	1692.9	2248.1
<i>P150_1</i>	88932	228085	84667.9	707.2	89650	88056	88056	3312.3	1333.3	2168.9
<i>P150_2</i>	93898	235871	91176.05	3352.3	97140	94800	94774	3511.9	1334.9	480.6
<i>P150_3</i>	89274	203499	84982.1	3384.7	91653	89142	87548	2789.1	1949.5	1802.5
<i>P150_4</i>	93180	218713	89060.1	3271.5	94774	93219	92317	3426.7	426.9	1548.0
<i>P150_5</i>	88056	214426	85053.5	3275.3	89663	87351	88932	3600.0	3425.5	2175.8
<i>Average np=150</i>	90668	220118.8	86987.93	2798.2	92576	90513.6	90325.4	3328.1	1694.0	1635.2
<i>P200_1</i>	122787	304923	118014.05	3387.4	130041	124381	122787	3600.0	545.9	3258.5
<i>P200_2</i>	122222	306859	116939.4	3265.4	134955	123124	121543	3600.0	3600.0	910.2
<i>P200_3</i>	127385	311325	121239.4	3325.7	145421	126496	126470	3600.0	1981.8	1449.4
<i>P200_4</i>	115522	290077	111622.5	3299.4	120332	117129	116398	3354.4	649.9	2162.1
<i>P200_5</i>	124521	330499	119045.8	3255.0	151724	126141	122914	3582.1	2179.5	2525.0
<i>Average np=200</i>	122487.4	308736.6	117372.23	3306.6	136494.6	123454.2	122022.4	3547.3	1791.4	2061.0
<i>P350_1</i>	214552	524598	206110.5	3579.8	388282	219544	212984	3600.0	3429.8	3600.0
<i>P350_2</i>	221322	518439	210898.4	3278.4	362021	225215	220591	3600.0	3487.6	3005.7
<i>P350_3</i>	212126	508290	201371.7	3382.1	357833	237083	211237	3600.0	3581.8	3600.0
<i>P350_4</i>	217245	535828	206178.2	2847.0	379739	227534	214946	3600.0	3600.0	2189.0
<i>P350_5</i>	216620	554355	207275.7	3384.9	399821	218134	213352	3600.0	2597.7	3349.4

<i>Average np=350</i>	216373	528302	206366.9	3294.4	377539.2	225502	214622	3600.0	3339.4	3148.8
<i>P500_1</i>	309912	754269	291891.1	1762.0	614332	535005	311301	3600.0	3357.8	3600.0
<i>P500_2</i>	311874	755640	294525.03	499.4	628797	710371	312895	3600.0	3360.2	1527.1
<i>P500_3</i>	300532	745996	284648.9	1173.3	582354	642009	300861	3600.0	3601.2	1308.2
<i>P500_4</i>	333840	791959	308367.5	1978.5	654295	595260	323374	3600.0	3373.4	3600.0
<i>P500_5</i>	316827	754020	290365.4	1385.2	611745	670931	305669	3600.0	3359.4	3600.0
<i>Average np=500</i>	314597	760376.8	293959.586	1359.7	618304.6	630715.2	310820	3600.02	3410.4	2727.1
<i>P750_1</i>	465696	1148566	439092.3	2679.8	1002147	1023435	468863	3572.5	3362.8	2184.2
<i>P750_2</i>	477344	1167186	442327.9	2776.0	1052429	1053983	473588	3597.0	3556.3	1664.7
<i>P750_3</i>	472777	1156088	443803.6	2993.1	1034356	1010829	469200	3586.5	3513.7	3600.1
<i>P750_4</i>	471183	1144212	442099.5	3478.2	992215	1034989	469239	3577.7	3564.6	3600.2
<i>P750_5</i>	477559	1124789	448636.8	2547.8	993361	725126	478072	3574.7	3292.0	3402.6
<i>Average np=750</i>	472911.8	1148168.2	443192.02	2895.0	1014901.6	969672.4	471792.4	3581.7	3457.9	2890.4
<i>P1000_1</i>	1516077	1516077	591583.6	1649.4	1458263	1354355	649244	3642.9	3525.9	3280.8
<i>P1000_2</i>	1495791	1495791	581894.4	544.5	1440395	1404983	623548	3612.4	3443.1	2286.8
<i>P1000_3</i>	1519815	1519815	597452.8	510.7	1446538	1383930	642886	3730.5	3542.0	2620.8
<i>P1000_4</i>	1523477	1523477	594256.6	550.4	1415034	1286397	645825	3594.4	3352.1	2908.9
<i>P1000_5</i>	1512804	1512804	597665.2	985.1	1411732	1403501	642497	3747.9	3593.3	2527.0
<i>Average np=1000</i>	1513592.8	1513592.8	592570.52	848.0	1434392.4	1366633.2	640800	3665.6	3491.3	2724.8