Table 1: A performance comparison between the ϵ-constraint and BOBLB&B&C algorithms.

			ϵ-constraint	B&B		EPB B&C (ISC) ($\|\Lambda\|$)		Cut&Branch	
Instance	**n**	**m**	**Time(s)**	**Time(s)**	**#Nodes**	**Time(s)**	**#Nodes**	**Time(s)**	**#Nodes**
MDMKP_n10_m2_q1_0.25	10	2	2.84	1.61	107	0.95	1	0.47	1
MDMKP_n10_m2_q1_0.5	10	2	3.88	1.79	393	2.87	50	2.36	277
MDMKP_n10_m2_q1_0.75	10	2	3.01	1.67	259	2.46	16	2.22	107
MDMKP_n10_m2_q2_0.25	10	2	2.87	1.66	181	2.37	19	2.22	97
MDMKP_n10_m2_q2_0.5	10	2	3.88	1.7	229	2.76	33	2.3	161
MDMKP_n10_m2_q2_0.75	10	2	2.83	1.64	65	1.84	19	2.19	59
MDMKP_n20_m2_q1_0.25	20	2	5.4	19.12	34877	3.45	159	4.84	2669
MDMKP_n20_m2_q1_0.5	20	2	8.05	94.6	139437	4.42	361	6.87	5207
MDMKP_n20_m2_q1_0.75	20	2	5.69	3.99	1903	3.76	155	4.28	1527
MDMKP_n20_m2_q2_0.25	20	2	6.77	6.27	10379	4.14	220	4.81	1859
MDMKP_n20_m2_q2_0.5	20	2	5.4	20.7	26139	7.38	781	10.29	8019
MDMKP_n20_m2_q2_0.75	20	2	4.03	3.13	1751	3.53	146	3.34	811
MDMKP_n20_m4_q1_0.25	20	4	4.82	9.28	13611	5.13	167	4.87	2701
MDMKP_n20_m4_q1_0.5	20	4	5.62	19.3	23193	7.96	584	7.11	4317
MDMKP_n20_m4_q1_0.75	20	4	5.46	8.25	10037	4.63	268	5.35	3563
MDMKP_n20_m4_q2_0.25	20	4	4.44	5.56	7043	3.78	149	3.89	1195
MDMKP_n20_m4_q2_0.5	20	4	5.77	30.73	29217	11.72	885	13.38	8253
MDMKP_n20_m4_q2_0.75	20	4	4.22	7.85	5611	4.34	111	4.51	1377
MDMKP_n20_m4_q4_0.25	20	4	5.89	5.15	5011	5.51	321	4.62	3119
MDMKP_n20_m4_q4_0.5	20	4	6.57	19.54	18213	17.2	1339	16.63	14891
MDMKP_n20_m4_q4_0.75	20	4	4.98	3.36	2063	4.42	117	4.02	1411
MDMKP_n30_m2_q1_0.25	30	2	9.31	3549.99	2553847	26.09	4667	75.23	35753
MDMKP_n30_m2_q1_0.5	30	2	13.1	1953.31	793651	29.72	4968	267.25	124975
MDMKP_n30_m2_q1_0.75	30	2	7.26	175.81	108371	10.31	1457	52.82	27023
MDMKP_n30_m2_q2_0.25	30	2	12.92	536.24	333799	20.62	3257	139.97	80499
MDMKP_n30_m2_q2_0.5	30	2	10.12	1783.2	1062045	32.18	3656	206.32	132767
MDMKP_n30_m2_q2_0.75	30	2	6.94	17.12	8905	6.88	630	9.65	3991
MDMKP_n30_m4_q1_0.25	30	4	7.11	689.02	468263	193.61	20998	156.9	78503
MDMKP_n30_m4_q1_0.5	30	4	9.05	TL	1000901	224.61	26285	807.25	312375
MDMKP_n30_m4_q1_0.75	30	4	5.84	330.69	141019	39.33	4206	51.8	19385
MDMKP_n30_m4_q2_0.25	30	4	9.15	766.61	746357	49.29	4742	87.3	43163
MDMKP_n30_m4_q2_0.5	30	4	5.54	3375.34	1960679	27.85	2522	63.33	30781
MDMKP_n30_m4_q2_0.75	30	4	7.7	284.83	122047	27.99	3351	76.12	29767
MDMKP_n30_m4_q4_0.25	30	4	7.14	416.02	330739	36.69	3506	54.03	26635
MDMKP_n30_m4_q4_0.5	30	4	11.14	2342.68	830987	322.95	31212	1210.58	402423
MDMKP_n30_m4_q4_0.75	30	4	6.13	166.88	155613	36.89	3061	66.36	50885
MDMKP_n30_m6_q1_0.25	30	6	6.3	639.99	630457	55.78	5580	60.82	34173
MDMKP_n30_m6_q1_0.5	30	6	12.78	TL	982945	1295.86	171149	2444.64	845293
MDMKP_n30_m6_q1_0.75	30	6	7.33	414.99	210013	128.5	14832	213.44	104069
MDMKP_n30_m6_q3_0.25	30	6	12.1	239.2	207343	857.11	98061	177.18	123775
MDMKP_n30_m6_q3_0.5	30	6	14.47	TL	1259961	775.2	84772	766.6	282721
MDMKP_n30_m6_q3_0.75	30	6	4.73	168.85	99497	22.8	1798	46.63	18855
MDMKP_n30_m6_q6_0.25	30	6	4.68	98.74	92555	17.95	922	25.41	14069
MDMKP_n30_m6_q6_0.5	30	6	6.95	772.88	771663	152.54	12261	128.91	82117
MDMKP_n30_m6_q6_0.75	30	6	4.49	81.99	46695	30.77	2059	29.18	18939
MDMKP_n40_m2_q1_0.25	40	2	14.21	TL	824379	189.06	24130	2010.25	528517
MDMKP_n40_m2_q1_0.5	40	2	13.89	TL	447465	277.73	34614	2491.88	826361
MDMKP_n40_m2_q1_0.75	40	2	6.65	619.68	225357	18.56	2585	139.29	53659
MDMKP_n40_m2_q2_0.25	40	2	12.23	TL	1102005	52.34	6653	892.83	425449
MDMKP_n40_m2_q2_0.5	40	2	16.28	TL	542459	270.67	32775	3121.58	1305391
MDMKP_n40_m2_q2_0.75	40	2	12.22	2385.94	631379	66.34	9201	260.35	113349
MDMKP_n40_m4_q1_0.25	40	4	7.21	TL	973269	123.89	12500	718.87	273853
MDMKP_n40_m4_q1_0.5	40	4	13.34	TL	352819	1100.93	128201	TL	648775
MDMKP_n40_m4_q1_0.75	40	4	14.17	TL	553077	382.48	44739	1670.45	356459
MDMKP_n40_m4_q2_0.25	40	4	13.69	TL	889325	811.88	85129	TL	684493
MDMKP_n40_m4_q2_0.5	40	4	18.51	TL	331119	2027.7	228404	TL	317645
MDMKP_n40_m4_q2_0.75	40	4	19.17	TL	791437	2024.87	237418	3397.21	940493
MDMKP_n40_m4_q4_0.25	40	4	13.86	TL	740819	824.85	75434	2826.89	771221
MDMKP_n40_m4_q4_0.5	40	4	30.4	TL	363581	TL	369249	TL	369333
MDMKP_n40_m4_q4_0.75	40	4	9.79	TL	801357	172.02	17562	1101.94	331739
MDMKP_n40_m6_q1_0.25	40	6	10.76	TL	925841	1162.29	131823	2377.05	771507
MDMKP_n40_m6_q1_0.5	40	6	15.95	TL	294625	TL	385164	TL	355783
MDMKP_n40_m6_q1_0.75	40	6	6.98	TL	742787	362.69	39374	828.74	268147
MDMKP_n40_m6_q3_0.25	40	6	29.7	TL	706235	TL	339800	TL	644075
MDMKP_n40_m6_q3_0.5	40	6	44.46	TL	273251	TL	390183	TL	264585
MDMKP_n40_m6_q3_0.75	40	6	9.44	TL	681439	560.5	55006	519.99	116475
MDMKP_n40_m6_q6_0.25	40	6	14.96	TL	1002671	1059.64	93326	3521.03	1282609
MDMKP_n40_m6_q6_0.5	40	6	34.22	TL	243335	TL	304486	TL	245411
MDMKP_n40_m6_q6_0.75	40	6	11.45	3026.65	642001	638.08	62329	1328.78	321287
MDMKP_n40_m8_q1_0.25	40	8	7.48	TL	1264237	490.63	43376	1088.6	318309
MDMKP_n40_m8_q1_0.5	40	8	8.11	TL	339329	1455.44	145310	1980.82	391221

MDMKP_n40_m8_q1_0.75	40	8	7.23	TL	599887	616.96	65588	891.9	207127
MDMKP_n40_m8_q4_0.25	40	8	18.61	TL	1177239	2674.74	244723	1581.75	534277
MDMKP_n40_m8_q4_0.5	40	8	22.39	TL	301637	TL	312311	TL	295315
MDMKP_n40_m8_q4_0.75	40	8	10.01	TL	734301	694.89	58426	938.92	232515
MDMKP_n40_m8_q8_0.25	40	8	34.77	2617.5	1272087	2335.17	176194	1514.59	600343
MDMKP_n40_m8_q8_0.5	40	8	60.86	TL	273349	TL	297080	TL	253041