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

Instance	n	m	ϵ-constraint Time(s)	B&B Time(s)	#Nodes	EPB B&C (ISC) ($|\Lambda|$) Time(s)	#Nodes	Cut&Branch Time(s)	#Nodes
KP_p-3_n-100_ins-1.dat	100	1	24.54	TL	117493	705.62	52074	TL	114271
KP_p-3_n-100_ins-10.dat	100	1	28.74	TL	125371	2292.23	159657	TL	137589
KP_p-3_n-100_ins-2.dat	100	1	21.19	TL	142583	671.96	48269	TL	149391
KP_p-3_n-100_ins-3.dat	100	1	24.71	TL	118553	883.31	59841	TL	113895
KP_p-3_n-100_ins-4.dat	100	1	47.22	TL	114125	3423.36	226243	TL	100097
KP_p-3_n-100_ins-5.dat	100	1	37.27	TL	108747	2527.95	174890	TL	100771
KP_p-3_n-100_ins-6.dat	100	1	29.53	TL	124825	1459.95	97854	TL	117529
KP_p-3_n-100_ins-7.dat	100	1	19.83	TL	173589	650.37	43955	TL	177197
KP_p-3_n-100_ins-8.dat	100	1	30.67	TL	122739	2077.82	144664	TL	134497
KP_p-3_n-100_ins-9.dat	100	1	28.43	TL	121213	935.28	67502	TL	144919
KP_p-3_n-10_ins-1.dat	10	1	3.27	1.51	169	0.06	21	2.43	57
KP_p-3_n-10_ins-10.dat	10	1	3.5	1.44	177	0.09	28	2.95	111
KP_p-3_n-10_ins-2.dat	10	1	3.88	1.6	751	0.19	51	2.77	423
KP_p-3_n-10_ins-3.dat	10	1	3.28	1.54	473	0.0	1	0.4	1
KP_p-3_n-10_ins-4.dat	10	1	3.27	1.49	129	0.05	15	2.64	73
KP_p-3_n-10_ins-5.dat	10	1	3.95	1.55	443	0.14	42	3.02	277
KP_p-3_n-10_ins-6.dat	10	1	3.64	1.47	265	0.06	19	2.56	123
KP_p-3_n-10_ins-7.dat	10	1	3.43	1.6	609	0.06	21	2.47	139
KP_p-3_n-10_ins-8.dat	10	1	3.56	1.53	251	0.12	33	2.61	131
KP_p-3_n-10_ins-9.dat	10	1	3.43	1.56	461	0.08	24	2.56	87
KP_p-3_n-20_ins-1.dat	20	1	4.09	11.9	21121	0.63	126	4.46	3077
KP_p-3_n-20_ins-10.dat	20	1	3.88	12.9	12595	0.62	122	4.26	1467
KP_p-3_n-20_ins-2.dat	20	1	4.21	8.52	5949	0.61	122	4.43	737
KP_p-3_n-20_ins-3.dat	20	1	4.32	3.63	2955	0.69	127	3.94	889
KP_p-3_n-20_ins-4.dat	20	1	3.98	5.71	9127	0.5	87	3.62	983
KP_p-3_n-20_ins-5.dat	20	1	5.0	15.61	10837	1.39	302	7.78	3043
KP_p-3_n-20_ins-6.dat	20	1	3.83	16.33	19097	0.67	102	3.57	1183
KP_p-3_n-20_ins-7.dat	20	1	4.53	5.51	3509	0.8	163	4.82	1405
KP_p-3_n-20_ins-8.dat	20	1	4.25	9.9	18793	0.59	92	4.24	1669
KP_p-3_n-20_ins-9.dat	20	1	4.5	13.48	12373	0.74	165	4.74	1405
KP_p-3_n-30_ins-1.dat	30	1	5.09	88.01	81077	3.75	577	14.01	11523
KP_p-3_n-30_ins-10.dat	30	1	4.86	52.31	37209	2.79	427	7.34	2853
KP_p-3_n-30_ins-2.dat	30	1	4.86	171.71	138815	2.17	342	12.96	5657
KP_p-3_n-30_ins-3.dat	30	1	5.39	160.4	104753	3.52	512	23.7	11155
KP_p-3_n-30_ins-4.dat	30	1	4.42	56.58	98343	1.56	247	7.77	6403
KP_p-3_n-30_ins-5.dat	30	1	5.35	54.53	45701	3.0	462	10.79	6053
KP_p-3_n-30_ins-6.dat	30	1	4.99	174.26	88373	2.57	398	12.03	4143
KP_p-3_n-30_ins-7.dat	30	1	5.43	130.76	85591	2.5	442	26.82	14837
KP_p-3_n-30_ins-8.dat	30	1	3.89	138.09	163167	0.86	132	6.81	3449
KP_p-3_n-30_ins-9.dat	30	1	4.06	61.42	61839	1.6	239	4.83	2007
KP_p-3_n-40_ins-1.dat	40	1	10.85	1127.83	416541	30.15	3723	305.78	110739
KP_p-3_n-40_ins-10.dat	40	1	6.98	427.93	201071	11.2	1424	198.01	80313
KP_p-3_n-40_ins-2.dat	40	1	4.9	410.78	293999	3.43	397	29.28	17843
KP_p-3_n-40_ins-3.dat	40	1	7.08	661.87	330229	25.06	2966	127.1	77037
KP_p-3_n-40_ins-4.dat	40	1	7.34	411.7	202315	9.18	1243	83.84	35711
KP_p-3_n-40_ins-5.dat	40	1	6.25	195.14	89405	8.74	1216	28.1	10959
KP_p-3_n-40_ins-6.dat	40	1	6.51	974.94	533111	5.67	769	175.29	92505
KP_p-3_n-40_ins-7.dat	40	1	6.03	390.71	168359	7.41	1044	73.0	32859
KP_p-3_n-40_ins-8.dat	40	1	5.19	255.48	126623	3.6	477	17.68	7801
KP_p-3_n-40_ins-9.dat	40	1	4.54	249.14	123349	3.22	288	11.44	4305
KP_p-3_n-50_ins-1.dat	50	1	8.2	3396.44	791843	23.21	2695	868.56	231455
KP_p-3_n-50_ins-10.dat	50	1	10.63	1878.02	537177	45.23	5284	250.33	85045
KP_p-3_n-50_ins-2.dat	50	1	7.43	1554.52	556121	10.37	1375	263.51	84009
KP_p-3_n-50_ins-3.dat	50	1	8.21	1041.98	236569	45.63	4650	139.82	45341
KP_p-3_n-50_ins-4.dat	50	1	8.95	2376.67	754917	23.03	2460	703.21	217873
KP_p-3_n-50_ins-5.dat	50	1	9.72	2606.89	718235	51.47	5245	616.2	169213
KP_p-3_n-50_ins-6.dat	50	1	7.08	910.89	320875	14.84	1800	174.23	65713
KP_p-3_n-50_ins-7.dat	50	1	12.83	3451.32	892759	54.47	6163	1340.8	343499
KP_p-3_n-50_ins-8.dat	50	1	7.33	1208.39	286477	22.29	2388	169.03	43257
KP_p-3_n-50_ins-9.dat	50	1	8.31	1105.04	373805	20.63	2363	194.56	69129
KP_p-3_n-60_ins-1.dat	60	1	9.07	TL	620951	46.21	4334	928.08	204957
KP_p-3_n-60_ins-10.dat	60	1	11.53	TL	470763	86.11	8489	1693.76	374047
KP_p-3_n-60_ins-2.dat	60	1	11.05	TL	467547	92.34	10075	597.67	143075
KP_p-3_n-60_ins-3.dat	60	1	8.95	TL	859799	46.61	4588	805.02	231101
KP_p-3_n-60_ins-4.dat	60	1	10.29	TL	671153	50.84	5410	1481.71	388987
KP_p-3_n-60_ins-5.dat	60	1	9.94	3516.32	642995	48.53	5010	783.95	181455
KP_p-3_n-60_ins-6.dat	60	1	10.87	TL	477293	44.42	4132	1016.92	246169
KP_p-3_n-60_ins-7.dat	60	1	12.67	TL	639245	84.5	7928	1092.27	254515
KP_p-3_n-60_ins-8.dat	60	1	14.53	TL	323855	88.06	9122	TL	376061
KP_p-3_n-60_ins-9.dat	60	1	12.54	TL	313091	121.62	11497	TL	458979
KP_p-3_n-70_ins-1.dat	70	1	12.17	TL	227657	103.17	8500	2101.46	284807

KP__p-3__n-70__ins-10.dat	70	1	10.18	TL	403475	76.83	7775	2578.54	525681
KP__p-3__n-70__ins-2.dat	70	1	9.68	TL	290347	44.27	4324	2954.58	431701
KP__p-3__n-70__ins-3.dat	70	1	16.85	TL	247995	496.53	43556	2812.9	567605
KP__p-3__n-70__ins-4.dat	70	1	8.28	TL	428153	61.16	6448	1245.71	269021
KP__p-3__n-70__ins-5.dat	70	1	12.19	TL	275257	111.13	10290	1790.07	305253
KP__p-3__n-70__ins-6.dat	70	1	17.38	TL	281053	341.25	29624	TL	558635
KP__p-3__n-70__ins-7.dat	70	1	11.52	TL	312615	68.05	6580	1411.88	274591
KP__p-3__n-70__ins-8.dat	70	1	12.18	TL	208349	132.23	11264	2319.14	437903
KP__p-3__n-70__ins-9.dat	70	1	14.77	TL	304809	156.85	13996	TL	358761
KP__p-3__n-80__ins-1.dat	80	1	12.72	TL	192695	194.17	16501	TL	255197
KP__p-3__n-80__ins-10.dat	80	1	14.86	TL	244877	263.94	20676	TL	326467
KP__p-3__n-80__ins-2.dat	80	1	19.94	TL	180475	305.48	24014	TL	186813
KP__p-3__n-80__ins-3.dat	80	1	34.5	TL	158459	1660.92	131430	TL	167819
KP__p-3__n-80__ins-4.dat	80	1	22.69	TL	187183	411.33	31797	TL	205605
KP__p-3__n-80__ins-5.dat	80	1	12.35	TL	223417	158.08	14166	2558.52	367331
KP__p-3__n-80__ins-6.dat	80	1	22.25	TL	205911	369.99	31287	TL	265371
KP__p-3__n-80__ins-7.dat	80	1	22.38	TL	151975	708.65	55705	TL	218713
KP__p-3__n-80__ins-8.dat	80	1	32.3	TL	133873	1580.32	123140	TL	141727
KP__p-3__n-80__ins-9.dat	80	1	19.41	TL	179509	412.02	33408	TL	246265
KP__p-3__n-90__ins-1.dat	90	1	16.13	TL	170877	319.83	23025	TL	201427
KP__p-3__n-90__ins-10.dat	90	1	12.91	TL	173383	222.24	16637	TL	207005
KP__p-3__n-90__ins-2.dat	90	1	21.3	TL	132437	1251.44	92403	TL	181599
KP__p-3__n-90__ins-3.dat	90	1	19.67	TL	152219	462.15	36724	TL	180275
KP__p-3__n-90__ins-4.dat	90	1	25.68	TL	155947	1225.55	88588	TL	199541
KP__p-3__n-90__ins-5.dat	90	1	15.94	TL	219265	400.75	33886	TL	426297
KP__p-3__n-90__ins-6.dat	90	1	11.48	TL	170441	167.85	13933	3468.87	510825
KP__p-3__n-90__ins-7.dat	90	1	18.34	TL	157455	778.25	61114	TL	190685
KP__p-3__n-90__ins-8.dat	90	1	28.26	TL	127345	1517.83	115516	TL	147511
KP__p-3__n-90__ins-9.dat	90	1	22.43	TL	144491	554.85	41113	TL	150841
KP__p-4__n-10__ins-1.dat	10	1	3.53	1.76	333	0.08	29	2.66	115
KP__p-4__n-10__ins-10.dat	10	1	3.19	1.76	541	0.05	15	2.42	77
KP__p-4__n-10__ins-2.dat	10	1	3.64	1.72	295	0.1	35	2.75	133
KP__p-4__n-10__ins-3.dat	10	1	3.36	1.63	65	0.02	7	2.43	41
KP__p-4__n-10__ins-4.dat	10	1	3.31	1.6	95	0.06	25	2.52	43
KP__p-4__n-10__ins-5.dat	10	1	3.44	1.77	451	0.11	37	2.94	213
KP__p-4__n-10__ins-6.dat	10	1	3.59	1.79	777	0.07	17	2.85	413
KP__p-4__n-10__ins-7.dat	10	1	3.72	1.71	217	0.07	29	2.52	153
KP__p-4__n-10__ins-8.dat	10	1	3.22	1.64	123	0.03	13	2.35	69
KP__p-4__n-10__ins-9.dat	10	1	3.4	1.68	143	0.06	17	2.55	149
KP__p-4__n-20__ins-1.dat	20	1	3.98	8.43	14793	0.24	45	3.18	481
KP__p-4__n-20__ins-10.dat	20	1	4.71	22.13	17801	0.98	194	5.77	2723
KP__p-4__n-20__ins-2.dat	20	1	4.77	16.98	14033	0.97	165	6.42	2749
KP__p-4__n-20__ins-3.dat	20	1	4.2	10.42	11411	0.57	147	3.9	1605
KP__p-4__n-20__ins-4.dat	20	1	3.82	5.98	4155	0.44	73	3.43	597
KP__p-4__n-20__ins-5.dat	20	1	3.98	17.09	16053	0.49	97	3.9	731
KP__p-4__n-20__ins-6.dat	20	1	4.32	9.95	9727	0.69	150	3.9	1159
KP__p-4__n-20__ins-7.dat	20	1	3.89	9.55	10255	0.43	95	3.77	1377
KP__p-4__n-20__ins-8.dat	20	1	4.09	4.69	3755	0.7	149	3.73	1029
KP__p-4__n-20__ins-9.dat	20	1	5.03	18.92	11369	2.67	493	4.48	1939
KP__p-4__n-30__ins-1.dat	30	1	5.45	131.27	61489	5.22	680	26.58	13027
KP__p-4__n-30__ins-10.dat	30	1	6.38	166.25	105453	6.8	1007	44.5	25559
KP__p-4__n-30__ins-2.dat	30	1	5.47	170.73	150541	2.71	421	20.15	12029
KP__p-4__n-30__ins-3.dat	30	1	4.45	106.76	94513	1.64	215	10.36	6261
KP__p-4__n-30__ins-4.dat	30	1	4.62	68.51	61633	1.42	222	4.75	1745
KP__p-4__n-30__ins-5.dat	30	1	4.33	68.32	65875	1.97	245	8.28	4337
KP__p-4__n-30__ins-6.dat	30	1	4.53	64.53	33927	2.05	307	7.45	2759
KP__p-4__n-30__ins-7.dat	30	1	5.2	126.16	63821	2.65	433	18.64	8391
KP__p-4__n-30__ins-8.dat	30	1	4.65	102.67	48187	2.79	350	15.52	6909
KP__p-4__n-30__ins-9.dat	30	1	5.3	70.95	67709	2.97	480	13.38	12153
KP__p-4__n-40__ins-1.dat	40	1	6.61	949.84	372349	12.89	1738	147.77	60357
KP__p-4__n-40__ins-10.dat	40	1	7.12	544.44	209429	12.19	1562	49.23	19617
KP__p-4__n-40__ins-2.dat	40	1	6.01	661.3	372563	5.33	684	37.77	18081
KP__p-4__n-40__ins-3.dat	40	1	7.74	594.98	399787	15.12	1800	73.97	53503
KP__p-4__n-40__ins-4.dat	40	1	7.85	707.26	340137	18.68	2340	138.41	71293
KP__p-4__n-40__ins-5.dat	40	1	6.95	909.01	394585	19.07	2411	212.9	109923
KP__p-4__n-40__ins-6.dat	40	1	6.65	846.46	358187	15.77	1746	78.95	40455
KP__p-4__n-40__ins-7.dat	40	1	7.44	471.87	153461	11.3	1535	68.7	23941
KP__p-4__n-40__ins-8.dat	40	1	6.82	348.17	218913	12.43	1680	33.08	16771
KP__p-4__n-40__ins-9.dat	40	1	8.8	895.95	316889	22.73	2824	198.1	71917
KP__p-5__n-10__ins-1.dat	10	1	3.27	1.84	459	0.15	43	2.73	151
KP__p-5__n-10__ins-10.dat	10	1	3.32	1.64	101	0.05	19	2.44	49
KP__p-5__n-10__ins-2.dat	10	1	3.52	1.73	293	0.12	36	2.78	109
KP__p-5__n-10__ins-3.dat	10	1	3.56	1.72	505	0.05	20	2.72	207
KP__p-5__n-10__ins-4.dat	10	1	3.34	1.86	313	0.05	21	2.44	185
KP__p-5__n-10__ins-5.dat	10	1	3.37	1.68	355	0.06	21	2.81	103
KP__p-5__n-10__ins-6.dat	10	1	3.46	1.67	241	0.08	32	2.94	177

KP_p-5_n-10_ins-7.dat	10	1	3.36	1.69	165	0.05	19	2.47	87
KP_p-5_n-10_ins-8.dat	10	1	3.4	1.74	321	0.11	28	2.38	133
KP_p-5_n-10_ins-9.dat	10	1	3.29	1.67	199	0.01	3	0.53	1
KP_p-5_n-20_ins-1.dat	20	1	4.47	13.7	28861	0.83	138	4.52	2481
KP_p-5_n-20_ins-10.dat	20	1	4.69	20.0	12211	1.57	297	5.82	2487
KP_p-5_n-20_ins-2.dat	20	1	4.25	11.55	7729	0.8	178	4.05	1115
KP_p-5_n-20_ins-3.dat	20	1	4.19	13.02	7369	0.98	159	4.59	1535
KP_p-5_n-20_ins-4.dat	20	1	3.59	5.5	10611	0.24	59	2.45	379
KP_p-5_n-20_ins-5.dat	20	1	3.71	14.16	10741	0.49	97	3.87	915
KP_p-5_n-20_ins-6.dat	20	1	3.68	19.18	22119	0.57	104	3.74	1217
KP_p-5_n-20_ins-7.dat	20	1	4.0	6.08	3897	0.61	96	3.86	879
KP_p-5_n-20_ins-8.dat	20	1	4.61	23.46	36303	1.59	261	8.06	7207
KP_p-5_n-20_ins-9.dat	20	1	3.88	10.6	11693	0.66	113	4.6	2573