Supplementary Material

All new planning systems we tested in our experimental analysis are implemented in the ENHSP planner (https://sites.google.com/view/enhsp/), and will be made available if the paper gets accepted. In this supplementary material, we provide additional results. Specifically:

- Table 2 reports the pairwise comparison between LG-FJ(h^{abs}_{add}) and G(md) and between LG-FJ(h^{abs}_{add}) and G(h_{mrp}) in terms of average number of expanded nodes, average runtime, and average cost of returned solutions.
- Figure 2 reports the coverage over time plot, which includes NLM-CutPlan Sat (the winner of the numeric IPC-23 satisficing track) and Patty.
- Table 1 reports the coverage of each system, including NLM-CutPlan Sat and Patty.
- Figure 1 shows the scatter plot of the experimental results in a larger size for better readability.

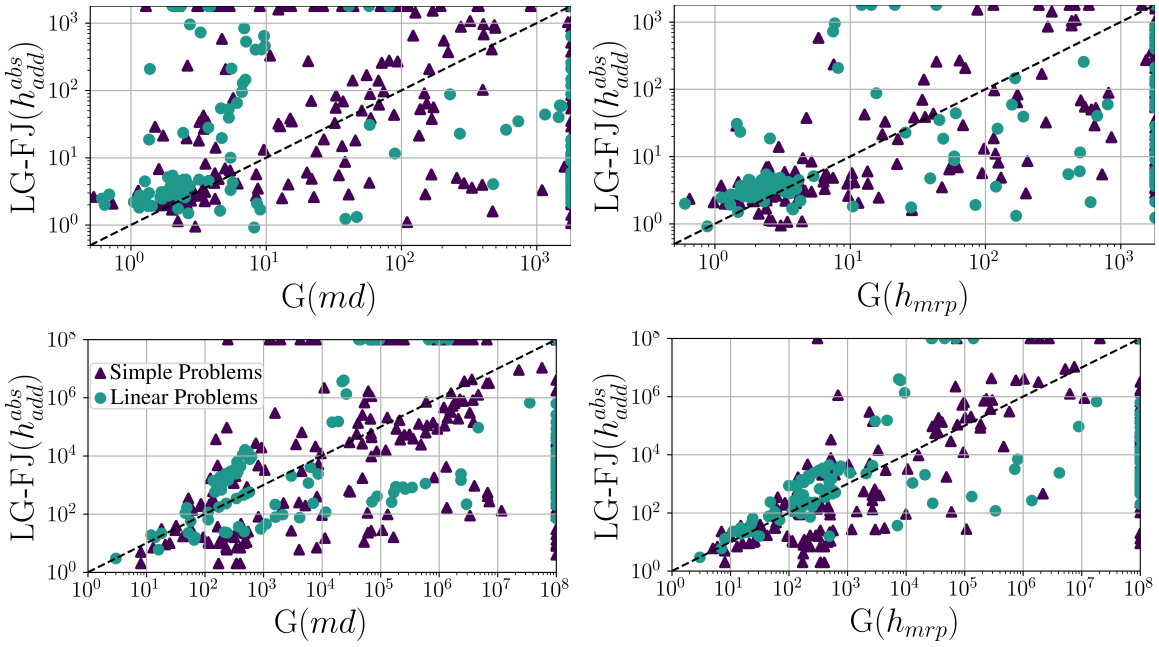

Figure 1: Pairwise comparison between LG-FJ(h^{abs}_{add}) and G(md) and between LG-FJ(h^{abs}_{add}) and G(h_{mrp}) in terms of runtime (above) and expanded nodes (below).

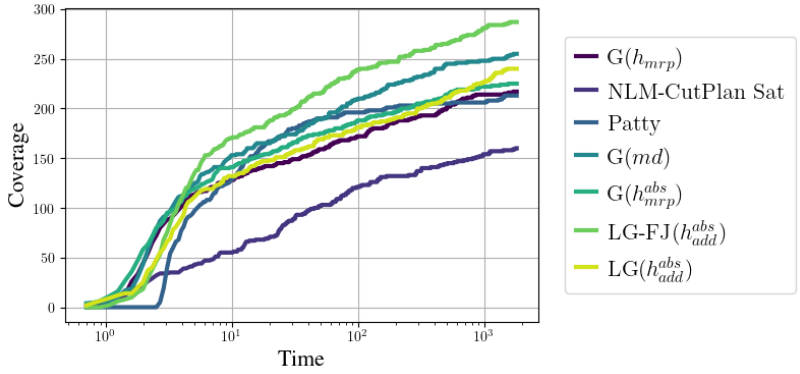

Figure 2: Coverage over time plot.

Domain	G(md)	G(h_{mrp})	G(h^{abs}_{mrp})	LG(h^{abs}_{add})	LG-FJ(h^{abs}_{add})	NLM-CutPlan Sat	Patty
BGrouping	**20**	17	16	**20**	19	0	**20**
Counters	15	15	15	10	18	12	**20**
Delivery	16	11	11	17	**18**	9	6
Expedition	**7**	3	3	2	2	4	4
Farmland	**20**	**20**	**20**	**20**	**20**	15	0
HPower	4	5	4	5	4	6	**20**
MPrime	9	13	13	17	**19**	14	17
MTrader	**19**	2	2	6	14	0	0
Pathways	1	2	2	2	**3**	1	2
Rover	9	4	4	4	4	4	**19**
Sailing	5	**20**	**20**	16	**20**	10	**20**
Sugar	**20**	5	5	6	16	4	**20**
Watering	**20**	19	19	19	18	19	6
Partial SNP	165	136	134	144	**175**	98	154
Drone	**19**	16	16	11	11	16	4
FO-Counters	9	7	9	7	19	6	**20**
FO-Farmland	**20**	**20**	**20**	**20**	**20**	11	0
FO-Sailing	4	11	12	18	**20**	16	**20**
Settlers	0	**2**	**2**	1	**2**	0	0
TPP	**20**	5	12	**20**	**20**	2	4
Zeno	18	**20**	**20**	19	**20**	11	11
Partial LNP	90	81	91	96	**112**	62	59
Total	255	217	225	240	**287**	160	213

Table 1: Coverage of all systems across all domains.

Domain	Expanded				Time				Solution Cost			
	G(md)	LG-FJ(h^{abs}_{add})	G(h_{mrp})	LG-FJ(h^{abs}_{add})	G(md)	LG-FJ(h^{abs}_{add})	G(h_{mrp})	LG-FJ(h^{abs}_{add})	G(md)	LG-FJ(h^{abs}_{add})	G(h_{mrp})	LG-FJ(h^{abs}_{add})
BGrouping	**215.16**	3351.47	**231.38**	1152.31	**22.56**	162.06	223.63	**34.73**	**214.16**	250.58	**223.31**	236.81
Counters	32906.07	**16089.86**	32906.07	**16089.86**	18.40	**12.27**	88.56	**12.27**	**184.43**	266.57	**184.43**	266.57
Delivery	397971.27	**14973.13**	2886.91	**1295.00**	212.55	**175.65**	120.04	**12.31**	273.20	**270.53**	**161.55**	180.73
Expedition	**6184.50**	1248667.00	**36118.50**	1248667.00	**2.06**	131.68	**4.50**	131.68	**44.00**	133.00	**105.00**	133.00
Farmland	289.45	**13.10**	291.30	**13.10**	**2.00**	2.42	**1.97**	2.42	**272.30**	272.70	**272.30**	272.70
HPower	20601497.50	**5124855.00**	5968752.75	**5124855.00**	559.34	**488.31**	**317.54**	488.31	**34.50**	37.00	**32.50**	37.00
MPrime	556668.56	**37.78**	498.62	**40.08**	179.12	**3.59**	30.13	**4.99**	**8.00**	**8.00**	**7.08**	7.77
MTrader	**285183.15**	349137.77	**125345.00**	451994.50	**53.35**	86.53	145.43	**103.75**	4081.23	**1763.15**	**87.50**	5341.50
Pathways	69057.00	**27.00**	1091116.50	**242.00**	**2.27**	2.70	365.48	**4.08**	**12.00**	**12.00**	**32.50**	40.50
Rover	**3319.33**	36144.00	**288361.75**	1050819.25	**2.10**	9.49	**117.22**	230.06	1.33	**0.00**	**0.00**	**0.00**
Sailing	7220081.20	**28988.80**	**958.40**	10618.60	274.49	**9.62**	7.08	**6.30**	**794.00**	3271.40	**518.85**	2168.75
Sugar	338290.25	**203113.69**	**105268.40**	235115.40	**90.77**	122.05	209.64	**126.16**	**37.62**	39.69	**22.60**	27.20
Watering	2573647.67	**1103543.44**	**664304.12**	980084.88	**118.84**	368.30	**190.03**	332.95	**971.22**	1407.50	**996.12**	1340.06
Drone	**11644.18**	842378.82	**3194.18**	842378.82	**1.74**	177.84	**3.57**	177.84	**95.00**	100.09	**65.55**	100.09
FO-Counters	299755.67	**318.00**	253484.57	**95.71**	58.98	**2.23**	100.33	**2.11**	**23.33**	24.00	**15.14**	16.43
FO-Farmland	**285.85**	1247.70	**354.25**	1247.70	**2.08**	3.56	**2.09**	3.56	**265.45**	481.85	**286.50**	481.85
FO-Sailing	11298674.50	**192666.50**	2962679.73	**71123.73**	419.83	**25.95**	228.30	**11.99**	**136.75**	374.50	**222.91**	256.36
TPP	**297.20**	4391.60	2644.80	**278.80**	**5.69**	207.02	41.33	**11.08**	**54499.88**	120572.22	**17371.42**	18851.39
Zeno	98466.11	**421.11**	1154.50	**574.00**	334.08	**19.61**	97.15	**37.83**	**2581.00**	5033.39	**2182.15**	4544.40

Table 2: Comparison between G(md) and LG-FJ(h^{abs}_{add}) and between G(h_{mrp}) and LG-FJ(h^{abs}_{add}) in terms of average number of expanded nodes, average time spent to find a solution, and average cost of returned solutions. Averages are computed among instances solved by both compared planners.