

Recent Advances in Underwater Basket Weaving Under the Extreme Pressure of the Mariana Trench

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Abstract. This document provides a basic paper template and submission guidelines. Abstracts must be a single paragraph, ideally between 4–6 sentences long. Gross violations will trigger corrections at the camera-ready phase.

Keywords: First keyword · Second keyword · Another keyword.

Acknowledgments. A bold run-in heading in small font size at the end of the paper is used for general acknowledgments, for example: This study was funded by X (grant number Y).

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1 Appendix

1.1 Initial Grid Search

Generator Params

Linearly Separable

- **Energy Penalty** (Table ??): *ECCo* generally does yield better results than *Vanilla* for higher choices of the energy penalty (10,15) during training. *Generic* performs poorly across the board. *Omni* seems to have an anchoring effect, in that it never performs terribly but also never as good as the best *ECCo* results. *REVISE* performs poorly across the board.

- **Cost (distance penalty):** Results for all generators (except *Omni*) are quite bad, which can likely be attributed to extremely bad results for some choices of the **Energy Penalty** (results here are averaged). For *ECCo* and *Generic*, higher cost values generally lead to worse results.
- **Maximum Iterations:** No clear patterns recognizable, so it seems that smaller choices are ok.
- **Validity:** *ECCo* almost always valid except for very low values during training and high values at evaluation time. *Generic* often has poor validity.
- **Accuracy:** Seems largely unaffected.

Table 1: Results for Linearly Separable data by energy penalty.

Obj.	\lambda (exper)	Generator	Value	Std
full	0.01	<i>ECCo</i>	$-9.91 \cdot 10^{11}$	$2.25 \cdot 10^{12}$
full	0.01	<i>Generic</i>	$-5.71 \cdot 10^{17}$	$1.3 \cdot 10^{18}$
full	0.01	Omniscient	-2.54	0.116
full	0.01	<i>REVISE</i>	-15.6	13.2
vanilla	0.01	<i>ECCo</i>	-4.28	3.52
vanilla	0.01	<i>Generic</i>	-4.45	3.47
vanilla	0.01	<i>Omniscient</i>	-5.12	4.46
vanilla	0.01	<i>REVISE</i>	-4.91	4.24
full	0.05	<i>ECCo</i>	$-5.63 \cdot 10^5$	$1.28 \cdot 10^6$
full	0.05	<i>Generic</i>	$-8.35 \cdot 10^{17}$	$1.9 \cdot 10^{18}$
full	0.05	Omniscient	-2.53	0.114
full	0.05	<i>REVISE</i>	-15	12.6
vanilla	0.05	<i>ECCo</i>	-4.4	3.66
vanilla	0.05	<i>Generic</i>	-4.38	3.48
vanilla	0.05	<i>Omniscient</i>	-5.25	4.62
vanilla	0.05	<i>REVISE</i>	-4.94	4.22
full	0.1	<i>ECCo</i>	$-6.74 \cdot 10^5$	$1.53 \cdot 10^6$
full	0.1	<i>Generic</i>	$-1.72 \cdot 10^{11}$	$3.9 \cdot 10^{11}$
full	0.1	Omniscient	-2.56	0.124
full	0.1	<i>REVISE</i>	-15.6	13.2
vanilla	0.1	<i>ECCo</i>	-4.28	3.52
vanilla	0.1	<i>Generic</i>	-4.45	3.48
vanilla	0.1	<i>Omniscient</i>	-5.12	4.46
vanilla	0.1	<i>REVISE</i>	-4.91	4.25
full	0.5	<i>ECCo</i>	-11.8	9.83
full	0.5	<i>Generic</i>	$-1.06 \cdot 10^{18}$	$2.42 \cdot 10^{18}$
full	0.5	Omniscient	-2.54	0.123
full	0.5	<i>REVISE</i>	-15	12.6
vanilla	0.5	<i>ECCo</i>	-4.4	3.65

Continuing table below.

Obj.	\lambda	(exper)	Generator	Value	Std
vanilla	0.5		<i>Generic</i>	-4.38	3.48
vanilla	0.5		<i>Omniscient</i>	-5.25	4.61
vanilla	0.5		<i>REVISE</i>	-4.95	4.22
full	1		<i>ECCo</i>	-11.5	11.1
full	1		<i>Generic</i>	$-1.71 \cdot 10^{11}$	$3.88 \cdot 10^{11}$
full	1		Omniscient	-2.59	0.117
full	1		<i>REVISE</i>	-15.7	13.3
vanilla	1		<i>ECCo</i>	-4.28	3.51
vanilla	1		<i>Generic</i>	-4.44	3.47
vanilla	1		<i>Omniscient</i>	-5.11	4.46
vanilla	1		<i>REVISE</i>	-4.91	4.25
full	5		<i>ECCo</i>	-3.99	3.12
full	5		<i>Generic</i>	$-4.88 \cdot 10^{17}$	$1.11 \cdot 10^{18}$
full	5		Omniscient	-2.53	0.117
full	5		<i>REVISE</i>	-14.6	12.1
vanilla	5		<i>ECCo</i>	-4.4	3.65
vanilla	5		<i>Generic</i>	-4.38	3.48
vanilla	5		<i>Omniscient</i>	-5.25	4.61
vanilla	5		<i>REVISE</i>	-4.95	4.22
full	10		ECCo	-2.31	0.735
full	10		<i>Generic</i>	$-1.7 \cdot 10^{11}$	$3.86 \cdot 10^{11}$
full	10		<i>Omniscient</i>	-2.53	0.117
full	10		<i>REVISE</i>	-15.5	13
vanilla	10		<i>ECCo</i>	-4.28	3.51
vanilla	10		<i>Generic</i>	-4.44	3.47
vanilla	10		<i>Omniscient</i>	-5.12	4.46
vanilla	10		<i>REVISE</i>	-4.91	4.24
full	15		ECCo	-2.01	0.488
full	15		<i>Generic</i>	$-4.91 \cdot 10^{17}$	$1.12 \cdot 10^{18}$
full	15		<i>Omniscient</i>	-2.53	0.116
full	15		<i>REVISE</i>	-14.4	11.7
vanilla	15		<i>ECCo</i>	-4.4	3.65
vanilla	15		<i>Generic</i>	-4.38	3.48
vanilla	15		<i>Omniscient</i>	-5.25	4.6
vanilla	15		<i>REVISE</i>	-4.95	4.23

Moons

Table 2: Results for Moons data by energy penalty.

Obj.	\lambda (exper)	Generator	Value	Std
full	0.01	<i>ECCo</i>	$-2.8 \cdot 10^{22}$	$6.39 \cdot 10^{22}$
full	0.01	<i>Generic</i>	$-4.89 \cdot 10^{30}$	$1.11 \cdot 10^{31}$
full	0.01	Omniscient	-4.74	5.08
full	0.01	<i>REVISE</i>	-572	$1.25 \cdot 10^3$
vanilla	0.01	<i>ECCo</i>	-15.5	17.3
vanilla	0.01	<i>Generic</i>	-10.9	11.9
vanilla	0.01	<i>Omniscient</i>	-12.7	14.4
vanilla	0.01	<i>REVISE</i>	-11.2	13
full	0.05	<i>ECCo</i>	$-1.55 \cdot 10^{16}$	$3.52 \cdot 10^{16}$
full	0.05	<i>Generic</i>	$-2.22 \cdot 10^{20}$	$5 \cdot 10^{20}$
full	0.05	Omniscient	-4.41	4.48
full	0.05	<i>REVISE</i>	$-1.04 \cdot 10^3$	$2.3 \cdot 10^3$
vanilla	0.05	<i>ECCo</i>	-15.5	17.2
vanilla	0.05	<i>Generic</i>	-11.7	12.8
vanilla	0.05	<i>Omniscient</i>	-12.4	14.1
vanilla	0.05	<i>REVISE</i>	-11.3	13.1
full	0.1	<i>ECCo</i>	$-3.41 \cdot 10^3$	$7.73 \cdot 10^3$
full	0.1	<i>Generic</i>	$-5.22 \cdot 10^{30}$	$1.19 \cdot 10^{31}$
full	0.1	Omniscient	-4.78	5.12
full	0.1	<i>REVISE</i>	-288	594
vanilla	0.1	<i>ECCo</i>	-15.5	17.2
vanilla	0.1	<i>Generic</i>	-10.9	11.9
vanilla	0.1	<i>Omniscient</i>	-12.7	14.4
vanilla	0.1	<i>REVISE</i>	-11.3	13.1
full	0.5	<i>ECCo</i>	-7.09	7.51
full	0.5	<i>Generic</i>	$-1.11 \cdot 10^{31}$	$2.53 \cdot 10^{31}$
full	0.5	Omniscient	-4.58	4.83
full	0.5	<i>REVISE</i>	$-1.19 \cdot 10^3$	$2.64 \cdot 10^3$
vanilla	0.5	<i>ECCo</i>	-15.5	17.2
vanilla	0.5	<i>Generic</i>	-11.7	12.8
vanilla	0.5	<i>Omniscient</i>	-12.4	14.1
vanilla	0.5	<i>REVISE</i>	-11.3	13.1
full	1	<i>ECCo</i>	-6.06	6.33
full	1	<i>Generic</i>	$-1.58 \cdot 10^{33}$	$3.59 \cdot 10^{33}$
full	1	Omniscient	-4.66	4.89
full	1	<i>REVISE</i>	$-1.16 \cdot 10^3$	$2.59 \cdot 10^3$
vanilla	1	<i>ECCo</i>	-15.5	17.3
vanilla	1	<i>Generic</i>	-10.9	11.9
vanilla	1	<i>Omniscient</i>	-12.7	14.4

Continuing table below.

Obj.	\lambda	(exper)	Generator	Value	Std
vanilla	1	<i>REVISE</i>	-11.3	13.1	
full	5	ECCo	-2.57	2.07	
full	5	<i>Generic</i>	$-1.17 \cdot 10^{28}$	$2.66 \cdot 10^{28}$	
full	5	<i>Omniscient</i>	-4.29	4.31	
full	5	<i>REVISE</i>	-530	$1.16 \cdot 10^3$	
vanilla	5	<i>ECCo</i>	-15.5	17.2	
vanilla	5	<i>Generic</i>	-11.7	12.7	
vanilla	5	<i>Omniscient</i>	-12.4	14.1	
vanilla	5	<i>REVISE</i>	-11.3	13.1	
full	10	ECCo	-1.76	0.974	
full	10	<i>Generic</i>	$-1.54 \cdot 10^{33}$	$3.51 \cdot 10^{33}$	
full	10	<i>Omniscient</i>	-4.44	4.56	
full	10	<i>REVISE</i>	$-1.52 \cdot 10^3$	$3.4 \cdot 10^3$	
vanilla	10	<i>ECCo</i>	-15.5	17.3	
vanilla	10	<i>Generic</i>	-10.9	11.9	
vanilla	10	<i>Omniscient</i>	-12.7	14.4	
vanilla	10	<i>REVISE</i>	-11.3	13.1	
full	15	ECCo	-1.37	0.365	
full	15	<i>Generic</i>	$-5.32 \cdot 10^{28}$	$1.21 \cdot 10^{29}$	
full	15	<i>Omniscient</i>	-4.34	4.38	
full	15	<i>REVISE</i>	-473	$1.03 \cdot 10^3$	
vanilla	15	<i>ECCo</i>	-15.5	17.2	
vanilla	15	<i>Generic</i>	-11.7	12.8	
vanilla	15	<i>Omniscient</i>	-12.4	14.1	
vanilla	15	<i>REVISE</i>	-11.3	13.1	

Circles

Table 3: Results for Circles data by energy penalty.

Obj.	\lambda	(exper)	Generator	Value	Std
full	0.01	ECCo	-1.26	0.423	
full	0.01	<i>Generic</i>	-1.49	0.71	
full	0.01	<i>Omniscient</i>	-5.21	5.25	
full	0.01	<i>REVISE</i>	$-2.71 \cdot 10^{26}$	$6.37 \cdot 10^{26}$	
vanilla	0.01	<i>ECCo</i>	-9.33	7.34	
vanilla	0.01	<i>Generic</i>	-8.89	6.88	
vanilla	0.01	<i>Omniscient</i>	-8.67	6.87	
vanilla	0.01	<i>REVISE</i>	-8.65	6.8	
full	0.05	<i>ECCo</i>	-1.29	0.397	
full	0.05	Generic	-1.21	0.356	

Continuing table below.

Obj.	\lambda	(exper)	Generator	Value	Std
full	0.05	<i>Omniscient</i>	-5.08	5.09	
full	0.05	<i>REVISE</i>	$-5.91 \cdot 10^{27}$	$1.36 \cdot 10^{28}$	
vanilla	0.05	<i>ECCo</i>	-9.35	7.32	
vanilla	0.05	<i>Generic</i>	-8.85	6.87	
vanilla	0.05	<i>Omniscient</i>	-8.7	6.96	
vanilla	0.05	<i>REVISE</i>	-8.52	6.76	
full	0.1	ECCo	-1.2	0.383	
full	0.1	<i>Generic</i>	-1.5	0.735	
full	0.1	<i>Omniscient</i>	-5.17	5.23	
full	0.1	<i>REVISE</i>	$-3.06 \cdot 10^{26}$	$7.7 \cdot 10^{26}$	
vanilla	0.1	<i>ECCo</i>	-9.33	7.32	
vanilla	0.1	<i>Generic</i>	-8.88	6.86	
vanilla	0.1	<i>Omniscient</i>	-8.69	6.9	
vanilla	0.1	<i>REVISE</i>	-8.68	6.81	
full	0.5	ECCo	-1.12	0.217	
full	0.5	<i>Generic</i>	-1.21	0.352	
full	0.5	<i>Omniscient</i>	-5.09	5.12	
full	0.5	<i>REVISE</i>	$-5.97 \cdot 10^{27}$	$1.37 \cdot 10^{28}$	
vanilla	0.5	<i>ECCo</i>	-9.35	7.3	
vanilla	0.5	<i>Generic</i>	-8.89	6.92	
vanilla	0.5	<i>Omniscient</i>	-8.68	6.93	
vanilla	0.5	<i>REVISE</i>	-8.53	6.75	
full	1	ECCo	-1.1	0.163	
full	1	<i>Generic</i>	-1.49	0.726	
full	1	<i>Omniscient</i>	-5.16	5.2	
full	1	<i>REVISE</i>	$-3.09 \cdot 10^{26}$	$7.22 \cdot 10^{26}$	
vanilla	1	<i>ECCo</i>	-9.34	7.36	
vanilla	1	<i>Generic</i>	-8.86	6.85	
vanilla	1	<i>Omniscient</i>	-8.7	6.9	
vanilla	1	<i>REVISE</i>	-8.69	6.85	
full	5	<i>ECCo</i>	-1.75	0.154	
full	5	Generic	-1.21	0.363	
full	5	<i>Omniscient</i>	-5.14	5.16	
full	5	<i>REVISE</i>	$-1.1 \cdot 10^{28}$	$2.5 \cdot 10^{28}$	
vanilla	5	<i>ECCo</i>	-9.36	7.32	
vanilla	5	<i>Generic</i>	-8.88	6.91	
vanilla	5	<i>Omniscient</i>	-8.7	6.93	
vanilla	5	<i>REVISE</i>	-8.52	6.73	
full	10	<i>ECCo</i>	$-1.02 \cdot 10^6$	$2.32 \cdot 10^6$	
full	10	Generic	-1.49	0.702	
full	10	<i>Omniscient</i>	-5.13	5.16	
full	10	<i>REVISE</i>	$-3.74 \cdot 10^{26}$	$9.09 \cdot 10^{26}$	

Continuing table below.

Obj.	\lambda	(exper)	Generator	Value	Std
vanilla	10		<i>ECCo</i>	-9.31	7.33
vanilla	10		<i>Generic</i>	-8.87	6.86
vanilla	10		<i>Omniscient</i>	-8.7	6.89
vanilla	10		<i>REVISE</i>	-8.69	6.83
full	15		<i>ECCo</i>	$-3.31 \cdot 10^{13}$	$7.54 \cdot 10^{13}$
full	15		Generic	-1.22	0.37
full	15		<i>Omniscient</i>	-5.2	5.23
full	15		<i>REVISE</i>	$-9.01 \cdot 10^{27}$	$2.06 \cdot 10^{28}$
vanilla	15		<i>ECCo</i>	-9.38	7.34
vanilla	15		<i>Generic</i>	-8.86	6.87
vanilla	15		<i>Omniscient</i>	-8.69	6.96
vanilla	15		<i>REVISE</i>	-8.51	6.73