Constraints (single) - Optimal, Noisy

						$\delta_{\text{HCU}(L)}$							$\delta_{HC}(P)$						$\delta_{\text{HCU}}(P)$							$\delta_{HC}(S)$							$\delta_{HCU(S)}$							
#	$ \mathcal{G} $	% Obs	0	$ G^* $	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S
		10	1.25	8.0	28.48	5 0.42	0.38	0.2	91.7	10.61	18.713	0.42	0.38	0.2	91.7	10.61	29.008	0.41	0.34	0.25	88.9	8.22	19.207	0.41	0.34	0.25	88.9	8.22	18.972	0.44	0.28	0.28	88.9	8.58	12.661	0.44	0.28	0.28	88.9	8.58
8_		30	3.08	3.97	28.51	4 0.3	0.38	0.32	80.6	4.47	18.792	0.3	0.46	0.24	83.3	7.75	29.086	0.34	0.36	0.3	61.1	3.83	19.082	0.34	0.36	0.3	61.1	3.83	19.024	0.39	0.26	0.35	75.0	3.61	12.601	0.39	0.39	0.22	86.1	7.64
BLOCKS (936)	20.3	50	4.42	2.5	28.52	4 0.34	0.4	0.26	69.4	3.11	18.737	0.33	0.49	0.18	80.6	5.72	29.04	0.32	0.44	0.24	50.0	3.53	19.213	0.32	0.45	0.23	52.8	3.89	19.095	0.43	0.37	0.2	77.8	3.67	12.736	0.34	0.57	0.09	94.4	9.42
1 40		70	6.67	1.94	28.50	5 0.56	0.26	0.19	77.8	2.25	18.738	0.52	0.36	0.11	88.9	4.53	26.262	0.47	0.45	0.09	80.6	3.67	17.669	0.46	0.46	0.08	83.3	4.03	17.049	0.68	0.23	0.09	91.7	2.36	11.722	0.47	0.45	0.07	94.4	5.64
		100	8.83	1.83	28.45	4 0.59	0.2	0.21	75.0	1.75	18.542	0.62	0.27	0.11	91.7	3.5	20.068	0.51	0.4	0.09	75.0	3.5	14.882	0.51	0.4	0.09	75.0	3.5	14.363	0.64	0.2	0.16	83.3	1.92	9.443	0.65	0.31	0.04	100.0	4.25
		10	1.63	2.71	11.41	2 0.84	0.13	0.03	95.8	3.17	7.554	0.84	0.13	0.03	95.8	3.17	11.992	0.4	0.56	0.03	97.9	7.06	8.039	0.4	0.56	0.03	97.9	7.06	11.465	0.61	0.22	0.17	79.2	3.48	7.59	0.61	0.22	0.17	79.2	3.48
IPC-GRID (1248)		30	4.0	1.21	11.41	4 0.91	0.09	0.0	100.0	1.42	7.555	0.86	0.14	0.0	100.0	1.77	11.944	0.25	0.74	0.01	100.0	6.81	7.967	0.25	0.74	0.01	100.0	6.81	11.43	0.68	0.23	0.1	89.6	1.81	7.563	0.63	0.32	0.06	95.8	2.77
è 55	7.5	50	6.19	1.13	11.38	2 0.88	0.08	0.04	95.8	1.35	7.587	0.86	0.11	0.03	97.9	1.54	11.952	0.23	0.74	0.03	93.8	6.63	8.031	0.23	0.74	0.03	93.8	6.63	11.444	0.76	0.15	0.09	87.5	1.48	7.584	0.74	0.2	0.06	93.8	2.02
1 No		70	8.69	1.04	11.42	4 0.96	0.03	0.01	97.9	1.08	7.589	0.94	0.06	0.0	100.0	1.27	11.998	0.31	0.64	0.05	81.3	5.33	7.96	0.31	0.64	0.05	81.3	5.33	11.454	0.88	0.09	0.03	95.8	1.21	7.553	0.79	0.2	0.01	100.0	1.85
		100	11.88	1.0	11.50	0.97	0.03	0.0	100.0	1.06	7.548	0.97	0.03	0.0	100.0	1.06	11.991	0.25	0.62	0.13	56.3	4.13	7.95	0.25	0.62	0.13	56.3	4.13	11.516	1.0	0.0	0.0	100.0	1.0	7.497	0.94	0.06	0.0	100.0	1.5
		10	2.0	2.83	13.54	8 0.75	0.24	0.02	97.2	4.64	8.864	0.75	0.24	0.02	97.2	4.64	13.59	0.61	0.27	0.12	88.9	3.61	8.881	0.61	0.27	0.12	88.9	3.61	13.528	0.72	0.26	0.02	97.2	4.86	8.834	0.71	0.27	0.02	97.2	4.97
(936)		30	5.75	1.19	13.43	4 0.8	0.2	0.0	100.0	1.94	8.872	0.67	0.33	0.0	100.0	2.92	13.427	0.5	0.47	0.03	91.7	2.64	8.839	0.44	0.56	0.0	100.0	3.86	13.392	0.69	0.31	0.0	100.0	2.36	8.911	0.44	0.56	0.0	100.0	5.06
936 37	10.0	50	9.42	1.06	13.44	0.88	0.1	0.01	97.2	1.31	8.826	0.84	0.16	0.0	100.0	1.58	13.502	0.64	0.34	0.02	94.4	1.92	8.905	0.61	0.39	0.0	100.0	2.53	13.449	0.85	0.15	0.0	100.0	1.58	8.868	0.64	0.36	0.0	100.0	2.69
1 80		70	13.25	1.03	13.53	2 0.97	0.03	0.0	100.0	1.08	8.946	0.89	0.11	0.0	100.0	1.33	13.494	0.7	0.3	0.0	100.0	1.72	8.848	0.68	0.32	0.0	100.0	2.08	13.509	0.94	0.06	0.0	100.0	1.14	8.855	0.7	0.3	0.0	100.0	2.14
		100	18.17	1.0	13.41	5 1.0	0.0	0.0	100.0	1.0	8.817	1.0	0.0	0.0	100.0	1.0	13.469	0.69	0.31	0.0	100.0	1.67	8.961	0.69	0.31	0.0	100.0	1.67	13.568	0.96	0.04	0.0	100.0	1.08	8.859	0.88	0.13	0.0	100.0	1.25
		10	2.0	2.53	8.488	0.74	0.25	0.01	97.2	3.56	5.58	0.74	0.25	0.01	97.2	3.56	8.637	0.6	0.4	0.0	100.0	4.42	5.621	0.6	0.4	0.0	100.0	4.42	8.502	0.69	0.31	0.0	100.0	4.08	5.596	0.67	0.33	0.0	100.0	4.19
MICONIC (936)		30	5.42	1.22	8.552	0.62	0.34	0.04	94.4	2.08	5.592	0.6	0.36	0.03	94.4	2.36	8.517	0.51	0.49	0.0	100.0	2.83	5.588	0.26	0.74	0.0	100.0	4.86	8.485	0.51	0.49	0.0	100.0	2.83	5.579	0.26	0.74	0.0	100.0	5.25
600	6.0	50	8.42	1.06	8.445	0.79	0.19	0.01	97.2	1.47	5.645	0.61	0.38	0.01	97.2	2.31	8.54	0.69	0.31	0.0	100.0	1.81	5.656	0.4	0.6	0.0	100.0	3.72	8.501	0.69	0.31	0.0	100.0	1.81	5.576	0.26	0.74	0.0	100.0	5.08
1 2		70	11.92	1.0	8.516	0.85	0.13	0.01	97.2	1.28	5.578	0.77	0.21	0.01	97.2	1.5	8.499	0.8	0.2	0.0	100.0	1.47	5.721	0.45	0.55	0.0	100.0	3.17	8.53	0.8	0.2	0.0	100.0	1.47	5.565	0.31	0.69	0.0	100.0	4.22
		100	16.33	1.0	8.572	0.88	0.13	0.0	100.0	1.25	5.564		0.14	0.0	100.0	1.33	8.533	1.0	0.0	0.0	100.0	1.0	5.66	0.66	0.34	0.0	100.0	2.25	8.611	1.0	0.0	0.0	100.0	1.0	5.596	0.43	0.57	0.0	100.0	3.42
		10	1.67	2.28	9.214	0.57	0.27	0.15	75.0	2.92	6.102	0.57	0.27	0.15	75.0	2.92	9.267	0.54	0.4	0.05	91.7	4.31	6.141	0.54	0.4	0.05	91.7	4.31	9.275	0.51	0.45	0.04	94.4	4.64	6.065	0.51	0.48	0.02	100.0	4.94
8.6		30	3.67	1.31	9.204			0.05	88.9	1.92	6.146	0.7	0.27		91.7	2.22	9.284	0.6	0.37	0.03		2.58				0.01		4.14	9.245	0.48	0.48			3.19		0.34	0.65	0.01		4.67
ROVERS (936)	6.0	50	5.75	1.19	9.16		0.11			1.42	6.147	0.83	0.14	0.03	94.4	1.67	9.27			0.03		1.75	6.137	0.53		0.03		2.86	9.223		0.36		100.0	2.44	6.112	0.4	0.6	0.0	100.0	4.33
2		70	8.17	1.0	9.191	0.81	0.16	0.03	94.4	1.31	6.073	0.78	0.19	0.03	94.4	1.47	9.261	0.82	0.16	0.02	94.4	1.36	6.101	0.7	0.3	0.0	100.0	2.22	9.262	0.72	0.24	0.04	88.9	1.61	6.14	0.32	0.65	0.02	94.4	4.19
		100	10.83	1.0	9.267	1.0	0.0	0.0	100.0	1.0	6.126	1.0	0.0		100.0	1.0	9.279			0.0	100.0		6.173			0.0			9.286	0.85	0.15		100.0		6.127			0.0	100.0	3.17
		10	2.33	2.11	18.30				72.2	5.08	12.145	0.3	0.58	0.12		5.08	19.634	0.24	0.72	0.04		7.58	13.288	0.24	0.72	0.04	91.7	7.58	18.794	0.32	0.35	0.33	47.2		12.533			0.24	58.3	4.14
1 × 6		30	6.5	1.25			0.49			2.67	12.16			0.1		3.53	19.618				63.9	5.0	13.257				63.9	5.0	18.71					1.72	12.641				97.2	
0KOBAN (936)	8.7	50	10.33	1.22			0.38			1.81	12.236						19.692			0.19			13.318			0.17		3.31	18.832					2.67	12.607			0.02	94.4	5.78
So		70	14.67	1.03			0.34			1.56	12.069				91.7		19.676			0.3	30.6		13.309			0.3		1.72	15.811					3.44	10.375				100.0	
		100	20.17	1.0	_				83.3		12.365				83.3		19.69				33.3		13.224				33.3		13.255				83.3		8.519				100.0	_
Average					14.90	8 0.71	0.21	0.08	89.1	2.37	9.84	0.68	0.26	0.06	92.66	2.99	14.941	0.5	0.42	0.08	83.57	3.54	9.991	0.43	0.49	0.08	84.68	4.0	12.919	0.67	0.25	0.08	89.88	2.58	8.543	0.51	0.44	0.04	95.72	4.33

Table 1: Results for each contraint set, for optimal observations. L for Landmarks, P for Post-hoc, and S for State equation.

Constraints (single) - Suboptimal, Noisy

																((single) Subopti																							
							$\delta_{\rm H}$	c(L)					δ_{HCU}				$\delta_{HC}(P)$					$\delta_{\text{HCU}}(P)$								$\delta_{\rm H}$	C(S)			$\delta_{HCU}(s)$						
#	$ \mathcal{G} $	% Obs	O	$ G^* $	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR 1	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR	FNR	Acc	S	Time	AR	FPR F	NR	Acc	S
		10	1.42	7.61	28.544	0.4	0.35	0.25	86.1	9.92	18.768	0.4	0.35	0.25	86.1	9.92	29.198	0.31	0.41	0.28	86.1	8.89	19.202	0.31	0.41	0.28	86.1	8.89	19.012	0.42	0.32	0.26	83.3	9.08	12.616	0.42	0.32 0	1.26	83.3 9).25
s_		30	3.83	3.58	28.428	0.36	0.39	0.25	80.6	4.92	18.715	0.28	0.52	0.2	86.1	9.0	29.092	0.33	0.41	0.26	63.9	4.72	19.066	0.33	0.41	0.26	66.7	4.97	19.116	0.4	0.3	0.3	75.0	4.31	12.669	0.31	0.5 0).19	94.4 9	9.56
(936)	20.3	50	5.92	3.19	28.548	0.33	0.35	0.32	66.7	3.44	18.702	0.32	0.46	0.22	77.8	7.03	29.143	0.4	0.38	0.22	66.7	3.53	19.257	0.4	0.38	0.22	66.7	3.53	19.078	0.47	0.28	0.24	86.1	4.17	12.581	0.27	0.6 0	0.13	94.4 9	9.64
ਵੂੰ		70	8.5	2.53	28.579	0.38	0.33	0.29	69.4	2.83	18.79	0.36	0.46	0.18	86.1	5.36	26.14	0.44	0.31	0.25	66.7	2.72	17.721	0.42	0.33	0.25	66.7	2.97	17.057	0.48	0.25	0.27	72.2	2.33	11.624	0.32	0.61 0	1.07	100.0 9).39
		100	11.83	2.25	28.502	0.44	0.27	0.29	66.7	2.0	18.725	0.56	0.33	0.11	100.0	4.08	20.091	0.49	0.31	0.21	66.7	2.25	14.755	0.47	0.35	0.18	75.0	3.33	14.526	0.58	0.17	0.25	75.0	1.92	9.428	0.58	0.29 0	1.13	100.0 3	3.67
		10	2.06	1.58	11.381	0.69	0.28	0.02	95.8	2.75	7.503	0.65	0.32	0.02	95.8	3.25	11.934	0.25	0.73	0.02	97.9	7.15	7.933	0.25	0.73	0.02	97.9	7.15	11.467	0.5	0.4	0.1	85.4	3.4	7.583	0.47	0.44 0	0.09	87.5 4	1.02
l ≘⊊		30	5.56	1.4	11.408	0.86	0.09	0.05	100.0	1.33	7.553	0.77	0.21	0.02	100.0	2.31	11.97	0.22	0.74	0.04	91.7	6.81	7.938	0.22	0.74	0.04	91.7	6.81	11.404	0.69	0.19	0.12	89.6	1.77	7.542	0.61	0.33 0	1.05	93.8 3	3.25
PC-GRID (1248)	7.5	50	8.88	1.35	11.456	0.85	0.09	0.06	97.9	1.25	7.464	0.75	0.22	0.03	100.0	1.83	11.932	0.31	0.63	0.06	81.3	5.6	7.898	0.31	0.63	0.06	81.3	5.6	11.386	0.71	0.22	0.07	97.9	1.69	7.523	0.53	0.41 0	1.06	97.9 3	3.08
No		70	12.56	1.31	11.404	0.86	0.06	0.08	97.9	1.13	7.517	0.81	0.14	0.06	100.0	1.44	11.988	0.21	0.63	0.16	47.9	4.31	7.937	0.21	0.63	0.16	47.9	4.31	11.445	0.79	0.12	0.09	95.8	1.25	7.571	0.61	0.33 0	0.06	100.0 2	2.73
		100	17.25	1.5	11.401	0.91	0.03	0.06	100.0	1.06	7.561	0.82	0.13	0.06	100.0	1.25	12.072	0.07	0.53	0.4	6.3	1.88	7.996	0.07	0.53	0.4	6.3	1.88	11.489	0.85	0.06	0.09	93.8	1.06	7.544	0.69	0.22 0	1.09	93.8 1	1.69
		10	2.67	2.0	13.475	0.73	0.27	0.0	100.0	3.78	8.887	0.73	0.27	0.0	100.0	3.78	13.475	0.69	0.3	0.02	97.2	3.53	8.845	0.68	0.3	0.02	97.2	3.58	13.529	0.72	0.28	0.0	100.0	3.86	8.856	0.61	0.39	0.0	100.0 5	5.22
OGISTICS (936)		30	7.5	1.14	13.499	0.86	0.13	0.01	97.2	1.44	8.896	0.71	0.29	0.0	100.0	2.53	13.496	0.66	0.32	0.02	94.4	1.97	8.886	0.63	0.37	0.0	100.0	2.33	13.441	0.74	0.26	0.0	100.0	2.03	8.839	0.5	0.5	0.0	100.0 4	1.44
936	10.0	50	11.92	1.06	13.527	0.88	0.12	0.0	100.0	1.33	8.899	0.7	0.3	0.0	100.0	2.11	13.402	0.69	0.31	0.0	100.0	1.75	8.914	0.68	0.32	0.0	100.0	1.92	13.473	0.79	0.21	0.0	100.0	1.72	8.957	0.47	0.53	0.0	100.0 4	1.22
000		70	16.67	1.03	13.57	0.98	0.02	0.0	100.0	1.08	8.86	0.85	0.15	0.0	100.0	1.39	13.571	0.71	0.29	0.0	100.0	1.67	8.788	0.69	0.31	0.0	100.0	1.69	13.497	0.91	0.09	0.0	100.0	1.22	8.893	0.7	0.3	0.0	100.0 2	2.36
		100	23.17	1.0	13.526	1.0	0.0	0.0	100.0	1.0	8.851	0.96	0.04	0.0	100.0	1.08	13.476	0.69	0.31	0.0	100.0	1.67	8.919	0.69	0.31	0.0	100.0	1.67	13.47	0.96	0.04	0.0	100.0	1.08	9.021	0.76	0.24	0.0	100.0 1	1.67
		10	3.0	1.83	8.486	0.61	0.36	0.03	94.4	3.25	5.547	0.61	0.37	0.03	94.4	3.33	8.572	0.48	0.52	0.0	100.0	4.36	5.664	0.42	0.58	0.0	100.0	5.17	8.568	0.48	0.52	0.0	100.0	4.36	5.581	0.39	0.61	0.0	100.0 5	5.31
e_		30	7.67	1.25	8.532	0.61	0.27	0.12	83.3	1.67	5.562	0.44	0.53	0.03	97.2	3.36	8.499	0.5	0.48	0.01	97.2	2.86	5.671	0.28	0.72	0.0	100.0	5.39	8.515	0.5	0.48	0.01	97.2	2.86	5.575	0.24	0.76	0.0	100.0 5	5.72
MICONIC (936)	6.0	50	12.25	1.03	8.528	0.74	0.19	0.08	86.1	1.31	5.556	0.53	0.43	0.04	94.4	2.5	8.593	0.78	0.22	0.0	100.0	1.61	5.661	0.25	0.75	0.0	100.0	4.89	8.452	0.78	0.22	0.0	100.0	1.61	5.602	0.22	0.78	0.0	100.0 5	5.33
¥		70	17.33	1.0	8.557	0.81	0.14	0.05	88.9	1.25	5.576	0.63	0.34	0.03	94.4	2.08	8.556	0.76	0.23	0.01	97.2	1.5	5.581	0.37	0.63	0.0	100.0	3.75	8.479	0.75	0.23	0.01	97.2	1.53	5.644	0.21	0.79	0.0	100.0 5	5.25
		100	24.0	1.0	8.502	0.92	0.04	0.04	91.7	1.0	5.629	0.94	0.06	0.0	100.0	1.17	8.657	0.96	0.04	0.0	100.0	1.08	5.722	0.89	0.11	0.0	100.0	1.42	8.45	0.96	0.04	0.0	100.0	1.08	5.671	0.31	0.69	0.0	100.0 4	1.42
		10	1.83	2.39	9.259	0.72	0.23	0.05	94.4	3.33	6.091	0.72	0.23	0.05	94.4	3.33	9.221	0.59	0.39	0.02	97.2	4.53	6.06	0.59	0.39	0.02	97.2	4.53	9.2	0.54	0.44	0.02	97.2	4.75	6.08	0.5	0.48 0	1.02	97.2 5	5.06
2 .		30	4.5	1.39	9.254	0.75	0.16	0.09	88.9	1.64	6.103	0.66	0.27	0.07	91.7	2.33	9.242	0.64	0.31	0.06	88.9	2.25	6.145	0.47	0.52	0.01	97.2	4.17	9.269	0.56	0.38	0.06	86.1	2.64	6.035	0.37	0.62 0	0.01	97.2 4	1.78
(936)	6.0	50	7.17	1.11	9.234	0.78	0.17	0.05	91.7	1.42	6.049	0.69	0.26	0.05	91.7	2.0	9.256	0.67	0.28	0.04	88.9	1.81	6.159	0.35	0.63	0.01	97.2	3.89	9.232	0.53	0.43	0.04	88.9	2.64	6.13	0.28	0.72	0.0	100.0 5	5.14
2		70	10.0	1.06	9.337	0.9	0.1	0.0	100.0	1.36	6.075	0.75	0.25	0.0	100.0	1.97	9.345	0.82	0.18	0.0	100.0	1.58	6.119	0.55	0.45	0.0	100.0	2.86	9.287	0.74	0.24	0.01	97.2	1.81	6.037	0.33	0.67	0.0	100.0 4	1.75
		100	13.67	1.0	9.136	1.0	0.0	0.0	100.0	1.0	6.063	0.94	0.06	0.0	100.0	1.25	9.333	1.0	0.0	0.0	100.0	1.0	6.277	0.9	0.1	0.0	100.0	1.33	9.209	0.9	0.1	0.0	100.0	1.33	5.974	0.61	0.39	0.0	100.0 2	2.92
		10	3.33	1.83	18.268	0.27	0.52	0.21	58.3	3.81	12.179	0.27	0.54	0.19	61.1	4.06	19.612	0.24	0.72	0.04	91.7	6.78	13.308	0.24	0.72	0.04	91.7	6.78	18.774	0.37	0.3	0.33	47.2	1.94	12.464	0.36	0.44 0).19	72.2 3	3.97
3 .		30	8.67	1.28	18.376	0.37	0.45	0.17	72.2	2.53	12.225	0.28	0.65	0.07	86.1	5.11	19.76	0.13	0.62	0.25	41.7	2.97	13.499	0.13	0.62	0.25	41.7	2.97	18.779	0.58	0.25	0.17	72.2	2.19	12.618	0.35	0.64 0	1.01	97.2 5	5.56
SOKOBAN (936)	8.7	50	13.75	1.33	18.366	0.4	0.34	0.27	55.6	1.61	12.207	0.38	0.57	0.05	91.7	4.67	19.74	0.16	0.43	0.41	19.4	1.39	13.422	0.16	0.47	0.37	30.6	1.78	18.808	0.54	0.25	0.22	63.9	2.0	12.571	0.32	0.6 0	80.0	83.3 4	4.83
SO.		70	19.33	1.36	18.318	0.43	0.32	0.25	63.9	1.72	12.277	0.37	0.53	0.11	80.6	3.89	19.746	0.17	0.41	0.42	22.2	1.44	13.37	0.16	0.43	0.41	22.2	1.61	15.75	0.44	0.41	0.15	83.3	3.97	10.337	0.25	0.72 0	0.03	94.4 6	5.53
\Box		100	27.0	1.33	18.254	0.74	0.1	0.17	83.3	1.17	12.082												13.69						12.955						8.222				91.7 6	
Average					14.922	0.69	0.21	0.11	87.04	2.24	9.83	0.62	0.32	0.06	93.66	3.35	14.96	0.48	0.4	0.12	77.59	3.18	10.013	0.41	0.48	0.11	79.26	3.77	12.904	0.64	0.27	0.1	88.93	2.68	8.526	0.43	0.52 0	1.05	95.95	5.0

Table 2: Results for each contraint set, for suboptimal observations. L for Landmarks, P for Post-hoc, and S for State equation.