

TABLE II: Comparison results of the different HSD management strategies on the 2005 IEEE CEC benchmark problem set.

Prob (Dims)	HMH				HSD(1)				HSD(2)				HSD(3)			
	FFV		# FEs		FFV		# FEs		FFV		# FEs		FFV		# FEs	
	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ
1(10)	1.00E-06	0	11870	538.93	1.00E-06	0	12103	605.99	1.00E-06	0	11980	636.48	1.00E-06	0	13370	1755
1(30)	1.00E-06	0	52983	2723.3	1.00E-06	0	44767	2035.1	1.00E-06	0	44873	1848.6	1.00E-06	0	39780	1835.2
2(10)	1.00E-06	0	14013	1246.7	1.00E-06	0	14027	908.55	1.00E-06	0	13717	914.29	1.00E-06	0	17810	2975.3
2(30)	1.00E-06	0	90727	15876	1.00E-06	0	82073	19964	1.00E-06	0	80313	17887	1.00E-06	0	90380	14391
3(10)	1.00E-06	0	22750	3003	1.00E-06	0	21077	1673.7	1.00E-06	0	21810	1921.4	1.00E-06	0	24763	7571.2
3(30)	295.35	998.74	2.79E+05	27782	1.00E-06	0	2.19E+05	45887	12.367	64.564	2.30E+05	59316	413.7	1380.7	2.60E+05	49508
4(10)	1.00E-06	0	15853	1341.8	1.00E-06	0	15530	934.46	1.00E-06	0	15903	1486.4	1.00E-06	0	27937	9077
4(30)	1.00E-06	0	1.50E+05	27962	1.00E-06	0	1.27E+05	41055	1.00E-06	0	1.36E+05	49203	1.00E-06	0	1.13E+05	38927
5(10)	1.00E-06	0	17110	883.31	1.00E-06	0	16893	910.07	1.00E-06	0	16957	863.71	1.00E-06	0	20730	2566.8
5(30)	174.5	278.17	3.00E+05	0	18.572	56.955	3.00E+05	0	121.87	163.19	3.00E+05	0	145.68	225.96	3.00E+05	0
6(10)	0	0	33417	7388.8	0.00033333	0.0018257	30357	5412	0.0013333	0.0034575	36953	15182	0.13333	0.72652	38320	15085
6(30)	0.13267	0.72665	2.43E+05	33935	0.163	0.73937	2.26E+05	38802	0.41167	1.2114	2.22E+05	52313	0.53067	1.3761	2.22E+05	54578
7(10)	0.162	0.13632	1.00E+05	0	0.12167	0.094288	1.00E+05	0	0.15767	0.17378	1.00E+05	0	0.40267	0.60195	94610	20515
7(30)	0.0036667	0.0080872	1.30E+05	1.13E+05	0.0046667	0.0068145	1.71E+05	1.23E+05	0.03	0.02	3.00E+05	0	0.009	0.0099481	2.21E+05	1.14E+05
8(10)	20.06	0.086681	1.00E+05	0	20.075	0.10602	1.00E+05	0	20.028	0.075113	1.00E+05	0	20.052	0.10447	1.00E+05	0
8(30)	20.169	0.12041	3.00E+05	0	20.227	0.13817	3.00E+05	0	20.22	0.14306	3.00E+05	0	20.14	0.12029	3.00E+05	0
9(10)	0.005	0.0050855	43320	19202	0.006	0.0049827	48507	19386	0.040333	0.17752	44070	19095	0.038667	0.17786	45710	24776
9(30)	2.3763	1.3964	2.98E+05	10079	2.2783	1.2808	2.95E+05	21120	2.408	1.0675	3.00E+05	0	2.6023	1.7112	2.97E+05	15370
10(10)	15.556	9.1746	1.00E+05	0	15.256	7.3406	1.00E+05	0	16.37	9.6037	1.00E+05	0	20.716	12.239	1.00E+05	0
10(30)	55.768	19.838	3.00E+05	0	65.178	23.908	3.00E+05	0	62.821	21.911	3.00E+05	0	65.474	40.817	3.00E+05	0
11(10)	5.0464	2.2525	97283	14880	5.6651	2.0562	1.00E+05	0	6.3133	2.1066	1.00E+05	0	6.8019	1.3304	1.00E+05	0
11(30)	24.378	5.1224	3.00E+05	0	28.237	5.5627	3.00E+05	0	28.528	5.1712	3.00E+05	0	26.981	5.9147	3.00E+05	0
12(10)	302.86	546.06	69543	39317	500.86	719.27	65240	40969	284.68	588.11	60770	39431	355.41	620.41	66343	37607
12(30)	2611.5	3622.3	2.95E+05	20162	1882.6	2790.8	2.88E+05	44191	2767	2840.5	2.99E+05	6098	1894.2	2285.1	2.95E+05	25524
13(10)	0.43267	0.16282	99050	5203.4	0.46433	0.16733	1.00E+05	0	0.529	0.16979	1.00E+05	0	0.50233	0.19537	1.00E+05	0
13(30)	2.0187	0.44262	3.00E+05	0	2.0017	0.47695	3.00E+05	0	1.8873	0.45001	3.00E+05	0	1.9227	0.81506	3.00E+05	0
14(10)	3.6397	0.29122	1.00E+05	0	3.5657	0.37704	1.00E+05	0	3.6007	0.31844	1.00E+05	0	3.686	0.29084	1.00E+05	0
14(30)	13.14	0.44011	3.00E+05	0	13.072	0.45905	3.00E+05	0	13.182	0.40298	3.00E+05	0	13.284	0.31641	3.00E+05	0