

Table 1: Numerical Results for Algorithm1, Algorithm2, Algorithm3, Algorithm4 on Problem 1

#Dim	Ip	Algorithm1				Algorithm2				Algorithm3				Algorithm4			
		#Itr	#Fev	#Tm	#Nrm	#Itr	#Fev	#Tm	#Nrm	#Itr	#Fev	#Tm	#Nrm	#Itr	#Fev	#Tm	#Nrm
100,000	x1	1	2	0.049896	0	2	3	0.093999	0	1	2	0.047838	0	1	2	0.031789	0
	x2	1	2	0.017076	0	1	2	0.04462	0	1	2	0.037003	0	1	2	0.033592	0
	x3	10	11	0.140578	2.8E-07	1	2	0.032805	0	1	2	0.03172	0	1	2	0.026271	0
	x4	3	4	0.049347	0	4	5	0.144214	0	8	10	0.267398	5.17E-07	8	10	0.225227	5.17E-07
	x5	1	2	0.022631	0	1	2	0.050786	0	1	2	0.057437	0	1	2	0.038825	0
	x1	1	2	0.022904	0	2	3	0.065393	0	1	2	0.034993	0	1	2	0.044688	0
	x2	1	2	0.018075	0	1	2	0.053794	0	1	2	0.04469	0	1	2	0.044292	0
	x3	10	11	0.183165	2.8E-07	1	2	0.039593	0	1	2	0.038756	0	1	2	0.036483	0
	x4	3	4	0.067875	0	4	5	0.120086	0	8	10	0.218957	5.17E-07	8	10	0.229779	5.17E-07
	x5	1	2	0.0273	0	1	2	0.042522	0	1	2	0.042027	0	1	2	0.033703	0
100,000	x1	1	2	0.025154	0	2	3	0.069162	0	1	2	0.032816	0	1	2	0.045767	0
	x2	1	2	0.017804	0	1	2	0.036782	0	1	2	0.025519	0	1	2	0.023459	0
	x3	10	11	0.14798	2.8E-07	1	2	0.030622	0	1	2	0.035749	0	1	2	0.037197	0
	x4	3	4	0.054625	0	4	5	0.10889	0	8	10	0.214395	5.17E-07	8	10	0.214153	5.17E-07
	x5	1	2	0.025482	0	1	2	0.036677	0	1	2	0.036881	0	1	2	0.038976	0
	x1	1	2	0.022895	0	2	3	0.058338	0	1	2	0.041245	0	1	2	0.041466	0
	x2	1	2	0.017417	0	1	2	0.023455	0	1	2	0.026808	0	1	2	0.029725	0
	x3	10	11	0.141861	2.8E-07	1	2	0.029105	0	1	2	0.029047	0	1	2	0.03032	0
	x4	3	4	0.05191	0	4	5	0.130378	0	8	10	0.234672	5.17E-07	8	10	0.227602	5.17E-07
	x5	1	2	0.020549	0	1	2	0.037304	0	1	2	0.038583	0	1	2	0.028466	0
100,000	x1	1	2	0.022404	0	2	3	0.062879	0	1	2	0.04204	0	1	2	0.045702	0
	x2	1	2	0.017344	0	1	2	0.028255	0	1	2	0.032725	0	1	2	0.027251	0
	x3	10	11	0.191139	2.8E-07	1	2	0.028802	0	1	2	0.031158	0	1	2	0.027215	0
	x4	3	4	0.066778	0	4	5	0.114583	0	8	10	0.218967	5.17E-07	8	10	0.230444	5.17E-07
	x5	1	2	0.026958	0	1	2	0.030801	0	1	2	0.034513	0	1	2	0.03442	0

Table 2: Numerical Results for Algorithm1, Algorithm2, Algorithm3, Algorithm4 on Problem 2

#Dim	Ip	Algorithm1				Algorithm2				Algorithm3				Algorithm4			
		#Htr	#Fev	#Tm	#Nrm	#Htr	#Fev	#Tm	#Nrm	#Htr	#Fev	#Tm	#Nrm	#Htr	#Fev	#Tm	#Nrm
100,000	x1	11	12	0.326351	5.32E-07	17	19	0.727638	4.28E-07	11	12	0.526342	4.56E-07	11	12	0.534478	4.56E-07
	x2	11	12	0.300557	2.9E-07	16	18	0.710676	4.81E-07	10	12	0.513561	8.87E-07	10	12	0.507949	8.87E-07
	x3	10	12	0.299001	7.94E-07	15	17	0.628796	9.87E-07	10	12	0.593604	5.82E-07	10	12	0.529334	5.82E-07
	x4	11	12	0.310636	5.32E-07	18	20	0.759858	8.31E-07	11	12	1.499693	5.32E-07	11	12	0.528961	5.32E-07
	x5	11	12	0.398289	2.53E-07	16	18	0.674761	4.19E-07	10	12	0.731848	7.73E-07	10	12	0.499329	7.73E-07
100,000	x1	11	12	0.388401	5.32E-07	17	19	0.733267	4.28E-07	11	12	0.659334	4.56E-07	11	12	0.528247	4.56E-07
	x2	11	12	0.431253	2.9E-07	16	18	0.678954	4.81E-07	10	12	0.53061	8.87E-07	10	12	0.494662	8.87E-07
	x3	10	12	0.447569	7.94E-07	15	17	0.643116	9.87E-07	10	12	0.588539	5.82E-07	10	12	0.654735	5.82E-07
	x4	11	12	0.321498	5.32E-07	18	20	0.764411	8.31E-07	11	12	0.532986	5.32E-07	11	12	0.598633	5.32E-07
	x5	11	12	0.583634	2.53E-07	16	18	0.679919	4.19E-07	10	12	0.567292	7.73E-07	10	12	0.550988	7.73E-07
100,000	x1	11	12	0.55475	5.32E-07	17	19	0.705577	4.28E-07	11	12	0.58557	4.56E-07	11	12	0.583723	4.56E-07
	x2	11	12	0.56711	2.9E-07	16	18	0.680131	4.81E-07	10	12	0.54038	8.87E-07	10	12	0.546889	8.87E-07
	x3	10	12	0.416047	7.94E-07	15	17	0.67646	9.87E-07	10	12	0.562744	5.82E-07	10	12	0.533498	5.82E-07
	x4	11	12	0.393957	5.32E-07	18	20	0.768163	8.31E-07	11	12	0.515859	5.32E-07	11	12	0.582413	5.32E-07
	x5	11	12	0.380598	2.53E-07	16	18	0.760099	4.19E-07	10	12	0.509622	7.73E-07	10	12	0.608245	7.73E-07
100,000	x1	11	12	0.49385	5.32E-07	17	19	0.740445	4.28E-07	11	12	0.532456	4.56E-07	11	12	0.642087	4.56E-07
	x2	11	12	0.560866	2.9E-07	16	18	0.674704	4.81E-07	10	12	0.531648	8.87E-07	10	12	0.700468	8.87E-07
	x3	10	12	0.436938	7.94E-07	15	17	0.712772	9.87E-07	10	12	0.541577	5.82E-07	10	12	0.591059	5.82E-07
	x4	11	12	0.479141	5.32E-07	18	20	0.812074	8.31E-07	11	12	0.52342	5.32E-07	11	12	0.571105	5.32E-07
	x5	11	12	0.395166	2.53E-07	16	18	0.700357	4.19E-07	10	12	0.538306	7.73E-07	10	12	0.579783	7.73E-07
100,000	x1	11	12	0.370921	5.32E-07	17	19	0.755335	4.28E-07	11	12	0.624125	4.56E-07	11	12	0.57996	4.56E-07
	x2	11	12	0.457401	2.9E-07	16	18	0.72801	4.81E-07	10	12	0.577702	8.87E-07	10	12	0.584863	8.87E-07
	x3	10	12	0.497432	7.94E-07	15	17	0.6668298	9.87E-07	10	12	0.525873	5.82E-07	10	12	0.591795	5.82E-07
	x4	11	12	0.5753	5.32E-07	18	20	0.797201	8.31E-07	11	12	0.525939	5.32E-07	11	12	0.591101	5.32E-07
	x5	11	12	0.571019	2.53E-07	16	18	0.833763	4.19E-07	10	12	0.524699	7.73E-07	10	12	0.561009	7.73E-07

Table 3: Numerical Results for Algorithm1, Algorithm2, Algorithm3, Algorithm4 on Problem 3

#Dim	Ip	Algorithm1				Algorithm2				Algorithm3				Algorithm4			
		#Htr	#Fev	#Tm	#Nrm	#Htr	#Fev	#Tm	#Nrm	#Htr	#Fev	#Tm	#Nrm	#Htr	#Fev	#Tm	
100,000	x1	15	17	0.658516	8.51E-07	28	29	1.95501	5.02E-07	15	17	0.719155	8.51E-07	15	17	0.870809	8.51E-07
	x2	48	50	2.89523	9.05E-07	18	19	0.903193	7.35E-07	32	34	1.53725	8.57E-07	32	34	2.420821	8.57E-07
	x3	16	18	1.166024	8.09E-07	17	18	0.9555736	9.14E-07	15	17	0.697325	5.77E-07	15	17	1.269387	5.77E-07
	x4	15	17	0.915641	8.51E-07	20	22	1.203316	6.87E-07	15	17	0.71861	9.64E-07	15	17	1.326977	9.64E-07
	x5	15	17	1.549615	8.95E-07	19	20	1.027534	5.63E-07	15	17	0.764956	6.39E-07	15	17	1.133889	6.39E-07
	x1	15	17	0.832785	8.51E-07	28	29	1.472566	5.02E-07	15	17	0.809485	8.51E-07	15	17	0.957727	8.51E-07
	x2	48	50	1.767932	9.05E-07	18	19	0.972836	7.35E-07	32	34	1.462355	8.57E-07	32	34	1.692176	8.57E-07
	x3	16	18	0.708715	8.09E-07	17	18	0.832444	9.14E-07	15	17	0.697061	5.77E-07	15	17	0.756056	5.77E-07
	x4	15	17	0.688902	8.51E-07	20	22	0.947313	6.87E-07	15	17	0.719581	9.64E-07	15	17	0.759824	9.64E-07
	x5	15	17	0.668883	8.95E-07	19	20	0.79257	5.63E-07	15	17	0.694076	6.39E-07	15	17	0.86401	6.39E-07
100,000	x1	15	17	0.632511	8.51E-07	28	29	1.155923	5.02E-07	15	17	0.712071	8.51E-07	15	17	0.969913	8.51E-07
	x2	48	50	1.87236	9.05E-07	18	19	0.786532	7.35E-07	32	34	1.447885	8.57E-07	32	34	1.849514	8.57E-07
	x3	16	18	0.532055	8.09E-07	17	18	0.716776	9.14E-07	15	17	0.748351	5.77E-07	15	17	0.797236	5.77E-07
	x4	15	17	0.519535	8.51E-07	20	22	0.87902	6.87E-07	15	17	0.724882	9.64E-07	15	17	0.796479	9.64E-07
	x5	15	17	0.517651	8.95E-07	19	20	0.865502	5.63E-07	15	17	0.69783	6.39E-07	15	17	0.761742	6.39E-07
	x1	15	17	0.531621	8.51E-07	28	29	1.401409	5.02E-07	15	17	0.708924	8.51E-07	15	17	0.752255	8.51E-07
	x2	48	50	1.675025	9.05E-07	18	19	0.824093	7.35E-07	32	34	1.441707	8.57E-07	32	34	1.614391	8.57E-07
	x3	16	18	0.527434	8.09E-07	17	18	0.741947	9.14E-07	15	17	0.725671	5.77E-07	15	17	0.775557	5.77E-07
	x4	15	17	0.522404	8.51E-07	20	22	0.878858	6.87E-07	15	17	0.68762	9.64E-07	15	17	0.758049	9.64E-07
	x5	15	17	0.520717	8.95E-07	19	20	0.881142	5.63E-07	15	17	0.727294	6.39E-07	15	17	0.8195	6.39E-07
3	x1	15	17	0.689416	8.51E-07	28	29	1.213862	5.02E-07	15	17	0.703866	8.51E-07	15	17	0.793496	8.51E-07
	x2	48	50	1.717333	9.05E-07	18	19	0.746785	7.35E-07	32	34	1.474439	8.57E-07	32	34	1.595028	8.57E-07
	x3	16	18	0.577706	8.09E-07	17	18	0.77569	9.14E-07	15	17	0.701303	5.77E-07	15	17	0.764156	5.77E-07
	x4	15	17	0.601609	8.51E-07	20	22	0.926583	6.87E-07	15	17	0.715483	9.64E-07	15	17	0.766723	9.64E-07
	x5	15	17	0.597669	8.95E-07	19	20	0.814429	5.63E-07	15	17	0.716089	6.39E-07	15	17	0.77624	6.39E-07

Table 4: Numerical Results for Algorithm1, Algorithm2, Algorithm3, Algorithm4 on Problem 4

#Dim	Ip	Algorithm1				Algorithm2				Algorithm3				Algorithm4			
		#Itr	#Fev	#Tm	#Nrm	#Itr	#Fev	#Tm	#Nrm	#Itr	#Fev	#Tm	#Nrm	#Itr	#Fev	#Tm	#Nrm
100,000	x1	1	2	0.08334	0	69	70	2.96646	9.92E-07	1	2	0.060989	0	1	2	0.066421	0
	x2	1	2	0.050198	0	1	2	0.059715	0	1	2	0.066157	0	1	2	0.056685	0
	x3	1	2	0.056329	0	1	2	0.057018	0	1	2	0.065638	0	1	2	0.07215	0
	x4	1	2	0.083591	0	82	83	3.298453	9.04E-07	1	2	0.075668	0	1	2	0.076198	0
	x5	1	2	0.081796	0	66	67	2.5657	9.63E-07	15	16	0.755677	6.15E-07	15	16	0.804901	6.15E-07
100,000	x1	1	2	0.093017	0	69	70	2.892107	9.92E-07	1	2	0.057828	0	1	2	0.064912	0
	x2	1	2	0.077173	0	1	2	0.050677	0	1	2	0.054803	0	1	2	0.060593	0
	x3	1	2	0.09679	0	1	2	0.055736	0	1	2	0.059305	0	1	2	0.064493	0
	x4	1	2	0.285321	0	82	83	3.377071	9.04E-07	1	2	0.059413	0	1	2	0.061113	0
	x5	1	2	0.118955	0	66	67	2.760371	9.63E-07	15	16	0.904564	6.15E-07	15	16	0.765933	6.15E-07
100,000	x1	1	2	0.090126	0	69	70	2.869636	9.92E-07	1	2	0.065828	0	1	2	0.066474	0
	x2	1	2	0.067188	0	1	2	0.055099	0	1	2	0.065874	0	1	2	0.059583	0
	x3	1	2	0.058603	0	1	2	0.0678	0	1	2	0.063214	0	1	2	0.075929	0
	x4	1	2	0.07282	0	82	83	3.231944	9.04E-07	1	2	0.063611	0	1	2	0.084711	0
	x5	1	2	0.077188	0	66	67	2.675093	9.63E-07	15	16	0.656869	6.15E-07	15	16	1.008983	6.15E-07
100,000	x1	1	2	0.070151	0	69	70	2.996318	9.92E-07	1	2	0.060371	0	1	2	0.064817	0
	x2	1	2	0.070679	0	1	2	0.056533	0	1	2	0.055587	0	1	2	0.055577	0
	x3	1	2	0.063749	0	1	2	0.065946	0	1	2	0.068864	0	1	2	0.060865	0
	x4	1	2	0.083968	0	82	83	3.500489	9.04E-07	1	2	0.061799	0	1	2	0.073983	0
	x5	1	2	0.063963	0	66	67	2.593286	9.63E-07	15	16	0.907441	6.15E-07	15	16	0.922777	6.15E-07
100,000	x1	1	2	0.073165	0	69	70	2.871513	9.92E-07	1	2	0.054684	0	1	2	0.078533	0
	x2	1	2	0.052541	0	1	2	0.059747	0	1	2	0.056846	0	1	2	0.060437	0
	x3	1	2	0.058761	0	1	2	0.069001	0	1	2	0.056014	0	1	2	0.068982	0
	x4	1	2	0.076693	0	82	83	3.370761	9.04E-07	1	2	0.069635	0	1	2	0.062359	0
	x5	1	2	0.082152	0	66	67	2.56034	9.63E-07	15	16	0.684792	6.15E-07	15	16	0.899593	6.15E-07

Table 5: Numerical Results for Algorithm1, Algorithm2, Algorithm3, Algorithm4 on Problem 5

#Dim	Ip	Algorithm1				Algorithm2				Algorithm3				Algorithm4					
		#Htr		#Fev	#Tm	#Nrm		#Htr		#Fev	#Tm	#Nrm		#Htr		#Fev	#Tm	#Nrm	
		*	*	*	*	*	*	43	45	2.09174	8.62E-07	10	11	0.579842	8.6E-07	10	11	0.594117	8.6E-07
100,000	x1	*	*	*	*	*	*	77	79	3.911533	7.5E-07	10	11	0.595803	4.86E-07	10	11	0.620968	4.86E-07
	x2	*	*	*	*	*	*	77	79	0.466308	4.81E-07	10	12	0.584756	3.95E-07	10	12	0.669014	3.95E-07
	x3	22	24	0.82645	9.34E-07	8	9	45	45	2.125555	8.62E-07	10	11	0.548668	8.6E-07	10	11	0.64018	8.6E-07
	x4	11	12	0.435042	8.6E-07	43	45	37	39	1.806567	8.2E-07	10	11	0.547735	8.6E-07	10	11	0.769797	8.6E-07
	x5	10	11	0.379594	5.85E-07	37	39	45	45	2.075238	8.62E-07	10	11	0.635378	8.6E-07	10	11	0.705751	8.6E-07
100,000	x1	*	*	*	*	*	*	43	45	3.697668	7.5E-07	10	11	0.698122	4.86E-07	10	11	0.782755	4.86E-07
	x2	*	*	*	*	*	*	77	79	0.440981	4.81E-07	10	12	0.762542	3.95E-07	10	12	0.762996	3.95E-07
	x3	22	24	1.322046	9.34E-07	8	9	45	45	2.145287	8.62E-07	10	11	0.706523	8.6E-07	10	11	1.259148	8.6E-07
	x4	11	12	0.676061	8.6E-07	43	45	37	39	1.798159	8.2E-07	10	11	0.695467	8.6E-07	10	11	0.702746	8.6E-07
	x5	10	11	0.59881	5.85E-07	37	39	45	45	2.105223	8.62E-07	10	11	0.681107	8.6E-07	10	11	0.708542	8.6E-07
5	x1	*	*	*	*	*	*	43	45	3.926863	7.5E-07	10	11	0.688697	4.86E-07	10	11	0.603058	4.86E-07
	x2	*	*	*	*	*	*	77	79	0.452486	4.81E-07	10	12	0.709741	3.95E-07	10	12	0.667433	3.95E-07
	x3	22	24	1.06491	9.34E-07	8	9	45	45	2.177853	8.62E-07	10	11	0.563809	8.6E-07	10	11	0.64108	8.6E-07
	x4	11	12	0.554734	8.6E-07	43	45	37	39	1.808626	8.2E-07	10	11	0.543452	8.6E-07	10	11	0.614405	8.6E-07
	x5	10	11	0.490317	5.85E-07	37	39	45	45	2.118923	8.62E-07	10	11	0.604147	8.6E-07	10	11	0.630316	8.6E-07
100,000	x1	*	*	*	*	*	*	43	45	2.03441	7.5E-07	10	11	0.614794	4.86E-07	10	11	0.657592	4.86E-07
	x2	*	*	*	*	*	*	77	79	0.537343	4.81E-07	10	12	0.64577	3.95E-07	10	12	0.729876	3.95E-07
	x3	22	24	1.108083	9.34E-07	8	9	45	45	2.70556	8.62E-07	10	11	0.609519	8.6E-07	10	11	0.646043	8.6E-07
	x4	11	12	0.527048	8.6E-07	43	45	37	39	2.283218	8.2E-07	10	11	0.596958	8.6E-07	10	11	0.650146	8.6E-07
	x5	10	11	0.492918	5.85E-07	37	39	45	45	2.257014	8.62E-07	10	11	0.543565	8.6E-07	10	11	0.610562	8.6E-07
100,000	x1	*	*	*	*	*	*	43	45	3.805416	7.5E-07	10	11	0.583738	4.86E-07	10	11	0.618069	4.86E-07
	x2	*	*	*	*	*	*	77	79	0.451772	4.81E-07	10	12	0.630293	3.95E-07	10	12	0.656942	3.95E-07
	x3	22	24	1.956057	9.34E-07	8	9	45	45	2.20801	8.62E-07	10	11	0.675809	8.6E-07	10	11	0.621481	8.6E-07
	x4	11	12	0.772981	8.6E-07	43	45	37	39	1.821866	8.2E-07	10	11	0.704236	8.6E-07	10	11	0.608067	8.6E-07
	x5	10	11	0.577504	5.85E-07	37	39	45	45	3.697668	7.5E-07	10	11	0.698122	4.86E-07	10	11	0.782755	4.86E-07