

Table 1: Comprehensive Performance Comparison of Optimization Algorithms

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
Sphere_2D	Adam-Robust			5.86e-2	2.41e-2	2.27e-2	1.25e-1	2502.0	0.0	
	Adam-AMSGrad			7.20e-2	3.21e-2	2.82e-2	1.30e-1	2502.0	0.0	
	Adam			7.60e-3	2.83e-3	4.96e-3	1.28e-2	2432.4	40.0	
	Adam-WeightDecay			4.98e-3	2.03e-5	4.94e-3	5.00e-3	1113.1	100.0	
	GD			4.93e-3	5.43e-5	4.81e-3	5.00e-3	152.6	100.0	
	Trust Region-Conservative			1.69e-3	1.41e-3	2.11e-4	4.46e-3	602.0	100.0	
	L-BFGS-Conservative			4.28e-3	6.13e-4	2.80e-3	4.97e-3	156.2	100.0	
	GD-WeightDecay			4.67e-3	1.71e-4	4.31e-3	4.95e-3	51.6	100.0	
	Trust Region-Precise			6.58e-1	7.91e-1	5.18e-6	2.79e0	115.3	55.0	
	Adam-Fast			8.78e-2	5.67e-2	2.82e-4	1.34e-1	33.5	30.0	
	GD-Nesterov			2.51e-3	2.02e-3	2.83e-4	4.93e-3	16.4	100.0	
	GD-Momentum			4.85e-4	1.02e-3	1.93e-4	4.95e-3	16.9	100.0	
	GD-AdaptiveMomentum			2.05e-1	2.50e-1	2.68e-5	5.53e-1	13.8	60.0	
	L-BFGS-Limited			1.24e-3	1.70e-3	0.00e0	4.92e-3	23.1	100.0	
	Trust Region-Adaptive			6.68e2	6.05e2	1.21e-5	1.22e3	41.1	35.0	
	QQN-GoldenSection			3.22e-14	4.92e-15	2.46e-14	3.96e-14	46.0	100.0	
	QQN-CubicQuadraticInterpolation			0.00e0	0.00e0	0.00e0	0.00e0	12.0	100.0	
	Trust Region-Standard			1.25e3	2.01e3	7.55e-4	6.04e3	27.1	10.0	
	L-BFGS			8.79e-5	3.32e-4	0.00e0	1.51e-3	13.5	100.0	
	QQN-Bisection-2			0.00e0	0.00e0	0.00e0	0.00e0	13.0	100.0	
	QQN-Bisection-1			0.00e0	0.00e0	0.00e0	0.00e0	15.0	100.0	
	Trust Region-Aggressive			7.95e3	5.21e3	2.26e-5	1.15e4	18.6	30.0	
	QQN-StrongWolfe			0.00e0	0.00e0	0.00e0	0.00e0	11.0	100.0	
	L-BFGS-MoreThuente			0.00e0	0.00e0	0.00e0	0.00e0	10.0	100.0	
Sphere_10D	L-BFGS-Aggressive			0.00e0	0.00e0	0.00e0	0.00e0	10.0	100.0	
	Adam-Robust			1.08e-1	3.40e-2	4.84e-2	1.71e-1	2502.0	0.0	
	Adam-AMSGrad			2.64e-1	4.59e-2	1.95e-1	3.63e-1	2502.0	0.0	
	Adam			4.98e-3	5.65e-5	4.94e-3	5.21e-3	2391.8	95.0	
	Adam-WeightDecay			4.92e-3	3.21e-5	4.88e-3	4.98e-3	968.0	100.0	
	Trust Region-Conservative			3.41e-1	3.63e-1	1.07e-3	1.34e0	2968.8	35.0	
	GD			4.91e-3	5.40e-5	4.82e-3	5.00e-3	192.4	100.0	
	L-BFGS-Conservative			4.51e-3	2.33e-4	4.20e-3	4.95e-3	197.5	100.0	
	Trust Region-Precise			5.27e-1	7.84e-1	1.01e-4	2.83e0	504.0	65.0	
	GD-WeightDecay			4.61e-3	1.67e-4	4.33e-3	4.92e-3	62.5	100.0	
	Trust Region-Adaptive			7.30e2	5.96e2	2.03e-4	1.22e3	139.3	30.0	
	Adam-Fast			6.12e-1	2.40e-2	5.73e-1	6.56e-1	37.4	0.0	
	L-BFGS-Limited			1.08e-3	1.10e-3	5.57e-7	4.03e-3	40.3	100.0	
	GD-AdaptiveMomentum			5.51e-1	6.74e-1	2.42e-4	1.41e0	18.4	60.0	
	GD-Nesterov			1.59e-1	2.14e-1	1.53e-5	4.62e-1	19.9	65.0	
	GD-Momentum			1.70e-1	2.92e-1	2.45e-5	7.34e-1	19.4	75.0	
	Trust Region-Standard			6.75e2	1.25e3	2.86e-5	6.06e3	51.8	15.0	
	Trust Region-Aggressive			1.09e4	1.85e3	5.34e3	1.18e4	30.3	0.0	
	QQN-GoldenSection			1.60e-13	1.03e-14	1.45e-13	1.79e-13	46.0	100.0	
	L-BFGS			0.00e0	0.00e0	0.00e0	0.00e0	15.0	100.0	
	QQN-Bisection-2			0.00e0	0.00e0	0.00e0	0.00e0	13.0	100.0	
	QQN-Bisection-1			0.00e0	0.00e0	0.00e0	0.00e0	15.0	100.0	
	QQN-CubicQuadraticInterpolation			0.00e0	0.00e0	0.00e0	0.00e0	12.0	100.0	
	QQN-StrongWolfe			0.00e0	0.00e0	0.00e0	0.00e0	11.0	100.0	
	L-BFGS-MoreThuente			0.00e0	0.00e0	0.00e0	0.00e0	10.0	100.0	
Rosenbrock_2D	L-BFGS-Aggressive			0.00e0	0.00e0	0.00e0	0.00e0	10.0	100.0	
	QQN-GoldenSection			1.26e-1	5.76e-2	8.08e-5	1.93e-1	4248.6	10.0	
	QQN-CubicQuadraticInterpolation			3.73e-2	3.12e-2	5.16e-3	9.89e-2	1619.8	40.0	
	QQN-StrongWolfe			5.67e-2	7.24e-2	4.58e-3	3.11e-1	2004.3	35.0	
	QQN-Bisection-1			4.65e-1	8.86e-1	6.39e-3	3.18e0	2363.3	5.0	
	Adam			1.22e0	3.51e-1	4.86e-1	1.76e0	2502.0	0.0	
	L-BFGS-Aggressive			3.18e1	2.86e1	4.34e0	1.12e2	3852.0	0.0	
	L-BFGS-Limited			3.93e0	5.18e0	3.26e-2	1.96e1	2251.6	0.0	
	GD			1.23e0	1.46e0	7.46e-1	6.37e0	854.0	0.0	
	Trust Region-Conservative			2.84e1	2.98e1	1.90e-1	1.23e2	2770.7	0.0	
	L-BFGS-Conservative			6.53e-3	2.16e-3	1.09e-3	8.39e-3	985.0	100.0	
	Adam-AMSGrad			3.83e0	1.33e0	4.66e-1	4.75e0	678.1	0.0	
	L-BFGS-MoreThuente			1.91e-2	6.42e-2	1.40e-4	2.99e-1	651.0	95.0	
	Adam-Robust			4.04e0	8.59e-1	1.90e0	4.73e0	419.2	0.0	
	QQN-Bisection-2			6.07e-2	6.89e-2	4.36e-3	2.52e-1	304.7	30.0	
	Trust Region-Precise			7.26e0	8.07e0	3.76e0	3.52e1	946.2	0.0	
	Adam-WeightDecay			4.11e0	9.66e-1	1.55e-2	4.69e0	231.9	0.0	

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
	Adam-Fast			2.13e0	2.74e0	8.12e-3	8.39e0	171.8	60.0
	Trust Region-Adaptive			4.12e0	2.07e-1	3.83e0	4.42e0	494.4	0.0
	GD-WeightDecay			3.65e0	3.07e0	3.75e-2	1.07e1	58.7	0.0
	L-BFGS			1.36e2	1.58e2	8.12e-1	5.03e2	121.5	0.0
	GD-AdaptiveMomentum			6.54e-1	1.23e0	3.23e-3	4.36e0	47.7	25.0
	GD-Nesterov			1.49e0	1.88e0	5.05e-2	5.63e0	46.1	0.0
	GD-Momentum			5.61e0	3.44e0	4.79e-1	1.33e1	23.8	0.0
	Trust Region-Standard			4.18e0	1.83e-1	3.95e0	4.51e0	89.6	0.0
	Trust Region-Aggressive			4.66e0	3.99e-1	4.01e0	5.49e0	27.6	0.0
	QQN-GoldenSection			6.13e-1	3.74e-1	2.60e-1	1.61e0	3314.1	55.0
	Adam-Robust			1.46e1	6.99e0	6.12e0	2.99e1	2502.0	0.0
	Adam-AMSGrad			4.40e0	3.25e-1	3.25e0	4.82e0	2442.0	0.0
	Adam			3.92e0	4.66e-1	2.83e0	4.65e0	2471.6	0.0
	QQN-CubicQuadraticInterpolation			4.25e-1	1.40e-1	2.38e-1	7.25e-1	1199.2	70.0
	L-BFGS-Limited			4.21e-1	3.55e-2	3.92e-1	5.47e-1	3855.4	45.0
	QQN-Bisection-2			4.48e-1	1.63e-1	2.15e-1	9.11e-1	1588.3	55.0
	L-BFGS-Conservative			2.02e1	6.75e1	3.89e-1	3.11e2	3106.7	20.0
	QQN-Bisection-1			6.94e-1	1.01e0	2.50e-1	4.64e0	1147.7	85.0
	L-BFGS-Aggressive			8.07e2	4.06e2	1.72e1	1.19e3	3851.6	0.0
	Adam-WeightDecay			2.07e0	2.05e0	3.93e-1	4.66e0	1128.9	60.0
	QQN-StrongWolfe			3.45e-1	4.37e-2	2.58e-1	3.95e-1	792.6	100.0
	Trust Region-Conservative			1.02e3	1.63e2	7.14e2	1.31e3	3002.0	0.0
	Trust Region-Precise			1.01e3	1.27e2	8.08e2	1.35e3	3002.0	0.0
	L-BFGS-MoreThuente			9.01e-1	1.03e0	2.37e-1	3.50e0	1090.7	70.0
	Trust Region-Adaptive			8.41e2	1.37e2	5.05e2	1.11e3	3002.0	0.0
	Trust Region-Standard			6.23e1	7.73e1	4.66e0	2.53e2	2827.2	0.0
	GD-Nesterov			4.24e0	5.00e0	3.90e-1	1.31e1	335.4	10.0
	Trust Region-Aggressive			5.00e0	4.17e-1	4.66e0	5.93e0	776.1	0.0
	GD-WeightDecay			7.30e-1	1.08e0	3.59e-1	5.40e0	72.1	60.0
	L-BFGS			1.50e2	2.28e2	1.98e1	7.52e2	135.3	0.0
	Adam-Fast			1.44e1	3.86e0	3.48e-1	1.86e1	44.4	5.0
	GD			5.09e0	1.48e-1	4.75e0	5.31e0	32.5	0.0
	GD-AdaptiveMomentum			4.60e1	6.15e0	3.36e1	5.66e1	20.6	0.0
	GD-Momentum			3.55e1	8.91e0	1.96e1	4.95e1	20.8	0.0
	Adam-Robust			3.49e1	9.88e0	1.61e1	5.15e1	2502.0	0.0
	Adam-AMSGrad			9.69e0	8.57e-3	9.66e0	9.70e0	2353.0	100.0
	L-BFGS-Aggressive			1.64e2	3.20e2	5.82e1	1.56e3	3850.3	0.0
	Adam			9.71e0	6.65e-2	9.68e0	9.93e0	2293.1	90.0
	Trust Region-Adaptive			2.02e3	2.22e2	1.64e3	2.59e3	3002.0	0.0
	Trust Region-Precise			2.10e3	1.92e2	1.66e3	2.46e3	3002.0	0.0
	Trust Region-Standard			1.06e3	2.06e2	6.70e2	1.41e3	3002.0	0.0
	Trust Region-Conservative			2.16e3	2.33e2	1.76e3	2.55e3	3002.0	0.0
	Adam-WeightDecay			9.67e0	2.09e-2	9.61e0	9.70e0	789.4	100.0
	Trust Region-Aggressive			1.00e1	3.85e-1	9.59e0	1.09e1	1615.8	30.0
	L-BFGS-Conservative			9.68e0	1.80e-2	9.63e0	9.70e0	205.3	100.0
	L-BFGS			1.19e2	1.68e2	2.51e1	7.37e2	338.9	0.0
	QQN-GoldenSection			9.45e0	1.57e-1	9.03e0	9.66e0	277.2	100.0
	QQN-CubicQuadraticInterpolation			9.60e0	5.83e-2	9.48e0	9.70e0	109.6	100.0
	L-BFGS-MoreThuente			9.20e0	1.98e0	7.83e0	1.75e1	212.8	95.0
	QQN-Bisection-1			8.47e0	8.02e-1	7.17e0	9.68e0	120.3	100.0
	QQN-StrongWolfe			8.69e0	5.85e-1	7.76e0	9.57e0	90.3	100.0
	QQN-Bisection-2			9.37e0	3.57e-1	8.02e0	9.67e0	83.2	100.0
	Adam-Fast			1.94e1	1.08e1	9.18e0	3.68e1	61.6	45.0
	GD-WeightDecay			9.58e0	5.37e-2	9.45e0	9.67e0	35.7	100.0
	GD			9.75e0	2.14e-1	9.59e0	1.02e1	41.5	75.0
	L-BFGS-Limited			9.59e0	4.89e-2	9.51e0	9.68e0	62.3	100.0
	GD-Momentum			3.53e1	2.87e1	9.32e0	7.27e1	35.0	55.0
	GD-Nesterov			9.31e0	1.92e-1	8.97e0	9.62e0	28.6	100.0
	GD-AdaptiveMomentum			1.02e2	9.83e0	8.45e1	1.16e2	23.1	0.0
	QQN-Bisection-1			-1.99e-2	8.69e-2	-3.99e-1	-1.17e-13	1278.7	0.0
	Adam			-4.98e-1	4.98e-1	-9.97e-1	-2.05e-12	1642.0	50.0
	QQN-StrongWolfe			-4.01e-2	1.75e-1	-8.01e-1	-8.45e-13	1192.1	0.0
	QQN-Bisection-2			-4.01e-2	1.75e-1	-8.01e-1	-4.27e-14	1074.5	0.0
	QQN-GoldenSection			-7.52e-7	2.11e-6	-9.60e-6	-8.52e-13	1573.8	0.0
	Adam-Fast			-4.71e-1	4.78e-1	-1.00e0	-4.63e-13	1058.0	40.0
	L-BFGS-Aggressive			-8.97e-2	2.69e-1	-8.97e-1	-2.07e-13	1145.5	0.0
	L-BFGS-Conservative			-7.20e-7	2.35e-6	-1.07e-5	-2.95e-14	838.7	0.0
	GD-WeightDecay			-3.24e-6	7.04e-6	-2.45e-5	-3.78e-13	423.0	0.0

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
	L-BFGS			-9.99e-2	3.00e-1	-1.00e0	-4.83e-13	802.0	10.0	
	L-BFGS-MoreThuente			-2.50e-1	4.32e-1	-1.00e0	-4.09e-13	752.4	25.0	
	GD-Nesterov			-9.98e-2	2.99e-1	-9.99e-1	-3.87e-13	272.0	10.0	
	GD			-1.16e-6	2.04e-6	-7.38e-6	-3.67e-14	252.8	0.0	
	L-BFGS-Limited			-2.50e-1	4.32e-1	-1.00e0	-3.18e-14	466.0	25.0	
	Adam-AMSGrad			-2.99e-1	4.57e-1	-9.96e-1	-1.10e-12	192.4	30.0	
	GD-Momentum			-3.25e-2	1.42e-1	-6.49e-1	-6.08e-14	42.9	0.0	
	GD-AdaptiveMomentum			-5.00e-2	2.18e-1	-9.99e-1	-6.90e-14	29.5	5.0	
	QQN-CubicQuadraticInterpolation			-5.13e-7	2.19e-6	-1.00e-5	-4.20e-14	19.1	0.0	
	Adam-Robust			-3.65e-7	9.47e-7	-3.26e-6	-9.07e-14	13.0	0.0	
	Adam-WeightDecay			-3.49e-7	6.17e-7	-2.33e-6	-7.24e-14	13.0	0.0	
	Trust Region-Precise			-7.80e-7	1.28e-6	-4.71e-6	-4.65e-14	4.5	0.0	
	Trust Region-Conservative			-8.81e-7	3.16e-6	-1.46e-5	-1.54e-13	4.3	0.0	
	Trust Region-Adaptive			-4.40e-7	7.97e-7	-2.59e-6	-3.25e-14	4.3	0.0	
	Trust Region-Aggressive			-5.33e-7	1.94e-6	-8.89e-6	-6.50e-14	4.2	0.0	
Michalewicz_5D_m10	Trust Region-Standard			-6.09e-7	2.15e-6	-9.91e-6	-1.36e-13	4.2	0.0	
	QQN-CubicQuadraticInterpolation			-8.49e-1	4.86e-1	-1.88e0	-4.46e-5	1726.7	0.0	
	QQN-StrongWolfe			-1.76e0	7.40e-1	-2.79e0	-5.69e-5	1288.2	25.0	
	QQN-Bisection-1			-1.78e0	6.73e-1	-2.74e0	-8.39e-1	1432.2	20.0	
	QQN-GoldenSection			-1.36e0	7.15e-1	-2.69e0	-3.60e-6	1751.2	5.0	
	QQN-Bisection-2			-1.78e0	8.34e-1	-2.85e0	-2.09e-4	1315.8	35.0	
	L-BFGS-Aggressive			-4.98e-1	3.88e-1	-1.25e0	1.67e-8	3524.2	0.0	
	L-BFGS-Conservative			-1.78e0	7.13e-1	-2.69e0	-8.39e-1	1302.2	30.0	
	L-BFGS-Limited			-8.44e-1	6.65e-1	-1.86e0	-3.16e-6	2003.6	0.0	
	GD			-2.00e0	7.11e-1	-2.69e0	-8.39e-1	738.0	45.0	
	Adam-AMSGrad			-2.17e0	6.28e-1	-2.71e0	-8.39e-1	439.6	55.0	
	Adam			-2.46e0	5.04e-1	-2.71e0	-8.39e-1	474.6	80.0	
	L-BFGS-MoreThuente			-1.39e0	5.83e-1	-2.73e0	-8.39e-1	519.5	5.0	
	GD-Nesterov			-1.24e0	6.70e-1	-2.69e0	-6.95e-1	159.9	5.0	
	Adam-WeightDecay			-1.75e0	5.79e-1	-2.69e0	-8.31e-1	178.5	10.0	
	GD-WeightDecay			-1.24e0	5.21e-1	-2.69e0	-7.45e-1	86.0	5.0	
	Adam-Robust			-1.65e0	7.13e-1	-2.69e0	-8.20e-1	83.1	10.0	
	Trust Region-Conservative			-9.74e-1	4.08e-1	-1.86e0	-1.78e-3	263.6	0.0	
	GD-Momentum			-1.11e0	8.01e-1	-2.69e0	-4.00e-5	51.9	5.0	
	Adam-Fast			-2.62e0	4.21e-1	-3.29e0	-1.68e0	70.8	65.0	
	L-BFGS			-2.16e-1	2.92e-1	-8.96e-1	-1.24e-6	90.4	0.0	
	GD-AdaptiveMomentum			-1.09e0	5.78e-1	-2.69e0	-4.06e-1	27.8	5.0	
	Trust Region-Precise			-9.85e-1	6.29e-1	-1.74e0	-1.94e-6	41.0	0.0	
	Trust Region-Adaptive			-7.58e-1	6.00e-1	-1.73e0	-4.40e-4	10.8	0.0	
Michalewicz_10D_m10	Trust Region-Standard			-3.29e-1	4.87e-1	-1.53e0	-4.71e-5	5.5	0.0	
	Trust Region-Aggressive			-1.81e-1	2.12e-1	-7.69e-1	-2.00e-4	5.0	0.0	
	QQN-CubicQuadraticInterpolation			-3.34e0	1.51e0	-6.26e0	-9.35e-1	1730.8	0.0	
	QQN-StrongWolfe			-4.71e0	1.16e0	-6.27e0	-2.13e0	1916.5	5.0	
	QQN-Bisection-1			-4.24e0	1.09e0	-5.36e0	-2.14e0	2030.0	0.0	
	QQN-Bisection-2			-4.37e0	1.24e0	-6.26e0	-1.67e0	1808.5	5.0	
	QQN-GoldenSection			-4.14e0	1.08e0	-6.30e0	-2.32e0	2197.4	5.0	
	L-BFGS-Limited			-3.52e0	1.38e0	-5.59e0	-6.44e-1	3009.3	0.0	
	L-BFGS-Conservative			-4.54e0	9.46e-1	-6.26e0	-2.94e0	2566.8	0.0	
	L-BFGS-Aggressive			-1.30e0	9.34e-1	-3.26e0	3.39e-1	3050.9	0.0	
	L-BFGS-MoreThuente			-4.11e0	7.64e-1	-5.98e0	-2.73e0	925.2	0.0	
	Adam			-5.84e0	5.72e-1	-6.27e0	-4.65e0	508.9	20.0	
	Adam-AMSGrad			-5.74e0	6.30e-1	-6.28e0	-4.40e0	450.1	30.0	
	GD-WeightDecay			-4.56e0	7.54e-1	-6.26e0	-2.97e0	174.7	0.0	
	Trust Region-Conservative			-3.71e0	9.15e-1	-5.42e0	-2.14e0	644.0	0.0	
	Adam-WeightDecay			-5.31e0	5.80e-1	-6.25e0	-4.38e0	179.3	0.0	
	Adam-Robust			-5.03e0	7.58e-1	-6.26e0	-3.55e0	111.0	0.0	
	Adam-Fast			-6.12e0	4.94e-1	-6.77e0	-4.58e0	106.2	35.0	
	GD-Momentum			-3.79e0	1.08e0	-5.24e0	-1.13e0	37.3	0.0	
	GD-AdaptiveMomentum			-4.52e0	7.73e-1	-6.23e0	-2.85e0	27.6	0.0	
	L-BFGS			-3.66e-1	3.76e-1	-1.14e0	6.67e-2	64.8	0.0	
	Trust Region-Precise			-3.69e0	9.58e-1	-5.30e0	-2.10e0	114.2	0.0	
	GD-Nesterov			-3.74e0	1.19e0	-6.19e0	-1.81e0	26.9	0.0	
	GD			-3.59e0	7.26e-1	-5.04e0	-2.59e0	17.2	0.0	
	Trust Region-Adaptive			-3.26e0	9.04e-1	-5.27e0	-1.43e0	28.7	0.0	
	Trust Region-Standard			-2.49e0	1.15e0	-4.98e0	-5.97e-1	9.8	0.0	
Rastrigin_2D	Trust Region-Aggressive			-1.68e0	6.53e-1	-3.16e0	-5.90e-1	5.3	0.0	
	L-BFGS-Aggressive				2.81e1	4.88e0	1.91e1	3.73e1	3851.8	0.0
	Trust Region-Conservative				1.85e1	4.65e0	9.36e0	2.65e1	3002.0	0.0

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
	Adam-AMSGrad				1.02e1	2.48e0	7.96e0	1.29e1	770.2
	Adam				1.02e1	2.48e0	7.96e0	1.29e1	780.5
	L-BFGS-Conservative				9.82e0	5.01e0	7.96e0	3.02e1	455.9
	Trust Region-Precise				9.71e0	2.37e0	7.96e0	1.29e1	915.9
	Adam-WeightDecay				9.71e0	2.38e0	7.96e0	1.30e1	254.7
	L-BFGS-MoreThuente				8.56e0	5.94e0	1.83e0	3.12e1	170.8
	Adam-Robust				9.22e0	2.16e0	7.96e0	1.30e1	111.5
	QQN-Bisection-1				8.59e0	4.47e0	1.03e0	1.69e1	125.3
	QQN-GoldenSection				8.19e0	5.01e0	1.29e-1	1.79e1	156.0
	QQN-CubicQuadraticInterpolation				7.75e0	3.18e0	2.17e0	1.59e1	64.2
	Trust Region-Adaptive				9.68e0	3.46e0	7.96e0	2.21e1	241.0
	QQN-StrongWolfe				8.32e0	4.20e0	1.36e0	1.69e1	71.4
	L-BFGS-Limited				9.13e0	2.25e0	5.86e0	1.29e1	106.5
	L-BFGS				5.70e1	3.05e1	2.49e0	1.31e2	88.4
	Adam-Fast				9.46e0	2.04e0	8.02e0	1.43e1	36.3
	GD-WeightDecay				1.01e1	2.27e0	7.96e0	1.34e1	24.3
	GD-AdaptiveMomentum				8.98e0	1.78e0	7.97e0	1.34e1	21.5
	GD-Momentum				1.04e1	2.44e0	7.98e0	1.57e1	22.7
	GD-Nesterov				1.00e1	2.35e0	7.96e0	1.37e1	20.1
	QQN-Bisection-2				8.57e0	4.87e0	2.07e0	1.69e1	23.8
	Trust Region-Standard				9.02e0	1.98e0	7.96e0	1.30e1	63.8
	GD				1.04e1	2.51e0	7.96e0	1.40e1	13.3
Rastrigin_5D	Trust Region-Aggressive				1.29e1	8.89e0	7.97e0	3.74e1	20.1
	L-BFGS-Aggressive				7.97e1	9.04e0	5.68e1	9.50e1	3852.0
	Trust Region-Conservative				6.91e1	7.96e0	5.03e1	8.29e1	3002.0
	Adam-AMSGrad				2.38e1	3.35e0	2.04e1	2.99e1	719.2
	Trust Region-Precise				2.39e1	3.48e0	2.03e1	2.99e1	2558.8
	Adam				2.42e1	3.17e0	2.03e1	2.99e1	745.3
	L-BFGS-Conservative				2.34e1	3.92e0	1.99e1	3.61e1	881.9
	Adam-WeightDecay				2.27e1	3.13e0	2.02e1	2.99e1	246.9
	Trust Region-Adaptive				2.34e1	5.02e0	2.02e1	4.05e1	646.1
	QQN-GoldenSection				2.31e1	9.30e0	7.97e0	4.97e1	266.0
	QQN-Bisection-1				2.48e1	4.08e0	1.80e1	3.38e1	186.6
	QQN-CubicQuadraticInterpolation				2.30e1	8.41e0	4.91e0	4.28e1	106.2
	L-BFGS-MoreThuente				2.77e1	2.23e1	7.71e0	9.40e1	165.1
	QQN-StrongWolfe				2.36e1	5.65e0	1.16e1	4.08e1	100.2
	Adam-Robust				2.24e1	3.09e0	1.99e1	2.99e1	103.5
	GD-AdaptiveMomentum				2.14e1	2.74e0	1.83e1	2.99e1	52.4
	L-BFGS-Limited				2.84e1	1.49e1	1.70e1	6.88e1	115.2
	L-BFGS				1.02e2	2.33e1	5.89e1	1.42e2	98.2
	GD-Nesterov				2.37e1	4.00e0	1.99e1	3.05e1	41.2
	GD-WeightDecay				2.25e1	2.90e0	1.89e1	2.99e1	37.8
	Trust Region-Standard				2.31e1	3.22e0	1.95e1	2.99e1	168.5
	Adam-Fast				2.33e1	3.56e0	1.92e1	3.17e1	48.9
	GD-Momentum				3.03e1	6.57e0	2.04e1	4.94e1	28.9
	QQN-Bisection-2				3.08e1	1.62e1	1.10e1	6.07e1	36.6
	GD				2.44e1	3.48e0	1.99e1	3.05e1	15.7
Rastrigin_10D	Trust Region-Aggressive				2.33e1	5.41e0	1.82e1	4.25e1	45.7
	L-BFGS-Aggressive				1.63e2	1.31e1	1.40e2	1.87e2	3852.0
	Trust Region-Conservative				1.57e2	1.05e1	1.28e2	1.71e2	3002.0
	Trust Region-Precise				9.70e1	1.03e1	6.33e1	1.13e2	3002.0
	L-BFGS-Conservative				4.68e1	8.45e0	4.06e1	7.77e1	2037.2
	Adam-AMSGrad				4.48e1	4.03e0	4.17e1	5.47e1	718.0
	Adam				4.65e1	4.42e0	4.16e1	5.97e1	731.5
	Trust Region-Adaptive				4.39e1	2.92e0	4.16e1	4.98e1	1397.8
	GD-Nesterov				4.50e1	4.13e0	4.02e1	5.49e1	249.0
	Adam-WeightDecay				4.52e1	3.97e0	4.15e1	5.48e1	253.8
	L-BFGS-MoreThuente				4.11e1	7.33e0	2.56e1	6.07e1	291.6
	QQN-Bisection-1				5.11e1	1.61e1	3.88e1	8.86e1	216.4
	QQN-GoldenSection				4.53e1	1.18e1	2.11e1	7.26e1	275.4
	QQN-CubicQuadraticInterpolation				4.52e1	7.84e0	3.21e1	5.87e1	102.5
	QQN-StrongWolfe				5.16e1	1.59e1	3.24e1	9.55e1	118.5
	Adam-Robust				4.44e1	4.07e0	4.13e1	5.48e1	127.9
	Trust Region-Standard				4.59e1	6.59e0	4.10e1	7.11e1	346.6
	GD-WeightDecay				4.39e1	3.41e0	3.60e1	4.98e1	61.3
	Adam-Fast				4.51e1	4.26e0	3.98e1	5.44e1	71.9
	L-BFGS-Limited				4.36e1	4.97e0	3.39e1	5.47e1	122.0
	L-BFGS				1.85e2	3.27e1	1.42e2	2.59e2	102.0

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
Ackley_2D_a20_b0.2_c6.28e0	QQN-Bisection-2			5.38e1	1.81e1	2.52e1	8.86e1	50.6	15.0
	GD-Momentum			6.15e1	1.25e1	4.06e1	8.46e1	30.6	10.0
	GD-AdaptiveMomentum			4.85e1	8.54e0	3.80e1	6.99e1	23.2	40.0
	Trust Region-Aggressive			4.36e1	3.69e0	3.87e1	5.26e1	93.5	45.0
	GD			4.47e1	4.34e0	3.89e1	5.49e1	19.4	35.0
	L-BFGS-Aggressive			3.74e0	3.90e-1	2.80e0	4.38e0	3083.9	20.0
	Adam-AMSGrad			3.57e0	2.23e-5	3.57e0	3.57e0	753.0	0.0
	QQN-CubicQuadraticInterpolation			3.44e0	4.86e-1	1.95e0	4.24e0	496.8	40.0
	Adam			3.57e0	5.40e-5	3.57e0	3.57e0	301.6	0.0
	L-BFGS-Conservative			3.57e0	1.87e-8	3.57e0	3.57e0	183.6	0.0
	L-BFGS			3.20e0	4.86e-1	1.89e0	3.57e0	202.7	50.0
	Adam-WeightDecay			3.58e0	8.83e-4	3.57e0	3.58e0	119.4	0.0
	L-BFGS-Limited			3.37e0	7.29e-1	2.64e-1	3.57e0	176.7	15.0
	QQN-GoldenSection			3.18e0	6.29e-1	1.58e0	3.57e0	137.5	35.0
	GD-WeightDecay			3.59e0	2.07e-2	3.57e0	3.66e0	49.2	0.0
	QQN-StrongWolfe			3.49e0	1.92e-1	3.00e0	3.57e0	62.8	15.0
	Trust Region-Conservative			3.58e0	1.90e-2	3.57e0	3.64e0	171.2	0.0
	Adam-Fast			3.62e0	6.41e-2	3.57e0	3.79e0	52.9	0.0
	QQN-Bisection-1			2.85e0	1.05e0	1.12e-2	3.57e0	53.6	60.0
	Adam-Robust			3.58e0	3.34e-3	3.57e0	3.59e0	42.9	0.0
Ackley_5D_a20_b0.2_c6.28e0	GD-Nesterov			3.57e0	2.11e-3	3.57e0	3.58e0	30.6	0.0
	QQN-Bisection-2			2.75e0	1.16e0	3.79e-1	3.57e0	36.5	40.0
	L-BFGS-MoreThuente			3.34e0	4.09e-1	1.83e0	3.57e0	42.2	45.0
	GD			3.57e0	1.91e-11	3.57e0	3.57e0	20.2	0.0
	GD-AdaptiveMomentum			3.57e0	6.21e-11	3.57e0	3.57e0	15.2	0.0
	GD-Momentum			3.70e0	6.22e-2	3.57e0	3.79e0	14.7	0.0
	Trust Region-Precise			3.58e0	1.39e-2	3.58e0	3.64e0	39.5	0.0
	Trust Region-Adaptive			3.66e0	2.13e-1	3.32e0	4.52e0	14.8	5.0
	Trust Region-Aggressive			4.78e0	2.77e0	3.62e0	1.67e1	5.3	0.0
	Trust Region-Standard			5.19e0	3.91e0	3.58e0	1.70e1	8.6	0.0
	Adam-AMSGrad			3.57e0	2.74e-9	3.57e0	3.57e0	1172.5	0.0
	L-BFGS-Aggressive			3.76e0	2.74e-1	3.01e0	4.09e0	3085.2	20.0
	Adam			3.57e0	1.27e-6	3.57e0	3.57e0	548.5	0.0
	QQN-CubicQuadraticInterpolation			3.56e0	9.71e-2	3.14e0	3.63e0	206.9	5.0
	L-BFGS-Conservative			3.57e0	5.12e-8	3.57e0	3.57e0	373.8	0.0
	L-BFGS-Limited			3.57e0	1.20e-8	3.57e0	3.57e0	310.5	0.0
	Adam-WeightDecay			3.57e0	4.57e-4	3.57e0	3.58e0	183.0	0.0
	QQN-GoldenSection			3.51e0	2.78e-1	2.30e0	3.57e0	193.7	5.0
	L-BFGS			3.46e0	4.50e-1	1.87e0	4.43e0	121.3	25.0
	Adam-Fast			3.60e0	4.00e-2	3.57e0	3.73e0	83.3	0.0
Ackley_10D_a20_b0.2_c6.28e0	QQN-Bisection-1			3.38e0	3.60e-1	2.37e0	3.57e0	65.2	30.0
	Trust Region-Conservative			3.58e0	8.66e-4	3.57e0	3.58e0	212.3	0.0
	QQN-StrongWolfe			3.50e0	3.36e-1	2.03e0	3.57e0	53.0	5.0
	Adam-Robust			3.58e0	3.67e-3	3.57e0	3.59e0	59.0	0.0
	GD			3.57e0	2.52e-11	3.57e0	3.57e0	51.8	0.0
	QQN-Bisection-2			3.34e0	3.86e-1	2.48e0	3.57e0	50.8	35.0
	GD-AdaptiveMomentum			3.58e0	3.63e-3	3.57e0	3.59e0	34.5	0.0
	L-BFGS-MoreThuente			3.50e0	2.48e-1	2.54e0	3.57e0	51.0	10.0
	GD-Nesterov			3.60e0	4.12e-2	3.57e0	3.76e0	17.0	0.0
	GD-WeightDecay			3.61e0	2.38e-2	3.58e0	3.69e0	15.3	0.0
	Trust Region-Precise			3.62e0	1.68e-1	3.57e0	4.35e0	45.5	0.0
	GD-Momentum			3.72e0	1.33e-1	3.59e0	4.11e0	13.0	0.0
	Trust Region-Adaptive			3.70e0	1.47e-1	3.58e0	4.11e0	17.3	0.0
	Trust Region-Standard			4.49e0	1.26e0	3.60e0	6.86e0	9.1	0.0
	Trust Region-Aggressive			4.15e0	2.82e-1	3.71e0	4.90e0	5.0	0.0
	Adam-AMSGrad			3.57e0	2.45e-9	3.57e0	3.57e0	1241.4	0.0
	Adam			3.57e0	7.49e-9	3.57e0	3.57e0	745.8	0.0
	QQN-CubicQuadraticInterpolation			3.59e0	9.76e-2	3.33e0	3.84e0	471.4	5.0
	Adam-WeightDecay			3.57e0	1.60e-5	3.57e0	3.57e0	281.3	0.0
	L-BFGS-Conservative			3.57e0	5.16e-9	3.57e0	3.57e0	170.7	0.0
Ackley_10D_a20_b0.2_c6.28e0	Adam-Robust			3.58e0	3.01e-3	3.57e0	3.59e0	126.8	0.0
	QQN-GoldenSection			3.57e0	1.01e-8	3.57e0	3.57e0	186.9	0.0
	GD			3.57e0	1.76e-10	3.57e0	3.57e0	99.3	0.0
	L-BFGS-Aggressive			3.54e0	1.35e-1	2.95e0	3.57e0	185.8	5.0
	L-BFGS-Limited			3.57e0	4.05e-10	3.57e0	3.57e0	142.2	0.0
	QQN-StrongWolfe			3.57e0	5.84e-15	3.57e0	3.57e0	79.2	0.0
	Adam-Fast			3.60e0	4.10e-2	3.57e0	3.70e0	106.6	0.0
	L-BFGS			3.50e0	2.17e-1	2.72e0	3.58e0	133.3	15.0

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
	QQN-Bisection-1			3.54e0	1.23e-1	3.08e0	3.57e0	96.2	10.0
	Trust Region-Conservative			3.58e0	2.44e-3	3.57e0	3.58e0	205.8	0.0
	QQN-Bisection-2			3.54e0	7.29e-2	3.30e0	3.57e0	65.9	20.0
	L-BFGS-MoreThuente			3.57e0	1.12e-2	3.52e0	3.57e0	55.9	5.0
	GD-WeightDecay			3.59e0	6.14e-3	3.58e0	3.60e0	19.4	0.0
	GD-AdaptiveMomentum			3.60e0	1.35e-2	3.57e0	3.63e0	16.1	0.0
	GD-Nesterov			3.66e0	2.68e-2	3.62e0	3.72e0	14.0	0.0
	GD-Momentum			3.81e0	6.88e-2	3.64e0	3.91e0	14.5	0.0
	Trust Region-Precise			3.61e0	7.74e-2	3.58e0	3.92e0	42.5	0.0
	Trust Region-Adaptive			4.41e0	1.08e0	3.59e0	6.23e0	18.2	0.0
	Trust Region-Standard			4.36e0	8.00e-1	3.64e0	5.79e0	9.1	0.0
	Trust Region-Aggressive			4.22e0	2.38e-1	3.81e0	4.95e0	5.2	0.0
	Adam-Robust			-2.07e1	2.26e0	-2.44e1	-1.49e1	2502.0	0.0
	Adam-AMSGrad			-3.03e1	1.58e0	-3.29e1	-2.78e1	2502.0	0.0
	Adam			-2.94e1	2.68e0	-3.47e1	-2.46e1	2502.0	0.0
	Adam-WeightDecay			-7.55e1	5.64e0	-7.83e1	-6.42e1	1893.5	80.0
	L-BFGS-Aggressive			-5.13e1	1.89e1	-7.77e1	-4.63e0	3848.1	0.0
	Trust Region-Precise			-6.26e1	4.27e-1	-6.35e1	-6.22e1	3002.0	0.0
	Trust Region-Conservative			-1.02e1	4.38e-1	-1.15e1	-9.64e0	3002.0	0.0
	QQN-StrongWolfe			-7.34e1	6.74e0	-7.83e1	-6.42e1	284.4	65.0
	L-BFGS-Conservative			-7.69e1	4.23e0	-7.83e1	-6.42e1	300.1	90.0
	QQN-Bisection-1			-7.40e1	7.84e0	-7.83e1	-5.01e1	385.6	70.0
	L-BFGS-Limited			-7.41e1	6.48e0	-7.83e1	-6.42e1	500.0	70.0
	Trust Region-Adaptive			-7.37e1	1.73e1	-7.83e1	3.85e-1	885.1	70.0
	QQN-GoldenSection			-7.69e1	4.24e0	-7.83e1	-6.42e1	159.8	90.0
	QQN-CubicQuadraticInterpolation			-7.34e1	8.08e0	-7.83e1	-5.01e1	74.5	70.0
	QQN-Bisection-2			-7.48e1	6.12e0	-7.83e1	-6.42e1	99.0	75.0
	L-BFGS			-7.32e1	7.01e0	-7.83e1	-5.78e1	132.3	50.0
	GD			-7.34e1	6.73e0	-7.83e1	-6.42e1	66.5	65.0
	Adam-Fast			-7.48e1	4.67e0	-7.83e1	-6.16e1	67.3	35.0
	Trust Region-Standard			6.01e1	5.78e2	-7.83e1	2.58e3	212.3	40.0
	GD-WeightDecay			-7.46e1	6.18e0	-7.83e1	-6.37e1	39.9	35.0
	GD-Momentum			-5.68e1	1.59e1	-7.83e1	-2.48e1	35.9	15.0
	GD-Nesterov			-6.56e1	1.28e1	-7.83e1	-3.59e1	29.1	10.0
	L-BFGS-MoreThuente			-7.41e1	6.47e0	-7.83e1	-6.42e1	54.1	70.0
	GD-AdaptiveMomentum			-3.87e1	1.37e1	-7.83e1	-1.65e1	24.4	5.0
	Trust Region-Aggressive			-6.43e1	2.56e1	-7.83e1	3.64e-1	49.3	20.0
	Adam-Robust			-5.32e1	3.79e0	-6.12e1	-4.49e1	2502.0	0.0
	Adam-AMSGrad			-7.50e1	4.47e0	-8.10e1	-6.56e1	2502.0	0.0
	Adam			-7.38e1	4.48e0	-8.30e1	-6.64e1	2502.0	0.0
	Adam-WeightDecay			-1.90e2	6.36e0	-1.95e2	-1.82e2	1865.5	65.0
	L-BFGS-Aggressive			-1.04e2	4.24e1	-1.83e2	-1.25e1	3847.9	0.0
	Trust Region-Precise			-6.28e1	7.02e-1	-6.40e1	-6.17e1	3002.0	0.0
	Trust Region-Conservative			-1.05e1	7.12e-1	-1.22e1	-9.39e0	3002.0	0.0
	Trust Region-Adaptive			-1.88e2	1.11e1	-1.95e2	-1.67e2	2249.5	65.0
	L-BFGS-Conservative			-1.89e2	1.03e1	-1.95e2	-1.59e2	567.8	65.0
	L-BFGS-Limited			-1.89e2	6.97e0	-1.96e2	-1.82e2	839.9	50.0
	QQN-StrongWolfe			-1.85e2	1.08e1	-1.96e2	-1.53e2	261.1	40.0
	QQN-Bisection-1			-1.89e2	8.22e0	-1.96e2	-1.68e2	413.4	60.0
	QQN-GoldenSection			-1.90e2	9.30e0	-1.96e2	-1.68e2	330.5	70.0
	QQN-Bisection-2			-1.89e2	9.39e0	-1.96e2	-1.68e2	177.8	60.0
	QQN-CubicQuadraticInterpolation			-1.82e2	1.48e1	-1.96e2	-1.53e2	129.7	45.0
	L-BFGS-MoreThuente			-1.89e2	6.99e0	-1.96e2	-1.82e2	209.2	50.0
	Trust Region-Standard			-1.88e2	8.33e0	-1.96e2	-1.67e2	568.8	55.0
	GD			-1.86e2	1.17e1	-1.95e2	-1.53e2	95.7	50.0
	L-BFGS			-1.86e2	7.77e0	-1.96e2	-1.74e2	153.3	30.0
	GD-Momentum			-1.64e2	3.72e1	-1.95e2	-7.54e1	57.8	15.0
	GD-WeightDecay			-1.88e2	1.04e1	-1.96e2	-1.53e2	53.1	60.0
	GD-Nesterov			-1.82e2	1.85e1	-1.96e2	-1.16e2	44.9	30.0
	Adam-Fast			-1.86e2	1.14e1	-1.96e2	-1.62e2	65.0	55.0
	GD-AdaptiveMomentum			-1.35e2	3.62e1	-1.95e2	-7.45e1	34.4	10.0
	Trust Region-Aggressive			-1.90e2	1.11e1	-1.96e2	-1.53e2	144.5	45.0
	Adam-Robust			-1.05e2	5.69e0	-1.13e2	-9.23e1	2502.0	0.0
	Adam-AMSGrad			-1.51e2	6.41e0	-1.63e2	-1.38e2	2502.0	0.0
	Adam			-1.49e2	8.21e0	-1.65e2	-1.36e2	2502.0	0.0
	Adam-WeightDecay			-3.73e2	6.63e0	-3.78e2	-3.63e2	1837.7	35.0
	L-BFGS-Aggressive			-1.97e2	5.94e1	-3.07e2	-3.33e1	3848.4	0.0
	Trust Region-Precise			-6.35e1	9.97e-1	-6.56e1	-6.19e1	3002.0	0.0

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
	Trust Region-Conservative			-1.09e1	7.10e-1	-1.25e1	-9.28e0	3002.0	0.0
	Trust Region-Adaptive			-2.51e2	1.09e0	-2.54e2	-2.49e2	3002.0	0.0
	L-BFGS-Conservative			-3.74e2	8.27e0	-3.82e2	-3.49e2	543.3	30.0
	QQN-StrongWolfe			-3.60e2	1.80e1	-3.86e2	-3.21e2	362.2	15.0
	QQN-Bisection-1			-3.74e2	9.58e0	-3.89e2	-3.49e2	412.5	30.0
	QQN-GoldenSection			-3.76e2	1.20e1	-3.91e2	-3.49e2	452.4	45.0
	L-BFGS-Limited			-3.76e2	7.70e0	-3.86e2	-3.63e2	550.6	35.0
	Trust Region-Standard			-3.68e2	1.96e1	-3.79e2	-3.00e2	1120.5	40.0
	QQN-CubicQuadraticInterpolation			-3.66e2	1.97e1	-3.91e2	-3.21e2	172.1	15.0
	QQN-Bisection-2			-3.72e2	1.22e1	-3.90e2	-3.49e2	234.2	35.0
	GD			-3.71e2	9.86e0	-3.80e2	-3.49e2	137.3	25.0
	GD-Momentum			-3.59e2	3.83e1	-3.82e2	-1.98e2	86.2	15.0
	GD-WeightDecay			-3.75e2	9.86e0	-3.83e2	-3.49e2	74.7	45.0
	L-BFGS-MoreThuente			-3.76e2	1.18e1	-3.91e2	-3.49e2	125.9	35.0
	Trust Region-Aggressive			-3.71e2	1.92e1	-3.81e2	-3.13e2	284.1	50.0
	GD-Nesterov			-3.75e2	7.32e0	-3.83e2	-3.60e2	65.9	30.0
	L-BFGS			-3.76e2	1.21e1	-3.90e2	-3.46e2	132.2	45.0
Beale_2D	GD-AdaptiveMomentum			-3.21e2	6.46e1	-3.82e2	-1.87e2	53.4	20.0
	Adam-Fast			-3.65e2	1.28e1	-3.85e2	-3.50e2	67.5	30.0
	Adam-AMSGrad			2.17e-1	7.60e-2	8.70e-2	3.95e-1	2502.0	0.0
	Adam-Robust			4.58e-1	2.48e-1	1.68e-1	1.07e0	2502.0	0.0
	Adam			7.19e-2	3.00e-2	3.04e-2	1.57e-1	2502.0	0.0
	Adam-WeightDecay			1.50e-2	2.32e-5	1.49e-2	1.50e-2	1539.9	100.0
	QQN-StrongWolfe			4.59e-1	1.93e0	3.96e-3	8.88e0	786.0	90.0
	L-BFGS-Aggressive			1.39e1	3.00e0	8.86e0	2.02e1	3851.9	0.0
	Trust Region-Conservative			4.33e0	3.19e0	9.92e-3	1.29e1	2999.7	5.0
	QQN-CubicQuadraticInterpolation			4.97e-1	2.13e0	2.46e-3	9.79e0	218.8	95.0
	QQN-Bisection-1			4.13e-1	1.77e0	4.49e-3	8.13e0	277.4	95.0
	GD			1.49e-2	4.62e-5	1.49e-2	1.50e-2	229.2	100.0
	QQN-GoldenSection			6.90e-3	2.42e-3	2.42e-3	9.87e-3	347.2	100.0
	L-BFGS-Conservative			1.17e-2	2.95e-3	5.27e-3	1.49e-2	200.7	100.0
	Trust Region-Precise			2.17e-2	1.24e-2	3.20e-3	4.17e-2	743.8	45.0
	GD-WeightDecay			1.48e-2	1.25e-4	1.46e-2	1.49e-2	88.0	100.0
	QQN-Bisection-2			2.61e0	3.98e0	3.70e-3	9.20e0	83.8	70.0
	L-BFGS			4.55e-1	8.11e-1	1.99e-3	3.15e0	122.0	65.0
	L-BFGS-Limited			1.00e-2	4.71e-3	3.68e-4	1.49e-2	110.5	100.0
	L-BFGS-MoreThuente			8.71e-3	4.80e-3	3.68e-4	1.50e-2	78.1	100.0
	Trust Region-Adaptive			1.27e-1	1.01e-1	3.79e-2	5.20e-1	179.6	0.0
	GD-AdaptiveMomentum			3.09e-1	7.01e-1	6.42e-4	2.11e0	25.5	80.0
	GD-Nesterov			9.18e-3	2.78e-3	4.69e-3	1.44e-2	27.7	100.0
	Adam-Fast			1.59e0	1.58e-1	1.39e0	1.86e0	37.6	0.0
	GD-Momentum			1.32e0	9.54e-1	1.20e-2	2.68e0	24.4	5.0
Levi_2D	Trust Region-Standard			2.71e2	1.18e3	1.24e-1	5.41e3	50.2	0.0
	Trust Region-Aggressive			1.23e0	4.13e-1	1.33e-3	1.91e0	17.8	5.0
	L-BFGS-Aggressive			2.87e0	8.03e-1	1.00e0	4.17e0	3851.3	0.0
	QQN-StrongWolfe			1.44e0	9.74e-1	1.40e-1	3.07e0	450.4	25.0
	L-BFGS-Limited			9.89e-1	6.68e-1	1.13e-1	2.50e0	828.4	25.0
	QQN-CubicQuadraticInterpolation			1.04e0	8.94e-1	1.50e-1	2.75e0	189.6	40.0
	Adam-AMSGrad			1.91e0	1.49e-1	1.43e0	1.98e0	282.9	0.0
	Adam			1.93e0	1.42e-1	1.43e0	1.98e0	242.4	0.0
	QQN-GoldenSection			9.83e-1	8.11e-1	1.87e-2	1.98e0	262.0	45.0
	L-BFGS-Conservative			1.94e0	1.32e-1	1.43e0	1.98e0	209.4	0.0
	QQN-Bisection-1			1.30e0	7.24e-1	1.54e-1	2.44e0	200.7	15.0
	Trust Region-Conservative			1.95e0	3.47e-1	1.07e0	2.75e0	490.0	0.0
	Adam-WeightDecay			1.95e0	2.71e-1	1.44e0	2.76e0	99.6	0.0
	L-BFGS			4.40e0	4.35e0	1.84e-1	1.60e1	107.2	15.0
	QQN-Bisection-2			1.08e0	8.03e-1	4.47e-2	1.98e0	77.5	20.0
	L-BFGS-MoreThuente			1.48e0	6.68e-1	1.36e-1	1.98e0	86.2	15.0
	Adam-Robust			1.88e0	2.51e-1	1.08e0	2.01e0	42.6	0.0
	Adam-Fast			2.09e0	2.68e-1	1.47e0	2.78e0	47.2	0.0
	GD-WeightDecay			2.00e0	4.00e-1	1.19e0	2.77e0	28.1	0.0
	GD-AdaptiveMomentum			2.06e0	3.04e-1	1.28e0	3.01e0	18.7	0.0
	Trust Region-Precise			2.04e0	3.89e-1	1.43e0	3.38e0	76.8	0.0
	GD			2.04e0	4.26e-1	1.43e0	3.11e0	21.9	0.0
	GD-Momentum			2.02e0	5.27e-1	7.01e-1	2.71e0	19.0	0.0
	GD-Nesterov			1.93e0	3.46e-1	7.77e-1	2.32e0	15.2	0.0
	Trust Region-Adaptive			2.09e0	5.10e-1	1.46e0	4.04e0	29.6	0.0
	Trust Region-Standard			2.18e0	4.89e-1	1.43e0	3.40e0	10.7	0.0

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Table 1 – continued from previous page

	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
GoldsteinPrice_2D		Trust Region-Aggressive				1.33e2	5.68e2	1.02e0	2.61e3	6.3	0.0
		L-BFGS-Limited				8.41e1	3.33e-1	8.40e1	8.54e1	4259.4	0.0
		L-BFGS-Aggressive				8.60e2	1.24e1	8.43e2	9.02e2	3847.0	0.0
		Trust Region-Conservative				2.12e3	1.02e3	8.97e2	4.67e3	3002.0	0.0
		Trust Region-Precise				2.20e3	1.09e3	8.40e2	4.16e3	2943.8	0.0
		Trust Region-Adaptive				2.09e3	1.19e3	8.40e2	4.29e3	2649.8	0.0
		QQN-StrongWolfe				8.34e1	2.81e0	7.11e1	8.40e1	552.0	15.0
		Adam-AMSGrad				8.40e2	3.17e-2	8.40e2	8.40e2	603.6	0.0
		Adam				8.40e2	3.55e-2	8.40e2	8.40e2	597.1	0.0
		QQN-CubicQuadraticInterpolation				2.71e2	3.24e2	8.40e1	8.40e2	291.6	15.0
		L-BFGS-MoreThuente				1.19e2	1.66e2	2.24e1	8.40e2	621.9	5.0
		Trust Region-Standard				1.22e3	6.11e2	8.40e2	2.65e3	1684.8	0.0
		QQN-Bisection-1				8.40e1	1.50e-11	8.40e1	8.40e1	362.8	20.0
		QQN-GoldenSection				8.40e1	3.02e-11	8.40e1	8.40e1	383.2	35.0
		L-BFGS-Conservative				8.44e2	1.17e1	8.40e2	8.81e2	346.4	0.0
		Adam-WeightDecay				8.40e2	2.73e-1	8.40e2	8.41e2	209.7	0.0
		Trust Region-Aggressive				9.54e2	4.95e2	8.40e2	3.11e3	725.5	0.0
		L-BFGS				8.00e2	8.72e2	6.35e1	3.89e3	176.8	5.0
		Adam-Robust				8.41e2	1.02e0	8.40e2	8.43e2	81.0	0.0
		QQN-Bisection-2				1.58e2	1.99e2	8.40e1	8.40e2	21.2	5.0
		GD-Nesterov				8.57e2	1.92e1	8.40e2	9.22e2	24.6	0.0
		Adam-Fast				8.55e2	1.83e1	8.40e2	9.15e2	35.3	0.0
		GD-AdaptiveMomentum				8.45e2	4.79e0	8.41e2	8.57e2	19.9	0.0
		GD				8.50e2	4.11e0	8.41e2	8.55e2	24.6	0.0
		GD-WeightDecay				8.57e2	1.90e1	8.40e2	9.08e2	20.3	0.0
Matyas_2D		GD-Momentum				8.98e2	2.94e2	9.88e1	1.93e3	17.9	0.0
		GD				2.50e-2	5.93e-6	2.50e-2	2.50e-2	629.6	100.0
		Adam-AMSGrad				2.50e-2	1.14e-5	2.50e-2	2.50e-2	680.7	100.0
		Adam				2.50e-2	1.45e-5	2.49e-2	2.50e-2	624.2	100.0
		GD-WeightDecay				2.50e-2	1.46e-5	2.50e-2	2.50e-2	223.7	100.0
		Adam-WeightDecay				2.49e-2	5.00e-5	2.48e-2	2.50e-2	221.4	100.0
		GD-Nesterov				2.49e-2	5.97e-5	2.48e-2	2.50e-2	71.0	100.0
		GD-Momentum				2.49e-2	6.76e-5	2.48e-2	2.50e-2	67.2	100.0
		L-BFGS-Aggressive				2.44e-2	3.00e-3	2.16e-2	3.66e-2	217.4	95.0
		Adam-Robust				2.48e-2	1.11e-4	2.46e-2	2.50e-2	79.0	100.0
		QQN-GoldenSection				1.55e-2	6.76e-3	1.12e-3	2.47e-2	138.9	100.0
		GD-AdaptiveMomentum				2.52e-2	2.56e-3	2.42e-2	3.63e-2	29.2	95.0
		QQN-Bisection-2				1.49e-2	6.16e-3	8.19e-4	2.50e-2	40.9	100.0
		QQN-CubicQuadraticInterpolation				1.07e-2	9.48e-3	2.70e-30	2.47e-2	34.0	100.0
		QQN-Bisection-1				1.91e-2	5.76e-3	2.83e-3	2.50e-2	34.2	100.0
		L-BFGS-Conservative				2.30e-2	1.27e-3	2.07e-2	2.49e-2	39.0	100.0
		QQN-StrongWolfe				2.73e-29	3.90e-29	1.77e-32	1.69e-28	24.0	100.0
		L-BFGS-Limited				1.73e-2	5.34e-3	7.16e-3	2.46e-2	24.6	100.0
		L-BFGS				1.47e-2	9.70e-3	5.88e-4	2.50e-2	20.1	100.0
		Adam-Fast				2.30e-2	1.45e-3	1.98e-2	2.49e-2	12.9	100.0
		L-BFGS-MoreThuente				1.72e-2	8.74e-3	2.59e-5	2.46e-2	20.8	100.0
		Trust Region-Standard				2.41e-1	1.19e-1	3.14e-2	3.36e-1	7.2	0.0
		Trust Region-Precise				4.71e-2	8.16e-3	3.00e-2	5.69e-2	5.0	0.0
		Trust Region-Adaptive				6.88e-2	1.85e-2	2.83e-2	8.71e-2	7.0	0.0
		Trust Region-Conservative				3.93e-2	6.90e-3	2.66e-2	5.75e-2	7.0	0.0
Himmelblau_2D		Trust Region-Aggressive				6.67e-1	6.95e-1	2.86e-2	1.50e0	6.3	0.0
		Adam-Robust				1.05e2	5.73e0	9.10e1	1.15e2	2502.0	0.0
		Adam-AMSGrad				8.17e1	5.99e0	7.19e1	9.17e1	2502.0	0.0
		Adam				8.20e1	5.99e0	7.20e1	9.40e1	2502.0	0.0
		Adam-WeightDecay				2.41e-1	4.02e-3	2.34e-1	2.48e-1	1744.1	100.0
		L-BFGS-Aggressive				3.44e1	1.81e1	4.95e0	7.59e1	3850.9	0.0
		Trust Region-Precise				1.07e2	3.03e0	1.02e2	1.12e2	3002.0	0.0
		Trust Region-Conservative				1.60e2	3.17e0	1.52e2	1.65e2	3002.0	0.0
		Trust Region-Adaptive				1.32e-1	5.93e-2	7.13e-2	2.46e-1	2048.1	100.0
		L-BFGS-Conservative				2.03e-1	2.91e-2	1.42e-1	2.47e-1	264.2	100.0
		Trust Region-Standard				1.50e-1	8.67e-2	3.76e-3	3.03e-1	516.7	80.0
		QQN-Bisection-1				1.09e-1	4.94e-2	2.06e-2	2.13e-1	107.9	100.0
		QQN-CubicQuadraticInterpolation				9.46e-2	7.76e-2	5.19e-3	2.45e-1	68.0	100.0
		Adam-Fast				5.29e0	2.08e-1	4.98e0	5.82e0	69.3	0.0
		QQN-StrongWolfe				9.18e-2	6.79e-2	9.60e-3	2.15e-1	61.5	100.0
		L-BFGS				6.22e0	5.64e0	1.56e-2	1.80e1	93.7	35.0
		QQN-GoldenSection				7.91e-2	6.51e-2	1.17e-4	2.36e-1	102.8	100.0
		QQN-Bisection-2				8.17e-2	6.08e-2	2.27e-3	2.05e-1	55.1	100.0

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Table 1 – continued from previous page

	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
Booth_2D		L-BFGS-Limited				9.58e-2	8.02e-2	7.81e-3	2.40e-1	60.9	100.0
		GD				1.53e-1	6.88e-2	2.80e-2	2.41e-1	42.9	100.0
		GD-WeightDecay				3.93e-1	4.16e-1	8.90e-2	1.20e0	29.6	75.0
		Trust Region-Aggressive				6.71e-1	4.77e-1	1.80e-2	1.52e0	133.1	25.0
		GD-Nesterov				9.49e0	7.94e0	3.27e-2	2.11e1	26.7	40.0
		GD-AdaptiveMomentum				6.94e1	3.44e0	5.87e1	7.33e1	22.8	0.0
		GD-Momentum				4.37e1	1.60e1	3.43e0	7.63e1	24.3	0.0
		L-BFGS-MoreThuente				1.02e-1	7.28e-2	8.92e-3	2.39e-1	36.3	100.0
		Adam-AMSGrad				1.19e1	2.01e0	8.69e0	1.53e1	2502.0	0.0
		Adam-Robust				2.03e1	2.55e0	1.43e1	2.49e1	2502.0	0.0
Griewank_2D		Adam				1.20e1	2.17e0	8.76e0	1.67e1	2502.0	0.0
		Adam-WeightDecay				1.19e-1	3.80e-4	1.19e-1	1.20e-1	1886.3	100.0
		L-BFGS-Aggressive				7.43e1	5.77e0	6.24e1	8.60e1	3852.0	0.0
		Trust Region-Precise				1.05e1	5.90e0	2.82e0	2.22e1	3002.0	0.0
		Trust Region-Conservative				6.49e1	6.14e0	5.04e1	7.80e1	3002.0	0.0
		Trust Region-Adaptive				6.12e-2	3.24e-2	2.38e-2	1.24e-1	919.9	90.0
		L-BFGS-Conservative				1.10e-1	5.23e-3	1.03e-1	1.20e-1	208.0	100.0
		QQN-Bisection-1				1.87e-2	1.86e-2	1.21e-2	9.94e-2	162.4	100.0
		GD				1.17e-1	1.31e-3	1.15e-1	1.20e-1	86.0	100.0
		QQN-Bisection-2				1.49e-2	2.92e-3	1.15e-2	2.20e-2	100.0	100.0
Griewank_5D		Trust Region-Standard				5.27e-1	1.54e-1	3.46e-1	7.93e-1	235.1	0.0
		QQN-CubicQuadraticInterpolation				2.56e-6	2.13e-6	2.81e-7	7.40e-6	56.0	100.0
		Adam-Fast				3.09e0	2.17e-1	2.74e0	3.45e0	56.3	0.0
		L-BFGS-Limited				6.14e-2	3.83e-2	2.04e-3	1.13e-1	56.1	100.0
		QQN-GoldenSection				3.39e-2	1.16e-2	1.60e-2	5.86e-2	92.0	100.0
		GD-WeightDecay				1.29e0	5.10e-1	1.15e-1	1.73e0	27.0	15.0
		GD-AdaptiveMomentum				9.51e0	8.38e-1	8.56e0	1.11e1	21.0	0.0
		GD-Nesterov				2.56e0	2.92e-1	2.10e0	2.95e0	20.6	0.0
		L-BFGS				4.05e-2	1.53e-2	1.17e-2	6.97e-2	42.4	100.0
		GD-Momentum				7.27e0	3.58e-1	6.20e0	8.01e0	21.2	0.0
Griewank_5D		Trust Region-Aggressive				1.49e0	4.64e-1	4.00e-1	2.38e0	63.5	0.0
		L-BFGS-MoreThuente				3.86e-2	3.42e-2	5.15e-4	1.13e-1	29.7	100.0
		QQN-StrongWolfe				1.13e-2	7.50e-4	9.93e-3	1.29e-2	26.0	100.0
		Adam-AMSGrad				5.24e0	4.70e-2	5.16e0	5.30e0	2502.0	0.0
		Adam-Robust				5.36e0	6.83e-2	5.26e0	5.48e0	2502.0	0.0
		L-BFGS-Aggressive				4.91e0	7.72e-3	4.91e0	4.95e0	2427.6	0.0
		Adam				5.24e0	4.43e-2	5.16e0	5.30e0	2502.0	0.0
		Adam-WeightDecay				4.92e0	2.42e-6	4.92e0	4.92e0	2231.2	0.0
		GD				4.91e0	3.24e-8	4.91e0	4.91e0	1668.0	0.0
		L-BFGS-Limited				4.91e0	4.49e-8	4.91e0	4.91e0	927.3	0.0
Griewank_5D		QQN-StrongWolfe				4.74e0	3.50e-1	3.76e0	4.91e0	347.6	0.0
		GD-WeightDecay				4.91e0	1.03e-7	4.91e0	4.91e0	406.6	0.0
		L-BFGS-Conservative				4.91e0	3.09e-9	4.91e0	4.91e0	504.6	0.0
		L-BFGS				4.91e0	3.75e-8	4.91e0	4.91e0	295.6	0.0
		QQN-GoldenSection				4.91e0	1.03e-13	4.91e0	4.91e0	258.3	0.0
		GD-Nesterov				4.91e0	1.90e-4	4.91e0	4.91e0	125.0	0.0
		GD-Momentum				4.91e0	4.49e-4	4.91e0	4.91e0	100.2	0.0
		Trust Region-Conservative				4.92e0	2.48e-3	4.91e0	4.92e0	336.5	0.0
		QQN-CubicQuadraticInterpolation				4.80e0	4.73e-1	2.74e0	4.91e0	77.3	0.0
		QQN-Bisection-2				4.66e0	2.21e-1	4.25e0	4.91e0	94.6	0.0
Griewank_5D		QQN-Bisection-1				4.91e0	1.27e-13	4.91e0	4.91e0	76.3	0.0
		Adam-Fast				4.93e0	6.09e-3	4.92e0	4.94e0	67.0	0.0
		L-BFGS-MoreThuente				4.91e0	1.88e-7	4.91e0	4.91e0	73.0	0.0
		GD-AdaptiveMomentum				4.99e0	5.58e-3	4.97e0	5.00e0	32.0	0.0
		Trust Region-Precise				4.95e0	1.38e-2	4.93e0	4.97e0	58.7	0.0
		Trust Region-Adaptive				5.11e0	1.18e-1	5.00e0	5.54e0	16.4	0.0
		Trust Region-Aggressive				6.00e0	6.58e-2	5.90e0	6.12e0	5.0	0.0
		Trust Region-Standard				5.99e0	7.24e-2	5.90e0	6.16e0	5.0	0.0
		QQN-StrongWolfe				1.09e1	2.09e0	5.74e0	1.33e1	1535.0	0.0
		Adam-Robust				1.29e1	6.91e-2	1.28e1	1.30e1	2502.0	0.0
Griewank_5D		Adam-AMSGrad				1.25e1	2.91e-2	1.25e1	1.26e1	2502.0	0.0
		Adam				1.25e1	2.35e-2	1.25e1	1.25e1	2502.0	0.0
		GD				1.22e1	1.06e-3	1.22e1	1.22e1	1668.0	0.0
		Adam-WeightDecay				1.23e1	6.65e-3	1.23e1	1.23e1	1651.7	0.0
		GD-WeightDecay				1.22e1	1.86e-5	1.22e1	1.22e1	915.3	0.0
		QQN-Bisection-2				1.21e1	5.61e-1	9.76e0	1.22e1	984.9	0.0
		QQN-GoldenSection				1.12e1	3.02e0	1.62e0	1.22e1	1154.2	0.0
		QQN-Bisection-1				1.06e1	3.32e0	2.18e0	1.22e1	872.0	0.0

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Table 1 – continued from previous page

	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
		L-BFGS-Conservative			1.22e1	5.00e-9	1.22e1	1.22e1	705.6	0.0
		L-BFGS-Limited			1.22e1	6.36e-8	1.22e1	1.22e1	632.5	0.0
		L-BFGS-Aggressive			1.09e1	2.56e0	5.15e0	1.22e1	1097.7	0.0
		GD-Nesterov			1.22e1	3.21e-9	1.22e1	1.22e1	394.2	0.0
		GD-Momentum			1.22e1	2.51e-9	1.22e1	1.22e1	387.2	0.0
		L-BFGS			1.22e1	4.05e-3	1.22e1	1.23e1	259.7	0.0
		GD-AdaptiveMomentum			1.23e1	3.47e-2	1.22e1	1.23e1	133.1	0.0
		QQN-CubicQuadraticInterpolation			1.28e1	2.58e-1	1.22e1	1.32e1	115.1	0.0
		Trust Region-Conservative			1.23e1	2.20e-3	1.23e1	1.23e1	380.4	0.0
		L-BFGS-MoreThuente			1.22e1	2.35e-7	1.22e1	1.22e1	118.5	0.0
		Adam-Fast			1.23e1	1.71e-2	1.22e1	1.23e1	67.1	0.0
		Trust Region-Precise			1.34e1	3.58e-1	1.23e1	1.36e1	11.4	0.0
		Trust Region-Adaptive			1.35e1	3.00e-2	1.34e1	1.35e1	5.0	0.0
		Trust Region-Standard			1.35e1	2.54e-2	1.34e1	1.36e1	5.0	0.0
Griewank_10D		Trust Region-Aggressive			1.35e1	2.50e-2	1.35e1	1.35e1	5.0	0.0
		QQN-StrongWolfe			6.06e0	1.00e1	9.86e-3	2.60e1	2281.2	0.0
		QQN-GoldenSection			2.35e1	6.71e0	2.19e0	2.58e1	4343.6	0.0
		QQN-Bisection-2			2.33e1	7.17e0	1.67e0	2.58e1	3260.0	0.0
		QQN-Bisection-1			2.19e1	9.08e0	5.93e-10	2.58e1	2381.1	5.0
		Adam-AMSGrad			2.54e1	2.09e-2	2.53e1	2.54e1	2502.0	0.0
		Adam-Robust			2.55e1	2.00e-2	2.55e1	2.55e1	2502.0	0.0
		Adam-WeightDecay			2.42e1	1.44e-2	2.41e1	2.42e1	2502.0	0.0
		L-BFGS-Limited			1.95e1	3.46e0	8.48e0	2.38e1	2256.7	0.0
		GD-WeightDecay			2.48e1	3.83e-2	2.48e1	2.49e1	1668.0	0.0
		GD-Nesterov			2.21e1	2.17e-1	2.15e1	2.23e1	1668.0	0.0
		Adam			2.54e1	2.20e-2	2.53e1	2.54e1	2502.0	0.0
		L-BFGS-Aggressive			6.09e0	5.66e0	1.01e0	2.16e1	3817.8	0.0
		GD-Momentum			2.20e1	3.14e-1	2.16e1	2.24e1	1668.0	0.0
		L-BFGS-Conservative			2.33e1	1.54e0	2.01e1	2.49e1	1668.3	0.0
		GD			2.56e1	2.73e-2	2.55e1	2.57e1	1668.0	0.0
		GD-AdaptiveMomentum			1.90e1	3.00e0	1.39e1	2.12e1	920.4	0.0
		Adam-Fast			1.17e1	3.56e0	2.89e0	1.50e1	950.2	0.0
		Trust Region-Conservative			2.08e1	2.32e0	1.60e1	2.43e1	1557.3	0.0
		L-BFGS			1.93e1	3.27e0	1.20e1	2.43e1	483.9	0.0
		L-BFGS-MoreThuente			1.42e1	5.29e0	1.93e0	2.12e1	499.3	0.0
		QQN-CubicQuadraticInterpolation			2.45e1	5.40e0	9.67e-1	2.58e1	108.6	0.0
		Trust Region-Precise			2.60e1	1.72e-2	2.60e1	2.60e1	5.0	0.0
		Trust Region-Aggressive			2.60e1	1.61e-2	2.60e1	2.60e1	5.0	0.0
		Trust Region-Adaptive			2.60e1	1.74e-2	2.60e1	2.60e1	5.0	0.0
Schwefel_2D		Trust Region-Standard			2.60e1	2.15e-2	2.60e1	2.60e1	5.0	0.0
		Adam-Robust			9.37e2	6.80e-1	9.36e2	9.39e2	2502.0	0.0
		Adam-AMSGrad			9.35e2	7.05e-1	9.34e2	9.36e2	2502.0	0.0
		L-BFGS-Conservative			7.11e2	3.94e-8	7.11e2	7.11e2	2095.3	0.0
		Adam-WeightDecay			9.10e2	8.43e-1	9.09e2	9.12e2	2502.0	0.0
		Adam			9.35e2	7.54e-1	9.33e2	9.36e2	2502.0	0.0
		GD			7.11e2	9.48e-4	7.11e2	7.11e2	1668.0	0.0
		Adam-Fast			7.11e2	9.21e-8	7.11e2	7.11e2	1972.4	0.0
		GD-WeightDecay			7.11e2	1.75e-8	7.11e2	7.11e2	1115.0	0.0
		Trust Region-Conservative			9.37e2	8.10e-1	9.35e2	9.39e2	3002.0	0.0
		Trust Region-Precise			8.84e2	7.64e-1	8.83e2	8.86e2	3002.0	0.0
		Trust Region-Adaptive			7.11e2	6.05e-2	7.11e2	7.11e2	2834.8	0.0
		QQN-StrongWolfe			-7.26e2	2.56e3	-1.07e4	5.92e2	379.3	50.0
		L-BFGS-Limited			7.11e2	7.58e-7	7.11e2	7.11e2	513.3	0.0
		GD-Nesterov			7.11e2	1.78e-7	7.11e2	7.11e2	292.6	0.0
		L-BFGS			7.11e2	5.60e-4	7.11e2	7.11e2	292.1	0.0
		GD-Momentum			7.11e2	1.13e-7	7.11e2	7.11e2	277.4	0.0
		Trust Region-Standard			7.12e2	2.41e-1	7.12e2	7.12e2	711.8	0.0
		L-BFGS-MoreThuente			7.11e2	1.08e-4	7.11e2	7.11e2	147.6	0.0
		GD-AdaptiveMomentum			7.12e2	3.92e-2	7.12e2	7.12e2	89.0	0.0
		QQN-GoldenSection			7.11e2	1.80e-4	7.11e2	7.11e2	145.1	0.0
		L-BFGS-Aggressive			7.11e2	2.18e-2	7.11e2	7.11e2	101.0	0.0
		QQN-CubicQuadraticInterpolation			7.11e2	0.00e0	7.11e2	7.11e2	57.9	0.0
		Trust Region-Aggressive			7.17e2	6.24e-1	7.16e2	7.18e2	179.0	0.0
		QQN-Bisection-1			7.11e2	3.40e-13	7.11e2	7.11e2	47.6	0.0
Schwefel_5D		QQN-Bisection-2			7.11e2	0.00e0	7.11e2	7.11e2	50.9	0.0
		L-BFGS-Conservative			1.78e3	1.53e-7	1.78e3	1.78e3	2163.4	0.0
		Adam-Robust			2.34e3	1.19e0	2.34e3	2.34e3	2502.0	0.0
		Adam-AMSGrad			2.34e3	1.27e0	2.34e3	2.34e3	2502.0	0.0

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	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
Schwefel_10D		Adam-WeightDecay				2.28e3	1.09e0	2.27e3	2.28e3	2502.0	0.0
		Adam				2.34e3	1.25e0	2.33e3	2.34e3	2502.0	0.0
		GD				1.78e3	1.99e-3	1.78e3	1.78e3	1668.0	0.0
		Adam-Fast				1.78e3	1.99e-7	1.78e3	1.78e3	1907.4	0.0
		GD-WeightDecay				1.78e3	4.13e-8	1.78e3	1.78e3	1124.1	0.0
		Trust Region-Conservative				2.36e3	1.17e0	2.35e3	2.36e3	3002.0	0.0
		Trust Region-Precise				2.30e3	1.15e0	2.30e3	2.31e3	3002.0	0.0
		Trust Region-Adaptive				2.12e3	1.37e0	2.11e3	2.12e3	3002.0	0.0
		L-BFGS-Limited				1.79e3	5.71e1	1.78e3	2.04e3	661.0	0.0
		QQN-StrongWolfe				-1.74e3	7.34e3	-3.30e4	1.48e3	349.1	50.0
		Trust Region-Standard				1.78e3	2.49e-1	1.78e3	1.78e3	1774.8	0.0
		GD-Nesterov				1.78e3	2.86e-7	1.78e3	1.78e3	339.1	0.0
		GD-Momentum				1.78e3	2.50e-7	1.78e3	1.78e3	323.9	0.0
		L-BFGS				1.78e3	5.48e-4	1.78e3	1.78e3	325.7	0.0
		GD-AdaptiveMomentum				1.78e3	1.03e-1	1.78e3	1.78e3	124.3	0.0
		L-BFGS-MoreThuente				1.78e3	9.47e-6	1.78e3	1.78e3	158.2	0.0
		Trust Region-Aggressive				1.78e3	9.61e-1	1.78e3	1.78e3	446.0	0.0
		QQN-GoldenSection				1.78e3	4.96e-13	1.78e3	1.78e3	149.4	0.0
		L-BFGS-Aggressive				1.78e3	4.59e-2	1.78e3	1.78e3	101.0	0.0
		QQN-CubicQuadraticInterpolation				1.78e3	4.55e-13	1.78e3	1.78e3	57.3	0.0
		QQN-Bisection-1				1.78e3	4.55e-13	1.78e3	1.78e3	52.0	0.0
		QQN-Bisection-2				1.78e3	4.69e-13	1.78e3	1.78e3	52.0	0.0
		Adam-Robust				4.69e3	1.88e0	4.68e3	4.69e3	2502.0	0.0
		L-BFGS-Conservative				3.55e3	2.96e-7	3.55e3	3.55e3	2188.9	0.0
		Adam-AMSGrad				4.67e3	1.85e0	4.67e3	4.68e3	2502.0	0.0
		Adam-WeightDecay				4.55e3	1.50e0	4.55e3	4.56e3	2502.0	0.0
		Adam				4.67e3	2.21e0	4.67e3	4.68e3	2502.0	0.0
		GD				3.55e3	8.86e-3	3.55e3	3.55e3	1668.0	0.0
		GD-WeightDecay				3.55e3	6.30e-8	3.55e3	3.55e3	1194.6	0.0
		Adam-Fast				3.55e3	1.08e-7	3.55e3	3.55e3	1628.7	0.0
		Trust Region-Adaptive				4.48e3	1.82e0	4.48e3	4.49e3	3002.0	0.0
		Trust Region-Conservative				4.72e3	1.20e0	4.72e3	4.73e3	3002.0	0.0
	Trust Region-Precise				4.67e3	1.71e0	4.67e3	4.67e3	3002.0	0.0	
	Trust Region-Standard				3.73e3	2.12e0	3.73e3	3.74e3	3002.0	0.0	
	L-BFGS-Limited				3.55e3	3.01e1	3.42e3	3.55e3	577.7	0.0	
	QQN-StrongWolfe				8.35e2	1.64e3	-2.28e3	2.96e3	395.5	50.0	
	GD-Nesterov				3.55e3	8.72e-7	3.55e3	3.55e3	392.1	0.0	
	GD-Momentum				3.55e3	6.50e-7	3.55e3	3.55e3	380.3	0.0	
	L-BFGS				3.55e3	1.15e-2	3.55e3	3.55e3	300.9	0.0	
	Trust Region-Aggressive				3.56e3	1.17e0	3.56e3	3.56e3	888.8	0.0	
	GD-AdaptiveMomentum				3.55e3	5.29e-2	3.55e3	3.55e3	164.1	0.0	
	L-BFGS-MoreThuente				3.55e3	1.12e-3	3.55e3	3.55e3	159.3	0.0	
	QQN-GoldenSection				3.55e3	9.37e-13	3.55e3	3.55e3	147.8	0.0	
	QQN-Bisection-2				3.55e3	9.09e-13	3.55e3	3.55e3	52.0	0.0	
	L-BFGS-Aggressive				3.55e3	4.65e-2	3.55e3	3.55e3	101.0	0.0	
	QQN-CubicQuadraticInterpolation				3.55e3	1.43e-3	3.55e3	3.55e3	56.9	0.0	
	QQN-Bisection-1				3.55e3	9.09e-13	3.55e3	3.55e3	52.0	0.0	
	Adam-Robust				4.34e-2	2.28e-2	1.83e-2	9.34e-2	2502.0	0.0	
	Adam-AMSGrad				2.61e-2	1.26e-2	1.24e-2	5.59e-2	2502.0	0.0	
	Adam				5.69e-3	3.31e-3	1.60e-3	1.48e-2	2502.0	0.0	
	Adam-WeightDecay				9.83e-7	7.75e-9	9.67e-7	9.98e-7	2229.0	100.0	
	GD-WeightDecay				9.96e-7	1.94e-9	9.93e-7	1.00e-6	1453.5	100.0	
	GD				2.39e-4	2.63e-5	1.85e-4	2.75e-4	1668.0	0.0	
	L-BFGS-Aggressive				6.19e-4	9.61e-4	6.80e-8	2.64e-3	1303.1	70.0	
	L-BFGS-Conservative				9.25e-7	1.12e-6	8.80e-8	5.33e-6	626.6	85.0	
	L-BFGS-Limited				1.05e-6	8.37e-7	1.49e-7	4.54e-6	583.7	95.0	
	L-BFGS				7.38e-3	2.81e-2	1.57e-7	1.29e-1	285.0	80.0	
	L-BFGS-MoreThuente				5.43e-6	2.10e-5	7.84e-9	9.69e-5	286.5	95.0	
	QQN-GoldenSection				1.81e-7	2.48e-7	1.48e-10	8.51e-7	300.9	100.0	
	QQN-Bisection-1				1.15e-7	1.44e-7	2.81e-9	5.10e-7	102.2	100.0	
	QQN-CubicQuadraticInterpolation				8.29e-8	1.84e-7	5.12e-10	8.65e-7	87.6	100.0	
	Trust Region-Conservative				1.34e-2	2.06e-3	9.88e-3	1.65e-2	385.2	0.0	
	QQN-StrongWolfe				2.98e-7	3.89e-7	1.89e-10	9.85e-7	79.0	100.0	
	QQN-Bisection-2				1.80e-7	2.24e-7	2.53e-9	8.17e-7	93.0	100.0	
	Adam-Fast				7.87e-2	4.29e-3	7.26e-2	8.98e-2	36.5	0.0	
	GD-Nesterov				1.31e-1	2.65e-2	9.69e-2	1.81e-1	22.4	0.0	
	GD-Momentum				1.57e-1	2.47e-2	1.15e-1	2.20e-1	22.5	0.0	
	Trust Region-Precise				6.16e-2	3.23e-2	3.16e-2	1.88e-1	70.6	0.0	

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Table 1 – continued from previous page

	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
Levy_5D		GD-AdaptiveMomentum			3.36e-1	5.15e-2	2.35e-1	4.11e-1	16.4	0.0
		Trust Region-Adaptive			1.01e1	2.44e1	6.77e-2	1.07e2	27.2	0.0
		Trust Region-Standard			3.36e0	7.59e0	1.74e-3	2.47e1	18.2	0.0
		Trust Region-Aggressive			1.31e0	2.09e-1	9.21e-1	1.57e0	5.0	0.0
		Adam-AMSGrad			7.64e-2	1.84e-2	5.66e-2	1.23e-1	2502.0	0.0
		Adam-Robust			6.80e-2	2.38e-2	3.18e-2	1.12e-1	2502.0	0.0
		Adam			7.73e-3	2.59e-3	3.13e-3	1.23e-2	2502.0	0.0
		GD-WeightDecay			9.96e-7	2.36e-9	9.93e-7	1.00e-6	1448.8	100.0
		Adam-WeightDecay			1.43e-6	8.78e-7	9.65e-7	3.66e-6	2087.2	60.0
		GD			2.32e-4	2.08e-5	1.98e-4	2.68e-4	1668.0	0.0
		L-BFGS-Limited			2.87e-4	1.19e-3	2.75e-7	5.49e-3	1375.8	70.0
		L-BFGS-Aggressive			2.73e-2	8.04e-2	6.19e-7	2.69e-1	825.3	75.0
		L-BFGS-Conservative			6.68e-7	2.83e-7	1.69e-8	9.92e-7	332.8	100.0
		Trust Region-Conservative			1.23e-2	2.42e-3	8.28e-3	1.73e-2	996.6	0.0
		QQN-GoldenSection			2.57e-7	2.61e-7	1.77e-10	8.61e-7	382.3	100.0
		L-BFGS-MoreThuente			6.91e-7	2.89e-7	1.12e-9	9.44e-7	296.9	100.0
		L-BFGS			4.35e-2	1.89e-1	2.47e-7	8.69e-1	173.6	80.0
		GD-Nesterov			9.57e-2	5.82e-2	9.78e-7	1.77e-1	102.2	25.0
		QQN-CubicQuadraticInterpolation			2.65e-7	2.41e-7	2.28e-9	8.78e-7	96.0	100.0
		QQN-Bisection-1			3.74e-7	3.37e-7	4.32e-9	9.98e-7	103.4	100.0
Levy_10D		QQN-Bisection-2			2.16e-7	2.19e-7	1.51e-10	8.82e-7	101.3	100.0
		QQN-StrongWolfe			3.31e-7	3.09e-7	1.45e-9	9.50e-7	69.2	100.0
		GD-Momentum			1.72e-1	6.34e-2	9.75e-7	2.44e-1	56.5	10.0
		Trust Region-Precise			3.62e-2	1.15e-2	1.69e-2	5.90e-2	168.1	0.0
		Adam-Fast			1.67e-1	6.57e-3	1.54e-1	1.81e-1	37.0	0.0
		GD-AdaptiveMomentum			4.77e-1	4.91e-2	3.80e-1	5.58e-1	19.2	0.0
		Trust Region-Adaptive			1.06e1	3.16e1	4.60e-2	1.07e2	46.9	0.0
		Trust Region-Standard			2.49e0	5.26e0	4.43e-4	2.47e1	26.4	0.0
		Trust Region-Aggressive			4.37e-1	1.99e-1	1.82e-1	1.11e0	8.2	0.0
		Adam-Robust			9.82e-2	2.53e-2	6.13e-2	1.55e-1	2502.0	0.0
		Adam-AMSGrad			1.51e-1	2.79e-2	1.12e-1	2.09e-1	2502.0	0.0
		Adam			6.46e-3	2.05e-3	2.32e-3	1.09e-2	2502.0	0.0
		GD-WeightDecay			9.97e-7	2.35e-9	9.93e-7	1.00e-6	1451.7	100.0
		GD			2.28e-4	3.05e-5	1.85e-4	2.81e-4	1668.0	0.0
		Adam-WeightDecay			2.80e-6	1.09e-6	1.41e-6	5.43e-6	1897.2	0.0
		L-BFGS-Aggressive			1.27e0	8.13e-1	4.01e-7	1.95e0	2637.9	25.0
		L-BFGS-Limited			2.41e-5	9.83e-5	5.25e-7	4.52e-4	1051.8	80.0
		Trust Region-Conservative			1.21e-2	2.16e-3	9.38e-3	1.68e-2	1976.9	0.0
		L-BFGS-Conservative			6.63e-7	2.81e-7	7.05e-8	9.84e-7	365.9	100.0
		QQN-GoldenSection			2.74e-7	3.41e-7	1.87e-10	9.92e-7	399.3	100.0
Zakharov_2D		L-BFGS			3.96e-3	1.37e-2	3.36e-7	6.19e-2	223.2	80.0
		L-BFGS-MoreThuente			7.24e-7	2.59e-7	8.40e-8	9.97e-7	165.1	100.0
		QQN-CubicQuadraticInterpolation			2.83e-7	2.18e-7	2.06e-9	7.21e-7	98.6	100.0
		QQN-Bisection-1			2.49e-7	2.81e-7	1.67e-8	9.80e-7	109.7	100.0
		QQN-Bisection-2			2.70e-7	3.13e-7	1.96e-10	9.48e-7	111.1	100.0
		Trust Region-Precise			3.14e-2	1.13e-2	1.56e-2	5.18e-2	325.6	0.0
		QQN-StrongWolfe			1.46e-7	2.27e-7	7.28e-10	8.42e-7	70.1	100.0
		GD-Nesterov			1.74e-1	1.99e-2	1.40e-1	2.05e-1	28.4	0.0
		GD-Momentum			2.58e-1	3.43e-2	1.93e-1	3.23e-1	28.1	0.0
		Adam-Fast			3.12e-1	1.23e-2	2.89e-1	3.41e-1	36.9	0.0
		GD-AdaptiveMomentum			6.50e-1	3.56e-2	5.54e-1	7.01e-1	21.9	0.0
		Trust Region-Adaptive			7.36e-2	4.00e-2	1.96e-2	1.41e-1	84.5	0.0
		Trust Region-Standard			2.04e0	7.08e0	8.10e-2	3.28e1	29.6	0.0
		Trust Region-Aggressive			6.17e-1	4.58e-1	2.22e-1	1.93e0	11.8	0.0
		Adam-AMSGrad				9.29e-2	2.94e-2	4.85e-2	1.34e-1	2502.0
		Adam-Robust				3.83e-2	2.87e-2	6.91e-3	1.35e-1	2502.0
		Adam				1.77e-3	1.69e-3	5.24e-5	6.40e-3	2502.0
		Adam-WeightDecay				9.88e-9	7.13e-11	9.74e-9	9.97e-9	2040.6
		L-BFGS-Conservative				6.39e-7	1.89e-6	5.41e-10	6.44e-6	863.5
		Trust Region-Conservative				8.84e-1	1.50e0	1.05e-2	6.57e0	2569.1
	L-BFGS-Limited				6.46e-7	2.30e-6	1.04e-9	1.04e-5	658.2	
	GD				9.76e-9	9.66e-11	9.61e-9	9.97e-9	417.4	
	L-BFGS-Aggressive				3.75e0	5.80e0	4.91e-10	1.50e1	1213.0	
	Trust Region-Precise				6.91e-2	9.24e-2	8.62e-3	4.38e-1	503.2	
	QQN-StrongWolfe				4.83e-9	2.70e-9	1.51e-9	9.93e-9	95.0	
	L-BFGS				2.88e-2	5.11e-2	5.69e-10	1.73e-1	158.7	
	QQN-CubicQuadraticInterpolation				1.52e-9	3.10e-9	1.85e-11	9.62e-9	89.2	
	QQN-GoldenSection				7.14e-11	3.11e-10	5.21e-21	1.43e-9	180.9	

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Table 1 – continued from previous page

	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
			QQN-Bisection-1				7.75e-14	8.83e-14	9.76e-18	3.54e-13	114.6
			QQN-Bisection-2				9.02e-14	2.34e-13	4.37e-17	9.97e-13	84.0
			GD-WeightDecay				8.53e-2	5.34e-2	8.63e-9	1.56e-1	47.9
			L-BFGS-MoreThuente				7.07e-9	1.81e-9	3.76e-9	9.71e-9	67.3
			Trust Region-Adaptive				4.96e3	2.16e4	3.14e-2	9.91e4	121.0
			Adam-Fast				2.81e-1	1.57e-2	2.54e-1	3.10e-1	37.5
			GD-AdaptiveMomentum				7.05e-1	1.56e-1	4.12e-1	1.03e0	16.6
			GD-Nesterov				6.00e-1	7.84e-2	5.01e-1	7.53e-1	16.7
			GD-Momentum				1.08e0	1.28e-1	8.96e-1	1.34e0	17.1
			Trust Region-Standard				2.38e0	4.10e0	1.22e-1	1.46e1	38.3
Zakharov_5D			Trust Region-Aggressive				5.16e4	2.24e5	5.33e-1	1.03e6	18.9
			L-BFGS-Aggressive				4.22e1	8.64e0	2.82e1	6.13e1	3309.5
			Adam-AMSGrad				2.23e-2	1.32e-2	4.59e-3	5.39e-2	2502.0
			Adam-Robust				7.06e-2	7.45e-2	6.18e-3	2.91e-1	2502.0
			Adam				2.82e-3	2.38e-3	2.65e-4	7.47e-3	2502.0
			Adam-WeightDecay				8.64e-3	1.13e-2	9.76e-9	2.86e-2	1586.3
			Trust Region-Standard				2.28e3	8.27e2	6.92e2	3.84e3	3002.0
			Trust Region-Precise				3.50e3	7.96e2	2.04e3	4.73e3	3002.0
			Trust Region-Conservative				3.28e3	6.15e2	2.05e3	4.46e3	3002.0
			Trust Region-Adaptive				3.10e3	8.27e2	1.77e3	4.98e3	3002.0
			Trust Region-Aggressive				5.65e1	1.12e2	6.02e-1	4.25e2	2415.8
			L-BFGS-Limited				1.94e-8	4.45e-8	7.85e-9	2.13e-7	1078.6
			L-BFGS-MoreThuente				9.32e-9	3.60e-10	8.60e-9	9.95e-9	634.6
			GD				9.78e-9	9.76e-11	9.63e-9	9.97e-9	477.1
			L-BFGS-Conservative				7.32e-9	2.98e-9	2.42e-10	9.99e-9	492.9
			QQN-CubicQuadraticInterpolation				1.52e-9	1.59e-9	3.50e-12	5.23e-9	205.0
			QQN-StrongWolfe				2.41e-9	3.17e-9	2.91e-14	9.91e-9	100.3
			QQN-Bisection-2				1.50e-9	1.97e-9	2.56e-15	6.16e-9	114.7
			QQN-Bisection-1				1.12e-12	2.99e-12	5.59e-14	1.40e-11	118.0
			QQN-GoldenSection				2.83e-12	2.87e-12	2.45e-13	1.21e-11	138.0
			GD-WeightDecay				7.62e-1	4.69e-1	9.24e-9	1.31e0	52.5
			L-BFGS				2.69e1	2.46e1	2.58e-1	8.10e1	93.0
			Adam-Fast				9.66e0	1.31e0	7.78e0	1.15e1	34.8
			GD-AdaptiveMomentum				6.97e1	1.64e1	4.83e1	1.09e2	18.5
			GD-Momentum				5.45e1	1.33e1	3.48e1	9.04e1	18.9
			GD-Nesterov				5.05e0	2.73e0	1.42e0	1.10e1	18.1
Zakharov_10D			Adam-Robust				3.12e0	6.81e0	2.92e-2	2.78e1	2502.0
			L-BFGS				2.07e4	8.30e3	6.23e3	3.58e4	3286.7
			L-BFGS-MoreThuente				1.67e-6	9.70e-7	4.87e-7	4.27e-6	2886.3
			L-BFGS-Aggressive				9.79e-1	8.37e-1	1.37e-2	3.03e0	3811.6
			Adam-AMSGrad				1.09e-1	3.02e-2	3.67e-2	1.63e-1	2016.2
			Adam				4.52e-2	4.19e-2	1.69e-3	1.18e-1	2253.9
			L-BFGS-Limited				9.29e-2	2.40e-1	5.26e-9	9.86e-1	2588.7
			Trust Region-Conservative				5.85e5	6.69e4	4.55e5	7.39e5	3002.0
			Trust Region-Precise				5.73e5	9.27e4	4.07e5	7.69e5	3002.0
			Trust Region-Aggressive				5.60e5	8.22e4	4.02e5	7.12e5	3002.0
			Trust Region-Adaptive				5.56e5	9.19e4	4.08e5	7.62e5	3002.0
			Trust Region-Standard				5.72e5	1.14e5	3.74e5	8.01e5	3002.0
			GD				3.37e-1	2.28e-1	9.65e-9	9.78e-1	686.0
			Adam-WeightDecay				1.79e-1	3.62e-2	1.29e-1	2.61e-1	683.1
			QQN-CubicQuadraticInterpolation				1.75e-9	9.69e-10	4.53e-10	4.49e-9	312.8
			QQN-StrongWolfe				9.67e-4	4.21e-3	2.12e-14	1.93e-2	281.4
			QQN-Bisection-2				1.58e-9	9.47e-10	1.13e-10	3.31e-9	159.2
			QQN-GoldenSection				1.50e-9	2.57e-9	3.14e-19	8.28e-9	233.1
			QQN-Bisection-1				1.96e-9	2.69e-9	4.68e-16	8.14e-9	161.5
			GD-WeightDecay				1.51e1	1.85e1	8.77e-9	5.75e1	67.5
			L-BFGS-Conservative				7.82e23	1.19e24	1.68e5	4.59e24	68.5
			Adam-Fast				1.13e3	5.38e2	3.62e2	2.13e3	34.7
			GD-AdaptiveMomentum				6.98e3	2.36e3	4.52e3	1.36e4	20.9
			GD-Nesterov				8.62e2	6.04e2	4.52e1	1.76e3	20.2
IllConditionedRosenbrock_2D_alpha100			GD-Momentum				6.41e3	3.22e3	1.95e3	1.10e4	21.1
			QQN-GoldenSection				1.25e-1	5.78e-2	6.99e-5	1.93e-1	4459.4
			QQN-StrongWolfe				5.46e-2	7.38e-2	9.29e-9	3.11e-1	2343.8
			QQN-CubicQuadraticInterpolation				3.48e-2	3.38e-2	4.34e-10	9.89e-2	1722.9
			QQN-Bisection-1				4.65e-1	8.86e-1	1.58e-8	3.18e0	2369.2
			Adam				1.22e0	3.51e-1	4.86e-1	1.76e0	2502.0
			L-BFGS-Conservative				2.69e-4	1.04e-3	2.05e-9	4.76e-3	1800.6
			L-BFGS-Aggressive				3.18e1	2.86e1	4.34e0	1.12e2	3852.0

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
	L-BFGS-MoreThuente					1.52e-2	6.51e-2	3.79e-9
	L-BFGS-Limited					3.93e0	5.18e0	3.26e-2
	GD					1.23e0	1.46e0	7.46e-1
	Trust Region-Conservative					2.84e1	2.98e1	1.90e-1
	Adam-AMSGrad					3.83e0	1.33e0	4.66e-1
	QQN-Bisection-2					5.88e-2	7.05e-2	6.64e-9
	Adam-Robust					4.04e0	8.59e-1	1.90e0
	Adam-Fast					2.13e0	2.75e0	2.59e-5
	Trust Region-Precise					7.26e0	8.07e0	3.76e0
	Adam-WeightDecay					4.11e0	9.66e-1	1.55e-2
	Trust Region-Adaptive					4.12e0	2.07e-1	3.83e0
	GD-WeightDecay					3.65e0	3.07e0	3.75e-2
	L-BFGS					1.36e2	1.58e2	8.12e-1
	GD-AdaptiveMomentum					8.18e-1	1.24e0	4.17e-2
	GD-Nesterov					1.49e0	1.88e0	5.05e-2
	GD-Momentum					5.61e0	3.44e0	4.79e-1
	Trust Region-Standard					4.18e0	1.83e-1	3.95e0
IllConditionedRosenbrock_5D_alpha100	Trust Region-Aggressive					4.66e0	3.99e-1	4.01e0
	QQN-GoldenSection					4.32e-1	5.14e-1	5.69e-8
	QQN-CubicQuadraticInterpolation					1.97e-1	2.84e-1	4.07e-9
	Adam-Robust					1.46e1	6.99e0	6.12e0
	Adam-AMSGrad					4.40e0	3.25e-1	3.25e0
	Adam					3.92e0	4.66e-1	2.83e0
	L-BFGS-Limited					4.05e-1	5.13e-2	3.00e-1
	QQN-Bisection-2					2.99e-1	2.82e-1	4.91e-8
	L-BFGS-MoreThuente					1.74e8	7.57e8	3.07e-7
	QQN-Bisection-1					4.19e-1	1.11e0	2.00e-9
	Adam-WeightDecay					1.84e0	2.24e0	1.84e-3
	QQN-StrongWolfe					1.59e-7	1.68e-7	2.70e-9
	L-BFGS-Conservative					2.02e1	6.75e1	2.46e-1
	L-BFGS-Aggressive					8.07e2	4.06e2	1.72e1
	Trust Region-Precise					1.01e3	1.27e2	8.08e2
	Trust Region-Conservative					1.02e3	1.63e2	7.14e2
	Trust Region-Adaptive					8.41e2	1.37e2	5.05e2
	Trust Region-Standard					6.23e1	7.73e1	4.66e0
	GD-WeightDecay					7.32e-1	1.11e0	1.46e-1
	GD-Nesterov					4.24e0	5.00e0	3.82e-1
	Trust Region-Aggressive					5.00e0	4.17e-1	4.66e0
	L-BFGS					1.50e2	2.28e2	1.98e1
	Adam-Fast					1.43e1	3.92e0	4.36e-2
	GD					5.09e0	1.48e-1	4.75e0
	GD-AdaptiveMomentum					4.60e1	6.15e0	3.36e1
IllConditionedRosenbrock_10D_alpha100	GD-Momentum					3.55e1	8.91e0	1.96e1
	QQN-GoldenSection					4.56e0	1.82e0	4.63e-1
	QQN-CubicQuadraticInterpolation					6.00e-1	1.52e0	1.13e-7
	Adam-Robust					3.49e1	9.88e0	1.61e1
	Adam-AMSGrad					9.31e0	3.61e-1	8.08e0
	QQN-StrongWolfe					5.85e-1	1.24e0	9.35e-8
	Adam					9.11e0	4.86e-1	7.98e0
	L-BFGS-MoreThuente					3.41e0	3.98e0	3.35e-5
	QQN-Bisection-1					1.22e0	2.80e0	1.19e-7
	GD-Nesterov					1.17e0	1.66e-2	1.12e0
	L-BFGS-Aggressive					1.64e2	3.20e2	5.82e1
	L-BFGS-Limited					3.86e0	5.50e-1	2.71e0
	Adam-WeightDecay					2.38e0	4.13e0	6.46e-6
	QQN-Bisection-2					4.40e0	1.40e0	1.07e-7
	GD-WeightDecay					1.34e0	1.81e0	1.70e-1
	L-BFGS-Conservative					1.90e4	6.07e4	1.03e0
	Trust Region-Precise					2.10e3	1.92e2	1.66e3
	Trust Region-Standard					1.06e3	2.06e2	6.70e2
	Trust Region-Conservative					2.16e3	2.33e2	1.76e3
	Trust Region-Adaptive					2.02e3	2.22e2	1.64e3
	GD-Momentum					3.04e1	3.31e1	5.05e-1
	Trust Region-Aggressive					6.55e1	2.02e2	9.60e0
	L-BFGS					1.19e2	1.68e2	2.51e1
	Adam-Fast					1.53e1	1.47e1	1.91e-1
	GD					9.96e0	2.61e-1	9.64e0
	GD-AdaptiveMomentum					1.02e2	9.83e0	8.45e1

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
Trigonometric_2D	Adam-AMSGrad					1.08e-6	3.54e-7	9.47e-7
	Adam					9.77e-7	1.59e-8	9.40e-7
	Adam-Robust					3.10e-3	1.20e-2	5.08e-7
	GD					9.80e-7	1.07e-8	9.61e-7
	L-BFGS-Aggressive					3.62e-4	1.35e-3	7.20e-8
	Adam-WeightDecay					1.76e-5	4.01e-5	3.77e-7
	QQN-GoldenSection					1.28e-3	5.56e-3	6.12e-10
	L-BFGS-Limited					7.02e-6	2.23e-5	2.15e-8
	QQN-Bisection-2					2.06e-7	2.73e-7	7.96e-10
	QQN-Bisection-1					2.08e-7	2.21e-7	1.49e-9
	QQN-StrongWolfe					4.90e-7	2.12e-7	2.93e-9
	GD-WeightDecay					2.11e-4	6.48e-4	8.75e-7
	QQN-CubicQuadraticInterpolation					3.11e-7	3.76e-7	6.47e-10
	L-BFGS-Conservative					5.22e-7	2.95e-7	3.92e-8
	L-BFGS					4.06e-3	1.77e-2	8.58e-10
	L-BFGS-MoreThuente					4.44e-7	3.28e-7	1.25e-8
	Adam-Fast					6.08e-3	1.20e-2	1.89e-8
	GD-AdaptiveMomentum					7.65e-3	4.04e-3	5.90e-5
	GD-Nesterov					2.31e-2	2.66e-2	5.79e-4
	GD-Momentum					3.43e-2	2.95e-2	2.30e-4
Trigonometric_5D	Trust Region-Conservative					8.94e-3	1.37e-2	1.87e-3
	Trust Region-Aggressive					2.50e1	1.94e1	3.36e-2
	Trust Region-Precise					1.11e-1	2.96e-1	1.34e-2
	Trust Region-Standard					1.22e1	2.59e1	2.19e-1
	Trust Region-Adaptive					8.77e0	2.18e1	1.18e-2
	Adam-AMSGrad					2.94e-2	3.49e-2	9.71e-7
	QQN-StrongWolfe					7.54e-7	4.98e-7	1.51e-8
	Adam					1.12e-2	2.74e-2	8.42e-7
	L-BFGS-Aggressive					1.22e0	5.81e-1	1.48e-1
	Adam-Robust					1.43e-2	2.36e-2	2.34e-7
	L-BFGS-MoreThuente					5.44e-4	2.01e-3	1.15e-7
	QQN-GoldenSection					2.34e-7	2.85e-7	3.03e-9
	L-BFGS-Limited					2.14e-3	9.31e-3	7.20e-7
	Adam-WeightDecay					1.95e-2	3.08e-2	3.70e-7
	QQN-CubicQuadraticInterpolation					4.16e-7	3.74e-7	1.09e-9
	QQN-Bisection-1					8.71e-4	3.70e-3	1.72e-10
	L-BFGS-Conservative					2.73e-3	1.19e-2	1.66e-7
	GD					9.83e-7	7.74e-9	9.62e-7
	QQN-Bisection-2					3.22e-7	3.08e-7	6.17e-10
	GD-WeightDecay					1.36e-2	2.77e-2	8.18e-7
Trigonometric_10D	L-BFGS					4.77e0	8.95e0	1.26e-2
	Trust Region-Conservative					1.91e-2	1.87e-2	8.29e-4
	Adam-Fast					6.17e-2	5.21e-2	7.00e-4
	GD-Nesterov					1.60e-2	2.60e-2	4.85e-4
	GD-AdaptiveMomentum					1.79e-2	3.35e-2	1.30e-4
	GD-Momentum					1.57e-1	1.93e-1	4.87e-3
	Trust Region-Precise					5.59e-2	2.09e-2	1.47e-2
	Trust Region-Adaptive					1.25e-1	7.39e-2	2.86e-2
	Trust Region-Standard					4.09e-1	1.81e-1	1.21e-1
	Trust Region-Aggressive					1.41e0	4.40e-1	6.56e-1
	Adam-AMSGrad					3.00e-2	3.66e-2	7.20e-6
	L-BFGS-Limited					7.31e-3	1.99e-2	9.82e-6
	Adam					9.70e-2	2.10e-1	9.68e-7
	Adam-Robust					7.13e-2	1.09e-1	9.71e-7
	L-BFGS-MoreThuente					1.34e-2	3.73e-2	4.78e-7
	L-BFGS-Conservative					9.45e0	4.12e1	7.52e-7
	QQN-GoldenSection					4.35e-4	1.06e-3	1.12e-7
	GD					4.39e-3	1.89e-2	9.77e-7
	L-BFGS-Aggressive					1.00e1	4.32e0	2.42e0
	Trust Region-Conservative					1.22e0	1.60e0	3.82e-3
Trigonometric_10D	QQN-Bisection-1					7.53e-4	2.61e-3	2.91e-8
	Adam-WeightDecay					4.25e-2	1.14e-1	8.69e-7
	QQN-CubicQuadraticInterpolation					4.48e-7	2.76e-7	9.99e-9
	QQN-StrongWolfe					2.92e-7	2.02e-7	9.27e-9
	QQN-Bisection-2					3.56e-7	2.58e-7	8.26e-8
	GD-WeightDecay					8.48e-3	2.56e-2	8.63e-7
	Trust Region-Precise					1.07e-1	6.92e-2	2.28e-2
	Adam-Fast					6.24e-2	9.50e-2	2.65e-4
								3.60e-1
								102.7

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
PenaltyI_2D_alpha1e6	GD-AdaptiveMomentum					1.41e-1	7.60e-2	4.06e-2
	GD-Nesterov					1.85e-1	7.94e-2	7.60e-2
	L-BFGS					4.76e1	6.11e1	8.87e0
	GD-Momentum					1.17e0	1.48e0	2.40e-3
	Trust Region-Adaptive					1.86e-1	1.19e-1	2.37e-2
	Trust Region-Standard					6.02e-1	2.65e-1	1.37e-1
	Trust Region-Aggressive					1.90e0	5.88e-1	9.79e-1
	QQN-StrongWolfe					1.14e0	1.65e-2	1.12e0
	L-BFGS-Aggressive					4.69e4	1.12e5	1.17e0
	QQN-GoldenSection					1.13e0	1.00e-4	1.12e0
	L-BFGS-MoreThuente					4.78e0	2.66e0	1.18e0
	QQN-Bisection-1					1.12e0	8.85e-7	1.12e0
	L-BFGS-Limited					1.18e0	5.23e-2	1.13e0
	Trust Region-Aggressive					1.39e5	7.17e4	1.23e4
	Trust Region-Precise					1.67e5	7.86e4	2.57e4
	Trust Region-Adaptive					1.32e5	8.14e4	1.57e4
	Trust Region-Conservative					1.39e5	8.98e4	8.35e3
	Trust Region-Standard					1.43e5	8.01e4	3.60e4
	L-BFGS-Conservative					1.13e0	2.13e-2	1.12e0
	Adam-AMSGrad					1.16e0	5.02e-2	1.13e0
PenaltyI_5D_alpha1e6	Adam					1.17e0	1.42e-1	1.13e0
	QQN-Bisection-2					2.42e0	1.73e0	1.17e0
	Adam-WeightDecay					1.59e0	9.85e-1	1.14e0
	Adam-Robust					2.11e0	2.17e0	1.13e0
	L-BFGS					7.22e4	1.26e5	1.52e0
	QQN-CubicQuadraticInterpolation					1.12e0	2.16e-16	1.12e0
	GD-AdaptiveMomentum					7.74e2	1.18e3	1.15e0
	Adam-Fast					1.01e2	2.80e2	1.26e0
	GD-Nesterov					1.46e2	3.37e2	1.38e0
	GD-WeightDecay					5.08e0	1.33e1	1.34e0
	GD					1.37e1	3.13e1	1.28e0
	GD-Momentum					6.67e1	2.53e2	1.26e0
	QQN-StrongWolfe					4.21e0	1.19e0	2.86e0
	QQN-Bisection-1					2.81e0	6.12e-4	2.81e0
	QQN-GoldenSection					2.81e0	7.61e-5	2.81e0
	L-BFGS-MoreThuente					1.29e1	4.81e0	3.57e0
	L-BFGS-Limited					2.96e0	9.11e-2	2.84e0
	L-BFGS-Conservative					2.85e0	5.01e-2	2.81e0
	L-BFGS-Aggressive					2.82e5	2.24e5	3.49e0
PenaltyI_10D_alpha1e6	Trust Region-Adaptive					3.71e5	1.47e5	9.78e4
	Trust Region-Standard					3.74e5	1.32e5	1.16e5
	Trust Region-Conservative					3.90e5	1.18e5	1.47e5
	Trust Region-Aggressive					3.61e5	1.19e5	1.76e5
	Trust Region-Precise					4.20e5	1.11e5	2.36e5
	Adam-AMSGrad					2.85e0	9.04e-2	2.82e0
	Adam					2.90e0	1.17e-1	2.82e0
	QQN-Bisection-2					1.03e1	5.36e0	3.91e0
	Adam-WeightDecay					7.65e0	7.96e0	2.86e0
	Adam-Robust					2.16e1	2.85e1	2.82e0
	L-BFGS					7.00e4	1.12e5	4.88e0
	QQN-CubicQuadraticInterpolation					2.81e0	7.09e-16	2.81e0
	Adam-Fast					4.69e2	8.74e2	3.30e0
	GD-AdaptiveMomentum					5.87e2	9.45e2	3.36e0
	GD-WeightDecay					3.50e1	9.28e1	3.50e0
	GD					8.04e1	1.22e2	3.17e0
	GD-Nesterov					3.89e2	8.55e2	3.28e0
	GD-Momentum					9.24e1	2.66e2	3.99e0
	QQN-StrongWolfe					1.10e1	3.01e0	8.12e0
	QQN-GoldenSection					5.63e0	1.88e-4	5.62e0
PenaltyI_10D_alpha1e6	QQN-Bisection-1					5.63e0	2.30e-3	5.63e0
	L-BFGS-Limited					5.89e0	1.07e-1	5.78e0
	L-BFGS-Conservative					5.73e0	1.30e-1	5.63e0
	L-BFGS-MoreThuente					2.89e1	6.69e0	1.06e1
	QQN-Bisection-2					1.86e1	5.50e0	9.12e0
	Trust Region-Standard					7.40e5	2.39e5	2.96e5
	Trust Region-Adaptive					7.20e5	1.83e5	3.49e5
	Trust Region-Conservative					7.72e5	1.26e5	5.48e5
	Trust Region-Precise					7.75e5	1.73e5	4.16e5
								9.96e5

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
Barrier_2D_mu0.1	Trust Region-Aggressive					7.20e5	1.73e5	3.91e5
	Adam-AMSGrad					5.66e0	1.39e-2	5.64e0
	Adam					5.68e0	4.13e-2	5.64e0
	Adam-WeightDecay					9.99e0	6.96e0	5.72e0
	Adam-Robust					2.18e1	1.43e1	5.69e0
	L-BFGS					1.71e5	2.52e5	8.62e0
	Adam-Fast					1.17e3	2.05e3	6.26e0
	QQN-CubicQuadraticInterpolation					5.62e0	1.32e-15	5.62e0
	L-BFGS-Aggressive					7.30e5	1.81e5	2.94e5
	GD					6.02e0	3.78e-2	5.96e0
	GD-AdaptiveMomentum					1.60e2	3.35e2	7.22e0
	GD-WeightDecay					6.01e1	1.13e2	6.73e0
	GD-Nesterov					4.81e2	6.94e2	6.89e0
	GD-Momentum					2.58e2	6.61e2	7.18e0
	Adam-Robust					4.09e-1	7.17e-3	4.00e-1
	Adam-AMSGrad					4.13e-1	1.06e-2	4.01e-1
	Adam					4.00e-1	1.38e-4	4.00e-1
	Adam-WeightDecay					4.00e-1	2.27e-9	4.00e-1
	L-BFGS-Conservative					4.00e-1	5.47e-8	4.00e-1
	GD					4.00e-1	2.64e-11	4.00e-1
	Trust Region-Conservative					4.61e-1	7.55e-2	4.00e-1
	L-BFGS-Limited					4.00e-1	2.73e-3	4.00e-1
	GD-WeightDecay					4.00e-1	6.36e-6	4.00e-1
	Trust Region-Precise					4.55e-1	1.16e-1	4.00e-1
	Adam-Fast					5.15e-1	2.22e-2	4.74e-1
	GD-Nesterov					5.03e-1	1.17e-2	4.85e-1
	GD-Momentum					5.05e-1	2.44e-2	4.82e-1
	Trust Region-Adaptive					4.54e-1	9.24e-2	4.00e-1
	Trust Region-Standard					7.17e-1	4.33e-1	4.00e-1
	GD-AdaptiveMomentum					4.65e-1	4.95e-3	4.60e-1
Barrier_5D_mu0.1	Trust Region-Aggressive					2.25e0	2.02e0	5.85e-1
	Adam-AMSGrad					1.03e0	1.71e-2	1.01e0
	Adam-Robust					1.01e0	4.00e-3	1.00e0
	Adam					9.99e-1	9.02e-6	9.99e-1
	Adam-WeightDecay					9.99e-1	2.90e-9	9.99e-1
	L-BFGS-Conservative					9.99e-1	6.66e-9	9.99e-1
	Trust Region-Conservative					1.04e0	6.35e-2	9.99e-1
	GD					9.99e-1	2.58e-11	9.99e-1
	L-BFGS-Limited					1.00e0	7.64e-3	9.99e-1
	Trust Region-Precise					1.02e0	1.49e-2	1.00e0
	GD-WeightDecay					9.99e-1	1.40e-5	9.99e-1
	Adam-Fast					1.28e0	5.59e-2	1.19e0
	GD-Nesterov					1.26e0	2.76e-2	1.22e0
	GD-Momentum					1.37e0	9.02e-2	1.28e0
	Trust Region-Adaptive					1.10e0	1.36e-1	9.99e-1
Barrier_10D_mu0.1	Trust Region-Standard					1.32e0	4.17e-1	9.99e-1
	Trust Region-Aggressive					1.86e0	2.57e-1	1.53e0
	Adam-Robust					2.00e0	2.51e-3	2.00e0
	Adam-AMSGrad					2.04e0	1.32e-2	2.02e0
	Adam					2.00e0	4.64e-7	2.00e0
	Adam-WeightDecay					2.00e0	5.45e-9	2.00e0
	Trust Region-Conservative					2.05e0	5.65e-2	2.00e0
	L-BFGS-Conservative					2.00e0	1.04e-8	2.00e0
	GD					2.00e0	4.28e-11	2.00e0
	L-BFGS-Limited					2.00e0	5.46e-9	2.00e0
	Trust Region-Precise					2.04e0	8.08e-2	2.00e0
	GD-WeightDecay					2.00e0	1.69e-5	2.00e0
	Trust Region-Adaptive					2.17e0	1.35e-1	2.00e0
	Adam-Fast					2.58e0	8.67e-2	2.45e0
	GD-Nesterov					2.50e0	4.65e-2	2.43e0
NoisySphere_2D_sigma0.01	GD-Momentum					3.39e0	2.40e-1	2.91e0
	Trust Region-Standard					2.34e0	4.45e-1	2.00e0
	Trust Region-Aggressive					3.43e0	1.45e0	2.00e0
	QQN-Bisection-1					1.33e0	6.30e-1	2.16e-1
	L-BFGS-Conservative					1.57e0	7.01e-2	1.46e0
	Adam-WeightDecay					2.18e0	2.38e-1	1.76e0
	Adam-AMSGrad					2.10e0	2.73e-1	1.65e0
	Adam					2.13e0	2.38e-1	1.72e0

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
NoisySphere_5D_sigma0.01	QQN-StrongWolfe					9.23e-1	6.21e-1	2.83e-2
	L-BFGS					1.02e1	1.19e1	7.26e-2
	Adam-Robust					2.10e0	2.43e-1	1.76e0
	L-BFGS-MoreThuente					1.84e0	7.24e-1	1.12e-1
	QQN-GoldenSection					2.04e0	2.79e-1	1.45e0
	L-BFGS-Limited					1.64e0	6.02e-1	7.63e-1
	GD					2.20e0	6.02e-1	1.42e0
	Adam-Fast					2.26e0	7.44e-1	1.40e0
	QQN-CubicQuadraticInterpolation					2.04e0	2.13e-1	1.70e0
	GD-Nesterov					2.82e0	9.93e-1	1.53e0
	GD-WeightDecay					2.30e0	5.19e-1	1.61e0
	GD-AdaptiveMomentum					2.39e0	7.39e-1	1.45e0
	GD-Momentum					2.45e0	8.96e-1	1.43e0
	L-BFGS-Aggressive					2.05e0	2.75e-1	1.69e0
	Trust Region-Precise					2.19e0	2.25e-1	1.76e0
	Trust Region-Conservative					2.06e0	2.96e-1	1.68e0
	Trust Region-Aggressive					2.09e0	2.18e-1	1.70e0
	Trust Region-Adaptive					2.03e0	2.74e-1	1.67e0
	Trust Region-Standard					2.10e0	2.61e-1	1.70e0
	QQN-Bisection-2					1.97e0	7.03e-3	1.96e0
	QQN-Bisection-1					4.46e0	9.06e-1	2.43e0
	L-BFGS-Conservative					4.42e0	1.19e-1	4.14e0
	Adam					5.42e0	2.68e-1	4.73e0
	Adam-AMSGrad					5.42e0	3.72e-1	4.94e0
	Adam-Robust					5.11e0	3.42e-1	4.60e0
	L-BFGS					1.44e1	8.91e0	2.91e0
	Adam-WeightDecay					5.22e0	3.07e-1	4.62e0
	GD					5.52e0	8.70e-1	4.36e0
	GD-Momentum					5.71e0	9.79e-1	4.41e0
	L-BFGS-Limited					3.90e0	8.53e-1	2.63e0
	Adam-Fast					5.99e0	1.16e0	4.17e0
	GD-AdaptiveMomentum					5.68e0	8.70e-1	4.36e0
	L-BFGS-MoreThuente					4.61e0	8.49e-1	3.27e0
	GD-Nesterov					5.61e0	1.00e0	4.26e0
	GD-WeightDecay					5.35e0	6.50e-1	4.47e0
NoisySphere_10D_sigma0.01	QQN-StrongWolfe					3.67e0	1.35e0	1.11e0
	QQN-GoldenSection					4.88e0	7.47e-1	3.49e0
	QQN-CubicQuadraticInterpolation					5.26e0	3.22e-1	4.75e0
	Trust Region-Precise					5.28e0	4.50e-1	4.65e0
	Trust Region-Conservative					5.20e0	3.98e-1	4.59e0
	Trust Region-Standard					5.20e0	3.94e-1	4.73e0
	Trust Region-Adaptive					5.32e0	3.69e-1	4.65e0
	L-BFGS-Aggressive					5.18e0	4.15e-1	4.66e0
	Trust Region-Aggressive					5.27e0	3.43e-1	4.65e0
	QQN-Bisection-1					9.08e0	1.54e0	4.69e0
	L-BFGS-Conservative					9.49e0	1.72e-1	9.16e0
	Adam-WeightDecay					1.04e1	4.40e-1	9.79e0
	Adam-AMSGrad					1.04e1	6.28e-1	9.75e0
	Adam					1.07e1	5.64e-1	9.87e0
	Adam-Robust					1.05e1	6.12e-1	9.71e0
	GD					1.10e1	7.03e-1	9.54e0
	GD-AdaptiveMomentum					1.03e1	7.39e-1	9.45e0
	L-BFGS					2.28e1	1.18e1	7.46e0
	GD-Nesterov					1.09e1	8.10e-1	9.63e0
	L-BFGS-MoreThuente					9.77e0	1.48e0	6.61e0
	GD-Momentum					1.11e1	9.34e-1	9.66e0
	QQN-GoldenSection					1.03e1	5.55e-1	9.18e0
	GD-WeightDecay					1.10e1	7.21e-1	9.66e0
	QQN-StrongWolfe					9.41e0	1.31e0	7.23e0
	Adam-Fast					1.11e1	1.47e0	9.46e0
	L-BFGS-Limited					9.06e0	1.17e0	6.79e0
	Trust Region-Conservative					1.04e1	3.84e-1	9.82e0
	Trust Region-Precise					1.06e1	3.31e-1	9.93e0
	L-BFGS-Aggressive					1.06e1	5.02e-1	9.75e0
	Trust Region-Aggressive					1.04e1	5.45e-1	9.77e0
	Trust Region-Standard					1.06e1	5.93e-1	9.80e0
	QQN-CubicQuadraticInterpolation					1.04e1	1.61e-1	1.03e1
	Trust Region-Adaptive					1.04e1	6.06e-1	9.73e0

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Table 1 – continued from previous page

	Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)		
SparseRosenbrock_4D				QQN-GoldenSection			3.33e-1	1.76e-1	6.04e-7	6.84e-1	4.00e-1
				QQN-StrongWolfe			3.39e-1	6.28e-1	2.24e-8	3.00e0	2.00e-1
				QQN-CubicQuadraticInterpolation			5.85e-2	6.41e-2	6.10e-9	2.15e-1	1.00e-1
				QQN-Bisection-1			4.56e-1	4.62e-1	9.12e-8	1.60e0	2.00e-1
				Adam-AMSGrad			3.39e0	1.45e0	1.65e0	8.86e0	2.00e-1
				Adam			2.06e0	4.83e-1	1.19e0	3.18e0	2.00e-1
				L-BFGS-MoreThuente			1.75e0	2.72e0	2.55e-7	8.30e0	2.00e-1
				L-BFGS-Limited			2.33e0	4.08e0	7.38e-2	1.74e1	3.00e-1
				L-BFGS-Conservative			1.27e2	5.46e2	3.78e-5	2.51e3	3.00e-1
				L-BFGS-Aggressive			6.34e1	4.42e1	8.59e0	1.72e2	3.00e-1
				Trust Region-Conservative			4.72e1	4.50e1	3.37e-1	1.58e2	2.00e-1
				Adam-WeightDecay			6.07e0	3.97e0	1.75e-2	9.30e0	8.00e-1
				Adam-Robust			7.53e0	1.96e0	3.60e0	8.99e0	6.00e-1
				GD			1.88e0	2.48e0	9.10e-1	9.50e0	5.00e-1
				Trust Region-Precise			2.16e1	2.75e1	7.75e0	1.10e2	1.00e-1
				Trust Region-Adaptive			8.31e0	2.62e-1	7.78e0	8.82e0	9.00e-1
				Adam-Fast			1.92e0	3.76e0	1.14e-3	1.01e1	2.00e-1
				QQN-Bisection-2			1.42e0	1.80e0	5.00e-7	3.95e0	1.00e-1
				GD-WeightDecay			3.04e0	4.49e0	4.73e-2	1.17e1	1.00e-1
				L-BFGS			9.62e1	1.12e2	7.18e0	4.84e2	1.00e-1
				GD-Nesterov			3.38e0	3.99e0	1.58e-1	1.22e1	0.00e-1
				GD-AdaptiveMomentum			1.31e0	4.23e0	2.41e-2	1.97e1	0.00e-1
				Trust Region-Standard			8.25e0	2.76e-1	7.68e0	8.68e0	1.00e-1
				GD-Momentum			1.10e1	6.57e0	4.39e-2	3.10e1	0.00e-1
	SparseRosenbrock_10D				Trust Region-Aggressive			8.72e0	4.61e-1	7.92e0	9.65e0
				QQN-GoldenSection			5.84e-1	5.22e-1	5.69e-7	2.38e0	4.00e-1
				QQN-StrongWolfe			5.37e-1	7.63e-1	1.90e-9	3.16e0	2.00e-1
				QQN-CubicQuadraticInterpolation			1.42e-1	1.61e-1	1.89e-8	3.94e-1	1.00e-1
				QQN-Bisection-1			6.70e-1	9.09e-1	1.26e-7	3.85e0	2.00e-1
				Adam-AMSGrad			5.73e0	9.36e-1	4.14e0	7.62e0	2.00e-1
				Adam-Robust			1.19e1	2.30e0	9.15e0	2.07e1	2.00e-1
				Adam			4.91e0	1.16e0	3.14e0	7.20e0	2.00e-1
				L-BFGS-MoreThuente			7.68e0	8.03e0	2.91e-4	2.32e1	2.00e-1
				L-BFGS-Limited			1.28e0	3.17e0	3.17e-1	1.51e1	3.00e-1
				Adam-WeightDecay			3.27e0	7.74e0	1.06e-2	2.19e1	2.00e-1
				L-BFGS-Conservative			1.05e7	4.58e7	2.96e-2	2.10e8	3.00e-1
				L-BFGS-Aggressive			1.81e2	7.47e1	8.09e1	4.01e2	3.00e-1
				QQN-Bisection-2			3.21e0	5.76e0	3.42e-1	1.61e1	8.00e-1
				Trust Region-Precise			1.04e2	6.99e1	1.18e0	2.43e2	3.00e-1
				Trust Region-Conservative			1.56e2	4.85e1	6.91e1	2.68e2	3.00e-1
				Trust Region-Adaptive			2.92e1	2.81e1	2.02e1	1.48e2	2.00e-1
				GD			3.27e0	5.80e0	1.20e0	2.11e1	3.00e-1
				Adam-Fast			1.90e0	5.64e0	5.27e-2	2.63e1	2.00e-1
				GD-WeightDecay			4.84e0	9.20e0	1.18e-1	2.47e1	1.00e-1
				GD-Nesterov			7.90e-1	5.92e-1	5.84e-2	2.48e0	1.00e-1
				Trust Region-Standard			2.05e1	3.97e-1	1.95e1	2.11e1	4.00e-1
				L-BFGS			2.80e2	3.25e2	2.70e1	1.32e3	1.00e-1
				GD-AdaptiveMomentum			1.31e1	1.44e1	5.08e-2	3.27e1	0.00e-1
				Trust Region-Aggressive			2.11e1	8.10e-1	1.97e1	2.26e1	1.00e-1
SparseQuadratic_5D_pattern[1, 3]				GD-Momentum			3.15e1	1.33e1	3.12e-1	4.42e1	0.00e-1
				Adam-Robust			6.93e-2	2.46e-2	2.83e-2	1.11e-1	2.00e-1
				Adam-AMSGrad			1.95e-1	5.56e-2	1.19e-1	3.19e-1	2.00e-1
				Adam			3.67e-3	1.54e-3	5.91e-4	5.76e-3	2.00e-1
				Adam-WeightDecay			9.85e-7	7.96e-9	9.73e-7	9.99e-7	1.00e-1
				Trust Region-Conservative			4.06e0	2.02e0	8.95e-3	5.15e0	1.00e-1
				GD			9.77e-7	1.24e-8	9.59e-7	9.96e-7	3.00e-1
				L-BFGS-Conservative			2.84e-7	3.62e-7	1.15e-10	9.31e-7	3.00e-1
				GD-WeightDecay			9.21e-7	4.76e-8	8.42e-7	9.96e-7	0.00e-1
				L-BFGS-Limited			4.57e-7	2.77e-7	4.26e-9	9.93e-7	1.00e-1
				Trust Region-Precise			4.92e-1	5.29e-1	3.14e-2	1.49e0	3.00e-1
				QQN-GoldenSection			1.09e-7	1.38e-7	2.49e-9	4.81e-7	1.00e-1
				QQN-CubicQuadraticInterpolation			4.31e-7	3.85e-8	3.60e-7	4.92e-7	0.00e-1
				QQN-Bisection-1			1.79e-7	2.00e-7	4.95e-9	7.40e-7	0.00e-1
				L-BFGS			4.77e-7	3.20e-7	1.77e-8	9.73e-7	0.00e-1
				QQN-Bisection-2			1.58e-7	2.16e-7	1.83e-9	7.77e-7	0.00e-1
				Adam-Fast			3.56e-1	1.39e-2	3.36e-1	3.82e-1	0.00e-1
				GD-Nesterov			3.19e-1	3.40e-2	2.73e-1	3.98e-1	0.00e-1
				GD-AdaptiveMomentum			9.75e-1	6.24e-2	8.63e-1	1.09e0	0.00e-1

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Table 1 – continued from previous page

Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
SparseQuadratic_10D_pattern[1, 3]	Trust Region-Adaptive					1.23e3	4.09e2	5.86e-2
	GD-Momentum					5.03e-1	4.96e-2	4.06e-1
	QQN-StrongWolfe					2.22e-7	1.26e-7	4.00e-8
	L-BFGS-Aggressive					2.84e-7	3.06e-8	2.36e-7
	L-BFGS-MoreThuente					8.81e-8	1.36e-7	1.12e-8
	Trust Region-Standard					1.81e2	7.08e0	1.67e2
	Trust Region-Aggressive					1.82e4	7.17e2	1.51e4
	Adam-Robust					1.03e-1	3.53e-2	4.23e-2
	Adam-AMSGrad					2.33e-1	4.06e-2	1.70e-1
	Adam					2.03e-3	8.81e-4	3.96e-4
	Adam-WeightDecay					9.83e-7	7.84e-9	9.70e-7
	Trust Region-Conservative					1.83e0	5.92e-1	6.04e-1
	GD					9.80e-7	1.20e-8	9.60e-7
	L-BFGS-Conservative					2.03e-7	2.96e-7	2.80e-9
	Trust Region-Precise					1.80e-1	3.28e-1	2.31e-3
	GD-WeightDecay					9.31e-7	3.38e-8	8.75e-7
	QQN-GoldenSection					3.11e-7	3.27e-7	7.74e-9
	QQN-CubicQuadraticInterpolation					2.38e-8	1.47e-8	2.26e-9
	L-BFGS					1.93e-3	8.35e-3	1.06e-8
	L-BFGS-Limited					4.74e-7	2.74e-7	5.73e-8
	QQN-Bisection-1					5.68e-7	3.82e-7	2.29e-8
	Trust Region-Adaptive					1.28e3	4.25e2	5.42e-2
	QQN-Bisection-2					3.81e-7	3.20e-7	2.03e-8
	QQN-StrongWolfe					2.19e-7	1.50e-7	8.82e-8
LogisticRegression_100samples_5features_reg0.01	Adam-Fast					7.28e-1	2.79e-2	6.71e-1
	GD-AdaptiveMomentum					1.57e0	4.23e-2	1.41e0
	GD-Nesterov					6.03e-1	2.70e-2	5.68e-1
	GD-Momentum					9.15e-1	5.54e-2	8.60e-1
	L-BFGS-Aggressive					2.16e-7	1.67e-8	1.72e-7
	L-BFGS-MoreThuente					2.20e-7	2.42e-7	2.06e-8
	Trust Region-Standard					1.02e2	3.48e1	2.21e-1
	Trust Region-Aggressive					2.01e4	4.68e3	8.89e-1
	GD-WeightDecay					3.27e-1	3.54e-4	3.26e-1
	GD-Nesterov					3.15e-1	3.66e-7	3.15e-1
	GD					3.77e-1	2.81e-3	3.72e-1
	GD-Momentum					3.15e-1	3.78e-7	3.15e-1
	Adam-Robust					4.32e-1	1.22e-2	4.13e-1
	Adam-AMSGrad					4.05e-1	9.76e-3	3.87e-1
	Adam-WeightDecay					3.22e-1	1.09e-3	3.20e-1
	L-BFGS-Limited					3.15e-1	1.97e-5	3.15e-1
	Adam					4.02e-1	9.33e-3	3.92e-1
	L-BFGS					3.16e-1	7.17e-4	3.15e-1
	L-BFGS-Aggressive					3.15e-1	1.24e-4	3.15e-1
	GD-AdaptiveMomentum					3.15e-1	4.41e-9	3.15e-1
	L-BFGS-Conservative					3.15e-1	5.83e-11	3.15e-1
	QQN-GoldenSection					3.15e-1	2.54e-12	3.15e-1
	QQN-Bisection-1					3.15e-1	2.67e-12	3.15e-1
	QQN-CubicQuadraticInterpolation					3.15e-1	2.75e-12	3.15e-1
LogisticRegression_200samples_10features_reg0.01	L-BFGS-MoreThuente					3.15e-1	2.25e-5	3.15e-1
	QQN-Bisection-2					3.15e-1	2.84e-12	3.15e-1
	Adam-Fast					3.16e-1	1.09e-4	3.16e-1
	QQN-StrongWolfe					3.15e-1	2.43e-12	3.15e-1
	Trust Region-Conservative					4.24e-1	2.86e-3	4.20e-1
	Trust Region-Precise					6.78e-1	2.08e-2	6.48e-1
	Trust Region-Aggressive					6.98e-1	2.53e-2	6.53e-1
	Trust Region-Adaptive					6.95e-1	3.03e-2	6.37e-1
	Trust Region-Standard					6.98e-1	3.18e-2	6.55e-1
	GD-WeightDecay					3.39e-1	4.45e-4	3.38e-1
	GD-Nesterov					3.23e-1	6.77e-7	3.23e-1
	GD-Momentum					3.23e-1	7.07e-7	3.23e-1
	GD					3.97e-1	3.28e-3	3.93e-1
	L-BFGS-Limited					3.23e-1	8.38e-5	3.23e-1
	Adam-Robust					4.12e-1	8.61e-3	3.96e-1
	Adam-AMSGrad					3.95e-1	5.85e-3	3.84e-1
	Adam-WeightDecay					3.27e-1	8.69e-4	3.25e-1
	Adam					3.92e-1	9.22e-3	3.75e-1
	L-BFGS-Aggressive					3.25e-1	7.06e-4	3.23e-1
	L-BFGS					3.23e-1	2.14e-5	3.23e-1

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
LinearRegression_100samples_5features_reg0.01	GD-AdaptiveMomentum					3.23e-1	4.50e-9	3.23e-1
	L-BFGS-Conservative					3.23e-1	9.68e-11	3.23e-1
	QQN-GoldenSection					3.23e-1	1.79e-12	3.23e-1
	QQN-Bisection-1					3.23e-1	1.05e-12	3.23e-1
	QQN-CubicQuadraticInterpolation					3.23e-1	1.34e-12	3.23e-1
	QQN-Bisection-2					3.23e-1	1.19e-12	3.23e-1
	QQN-StrongWolfe					3.23e-1	1.79e-12	3.23e-1
	Adam-Fast					3.24e-1	2.14e-4	3.24e-1
	L-BFGS-MoreThuente					3.23e-1	2.80e-4	3.23e-1
	Trust Region-Conservative					4.44e-1	2.76e-3	4.39e-1
	Trust Region-Precise					7.01e-1	2.67e-2	6.59e-1
	Trust Region-Aggressive					7.03e-1	2.08e-2	6.65e-1
	Trust Region-Standard					7.01e-1	2.90e-2	6.45e-1
	Trust Region-Adaptive					7.06e-1	2.50e-2	6.56e-1
	Adam-AMSGrad					3.06e0	3.82e-1	2.47e0
	Adam-Robust					4.89e0	5.55e-1	4.01e0
	Adam					2.88e0	4.16e-1	2.36e0
	Adam-WeightDecay					7.18e-2	1.52e-4	7.16e-2
	Trust Region-Conservative					7.87e0	9.98e-1	6.26e0
	L-BFGS-Conservative					7.15e-2	3.25e-10	7.15e-2
	GD					7.15e-2	5.94e-11	7.15e-2
	L-BFGS-MoreThuente					7.16e-2	5.33e-5	7.15e-2
	Trust Region-Precise					1.38e-1	8.18e-2	7.38e-2
	L-BFGS-Limited					7.15e-2	2.22e-10	7.15e-2
	GD-WeightDecay					7.15e-2	2.05e-10	7.15e-2
	QQN-GoldenSection					7.15e-2	1.34e-9	7.15e-2
	Trust Region-Adaptive					1.55e3	6.64e2	1.22e-1
	L-BFGS					1.38e-1	2.48e-1	7.15e-2
LinearRegression_200samples_10features_reg0.01	QQN-Bisection-1					7.15e-2	9.50e-15	7.15e-2
	QQN-CubicQuadraticInterpolation					7.15e-2	1.77e-9	7.15e-2
	QQN-StrongWolfe					7.15e-2	8.70e-14	7.15e-2
	QQN-Bisection-2					7.15e-2	3.89e-14	7.15e-2
	L-BFGS-Aggressive					7.15e-2	3.23e-14	7.15e-2
	Adam-Fast					1.90e-1	6.82e-2	7.25e-2
	Trust Region-Standard					1.10e2	5.00e1	2.92e-1
	GD-Nesterov					9.19e-1	2.74e-2	8.36e-1
	GD-Momentum					1.36e0	6.13e-2	1.22e0
	GD-AdaptiveMomentum					2.00e0	4.19e-2	1.90e0
	Trust Region-Aggressive					3.62e4	1.65e4	9.10e-1
	Adam-AMSGrad					5.39e1	1.53e0	5.00e1
	Adam-Robust					6.34e1	2.14e0	5.92e1
	Adam-WeightDecay					2.42e0	4.49e-1	1.66e0
	Adam					5.34e1	2.38e0	4.86e1
	Trust Region-Precise					5.39e1	3.12e0	4.85e1
	Trust Region-Conservative					1.06e2	1.88e0	1.03e2
	Trust Region-Adaptive					1.08e3	8.92e2	5.40e-1
	GD					4.82e-1	3.41e-6	4.82e-1
	L-BFGS-Conservative					4.82e-1	2.33e-5	4.82e-1
	Trust Region-Standard					2.56e3	4.67e3	7.13e-1
	Adam-Fast					5.14e-1	4.25e-2	4.82e-1
	GD-WeightDecay					4.82e-1	9.82e-6	4.82e-1
	L-BFGS-Aggressive					4.82e-1	2.65e-5	4.82e-1
	L-BFGS-Limited					4.82e-1	9.14e-5	4.82e-1
	QQN-Bisection-1					4.82e-1	1.93e-6	4.82e-1
	QQN-GoldenSection					4.82e-1	1.59e-5	4.82e-1
NeuralNetwork_100samples_layers_5-10-3	Trust Region-Aggressive					3.92e4	2.34e4	1.28e0
	QQN-Bisection-2					4.82e-1	1.86e-6	4.82e-1
	QQN-StrongWolfe					4.82e-1	1.42e-5	4.82e-1
	L-BFGS					5.09e-1	9.28e-2	4.82e-1
	L-BFGS-MoreThuente					4.82e-1	8.59e-5	4.82e-1
	QQN-CubicQuadraticInterpolation					4.82e-1	2.65e-5	4.82e-1
	GD-Nesterov					1.80e0	1.42e-2	1.78e0
	GD-Momentum					2.46e0	2.68e-2	2.41e0
	GD-AdaptiveMomentum					5.05e0	5.26e-2	4.95e0
	GD-WeightDecay					1.84e-1	3.79e-3	1.80e-1
	GD					2.03e-1	2.81e-3	1.98e-1
	Adam-AMSGrad					1.54e-1	9.68e-3	1.40e-1
	Adam-Robust					1.67e-1	9.86e-3	1.48e-1

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
NeuralNetwork_100samples.layers_10.20.5	Adam					1.53e-1	6.87e-3	1.40e-1
	L-BFGS-MoreThuente					1.51e-1	7.64e-3	1.40e-1
	QQN-StrongWolfe					1.43e-1	4.72e-3	1.38e-1
	Adam-WeightDecay					1.41e-1	2.52e-3	1.40e-1
	L-BFGS-Aggressive					1.50e-1	6.38e-3	1.40e-1
	L-BFGS-Limited					1.47e-1	1.08e-2	1.40e-1
	L-BFGS-Conservative					1.48e-1	9.87e-3	1.40e-1
	QQN-GoldenSection					1.41e-1	3.06e-3	1.38e-1
	L-BFGS					2.39e-1	9.10e-2	1.41e-1
	QQN-CubicQuadraticInterpolation					1.41e-1	4.67e-3	1.37e-1
	QQN-Bisection-1					1.40e-1	9.76e-4	1.38e-1
	QQN-Bisection-2					1.40e-1	1.16e-3	1.39e-1
	Adam-Fast					1.43e-1	5.31e-3	1.39e-1
	Trust Region-Conservative					2.20e-1	1.45e-3	2.18e-1
	Trust Region-Adaptive					8.19e-1	2.38e0	1.95e-1
	GD-Nesterov					2.27e-1	3.51e-3	2.20e-1
	GD-Momentum					2.34e-1	5.59e-3	2.25e-1
	Trust Region-Precise					2.23e-1	2.48e-2	1.97e-1
	Trust Region-Standard					4.01e-1	4.17e-1	2.08e-1
	GD-AdaptiveMomentum					2.56e-1	1.34e-2	2.32e-1
	Trust Region-Aggressive					7.98e-1	3.20e-1	2.20e-1
	GD					1.28e-1	4.01e-3	1.18e-1
	GD-WeightDecay					9.58e-2	2.99e-3	9.05e-2
	Adam-AMSGrad					4.96e-2	6.01e-3	3.82e-2
	Adam-Robust					5.97e-2	5.49e-3	4.85e-2
	Adam					4.42e-2	4.45e-3	3.82e-2
	L-BFGS-MoreThuente					6.08e-2	4.08e-3	5.29e-2
	L-BFGS-Limited					5.06e-2	8.80e-3	4.16e-2
	L-BFGS-Aggressive					5.60e-2	4.60e-3	4.81e-2
	L-BFGS-Conservative					4.39e-2	5.59e-3	3.82e-2
	QQN-GoldenSection					3.83e-2	6.37e-4	3.79e-2
	Adam-WeightDecay					3.82e-2	1.26e-5	3.82e-2
	L-BFGS					1.36e-1	1.66e-1	4.42e-2
	QQN-StrongWolfe					4.07e-2	4.88e-3	3.75e-2
	QQN-CubicQuadraticInterpolation					3.80e-2	1.40e-4	3.77e-2
	QQN-Bisection-1					3.80e-2	1.20e-4	3.78e-2
	GD-Nesterov					1.23e-1	5.62e-2	4.04e-2
	QQN-Bisection-2					3.80e-2	1.53e-4	3.77e-2
	GD-Momentum					1.63e-1	2.68e-2	4.69e-2
	Adam-Fast					4.24e-2	5.53e-3	3.71e-2
	Trust Region-Conservative					1.48e-1	5.17e-3	1.28e-1
	GD-AdaptiveMomentum					1.74e-1	5.09e-3	1.66e-1
	Trust Region-Adaptive					1.76e-1	4.58e-2	1.36e-1
	Trust Region-Precise					1.61e-1	2.68e-3	1.54e-1
	Trust Region-Aggressive					7.57e-1	1.49e-1	3.26e-1
	Trust Region-Standard					2.74e-1	1.79e-1	2.05e-1
SVM_100samples.5features.C1	Adam-AMSGrad					6.43e-1	1.44e-5	6.43e-1
	Adam					6.43e-1	5.18e-7	6.43e-1
	Adam-Robust					6.43e-1	1.65e-4	6.43e-1
	Adam-WeightDecay					6.43e-1	1.36e-6	6.43e-1
	GD					6.43e-1	1.32e-6	6.43e-1
	L-BFGS-Limited					6.43e-1	1.94e-5	6.43e-1
	GD-WeightDecay					6.43e-1	2.96e-6	6.43e-1
	QQN-GoldenSection					6.43e-1	1.87e-5	6.43e-1
	L-BFGS-Conservative					6.43e-1	1.59e-5	6.43e-1
	QQN-Bisection-1					6.43e-1	1.39e-5	6.43e-1
	Trust Region-Conservative					2.82e0	1.25e0	6.45e-1
	QQN-Bisection-2					6.43e-1	1.80e-5	6.43e-1
	QQN-CubicQuadraticInterpolation					6.43e-1	7.64e-7	6.43e-1
	QQN-StrongWolfe					6.43e-1	1.43e-5	6.43e-1
	GD-Nesterov					6.64e-1	5.99e-3	6.50e-1
	GD-Momentum					6.73e-1	9.01e-3	6.53e-1
	L-BFGS-MoreThuente					6.43e-1	1.35e-5	6.43e-1
	L-BFGS					6.43e-1	1.38e-12	6.43e-1
	Adam-Fast					6.84e-1	2.44e-2	6.44e-1
	L-BFGS-Aggressive					6.43e-1	1.41e-10	6.43e-1
	Trust Region-Precise					9.38e-1	2.76e-1	6.73e-1
	GD-AdaptiveMomentum					7.53e-1	2.76e-2	7.12e-1
								8.06e-1

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Problem	Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)	
SVM_200samples_10features_C1	Trust Region-Adaptive					4.68e0	6.93e0	7.07e-1	3.43e1
	Trust Region-Aggressive					1.00e3	4.36e3	6.57e-1	2.00e4
	Trust Region-Standard					3.47e2	9.80e2	7.26e-1	3.28e3
	Adam-AMSGrad					6.86e-1	1.05e-5	6.86e-1	6.86e-1
	Adam					6.86e-1	9.76e-6	6.86e-1	6.86e-1
	QQN-Bisection-1					6.86e-1	5.90e-6	6.86e-1	6.86e-1
	QQN-StrongWolfe					6.86e-1	3.82e-6	6.86e-1	6.86e-1
	QQN-Bisection-2					6.86e-1	1.16e-5	6.86e-1	6.86e-1
	GD					6.86e-1	1.43e-6	6.86e-1	6.86e-1
	Adam-WeightDecay					6.86e-1	7.69e-6	6.86e-1	6.86e-1
	Adam-Robust					6.86e-1	1.01e-5	6.86e-1	6.86e-1
	QQN-GoldenSection					6.86e-1	6.68e-6	6.86e-1	6.86e-1
	L-BFGS-MoreThuente					5.16e3	2.25e4	6.86e-1	1.03e5
	L-BFGS-Limited					6.86e-1	1.04e-4	6.86e-1	6.87e-1
	L-BFGS-Conservative					6.86e-1	5.85e-6	6.86e-1	6.86e-1
	QQN-CubicQuadraticInterpolation					6.86e-1	5.68e-6	6.86e-1	6.86e-1
	GD-WeightDecay					6.86e-1	6.77e-7	6.86e-1	6.86e-1
	L-BFGS					7.68e-1	3.55e-1	6.86e-1	2.32e0
	Trust Region-Conservative					2.49e0	1.56e0	6.88e-1	4.05e0
	L-BFGS-Aggressive					6.86e-1	6.90e-6	6.86e-1	6.86e-1
	Adam-Fast					7.22e-1	2.34e-2	6.87e-1	7.51e-1
	GD-Nesterov					7.03e-1	4.03e-3	6.94e-1	7.12e-1
	GD-Momentum					7.08e-1	5.01e-3	6.99e-1	7.17e-1
	Trust Region-Precise					9.09e-1	1.95e-1	7.00e-1	1.21e0
	GD-AdaptiveMomentum					7.83e-1	1.76e-2	7.62e-1	8.35e-1
	Trust Region-Adaptive					6.77e0	1.17e1	6.97e-1	3.46e1
	Trust Region-Standard					8.76e-1	1.40e-1	6.90e-1	1.09e0
	Trust Region-Aggressive					1.84e0	4.05e-1	7.56e-1	2.23e0