

Table 1: Performance Results for Ackley\_10D\_a20\_b0.2\_c6.28e0 Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
<b>QQN-Bisection-2</b>	3.54e0	7.29e-2	3.30e0	3.57e0	65.9	20.0	0.001
L-BFGS	3.50e0	2.17e-1	2.72e0	3.58e0	133.3	15.0	0.002
QQN-Bisection-1	3.54e0	1.23e-1	3.08e0	3.57e0	96.2	10.0	0.002
L-BFGS-MoreThuente	3.57e0	1.12e-2	3.52e0	3.57e0	55.9	5.0	0.001
L-BFGS-Aggressive	3.54e0	1.35e-1	2.95e0	3.57e0	185.8	5.0	0.003
QQN-CubicQuadraticInterpolation	3.59e0	9.76e-2	3.33e0	3.84e0	471.4	5.0	0.016
QQN-GoldenSection	3.57e0	1.01e-8	3.57e0	3.57e0	186.9	0.0	0.003
L-BFGS-Limited	3.57e0	4.05e-10	3.57e0	3.57e0	142.2	0.0	0.003
QQN-StrongWolfe	3.57e0	5.84e-15	3.57e0	3.57e0	79.2	0.0	0.002
L-BFGS-Conservative	3.57e0	5.16e-9	3.57e0	3.57e0	170.7	0.0	0.005
Adam	3.57e0	7.49e-9	3.57e0	3.57e0	745.8	0.0	0.017
GD	3.57e0	1.76e-10	3.57e0	3.57e0	99.3	0.0	0.003
GD-AdaptiveMomentum	3.60e0	1.35e-2	3.57e0	3.63e0	16.1	0.0	0.001
Adam-AMSGrad	3.57e0	2.45e-9	3.57e0	3.57e0	1241.4	0.0	0.031
Adam-Fast	3.60e0	4.10e-2	3.57e0	3.70e0	106.6	0.0	0.002
Adam-Robust	3.58e0	3.01e-3	3.57e0	3.59e0	126.8	0.0	0.003
Adam-WeightDecay	3.57e0	1.60e-5	3.57e0	3.57e0	281.3	0.0	0.007
Trust Region-Conservative	3.58e0	2.44e-3	3.57e0	3.58e0	205.8	0.0	0.002
Trust Region-Precise	3.61e0	7.74e-2	3.58e0	3.92e0	42.5	0.0	0.000
GD-WeightDecay	3.59e0	6.14e-3	3.58e0	3.60e0	19.4	0.0	0.001
Trust Region-Adaptive	4.41e0	1.08e0	3.59e0	6.23e0	18.2	0.0	0.000
GD-Nesterov	3.66e0	2.68e-2	3.62e0	3.72e0	14.0	0.0	0.000
Trust Region-Standard	4.36e0	8.00e-1	3.64e0	5.79e0	9.1	0.0	0.000
GD-Momentum	3.81e0	6.88e-2	3.64e0	3.91e0	14.5	0.0	0.000
Trust Region-Aggressive	4.22e0	2.38e-1	3.81e0	4.95e0	5.2	0.0	0.000