

Table 1: Performance Results for Ackley\\$_2Dn_a20n_b0.2n_c6.28e0Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
L-BFGS	3.81	6.21×10^{-1}	2.58	5.39	307.4	25.0	0.004
QQN-Backtracking	2.53	1.50	1.87×10^{-10}	3.57	168.9	15.0	0.004
QQN-Bisection-2	2.32	1.59	5.22×10^{-6}	3.57	58.6	10.0	0.001
QQN-StrongWolfe	2.40	1.60	5.23×10^{-8}	3.57	147.7	10.0	0.003
QQN-CubicQuadraticInterpolation	2.61	1.42	1.01×10^{-8}	3.57	194.5	10.0	0.006
QQN-GoldenSection	2.97	1.27	5.33×10^{-11}	3.57	193.5	6.7	0.002
QQN-Bisection-1	2.27	1.68	1.28×10^{-9}	3.57	220.0	5.0	0.005
QQN-MoreThuente	3.22	1.07	2.75×10^{-10}	3.57	128.1	0.0	0.003
GD	3.57	1.85×10^{-11}	3.57	3.57	20.1	0.0	0.000
L-BFGS-Conservative	3.57	4.96×10^{-8}	3.57	3.57	164.3	0.0	0.003
Adam	3.57	3.59×10^{-5}	3.57	3.57	295.1	0.0	0.006
GD-Nesterov	3.57	1.96×10^{-3}	3.57	3.58	30.3	0.0	0.001
Adam-WeightDecay	3.58	9.41×10^{-4}	3.58	3.58	107.8	0.0	0.002
Adam-AMSGrad	3.58	3.49×10^{-3}	3.57	3.58	489.9	0.0	0.011
GD-WeightDecay	3.58	1.83×10^{-2}	3.57	3.64	38.2	0.0	0.001
Trust Region-Conservative	3.59	2.08×10^{-2}	3.57	3.64	156.6	0.0	0.001
L-BFGS-Aggressive	3.63	9.99×10^{-1}	5.19×10^{-1}	4.93	772.1	0.0	0.005
Adam-Fast	3.64	8.79×10^{-2}	3.57	3.94	38.1	0.0	0.001
GD-Momentum	3.67	5.41×10^{-2}	3.59	3.78	17.7	0.0	0.000
Trust Region-Adaptive	3.73	2.86×10^{-1}	3.58	4.56	14.0	0.0	0.000
Trust Region-Standard	4.47	2.37	3.58	1.17×10^1	7.8	0.0	0.000