

Table 1: Performance Results for Ackley\\$_5Dn_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	3.51	1.20	6.37×10^{-1}	6.68	152.4	45.0	0.002
QQN-Backtracking	2.92	1.00	1.36×10^{-11}	3.57	122.9	30.0	0.003
QQN-Bisection-2	2.96	1.02	2.59×10^{-4}	3.57	79.0	20.0	0.001
QQN-Bisection-1	3.16	9.28×10^{-1}	2.56×10^{-7}	3.57	152.8	10.0	0.003
QQN-StrongWolfe	3.38	5.78×10^{-1}	1.65	3.57	84.5	10.0	0.002
QQN-GoldenSection	3.29	6.58×10^{-1}	6.60×10^{-11}	3.57	217.1	8.3	0.003
QQN-CubicQuadraticInterpolation	3.25	9.10×10^{-1}	3.03×10^{-5}	3.66	151.2	5.0	0.004
QQN-MoreThuente	3.40	7.72×10^{-1}	3.45×10^{-2}	3.57	95.0	0.0	0.002
L-BFGS-Aggressive	3.40	8.55×10^{-1}	1.09	4.06	771.5	0.0	0.007
GD	3.57	2.42×10^{-11}	3.57	3.57	51.0	0.0	0.001
Adam	3.57	4.84×10^{-5}	3.57	3.57	486.9	0.0	0.010
L-BFGS-Conservative	3.57	8.25×10^{-5}	3.57	3.57	234.4	0.0	0.004
Adam-WeightDecay	3.57	4.42×10^{-4}	3.57	3.58	183.7	0.0	0.004
Adam-AMSGrad	3.58	4.99×10^{-3}	3.57	3.59	502.0	0.0	0.011
Trust Region-Conservative	3.60	7.40×10^{-2}	3.57	3.82	186.4	0.0	0.001
GD-Nesterov	3.61	3.59×10^{-2}	3.57	3.68	18.3	0.0	0.000
GD-WeightDecay	3.62	1.90×10^{-2}	3.59	3.65	15.2	0.0	0.000
Adam-Fast	3.62	5.59×10^{-2}	3.57	3.73	67.2	0.0	0.001
Trust Region-Adaptive	3.72	2.44×10^{-1}	3.59	4.50	16.7	0.0	0.000
GD-Momentum	3.72	1.20×10^{-1}	3.58	4.02	14.2	0.0	0.000
Trust Region-Standard	4.35	1.27	3.60	7.62	9.7	0.0	0.000