

Table 1: Performance Results for Ackley_5D_a20_b0.2_c6.28e0 Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
QQN-Bisection-2	3.34e0	3.86e-1	2.48e0	3.57e0	50.8	35.0	0.001
QQN-Bisection-1	3.38e0	3.60e-1	2.37e0	3.57e0	65.2	30.0	0.001
L-BFGS	3.46e0	4.50e-1	1.87e0	4.43e0	121.3	25.0	0.002
L-BFGS-Aggressive	3.76e0	2.74e-1	3.01e0	4.09e0	3085.2	20.0	0.020
L-BFGS-MoreThuente	3.50e0	2.48e-1	2.54e0	3.57e0	51.0	10.0	0.001
QQN-StrongWolfe	3.50e0	3.36e-1	2.03e0	3.57e0	53.0	5.0	0.001
QQN-GoldenSection	3.51e0	2.78e-1	2.30e0	3.57e0	193.7	5.0	0.003
QQN-CubicQuadraticInterpolation	3.56e0	9.71e-2	3.14e0	3.63e0	206.9	5.0	0.006
L-BFGS-Conservative	3.57e0	5.12e-8	3.57e0	3.57e0	373.8	0.0	0.006
L-BFGS-Limited	3.57e0	1.20e-8	3.57e0	3.57e0	310.5	0.0	0.005
GD	3.57e0	2.52e-11	3.57e0	3.57e0	51.8	0.0	0.001
GD-AdaptiveMomentum	3.58e0	3.63e-3	3.57e0	3.59e0	34.5	0.0	0.001
Adam	3.57e0	1.27e-6	3.57e0	3.57e0	548.5	0.0	0.011
GD-Nesterov	3.60e0	4.12e-2	3.57e0	3.76e0	17.0	0.0	0.001
Adam-AMSGrad	3.57e0	2.74e-9	3.57e0	3.57e0	1172.5	0.0	0.028
Adam-Fast	3.60e0	4.00e-2	3.57e0	3.73e0	83.3	0.0	0.002
Adam-WeightDecay	3.57e0	4.57e-4	3.57e0	3.58e0	183.0	0.0	0.004
Adam-Robust	3.58e0	3.67e-3	3.57e0	3.59e0	59.0	0.0	0.001
Trust Region-Precise	3.62e0	1.68e-1	3.57e0	4.35e0	45.5	0.0	0.000
Trust Region-Conservative	3.58e0	8.66e-4	3.57e0	3.58e0	212.3	0.0	0.002
GD-WeightDecay	3.61e0	2.38e-2	3.58e0	3.69e0	15.3	0.0	0.000
Trust Region-Adaptive	3.70e0	1.47e-1	3.58e0	4.11e0	17.3	0.0	0.000
GD-Momentum	3.72e0	1.33e-1	3.59e0	4.11e0	13.0	0.0	0.000
Trust Region-Standard	4.49e0	1.26e0	3.60e0	6.86e0	9.1	0.0	0.000
Trust Region-Aggressive	4.15e0	2.82e-1	3.71e0	4.90e0	5.0	0.0	0.000