

Table 1: Performance Results for StyblinskiTang\\$_5D\$ Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
GD	-1.92×10^2	8.48	-1.96×10^2	-1.53×10^2	106.8	0.0	0.003
QQN-StrongWolfe	-1.89×10^2	9.46	-1.96×10^2	-1.68×10^2	225.4	0.0	0.006
QQN-CubicQuadraticInterpolation	-1.89×10^2	9.46	-1.96×10^2	-1.53×10^2	276.3	0.0	0.009
QQN-Bisection-2	-1.89×10^2	9.48	-1.96×10^2	-1.68×10^2	270.1	0.0	0.005
QQN-GoldenSection	-1.89×10^2	9.48	-1.96×10^2	-1.68×10^2	461.5	0.0	0.007
QQN-Backtracking	-1.88×10^2	9.46	-1.96×10^2	-1.68×10^2	135.4	0.0	0.003
Trust Region-Standard	-1.88×10^2	2.03×10^1	-1.96×10^2	-1.04×10^2	583.8	0.0	0.004
L-BFGS-Conservative	-1.87×10^2	1.13×10^1	-1.96×10^2	-1.53×10^2	547.4	0.0	0.013
GD-WeightDecay	-1.87×10^2	1.21×10^1	-1.96×10^2	-1.53×10^2	72.8	0.0	0.002
QQN-Bisection-1	-1.87×10^2	1.04×10^1	-1.96×10^2	-1.65×10^2	350.3	0.0	0.006
L-BFGS	-1.86×10^2	1.05×10^1	-1.96×10^2	-1.60×10^2	162.8	0.0	0.002
Adam-Fast	-1.83×10^2	8.69	-1.88×10^2	-1.62×10^2	72.2	0.0	0.001
GD-Nesterov	-1.79×10^2	1.84×10^1	-1.96×10^2	-1.13×10^2	62.1	0.0	0.002
GD-Momentum	-1.68×10^2	2.89×10^1	-1.96×10^2	-9.41×10^1	69.0	0.0	0.002
QQN-MoreThuente	-1.66×10^2	4.65×10^1	-1.96×10^2	-4.50×10^1	349.9	0.0	0.009
L-BFGS-Aggressive	-9.88×10^1	3.53×10^1	-1.65×10^2	-2.37×10^1	775.7	0.0	0.007
Trust Region-Adaptive	-5.05×10^1	7.73×10^{-1}	-5.24×10^1	-4.93×10^1	602.0	0.0	0.004
Adam-WeightDecay	-3.39×10^1	2.55	-3.76×10^1	-2.75×10^1	502.0	0.0	0.011
Adam	-6.74	1.55	-1.02×10^1	-3.86	502.0	0.0	0.010
Adam-AMSGrad	-6.62	1.45	-9.24	-4.01	502.0	0.0	0.011
Trust Region-Conservative	-2.71	6.60×10^{-1}	-4.44	-1.25	602.0	0.0	0.004