

Table 1: Performance Results for Griewank_10D Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
QQN-StrongWolfe	6.06e0	1.00e1	9.86e-3	2.60e1	2281.2	0.0	0.091
QQN-GoldenSection	2.35e1	6.71e0	2.19e0	2.58e1	4343.6	0.0	0.085
QQN-Bisection-2	2.33e1	7.17e0	1.67e0	2.58e1	3260.0	0.0	0.083
QQN-Bisection-1	2.19e1	9.08e0	5.93e-10	2.58e1	2381.1	5.0	0.065
Adam-AMSGrad	2.54e1	2.09e-2	2.53e1	2.54e1	2502.0	0.0	0.064
Adam-Robust	2.55e1	2.00e-2	2.55e1	2.55e1	2502.0	0.0	0.063
Adam-WeightDecay	2.42e1	1.44e-2	2.41e1	2.42e1	2502.0	0.0	0.061
L-BFGS-Limited	1.95e1	3.46e0	8.48e0	2.38e1	2256.7	0.0	0.059
GD-WeightDecay	2.48e1	3.83e-2	2.48e1	2.49e1	1668.0	0.0	0.059
GD-Nesterov	2.21e1	2.17e-1	2.15e1	2.23e1	1668.0	0.0	0.058
Adam	2.54e1	2.20e-2	2.53e1	2.54e1	2502.0	0.0	0.057
L-BFGS-Aggressive	6.09e0	5.66e0	1.01e0	2.16e1	3817.8	0.0	0.054
GD-Momentum	2.20e1	3.14e-1	2.16e1	2.24e1	1668.0	0.0	0.054
L-BFGS-Conservative	2.33e1	1.54e0	2.01e1	2.49e1	1668.3	0.0	0.049
GD	2.56e1	2.73e-2	2.55e1	2.57e1	1668.0	0.0	0.049
GD-AdaptiveMomentum	1.90e1	3.00e0	1.39e1	2.12e1	920.4	0.0	0.035
Adam-Fast	1.17e1	3.56e0	2.89e0	1.50e1	950.2	0.0	0.022
Trust Region-Conservative	2.08e1	2.32e0	1.60e1	2.43e1	1557.3	0.0	0.012
L-BFGS	1.93e1	3.27e0	1.20e1	2.43e1	483.9	0.0	0.012
L-BFGS-MoreThuente	1.42e1	5.29e0	1.93e0	2.12e1	499.3	0.0	0.011
QQN-CubicQuadraticInterpolation	2.45e1	5.40e0	9.67e-1	2.58e1	108.6	0.0	0.003
Trust Region-Precise	2.60e1	1.72e-2	2.60e1	2.60e1	5.0	0.0	0.000
Trust Region-Aggressive	2.60e1	1.61e-2	2.60e1	2.60e1	5.0	0.0	0.000
Trust Region-Adaptive	2.60e1	1.74e-2	2.60e1	2.60e1	5.0	0.0	0.000
Trust Region-Standard	2.60e1	2.15e-2	2.60e1	2.60e1	5.0	0.0	0.000