Table 1: Performance Results for SparseRosenbrock_4D Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
QQN-GoldenSection	3.33e-1	1.76e-1	6.04e-7	6.84e-1	4306.3	5.0	0.085
QQN-StrongWolfe	3.39e-1	6.28e-1	2.24e-8	3.00e0	2429.1	25.0	0.081
QQN-CubicQuadraticInterpolation	5.85e-2	6.41e-2	6.10e-9	2.15e-1	1743.3	45.0	0.073
QQN-Bisection-1	4.56e-1	4.62e-1	9.12e-8	1.60e0	2290.2	15.0	0.057
Adam-AMSGrad	3.39e0	1.45e0	1.65e0	8.86e0	2394.2	0.0	0.054
Adam	2.06e0	4.83e-1	1.19e0	3.18e0	2502.0	0.0	0.050
L-BFGS-MoreThuente	1.75e0	2.72e0	2.55e-7	8.30e0	2601.9	20.0	0.046
L-BFGS-Limited	2.33e0	4.08e0	7.38e-2	1.74e1	3916.8	0.0	0.042
L-BFGS-Conservative	1.27e2	5.46e2	3.78e-5	2.51e3	3413.7	0.0	0.039
L-BFGS-Aggressive	6.34e1	4.42e1	8.59e0	1.72e2	3852.0	0.0	0.029
Trust Region-Conservative	4.72e1	4.50e1	3.37e-1	1.58e2	2998.1	0.0	0.019
Adam-WeightDecay	6.07e0	3.97e0	1.75e-2	9.30e0	843.5	0.0	0.018
Adam-Robust	7.53e0	1.96e0	3.60e0	8.99e0	672.2	0.0	0.015
GD	1.88e0	2.48e0	9.10e-1	9.50e0	510.1	0.0	0.013
Trust Region-Precise	2.16e1	2.75e1	7.75e0	1.10e2	1739.2	0.0	0.011
Trust Region-Adaptive	8.31e0	2.62e-1	7.78e0	8.82e0	954.8	0.0	0.006
Adam-Fast	1.92e0	3.76e0	1.14e-3	1.01e1	243.3	0.0	0.005
QQN-Bisection-2	1.42e0	1.80e0	5.00e-7	3.95e0	193.1	5.0	0.005
GD-WeightDecay	3.04e0	4.49e0	4.73e-2	1.17e1	105.6	0.0	0.003
L-BFGS	9.62e1	1.12e2	7.18e0	4.84e2	143.9	0.0	0.002
GD-Nesterov	3.38e0	3.99e0	1.58e-1	1.22e1	61.4	0.0	0.002
GD-AdaptiveMomentum	1.31e0	4.23e0	2.41e-2	1.97e1	56.2	0.0	0.002
Trust Region-Standard	8.25e0	2.76e-1	7.68e0	8.68e0	168.3	0.0	0.001
GD-Momentum	1.10e1	6.57e0	4.39e-2	3.10e1	21.8	0.0	0.001
Trust Region-Aggressive	8.72e0	4.61e-1	7.92e0	9.65e0	57.2	0.0	0.000