

Table 1: Performance Results for Zakharov\10DProblem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
<b>QQN-GoldenSection</b>	$8.88 \times 10^{-17}$	$3.36 \times 10^{-16}$	$3.64 \times 10^{-31}$	$2.03 \times 10^{-15}$	281.6	100.0	0.004
QQN-Backtracking	$2.60 \times 10^{-16}$	$4.26 \times 10^{-16}$	$4.66 \times 10^{-19}$	$1.37 \times 10^{-15}$	150.2	100.0	0.004
QQN-StrongWolfe	$3.27 \times 10^{-16}$	$4.07 \times 10^{-16}$	$9.27 \times 10^{-18}$	$1.52 \times 10^{-15}$	160.6	100.0	0.005
QQN-Bisection-2	$4.56 \times 10^{-16}$	$6.68 \times 10^{-16}$	$2.42 \times 10^{-18}$	$2.68 \times 10^{-15}$	183.3	100.0	0.005
QQN-Bisection-1	$6.42 \times 10^{-2}$	$1.58 \times 10^{-1}$	$1.74 \times 10^{-30}$	$5.61 \times 10^{-1}$	228.2	85.0	0.005
GD-WeightDecay	$1.62 \times 10^1$	$1.89 \times 10^1$	$3.49 \times 10^{-10}$	$5.60 \times 10^1$	89.5	40.0	0.003
GD	$2.45 \times 10^{-1}$	$1.50 \times 10^{-1}$	$7.03 \times 10^{-6}$	$7.60 \times 10^{-1}$	328.1	0.0	0.009
QQN-CubicQuadraticInterpolation	2.83	$5.53 \times 10^{-1}$	2.21	5.02	401.9	0.0	0.016
GD-Nesterov	$7.35 \times 10^2$	$6.32 \times 10^2$	$4.44 \times 10^1$	$1.83 \times 10^3$	20.3	0.0	0.001
Adam-Fast	$1.21 \times 10^3$	$5.69 \times 10^2$	$3.56 \times 10^2$	$2.23 \times 10^3$	35.0	0.0	0.001
Adam-WeightDecay	$3.31 \times 10^3$	$1.86 \times 10^3$	$8.14 \times 10^2$	$7.11 \times 10^3$	502.0	0.0	0.012
GD-Momentum	$5.48 \times 10^3$	$2.59 \times 10^3$	$1.93 \times 10^3$	$9.56 \times 10^3$	21.1	0.0	0.001
L-BFGS	$1.41 \times 10^4$	$4.63 \times 10^3$	$7.78 \times 10^3$	$2.19 \times 10^4$	634.2	0.0	0.011
QQN-MoreThuente	$3.98 \times 10^4$	$3.25 \times 10^4$	$2.12 \times 10^3$	$1.21 \times 10^5$	482.2	0.0	0.011
Adam-AMSGrad	$1.79 \times 10^5$	$3.20 \times 10^4$	$1.27 \times 10^5$	$2.34 \times 10^5$	502.0	0.0	0.012
Adam	$1.93 \times 10^5$	$5.19 \times 10^4$	$1.07 \times 10^5$	$3.19 \times 10^5$	502.0	0.0	0.011
L-BFGS-Aggressive	$3.43 \times 10^5$	$3.20 \times 10^5$	$8.08 \times 10^{-3}$	$7.90 \times 10^5$	726.1	0.0	0.009
Trust Region-Adaptive	$5.79 \times 10^5$	$7.75 \times 10^4$	$4.66 \times 10^5$	$7.27 \times 10^5$	602.0	0.0	0.004
Trust Region-Standard	$5.91 \times 10^5$	$1.01 \times 10^5$	$4.61 \times 10^5$	$8.48 \times 10^5$	602.0	0.0	0.004
Trust Region-Conservative	$5.96 \times 10^5$	$7.70 \times 10^4$	$4.02 \times 10^5$	$7.10 \times 10^5$	602.0	0.0	0.004
L-BFGS-Conservative	$2.35 \times 10^{24}$	$7.32 \times 10^{24}$	$3.29 \times 10^{-10}$	$3.33 \times 10^{25}$	187.9	0.0	0.004