

Table 1: Performance Results for Zakharov\\$\_5DPproblem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
<b>QQN-Bisection-1</b>	$4.43 \times 10^{-16}$	$1.24 \times 10^{-15}$	$2.38 \times 10^{-25}$	$6.23 \times 10^{-15}$	136.2	100.0	0.002
QQN-GoldenSection	$1.01 \times 10^{-14}$	$4.17 \times 10^{-14}$	$6.87 \times 10^{-34}$	$2.40 \times 10^{-13}$	182.8	100.0	0.002
QQN-Bisection-2	$1.23 \times 10^{-14}$	$2.79 \times 10^{-14}$	$8.88 \times 10^{-19}$	$9.70 \times 10^{-14}$	123.9	100.0	0.002
QQN-StrongWolfe	$9.81 \times 10^{-5}$	$4.28 \times 10^{-4}$	$2.71 \times 10^{-20}$	$1.96 \times 10^{-3}$	130.1	95.0	0.003
QQN-Backtracking	$1.58 \times 10^{-10}$	$5.16 \times 10^{-10}$	$2.35 \times 10^{-18}$	$2.23 \times 10^{-9}$	173.1	90.0	0.004
GD-WeightDecay	$4.37 \times 10^{-1}$	$5.52 \times 10^{-1}$	$3.49 \times 10^{-10}$	1.45	110.4	60.0	0.003
QQN-MoreThuente	1.09	$4.98 \times 10^{-1}$	$4.18 \times 10^{-21}$	1.63	440.6	15.0	0.008
L-BFGS-Conservative	$2.40 \times 10^{-8}$	$6.11 \times 10^{-8}$	$7.70 \times 10^{-14}$	$2.65 \times 10^{-7}$	581.5	0.0	0.014
GD	$2.92 \times 10^{-6}$	$6.18 \times 10^{-7}$	$1.78 \times 10^{-6}$	$4.27 \times 10^{-6}$	335.0	0.0	0.008
QQN-CubicQuadraticInterpolation	$3.77 \times 10^{-1}$	$2.00 \times 10^{-1}$	$3.59 \times 10^{-3}$	$8.16 \times 10^{-1}$	398.7	0.0	0.014
GD-Nesterov	5.20	2.05	1.89	9.10	18.1	0.0	0.000
Adam-Fast	9.63	1.26	6.47	$1.24 \times 10^1$	34.9	0.0	0.001
Adam-WeightDecay	$2.43 \times 10^1$	$1.92 \times 10^1$	1.21	$7.60 \times 10^1$	502.0	0.0	0.011
L-BFGS	$4.17 \times 10^1$	$8.01 \times 10^1$	$5.52 \times 10^{-7}$	$3.33 \times 10^2$	123.0	0.0	0.002
GD-Momentum	$5.40 \times 10^1$	$1.47 \times 10^1$	$3.37 \times 10^1$	$9.11 \times 10^1$	18.9	0.0	0.000
Adam-AMSGrad	$1.05 \times 10^3$	$2.82 \times 10^2$	$6.87 \times 10^2$	$1.90 \times 10^3$	502.0	0.0	0.012
Adam	$1.14 \times 10^3$	$3.87 \times 10^2$	$7.29 \times 10^2$	$2.23 \times 10^3$	502.0	0.0	0.010
L-BFGS-Aggressive	$1.72 \times 10^3$	$1.77 \times 10^3$	$2.56 \times 10^1$	$5.10 \times 10^3$	712.2	0.0	0.009
Trust Region-Standard	$2.94 \times 10^3$	$7.54 \times 10^2$	$1.44 \times 10^3$	$4.37 \times 10^3$	602.0	0.0	0.004
Trust Region-Adaptive	$3.32 \times 10^3$	$7.43 \times 10^2$	$2.22 \times 10^3$	$4.82 \times 10^3$	602.0	0.0	0.004
Trust Region-Conservative	$3.47 \times 10^3$	$7.79 \times 10^2$	$2.14 \times 10^3$	$5.19 \times 10^3$	602.0	0.0	0.004