

Table 1: Performance Results for Michalewicz\10Dn<sub>m</sub>10Problem

Optimizer	Mean Final Value	Std Dev	Best Value	Worst Value	Mean Func Evals	Success Rate (%)	Mean Time (s)
<b>Adam-Fast</b>	-6.52	$6.55 \times 10^{-1}$	-7.26	-5.26	119.2	47.5	0.003
Adam-AMSGrad	-5.91	$5.70 \times 10^{-1}$	-6.67	-4.40	478.1	0.0	0.013
Adam	-5.65	$5.75 \times 10^{-1}$	-6.26	-4.40	424.4	0.0	0.010
Adam-WeightDecay	-5.18	$5.32 \times 10^{-1}$	-6.25	-4.38	170.2	0.0	0.004
GD-WeightDecay	-4.55	$8.33 \times 10^{-1}$	-6.26	-3.14	74.6	0.0	0.003
QQN-StrongWolfe	-4.36	1.24	-6.26	-1.93	547.2	0.0	0.016
QQN-MoreThuente	-4.18	$9.30 \times 10^{-1}$	-5.42	-2.21	461.5	0.0	0.013
L-BFGS-Conservative	-4.11	$7.10 \times 10^{-1}$	-5.30	-2.83	707.0	0.0	0.011
QQN-Backtracking	-4.11	1.18	-6.26	-1.90	640.4	0.0	0.019
GD-Nesterov	-3.93	1.16	-6.14	-1.97	22.0	0.0	0.001
QQN-Bisection-1	-3.79	$8.79 \times 10^{-1}$	-5.30	-1.54	471.4	0.0	0.012
QQN-GoldenSection	-3.72	$9.32 \times 10^{-1}$	-5.36	-1.50	884.4	0.0	0.016
GD-Momentum	-3.70	$8.69 \times 10^{-1}$	-5.30	-1.64	38.3	0.0	0.001
Trust Region-Adaptive	-3.70	$7.98 \times 10^{-1}$	-5.26	-2.27	33.0	0.0	0.000
QQN-Bisection-2	-3.58	$9.13 \times 10^{-1}$	-4.76	-1.35	337.4	0.0	0.008
Trust Region-Conservative	-3.23	$6.65 \times 10^{-1}$	-4.29	-2.04	524.0	0.0	0.004
QQN-CubicQuadraticInterpolation	-3.16	$9.99 \times 10^{-1}$	-5.31	$-7.91 \times 10^{-1}$	395.5	0.0	0.015
GD	-3.15	$8.12 \times 10^{-1}$	-5.15	-1.79	23.4	0.0	0.001
Trust Region-Standard	-2.54	$8.81 \times 10^{-1}$	-4.08	-1.06	10.1	0.0	0.000
L-BFGS-Aggressive	-1.55	$5.80 \times 10^{-1}$	-2.97	$-6.30 \times 10^{-2}$	717.9	0.0	0.006
L-BFGS	$-4.81 \times 10^{-1}$	$4.50 \times 10^{-1}$	-1.51	$1.36 \times 10^{-2}$	60.9	0.0	0.001