Table 1: Success Rate Heatmap: Color-coded Success Rates Across All Optimizer-Problem Combinations

Problem	Adam	Adam-AMSGrad	Adam-Fast	Adam-Robust	Adam-WeightDecay	GD	GD-AdaptiveMomentum	GD-Momentum	GD-Nesterov	GD-WeightDecay	L-BFGS	L-BFGS-Aggressive	L-BFGS-Conservative	L-BFGS-Limited	L-BFGS-MoreThuente	QQN-Bisection-1	QQN-Bisection-2	QQN-CubicQuadraticInterpolation	QQN-GoldenSection	QQN-StrongWolfe	Trust Region-Adaptive	Trust Region-Aggressive	Trust Region-Conservative	Trust Region-Precise	Trust Region-Standard
Sphere_2D	40%	0%	30%	0%	100%	100%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	35%	30%	100%	55%	10%
Sphere_10D	95%	0%	0%	0%	100%	100%	60%	75%	65%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	30%	0%	35%	65%	15%
Rosenbrock_2D	0%	0%	60%	0%	0%	0%	25%	0%	0%	0%	0%	0%	100%	0%	95%	5%	30%	40%	10%	35%	0%	0%	0%	0%	0%
Rosenbrock_5D	0%	0%	5%	0%	60%	0%	0%	0%	10%	60%	0%	0%	20%	45%	70%	85%	55%	70%	55%	100%	0%	0%	0%	0%	0%
Rosenbrock_10D	90%	100%	45%	0%	100%	75%	0%	55%	100%	100%	0%	0%	100%	100%	95%	100%	100%	100%	100%	100%	0%	30%	0%	0%	0%
Michalewicz_2D_m10	50%	30%	40%	0%	0%	0%	5%	0%	10%	0%	10%	0%	0%	25%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Michalewicz_5D_m10	80%	55%	65%	10%	10%	45%	5%	5%	5%	5%	0%	0%	30%	0%	5%	20%	35%	0%	5%	25%	0%	0%	0%	0%	0%
Michalewicz_10D_m10	20%	30%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	5%	5%	0%	0%	0%	0%	0%
Rastrigin_2D	55%	55%	0%	15%	50%	5%	0%	0%	5%	5%	5%	0%	75%	70%	55%	65%	30%	80%	55%	65%	15%	0%	0%	10%	0%
Rastrigin_5D	30%	40%	40%	55%	55%	30%	65%	5%	45%	50%	0%	0%	40%	35%	50%	25%	15%	50%	35%	40%	60%	50%	0%	35%	45%
Rastrigin_10D	30%	55%	30%	30%	35%	35%	40%	10%	25%	45%	0%	0%	20%	50%	65%	45%	15%	60%	50%	40%	40%	45%	0%	0%	25%
Ackley_2D_a20_b0.2_c6.28e0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	20%	0%	15%	45%	60%	40%	40%	35%	15%	5%	0%	0%	0%	0%
Ackley_5D_a20_b0.2_c6.28e0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	20%	0%	0%	10%	30%	35%	5%	5%	5%	0%	0%	0%	0%	0%
Ackley_10D_a20_b0.2_c6.28e0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	5%	0%	0%	5%	10%	20%	5%	0%	0%	0%	0%	0%	0%	0%
StyblinskiTang_2D	0%	0%	35%	0%	80%	65%	5%	15%	10%	35%	50%	0%	90%	70%	70%	70%	75%	70%	90%	65%	70%	20%	0%	0%	40%
StyblinskiTang_5D	0%	0%	55%	0%	65%	50%	10%	15%	30%	60%	30%	0%	65%	50%	50%	60%	60%	45%	70%	40%	65%	45%	0%	0%	55%
StyblinskiTang_10D	0%	0%	30%	0%	35%	25%	20%	15%	30%	45%	45%	0%	30%	35%	35%	30%	35%	15%	45%	15%	0%	50%	0%	0%	40%
Beale_2D	0%	0%	0%	0%	100%	100%	80%	5%	100%	100%	65%	0%	100%	100%	100%	95%	70%	95%	100%	90%	0%	5%	5%	45%	0%
Levi_2D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	25%	15%	15%	20%	40%	45%	25%	0%	0%	0%	0%	0%
GoldsteinPrice_2D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	5%	20%	5%	15%	35%	15%	0%	0%	0%	0%	0%
Matyas_2D	100%	100%	100%	100%	100%	100%	95%	100%	100%	100%	100%	95%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
Himmelblau_2D	0%	0%	0%	0%	100%	100%	0%	0%	40%	75%	35%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	25%	0%	0%	80%
Booth_2D	0%	0%	0%	0%	100%	100%	0%	0%	0%	15%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	90%	0%	0%	0%	0%
Griewank_2D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Griewank_5D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Griewank_10D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Schwefel_2D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%
Schwefel_5D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%
Schwefel_10D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%
Levy_2D	0%	0%	0%	0%	100%	0%	0%	0%	0%	100%	80%	70%	85%	95%	95%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
Levy_5D	0%	0%	0%	0%	60%	0%	0%	10%	25%	100%	80%	75%	100%	70%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
Levy_10D	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	80%	25%	100%	80%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
Zakharov_2D	0%	0%	0%	0%	100%	100%	0%	0%	0%	25%	60%	70%	75%	90%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
Zakharov_5D	0%	0%	0%	0%	60%	100%	0%	0%	0%	25%	0%	0%	100%	95%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
Zakharov_10D	0%	0%	0%	0%	0%	10%	0%	0%	0%	30%	0%	0%	0%	55%	0%	100%	100%	100%	100%	95%	0%	0%	0%	0%	0%
IllConditionedRosenbrock_2D_alpha100	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	80%	0%	65%	5%	25%	35%	0%	20%	0%	0%	0%	0%	0%
IllConditionedRosenbrock_5D_alpha100	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	80%	15%	65%	35%	100%	0%	0%	0%	0%	0%
IllConditionedRosenbrock_10D_alpha100	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	65%	5%	75%	0%	70%	0%	0%	0%	0%	0%
Trigonometric_2D	100%	85%	5%	5%	75%	100%	0%	0%	0%	85%	90%	80%	100%	90%	100%	100%	100%	100%	95%	100%	0%	0%	0%	0%	0%
Trigonometric_5D	85%	35%	0%	20%	70%	100%	0%	0%	0%	75%	0%	0%	90%	95%	75%	90%	80%	100%	100%	90%	0%	0%	0%	0%	0%
Trigonometric_10D	35%	0%	0%	10%	70%	55%	0%	0%	0%	85%	0%	0%	25%	0%	60%	85%	75%	100%	80%	100%	0%	0%	0%	0%	0%
PenaltyI_2D_alpha1e6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PenaltyI_5D_alpha1e6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PenaltyI_10D_alpha1e6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Barrier_2D_mu0.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Barrier_5D_mu0.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Barrier_10D_mu0.1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NoisySphere_2D_sigma0.01	0%	5%	35%	0%	0%	35%	30%	35%	25%	25%	40%	0%	80%	45%	15%	35%	0%	0%	5%	60%	0%	0%	0%	0%	0%
NoisySphere_5D_sigma0.01	0%	0%	10%	0%	0%	20%	15%	25%	30%	25%	20%	0%	85%	55%	25%	45%	0%	0%	10%	45%	0%	0%	0%	0%	0%
NoisySphere_10D_sigma0.01	0%	0%	15%	5%	0%	10%	35%	10%	15%	5%	20%	0%	85%	45%	10%	45%	0%	0%	5%	25%	0%	0%	0%	0%	0%
SparseRosenbrock_4D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	15%	5%	45%	5%	25%	0%	0%	0%	0%	0%
SparseRosenbrock_10D	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	55%	5%	45%	0%	0%	0%	0%	0%
SparseQuadratic_5D_pattern[1, 3]	0%	0%	0%	0%	100%	100%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
SparseQuadratic_10D_pattern[1, 3]	0%	0%	0%	0%	100%	100%	0%	0%	0%	100%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
LogisticRegression_100samples_5features_reg0.01	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LogisticRegression_200samples_10features_reg0.01	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LinearRegression_100samples_5features_reg0.01	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LinearRegression_200samples_10features_reg0.01	0%	0%	20%	0%	0%	100%	0%	0%	0%	100%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%
NeuralNetwork_100samples_layers_5_10_3	10%	0%	60%	0%	85%	0%	0%	0%	0%	0%	0%	5%	45%	45%	15%	95%	90%	80%	75%	45%	0%	0%	0%	0%	0%
NeuralNetwork_100samples_layers_10_20_5	10%	5%	50%	0%	100%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	100%	100%	100%	85%	70%	0%	0%	0%	0%	0%
SVM_100samples_5features_C1	100%	90%	0%	50%	100%	100%	0%	0%	0%	100%	100%	100%	100%	90%	100%	100%	100%	100%	90%	100%	0%	0%	0%	0%	0%
SVM_200samples_10features_C1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Legend: 90-100% Excellent, 50-89% Good, 10-49% Poor, 0-9% Very Poor, N/A No Data. Quickly identifies which optimizers work on which problem types.