

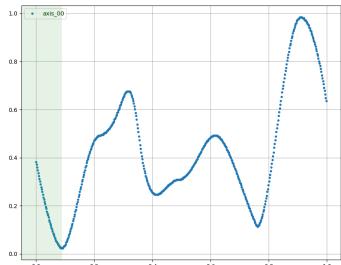
Hyppopy Solver Comparison Report

April 23, 2019

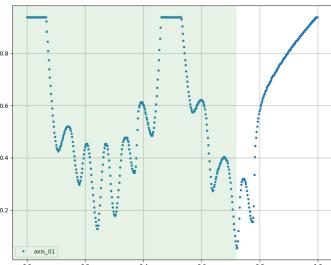
1 Benchmarking

1.1 Virtual Function I

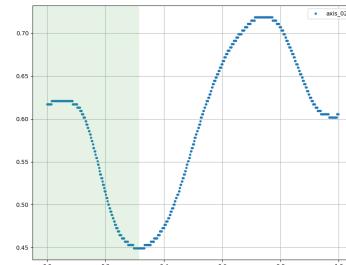
The figures below are depicting the axis plots of the virtual hyperparameter space function I to be optimized with the available hyppopy solvers.



axis 00



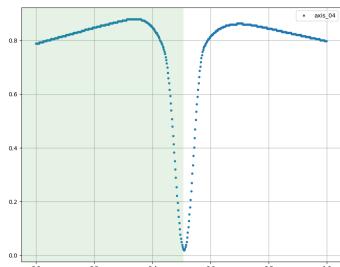
axis 01



axis 02



axis 03



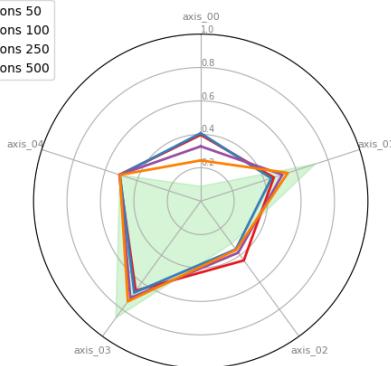
axis 04

1.1.1 Minimum Finding Abilities

The pictures below depict the accuracies reached on the individual axis. The light green region is the ground truth and the red, blue, violet and orange lines are the results after 50, 100, 250, and 500 iterations. Each line is the mean result over 50 individual optimizations on the target function.

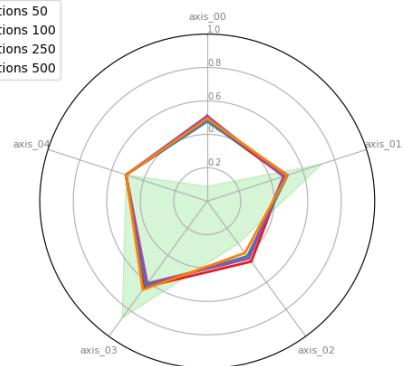
iterations 50
iterations 100
iterations 250
iterations 500

hyperopt



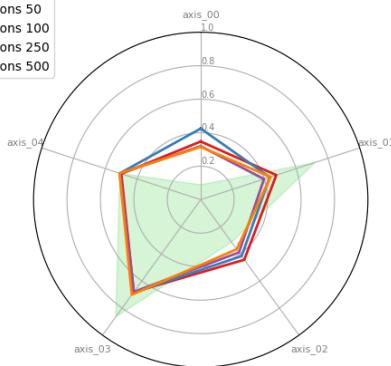
iterations 50
iterations 100
iterations 250
iterations 500

opportunity



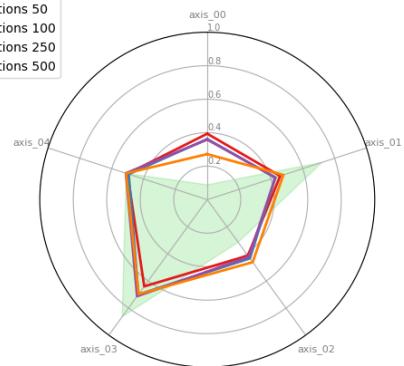
iterations 50
iterations 100
iterations 250
iterations 500

optuna



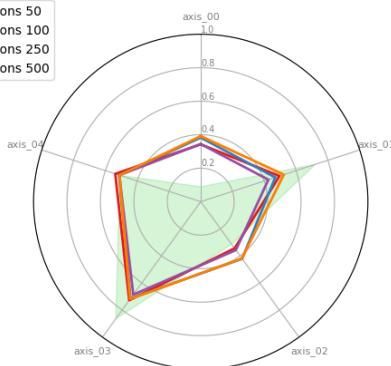
iterations 50
iterations 100
iterations 250
iterations 500

randomsearch



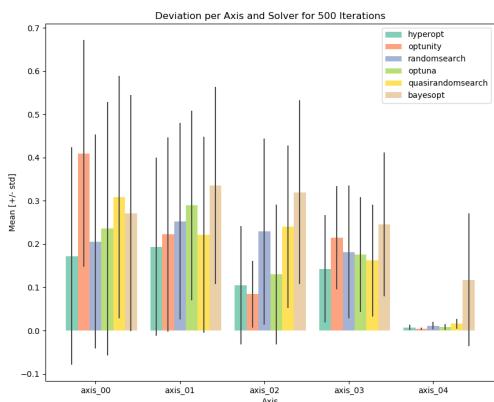
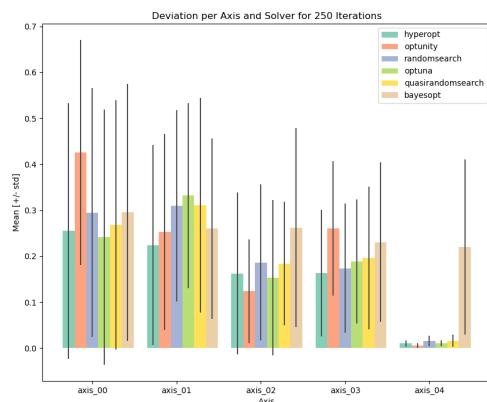
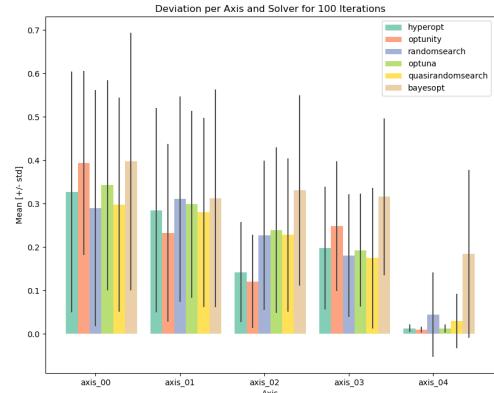
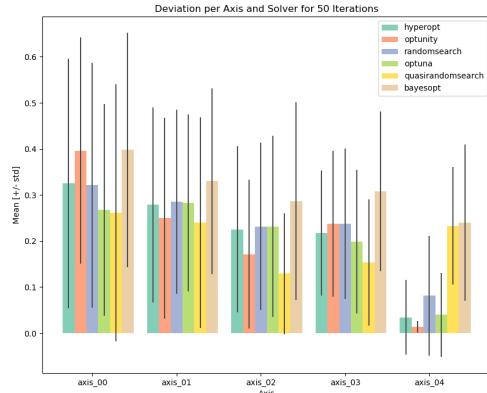
iterations 50
iterations 100
iterations 250
iterations 500

quasirandomsearch



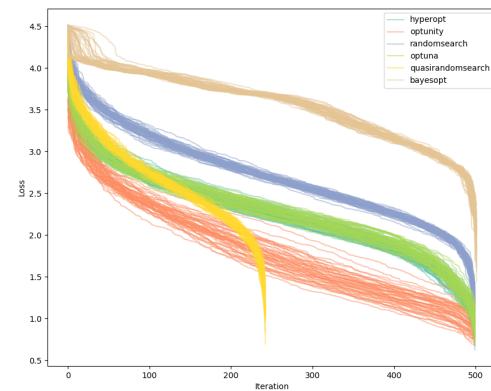
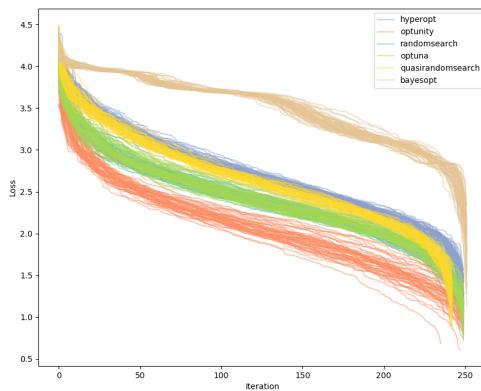
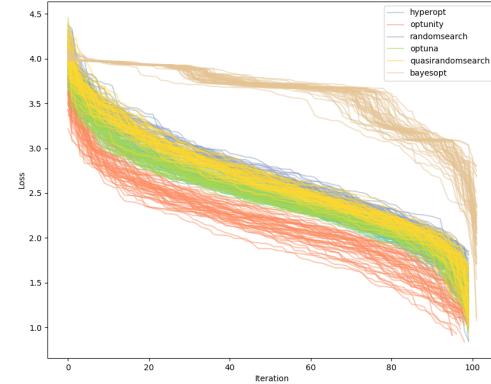
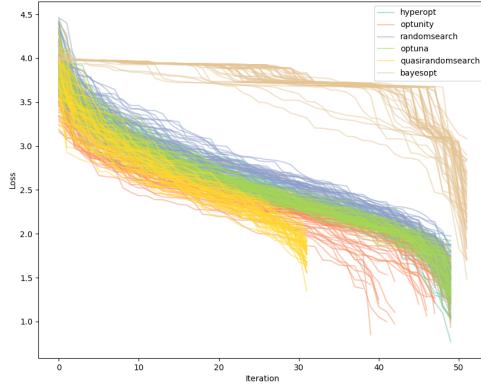
1.1.2 Relative Distances to the Axis Optima

The pictures in this section depict the mean distance and the standard deviation per axis for each solver.



1.1.3 Convergence Behaviour

The pictures in this section depict the loss over iteration plots for each of the 50 iterations for each solver. For better visualization the Loss values are sorted, so the mapping between Iteration and Loss values might not be correct. The purpose of these plots is to show the overall Loss curve for each solver and it's variation over different runs.

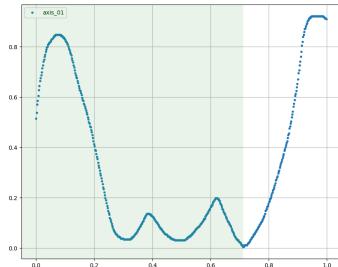


1.2 Virtual Function II

The figures below are depicting the axis plots of the virtual hyperparameter space function II to be optimized with the available hyppopy solvers.



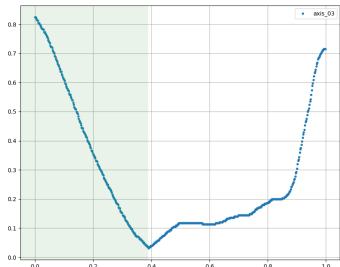
axis 00



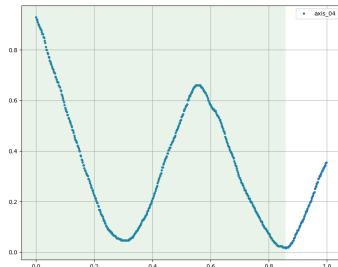
axis 01



axis 02



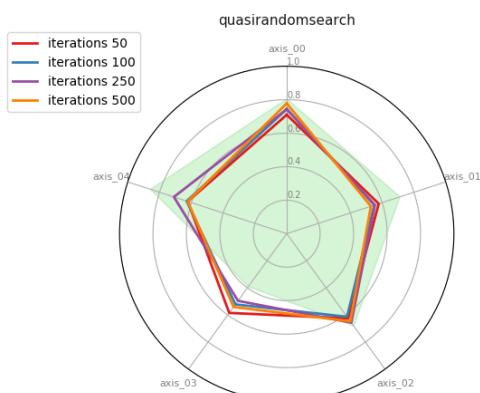
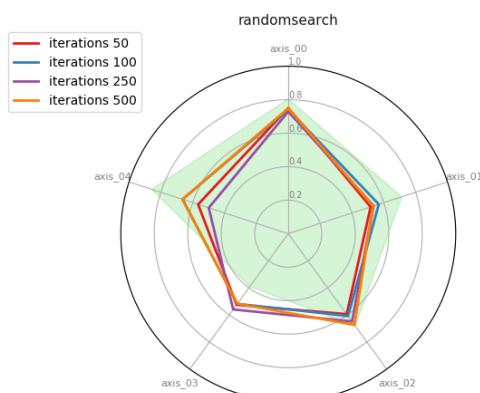
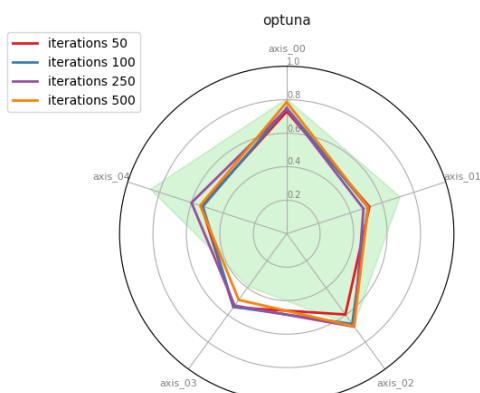
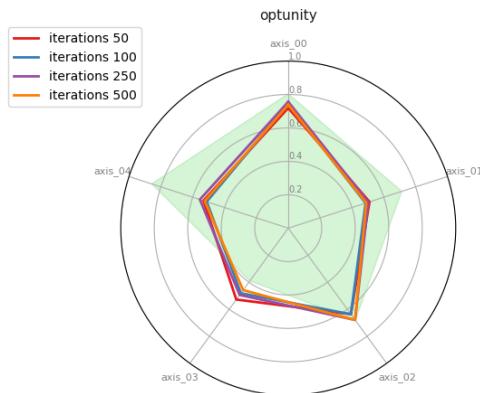
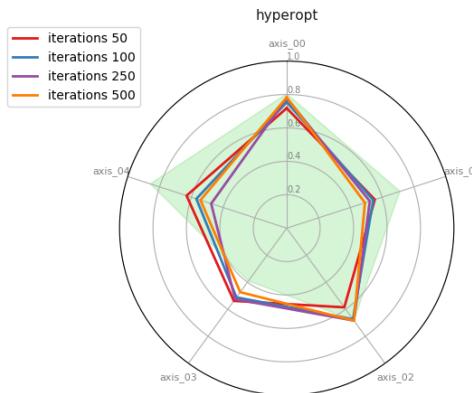
axis 03



axis 04

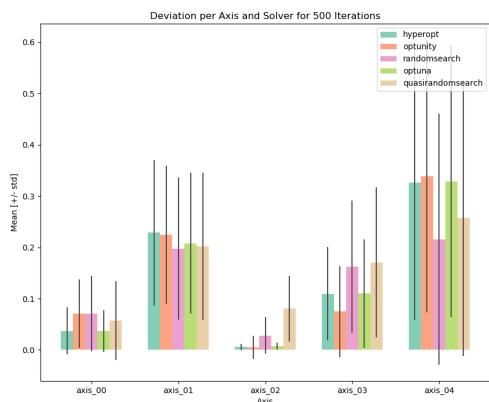
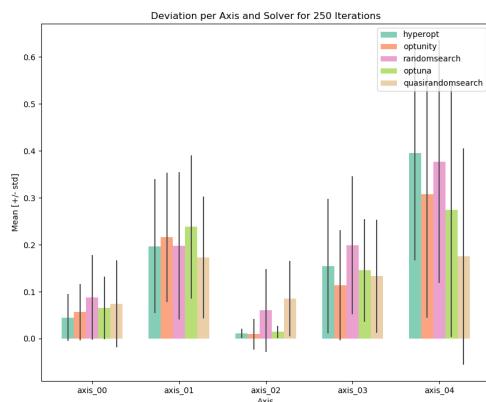
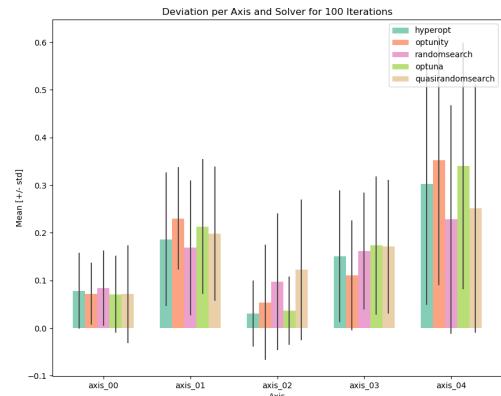
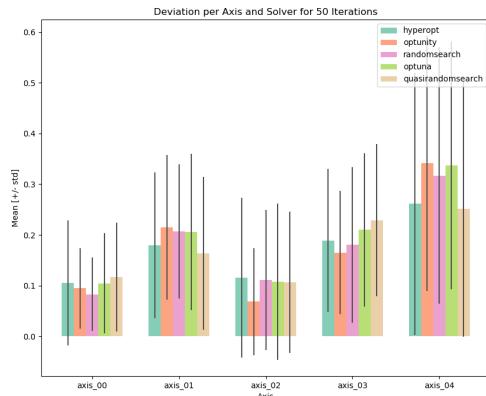
1.2.1 Minimum Finding Abilities

The pictures below depict the accuracies reached on the individual axis. The light green region is the ground truth and the red, blue, violet and orange lines are the results after 50, 100, 250, and 500 iterations. Each line is the mean result over 50 individual optimizations on the target function.



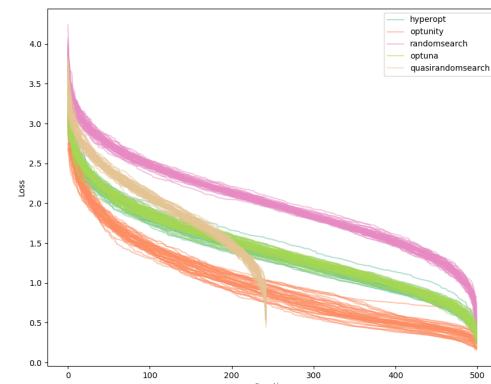
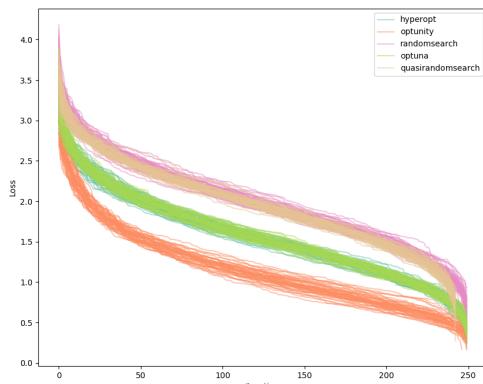
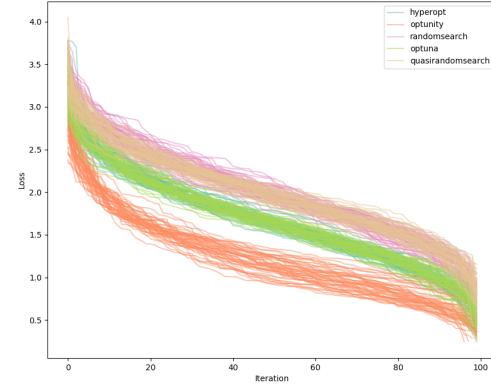
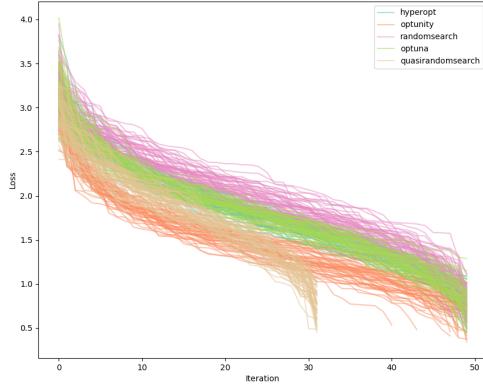
1.2.2 Relative Distances to the Axis Optima

The pictures in this section depict the mean distance and the standard deviation per axis for each solver.



1.2.3 Convergence Behaviour

The pictures in this section depict the loss over iteration plots for each of the 50 iterations for each solver. For better visualization the Loss values are sorted, so the mapping between Iteration and Loss values might not be correct. The purpose of these plots is to show the overall Loss curve for each solver and it's variation over different runs.

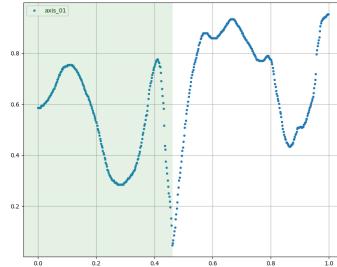


1.3 Virtual Function III

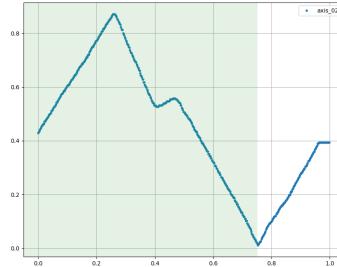
The figures below are depicting the axis plots of the virtual hyperparameter space function III to be optimized with the available hyppopy solvers.



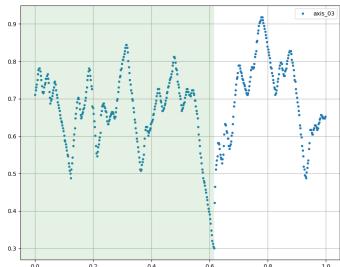
axis 00



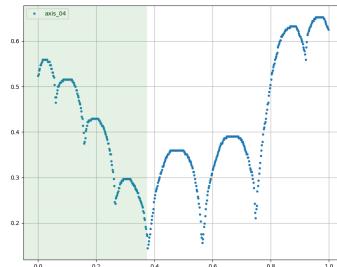
axis 01



axis 02



axis 03



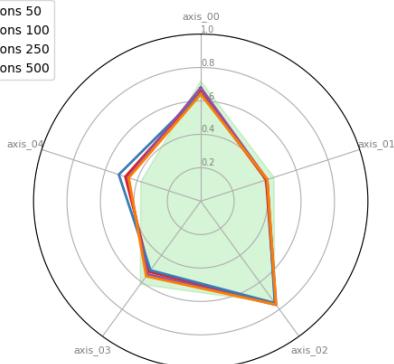
axis 04

1.3.1 Minimum Finding Abilities

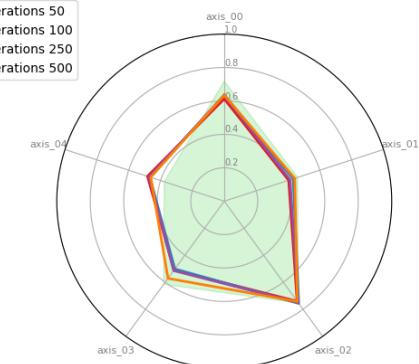
The pictures below depict the accuracies reached on the individual axis. The light green region is the ground truth and the red, blue, violet and orange lines are the results after 50, 100, 250, and 500 iterations. Each line is the mean result over 50 individual optimizations on the target function.

iterations 50
iterations 100
iterations 250
iterations 500

hyperopt

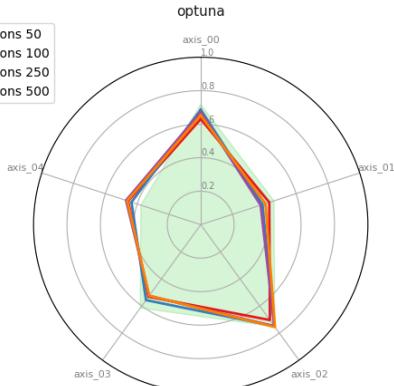


opportunity



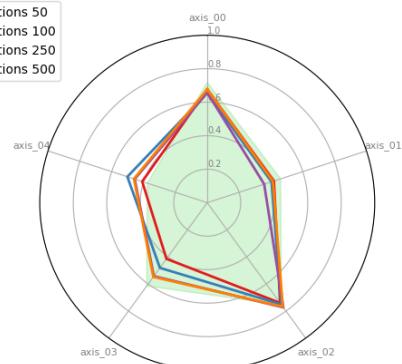
optuna

iterations 50
iterations 100
iterations 250
iterations 500



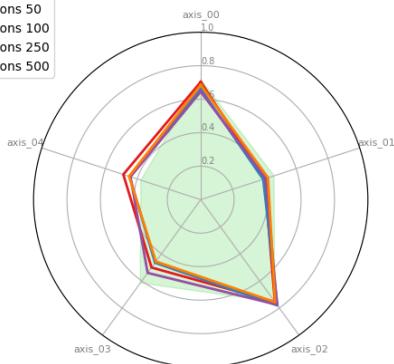
randomsearch

iterations 50
iterations 100
iterations 250
iterations 500



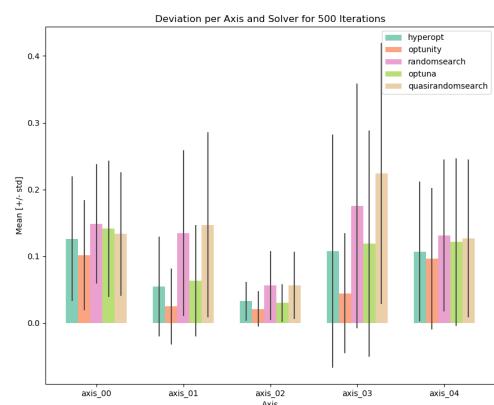
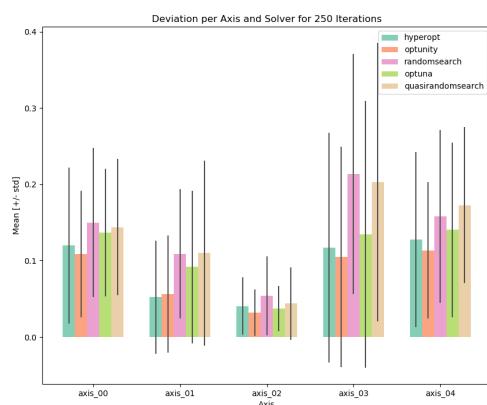
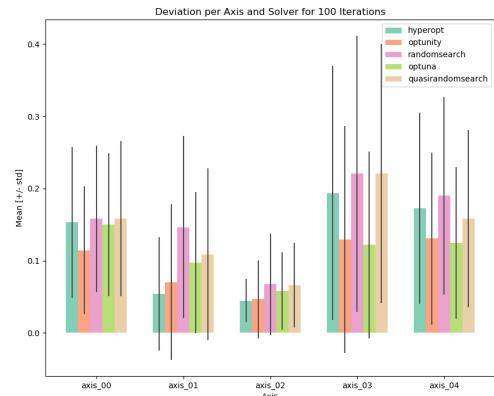
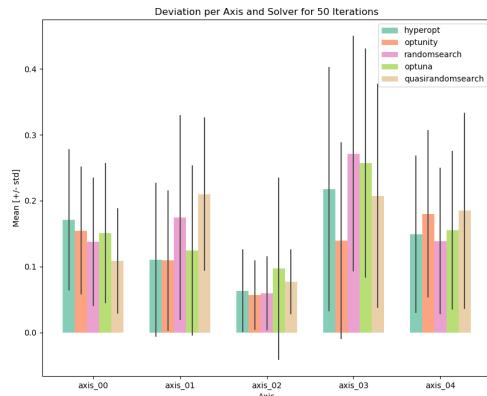
quasirandomsearch

iterations 50
iterations 100
iterations 250
iterations 500



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