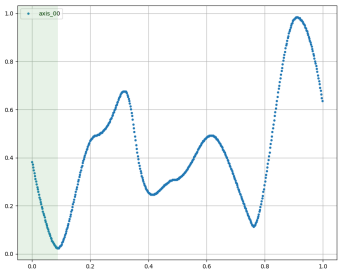
Hyppopy Solver Comparison Report

April 29, 2019

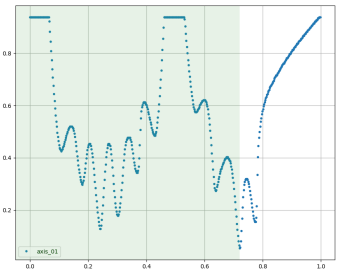
1 Benchmarking

1.1 Virtual Function I

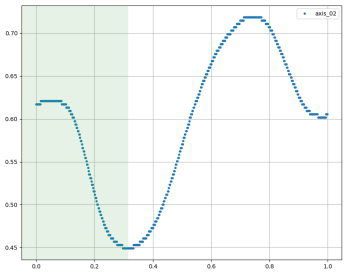
The figures below are depicting the axis plots of the virtual hyperparameter space function I to be optimized with the available hyppopy solvers.



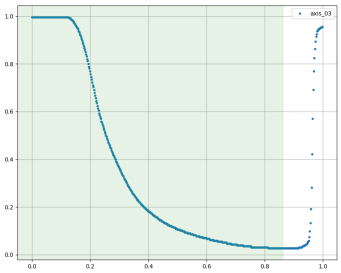
axis 00



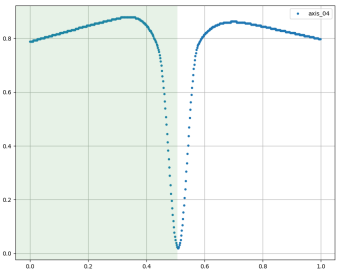
axis 01



axis 02



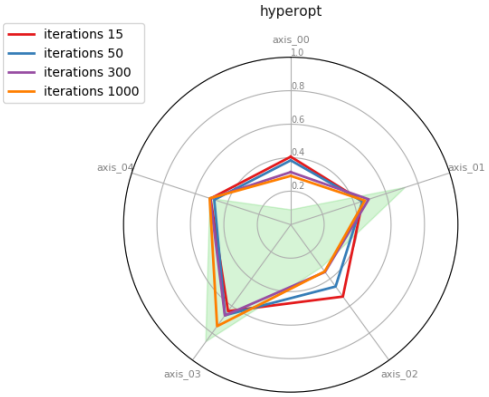
axis 03

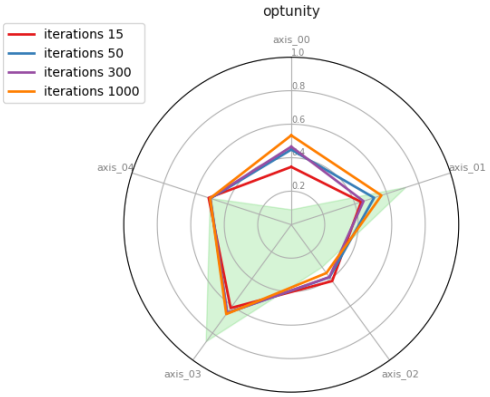


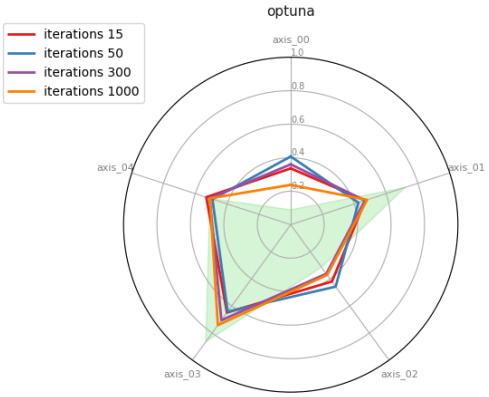
axis 04

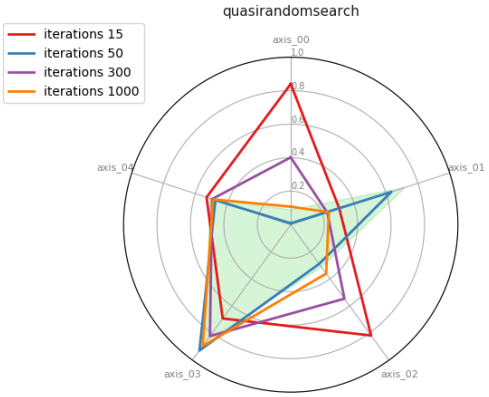
1.1.1 Minimum Finding Abilities

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 15, 50, 300, and 1000 iterations. Each line is the mean result over 50 individual optimizations on the target function. Exception is the QuasiRandomSolver, whose parameter space is deterministic and thus has no natural statistical variation.









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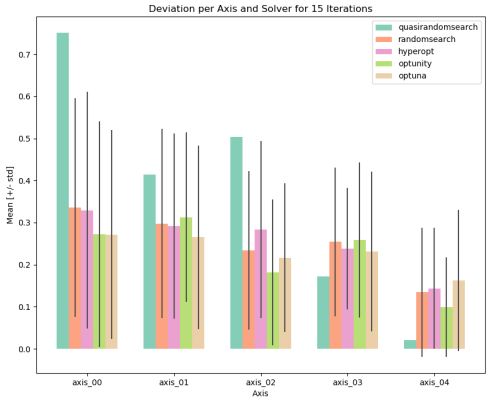
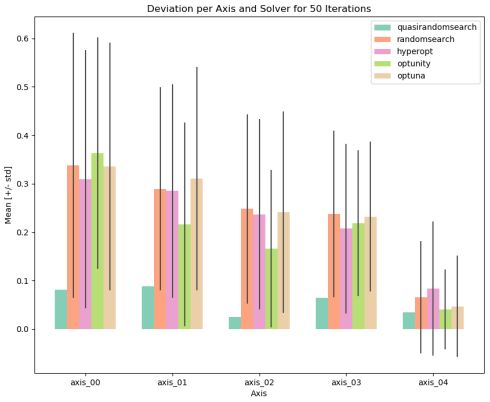
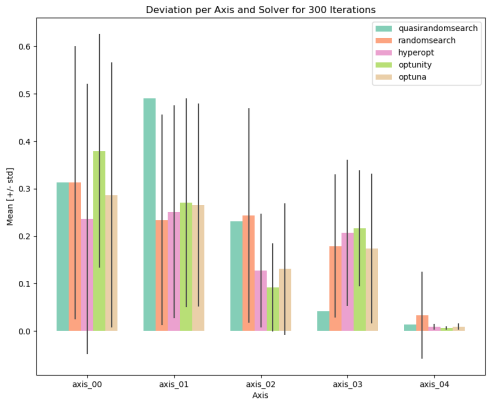
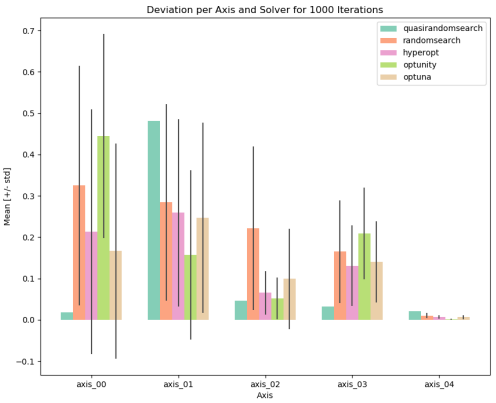
The pictures in this section depict the mean distance and the standard deviation per axis for each solver.



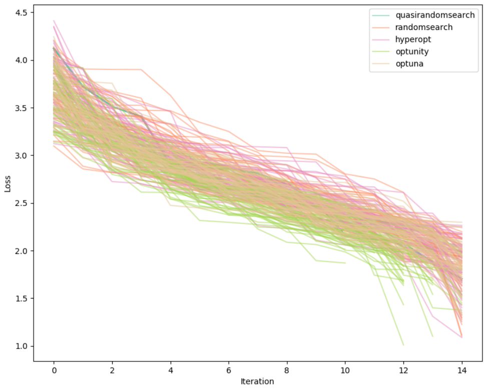


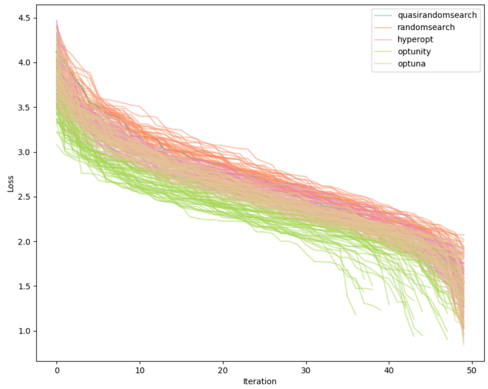


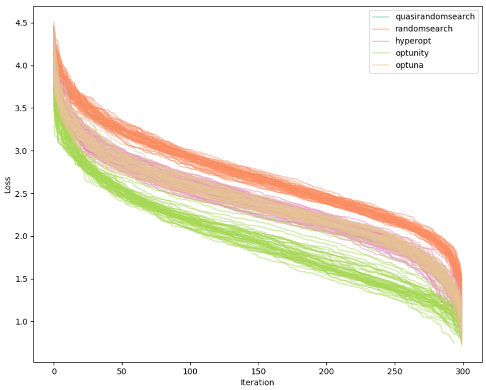


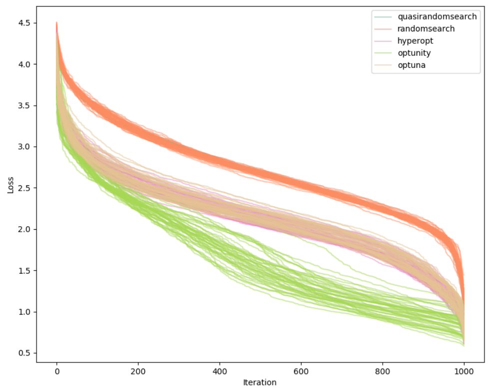
1.1.3 Convergence Beahviour

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.



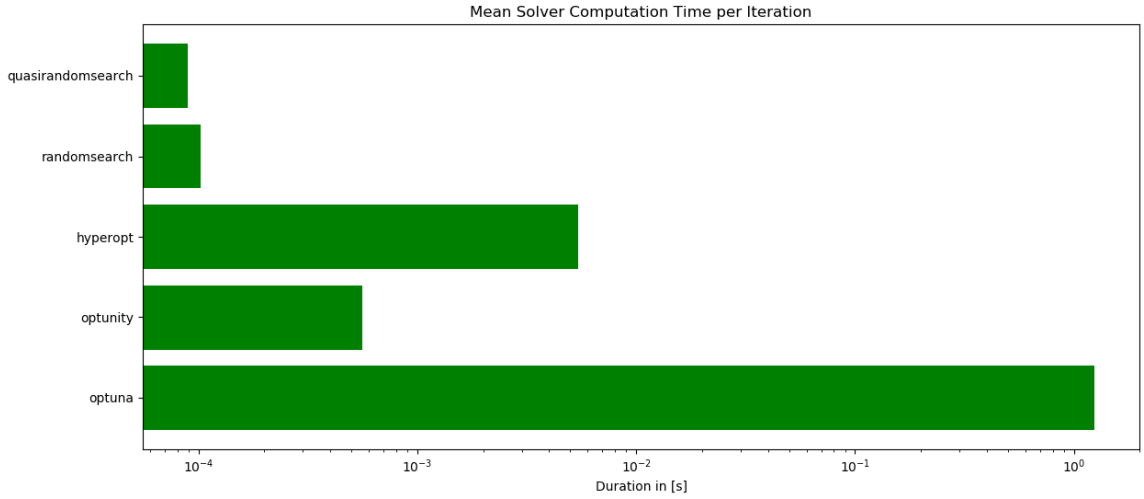






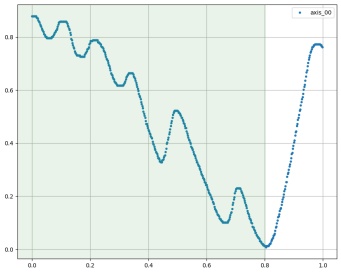
1.1.4 Mean Solver Runtime

The below depicts the mean computation time per iteration for each solver. The time axis is logarithmic!

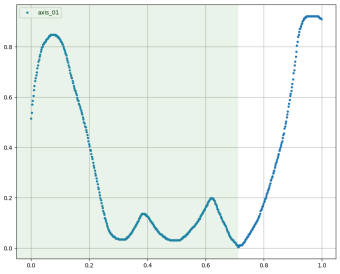


1.2 Virtual Function II

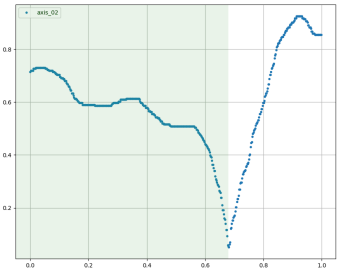
The figures below are depicting the axis plots of the virtual hyperparameter space function II to be optimized with the available hyppopy solvers.



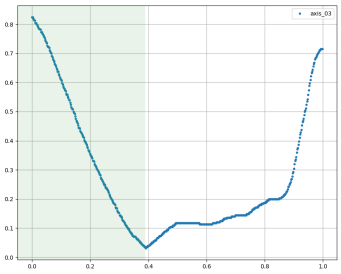
axis 00



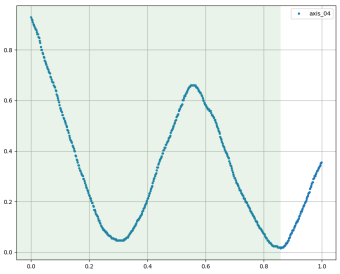
axis 01



axis 02



axis 03



axis 04

1.2.1 Minimum Finding Abilities

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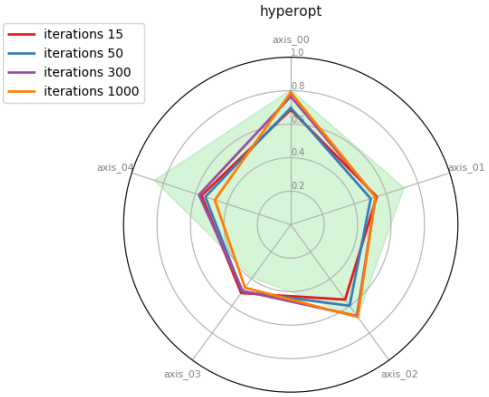

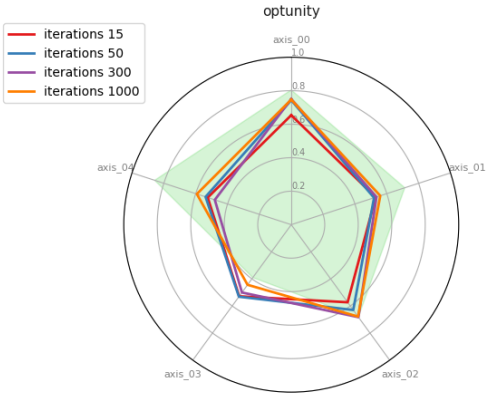

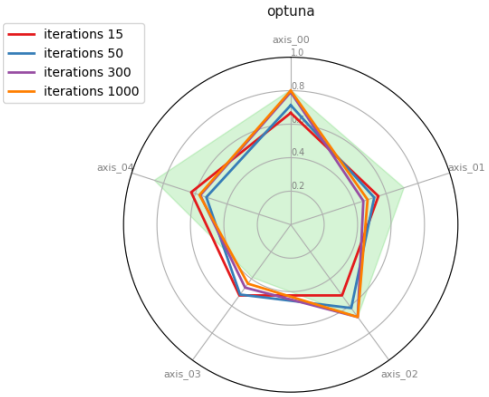

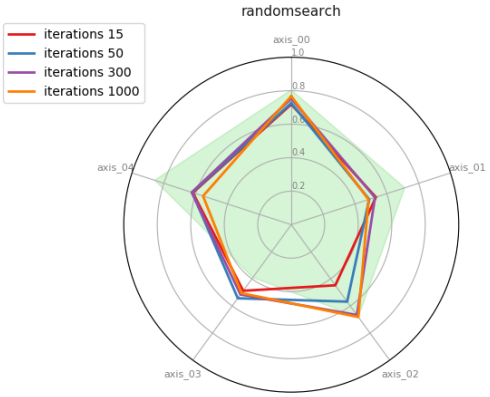

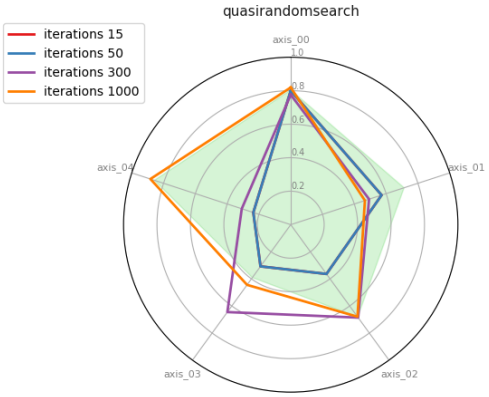

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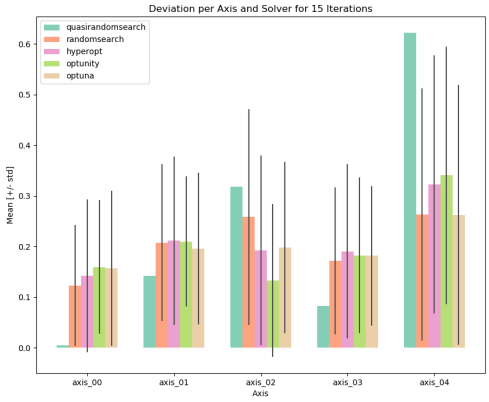

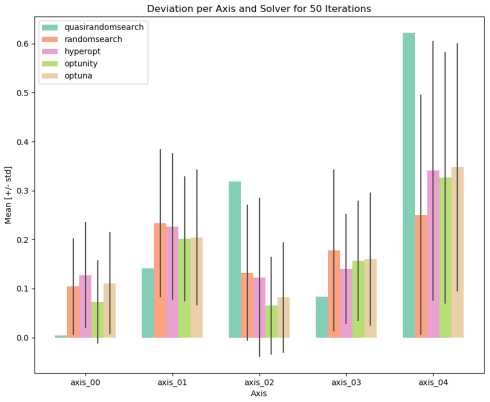

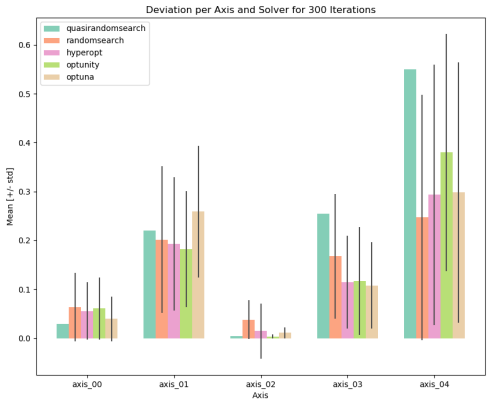

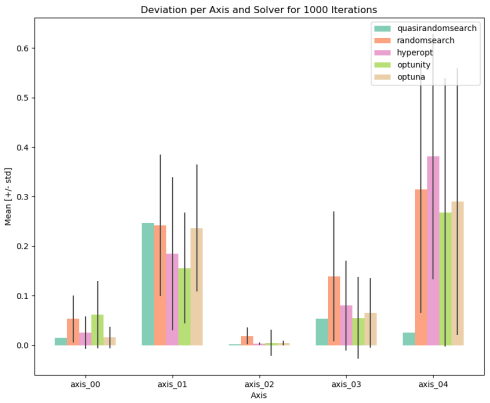

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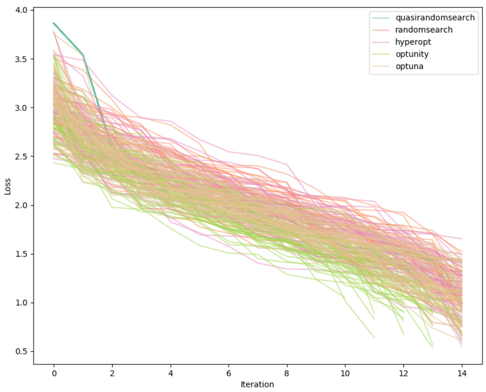

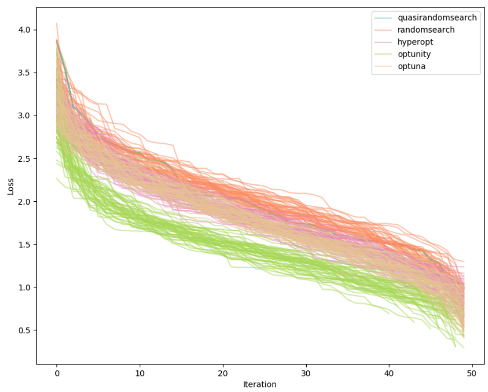

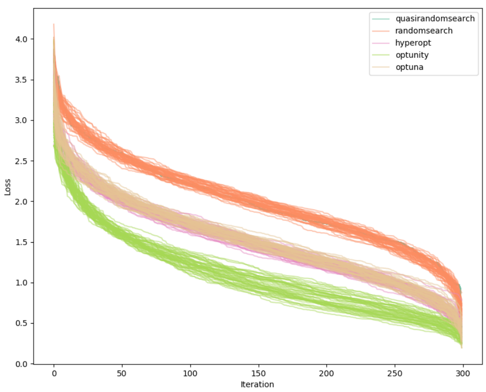

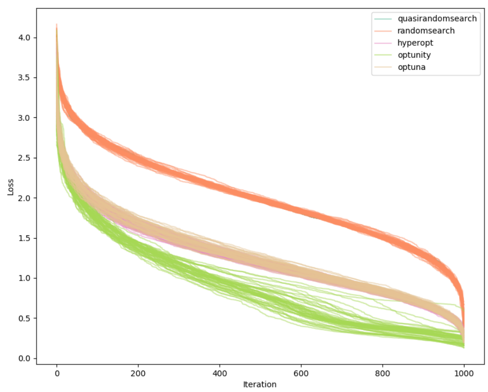

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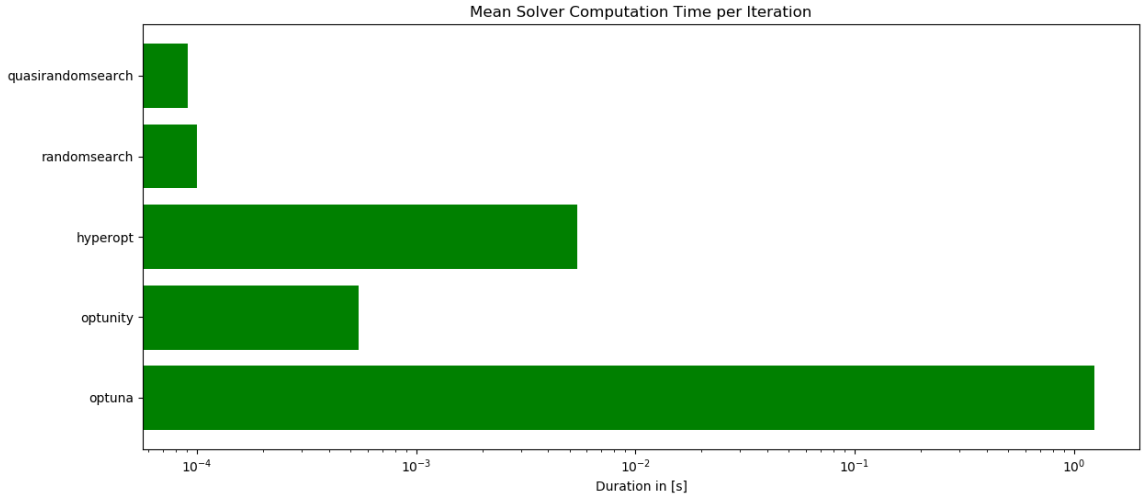

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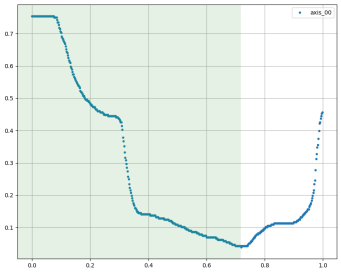
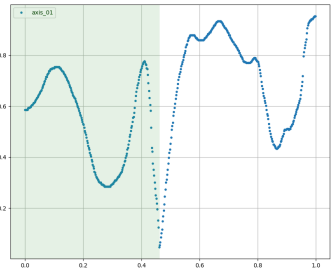
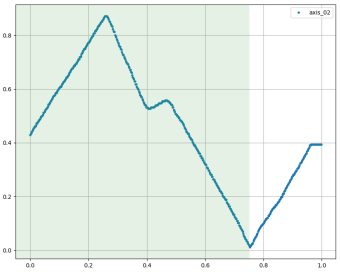


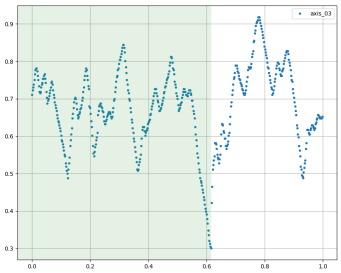
axis 00



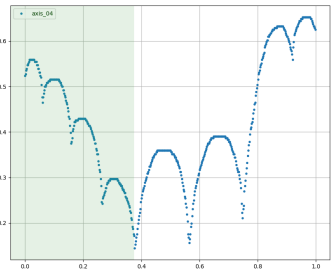
axis 01



axis 02



axis 03



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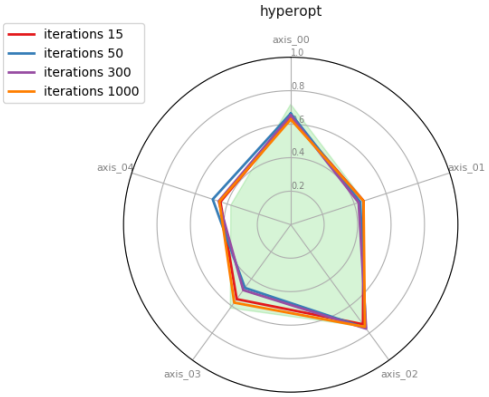

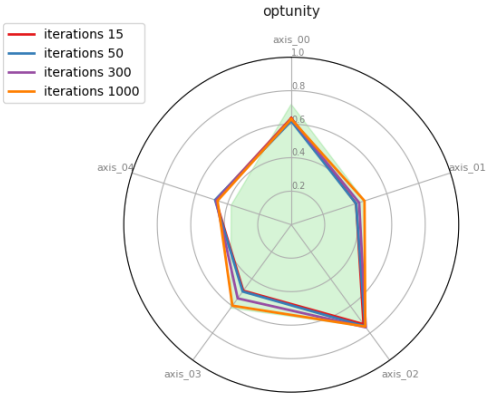

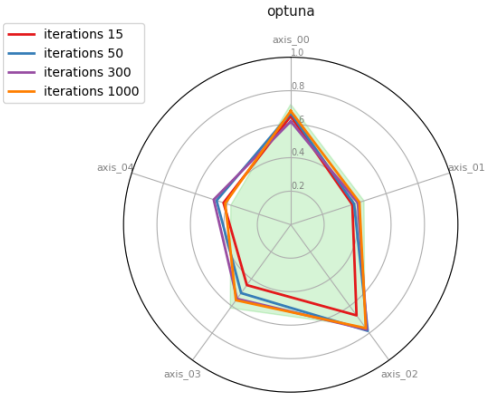

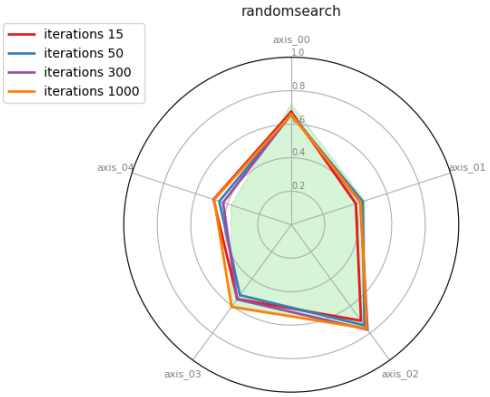

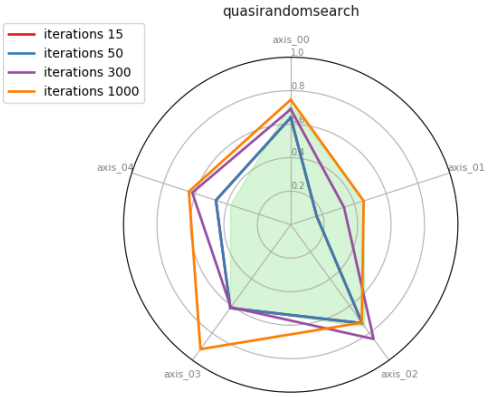

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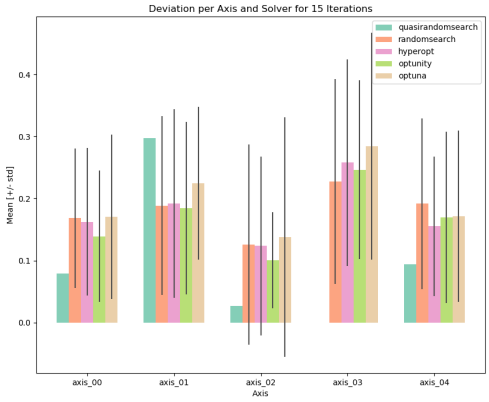

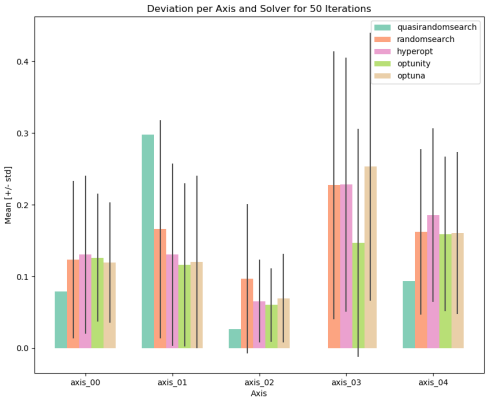

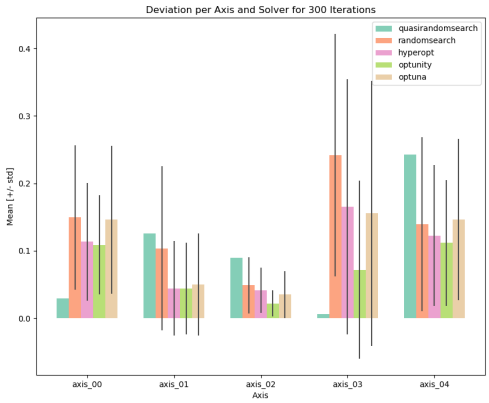

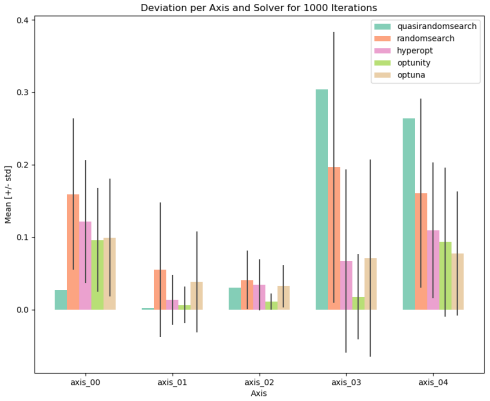

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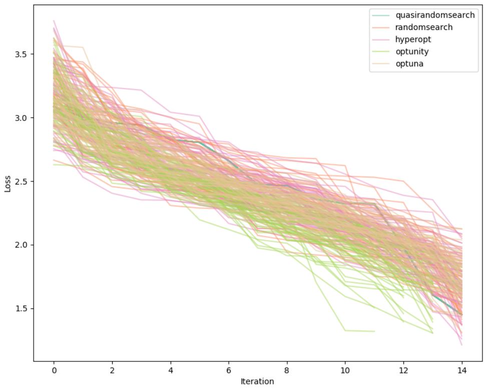

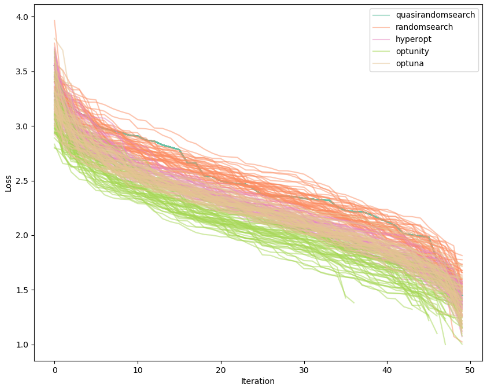

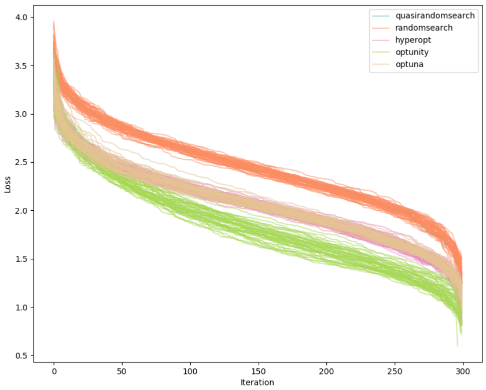

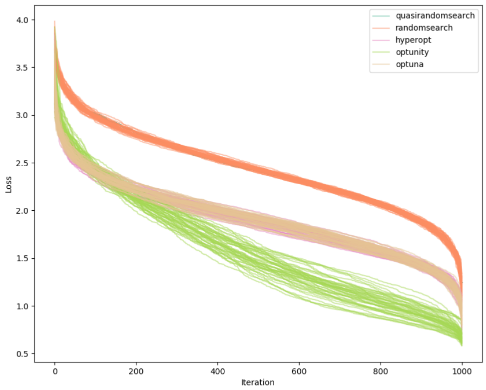

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