

# Optimization Assignment 2

## Comparison between Algorithms

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## Contents

# 1 Algorithm Performances

## 1.1 Methodology

### 1.1.1 Limitations

Note that there are limitations with this analysis. Points are summarized below.

1. The debugging and data recording code are in the algorithms run. In this report it is assumed that there are no

### 1.1.2 Further Areas to Explore

## 1.2 Steepest Descent

## 1.3 Powell's Conjugate Direction

## 1.4 Conjugate Gradient Techniques

## 1.5 Hooke Jeeves

## 1.6 Nelder-Mead Simplex Search

## 1.7 Original Newton's Method

## 1.8 Modified Newton's Method with Levenberg-Marquardt Modification

# 2 Conclusion

## 2.1 Number of Function Evaluations

# A All Plots

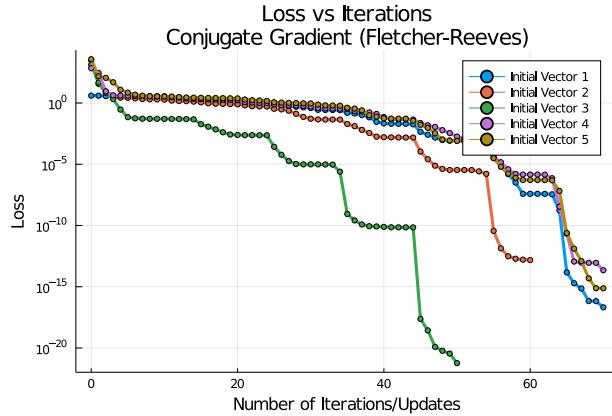


Figure 1: ConjugateGradientFletcherReevesLossPlot.svg

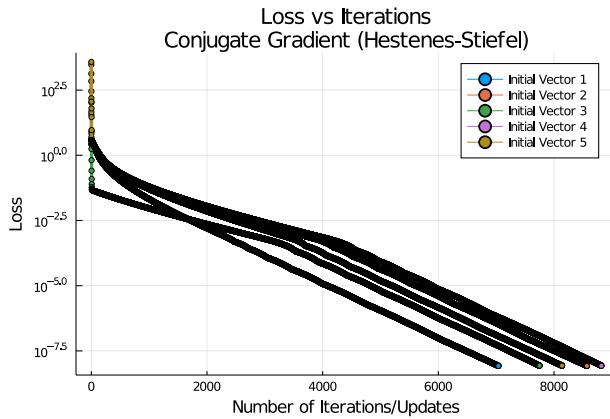


Figure 2: ConjugateGradientHestenesStiefelLossPlot.svg

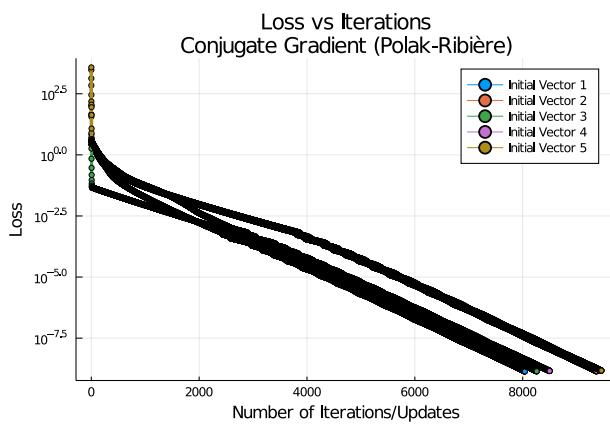


Figure 3: ConjugateGradientPolakRibiereLossPlot.svg

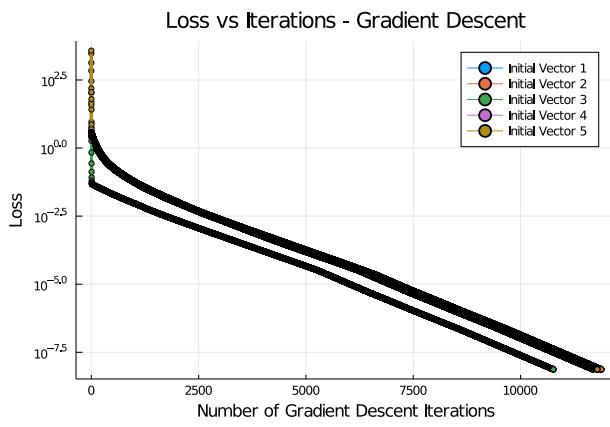


Figure 4: GradientDescentLossPlot.svg

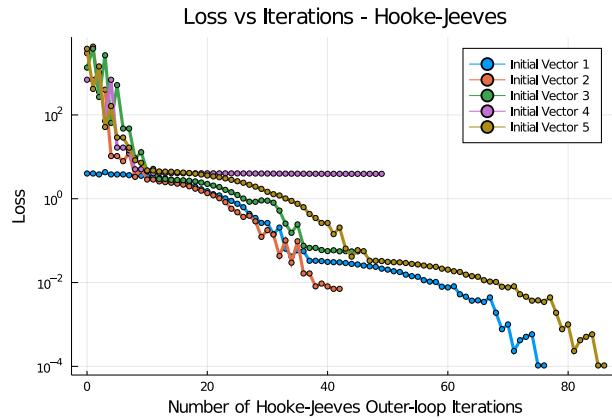


Figure 5: HookeJeevesLossPlot.svg

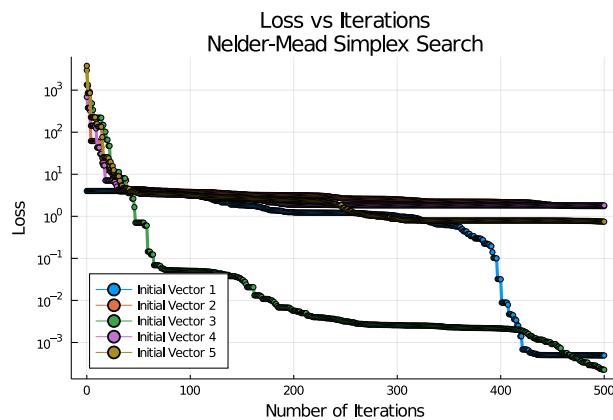


Figure 6: NelderMeadLossPlot.svg

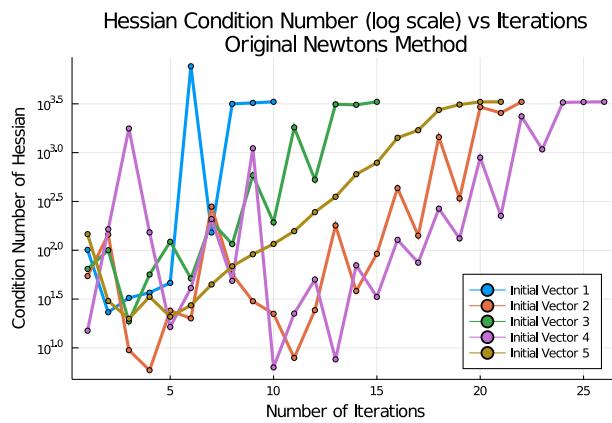


Figure 7: OriginalNewtonsMethodConditionNumberHessianPlot.svg

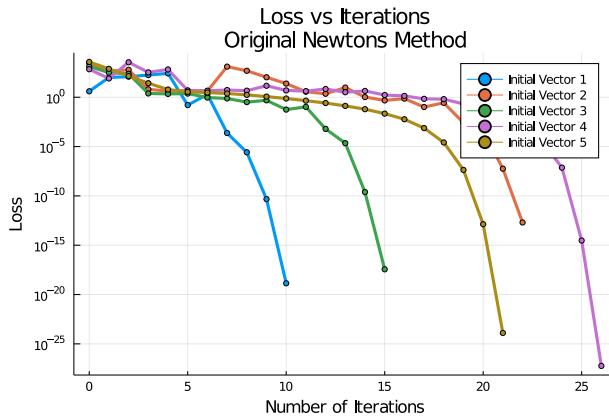


Figure 8: OriginalNewtonsMethodLossPlot.svg

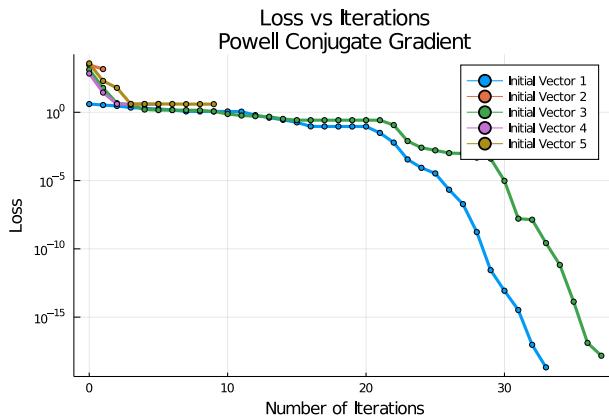


Figure 9: PowellConjugateGradientLossPlot.svg

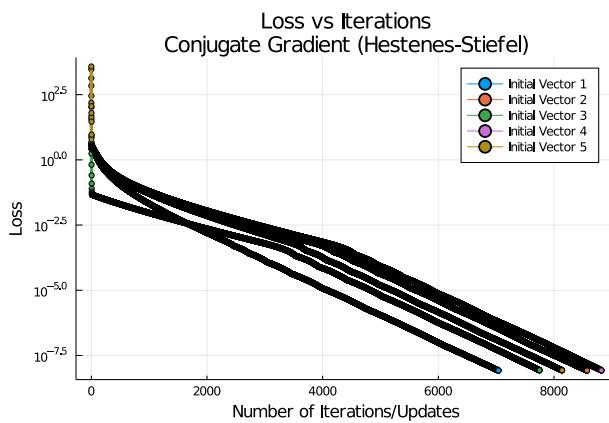


Figure 10: ConjugateGradientHestenesStiefelLossPlot.svg

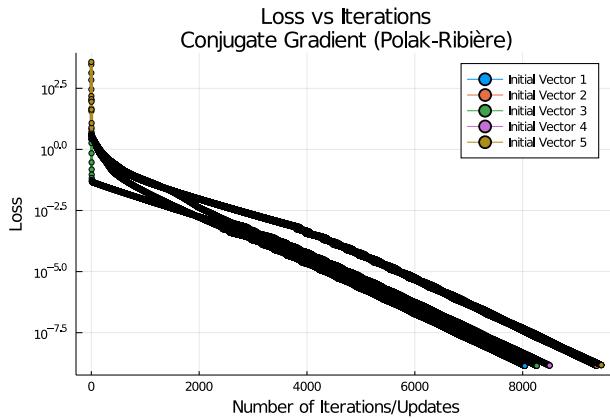


Figure 11: ConjugateGradientPolakRibiereLossPlot.svg

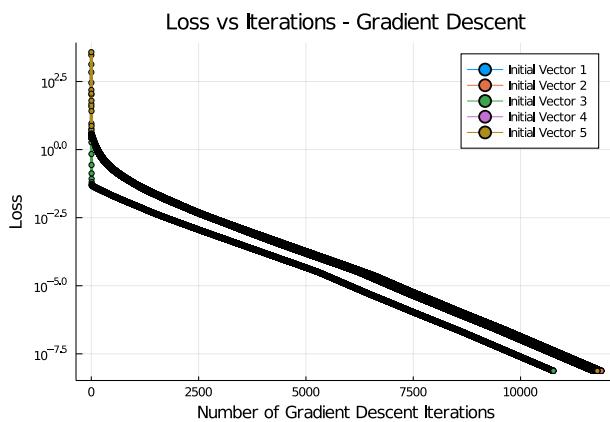


Figure 12: GradientDescentLossPlot.svg

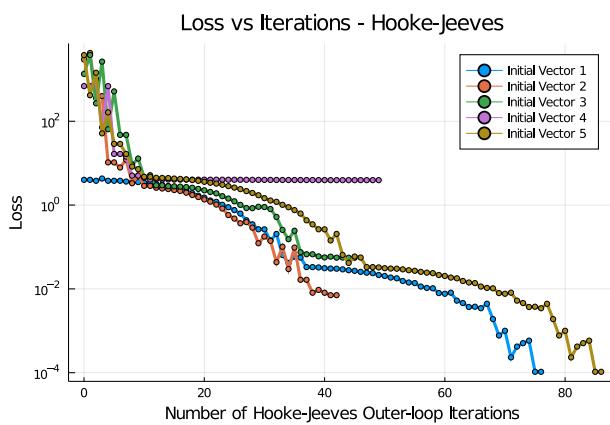


Figure 13: HookeJeevesLossPlot.svg

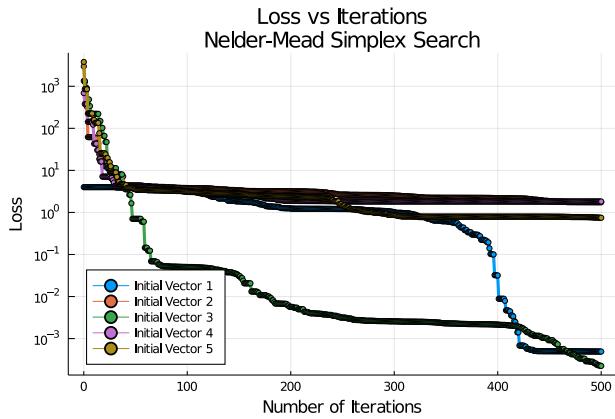


Figure 14: NelderMeadLossPlot.svg

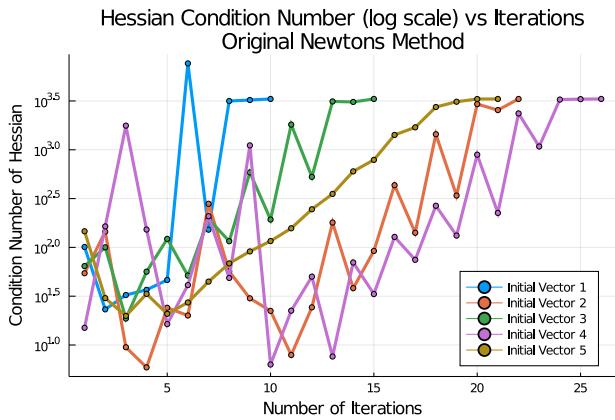


Figure 15: OriginalNewtonsMethodConditionNumberHessianPlot.svg

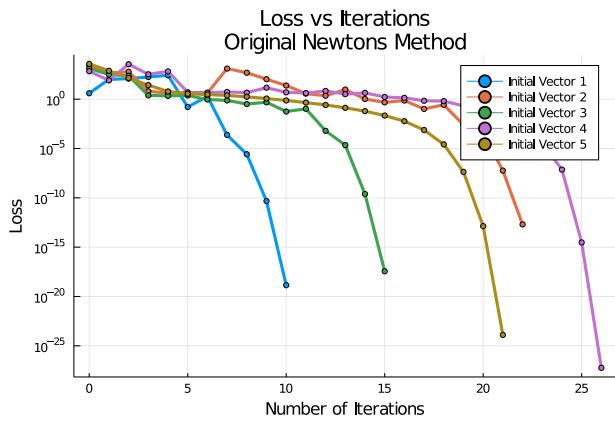


Figure 16: OriginalNewtonsMethodLossPlot.svg

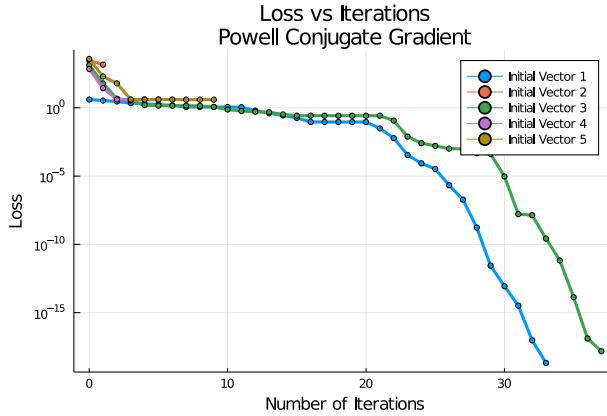


Figure 17: PowellConjugateGradient*LossPlot.svg*

Figure 18: ModifiedNewtonsWithLM<sub>C</sub>*conditionNumberHessianPlot1.svg*

Figure 19: ModifiedNewtonsWithLM<sub>C</sub>*conditionNumberHessianPlot2.svg*

Figure 20: ModifiedNewtonsWithLM<sub>C</sub>*conditionNumberHessianPlot3.svg*

Figure 21: ModifiedNewtonsWithLM<sub>L</sub>*LossPlot1.svg*

Figure 22: ModifiedNewtonsWithLM<sub>L</sub>*LossPlot2.svg*

Figure 23: ModifiedNewtonsWithLM<sub>L</sub>*LossPlot3.svg*

Figure 24: ModifiedNewtonsWithLM<sub>M</sub>*atrixCompare1.svg*

Figure 25: ModifiedNewtonsWithLM<sub>M</sub>*atrixCompare2.svg*

Figure 26: ModifiedNewtonsWithLM<sub>M</sub>*atrixCompare3.svg*

## B Source Code