ME 575 - Homework 3

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Abstract

To find optimal values for the Brachistochrone and truss problems, I used the pyOptSparse (PYthon OPTimization Sparse) framework. The optimization problem was solved using the SNOPT algorithm.
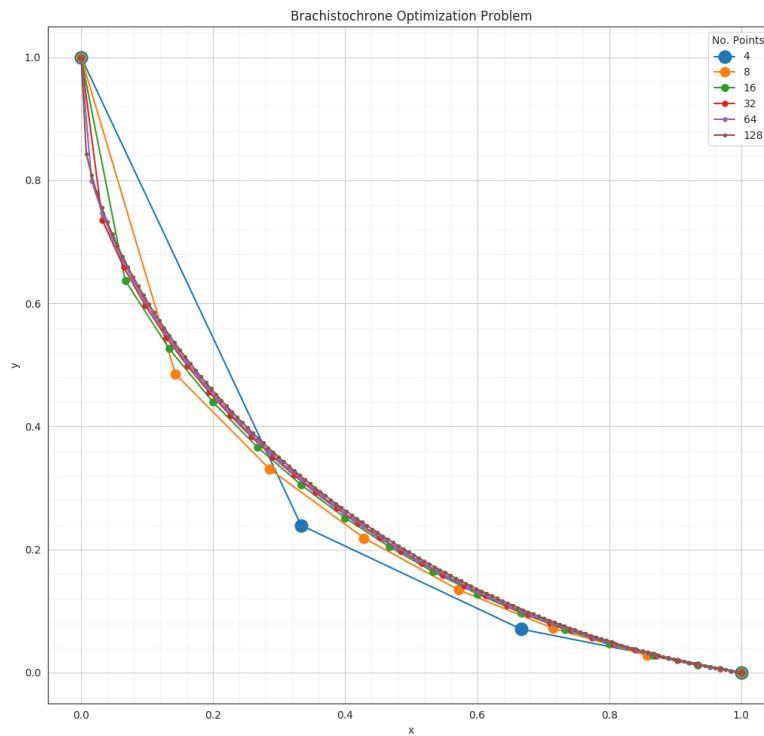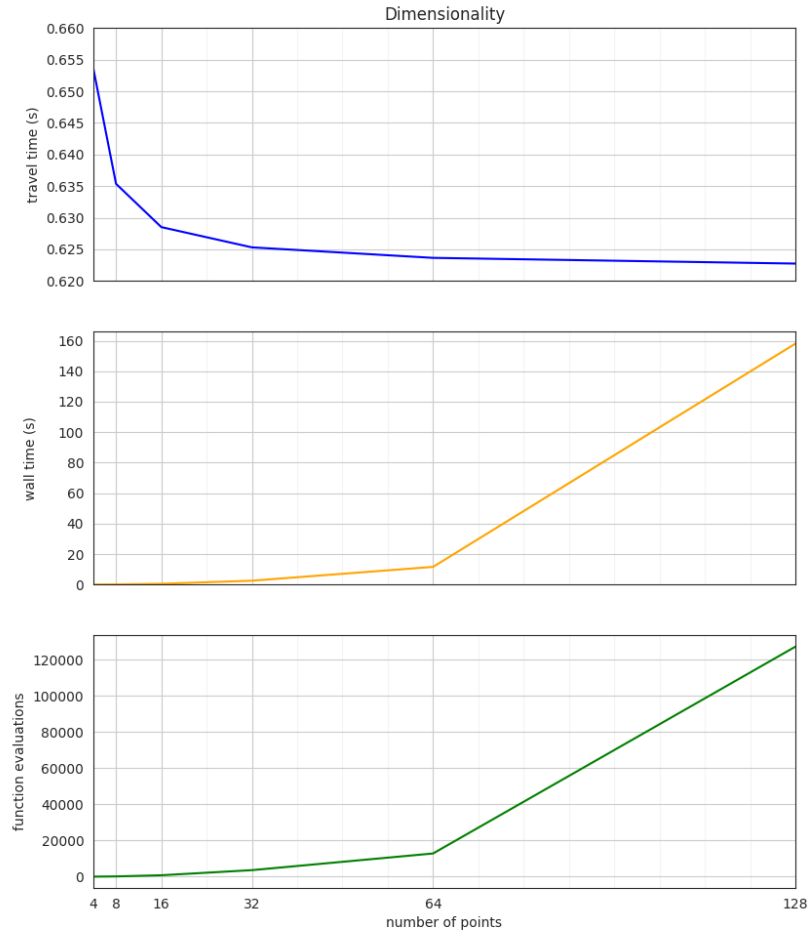
1   Truss Derivatives

Figure 1:

Figure 2: The effect of dimensionality on calculated travel time (top), the wall time for computing the optimal values (middle), and the number of function evaluations for convergence (bottom).

2 Truss

It is interesting to note that bar 9, the bar made of the strongest material, was allowed to have the highest stress of any of the bars.

Table 1: Comparison of number of function calls required for convergence.

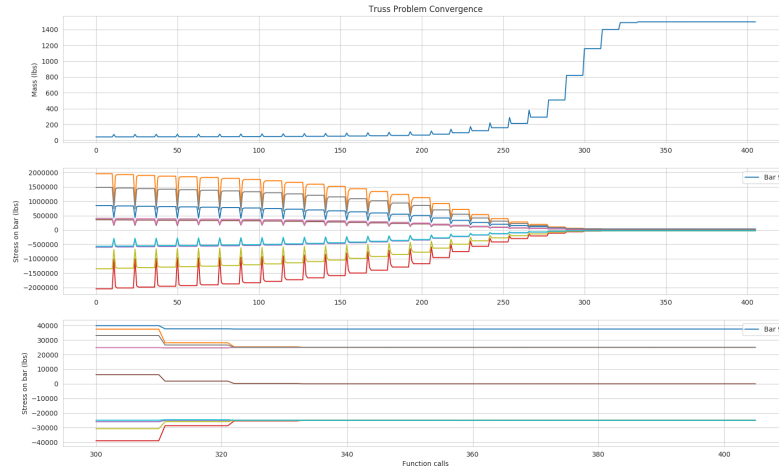| Algorithm	Matyas	Rosenbrock	Brachis.
Custom	7.9	25e3	0
pyOptSparse: SNOPT	0.14	11309	

Figure 3: Convergence of objective value over function evaluations. The bottom plot is the same as the middle, but zoomed in for clarity.