ME 575
Homework #3 Addendum

Please note the following changes to the assignment:

1. The due date for the assignment is now Feb 10 at 11:50 p.m.
2. The due date for the first project is now Feb 17 at 11:50 p.m.
3. Although I would like for you to solve problem 2, I don't want this problem to become an infinite time sink. Thus the grading will be 70% on problem 1 and 30% on problem 2.

Suggestions and comments:

1. Start with the simplest way to determine the steplength that is reasonable. For example, for steepest descent, you could fit a quadratic to the last three points, whether equally spaced or not, using Equation 3.21. (Note that you still have the case where your first step results in a greater function value.)
2. For the conjugate gradient method, the appropriate equations to determine the search direction are,

$$\mathbf{s}^{k+1} = -\nabla f^{k+1} + \beta^{\mathrm{k}} \mathbf{s}^{\mathrm{k}} \tag{1}$$

   Where β^{k}, a scalar, is given by

$$\beta^{k} = \frac{\left(\nabla f^{k+1}\right)^{\mathrm{T}} \nabla f^{k+1}}{\left(\nabla f^{k}\right)^{\mathrm{T}} \nabla f^{k}} \tag{2}$$

   To compute the search direction in (1), don't use a normalized $\mathbf{s}^{\mathrm{k}}$ (where you make it a unit vector by dividing by the magnitude). This will result in an incorrect $\mathbf{s}^{\mathrm{k+1}}$. I still used a normalized **s** in my line search, but not in the calculation of the new search direction.

3. You will want to use MATLAB's debugging features, specifically the ability to set breakpoints and halt execution. To do this, set a breakpoint at the calling statement for `fminun` and then *step in* to the function. This will allow you to set and access breakpoints in your routine.

4. As a check of the derivatives for Rosenbrock's function, at the starting point, $\mathbf{x}^{\mathrm{T}} = [-1.5, 1]$, the derivatives are $\nabla f^{\mathrm{T}} = [-755, -250]$