

**CS 591 Numerical Optimization -
Homework #2
Due Sept 27th**

September 14, 2005

- Program Quasi-Newton method in matlab to minimize:

$$f = 100(x_2 - x_1^2)^2 + (1 - x_2)^2 \quad (1)$$

Try different starting points.

- Interface the interpolation/Wolfe criteria line search matlab code (download from this web site) and repeat previous problem with this line search. Convince yourself that this implementation is correct, and if not make appropriate corrections. Discuss why this is correct or incorrect and explain any modifications.

Make modifications to the line search algorithm to test a simple backtracking scheme. Try different starting points and document the results and observations.

- Write a program that implements the dogleg method. Choose B_k to be the exact Hessian. Apply it to minimize:

$$f = 100(x_2 - x_1^2)^2 + (1 - x_2)^2 \quad (2)$$

and apply it to minimize:

$$f(x) = \sum_{i=1}^n [(1 - x_{2i})^2 + 10(x_{2i} - x_{2i-1}^2)^2] \quad (3)$$

with $n = 5$ and $n = 10$.

Experiment with the update rule for the trust region by changing the constants in the algorithm or by designing your own.