

**CS 491/591 Numerical Optimization -
Project #2
Due Oct 4th**

September 25, 2006

Solve the following optimization algorithm to match the target values from a forward run in which a viscosity value is given, in the `navier2d.m` code:

$$\min_{\mu} f(x) = \sum_{i=0}^N (u - u^*)^2 \quad (1)$$

where μ is viscosity, u is the simulated velocity in the x-direction, and u^* is the target velocity in the x-direction, N is the number of output locations.

To get the target values, run `navier2d` in the forward mode for a given μ and extract velocity values in the x-direction u from at least 5 random locations in the mesh (make sure you retain the x and y locations to be used later in the objective function calculation).

Implement Quasi-Newton with a backtracking line search method. Try three different starting points.

Requirements:

- email tar file with code, results and documentation to `bartv@sandia.gov` and add in subject line “UNM 591 Project 2”. Also, name your tar file as follows: `student-lastname_proj1.tar`
- label your code extensions with your initials, so that I can easily identify your extensions and modifications
- provide a brief description of the code modifications
- include results and conclusions of determination of smoothness of objective function

Note: the preferred documentation software is latex (with dvi, ps or pdf output)