ASSIGNMENT 1

Due September 27, 2005, before 11:00 am

Problem 2

This problem is adopted from computer problem 6.9 on page 304 in Heath's book. We want to find a minimum of Rosenbrock's function in two-dimensions,

$$f(x, y) = 100(y - x^2)^2 + (1 - x)^2.$$

(a) Derive an expression for the gradient of f.

(b) Derive an expression for the Hessian of f.

(c) Find the critical point(s) of f and classify them as minimum, maximum or saddle point.

(d) Produce a contour plot showing all the important features of this function.

(e) Find a minimum of f using the conjugate gradient method. You should try using each of the following starting points: $[-1 \quad 1]^T$, $[0 \quad 1]^T$, and $[2 \quad 1]^T$. Comment on your numerical findings.