AOE/ESM 4084 - ENGINEERING DESIGN OPTIMIZATION
Fall Semester, 2000

Homework Assignment 5
Due 2.00 PM, Tuesday, November 7

a) Minimize the following function,

$$f(\boldsymbol{x}) = \left(x_1^2 + x_2 - 11\right)^2 + \left(x_1 + x_2^2 - 7\right)^2$$

using each of the following methods implemented in Mathematica unconstrained minimization program

1) Sequential Simplex
2) Powell's Conjugate Directions
3) Steepest Descent
4) Conjugate Gradient
5) Newton's
6) BFGS Quasi-Newton (Variable Metric)

starting from each of the following two points

$$\boldsymbol{x}^0 = (0.0, -6.0) \qquad \boldsymbol{x}^0 = (0.0, 6.0)$$

Compare the convergence behavior of each of the methods with the others, in terms of the objective function and the design variables. Comment on the results.

b) For the same function, manually perform (without using the Sequential Simplex in UnconstrainedMin.m) two full iterations of Sequential Simplex Method starting from the first of the two initial point given in part a)