ASSIGNMENT 5

Due March 6, 2003

Homework 5

This problem is basically the same as computer problem 5.18 on p.252 of our textbook. The difference is that you can make use of the programs provided on our course website.

1. Use Newton's method to solve the system of nonlinear equations

$$\begin{aligned} (x_1 + 3)(x_2^3 - 7) + 18 &= 0, \\ \sin(x_2 e^{x_1} - 1) &= 0, \end{aligned}$$

   with starting point $\mathbf{x}_0 = [-0.5\ 1.4]^T$.

2. Repeat the calculation using Broyden's method.

3. Compare the convergence rates of the two methods by computing the error at each iteration, given that the exact solution is $\mathbf{x}^* = [0\ 1]^T$. How many iterations does each method require to attain full machine precision?