ASSIGNMENT 2

Due September 25, 2003

Problem 3

Implement Algorithm 4.8 QR iteration with shifts for computing the eigenvalues of a general real matrix $\mathbf{A}$. Repeat until convergence:

1. $\sigma = a_{n,n}$ (using the lower right-hand corner entry as shift)
2. Compute QR factorization $\mathbf{QR} = \mathbf{A} - \sigma\mathbf{I}$
3. $\mathbf{A} = \mathbf{RQ} + \sigma\mathbf{I}$

What convergence test should you use? Test you program on the following matrices which you dealt with before in the previous problems:

$$\mathbf{A} = \begin{bmatrix} 2 & 3 & 2 \\ 10 & 3 & 4 \\ 3 & 6 & 1 \end{bmatrix}$$

and

$$\mathbf{A} = \begin{bmatrix} 6 & 2 & 1 \\ 2 & 3 & 1 \\ 1 & 1 & 1 \end{bmatrix}.$$