

Numerical Methods Problem Set 8

Due 3/27/2011

1. Using inverse iteration improvement described in Section 11.8, compute highly accurate eigenvalues and eigenvectors for

$$A = \begin{pmatrix} 11 & 2 & 3 & 1 & 4 & 2 \\ 2 & 9 & 3 & 5 & 2 & 1 \\ 3 & 3 & 15 & 4 & 3 & 2 \\ 1 & 5 & 4 & 12 & 4 & 3 \\ 4 & 2 & 3 & 4 & 17 & 5 \\ 2 & 1 & 2 & 3 & 5 & 8 \end{pmatrix}$$

2. Using inverse iteration improvement described in Section 11.8, compute highly accurate eigenvalues λ and eigenvectors \mathbf{x} for the generalized eigen equation

$$\mathbf{A}\mathbf{x} = \lambda\mathbf{B}\mathbf{x}$$

Where

$$\mathbf{A} = \begin{pmatrix} 6 & -4 & 1 & 0 \\ -4 & 6 & -4 & 1 \\ 1 & -4 & 6 & -4 \\ 0 & 1 & -4 & 7 \end{pmatrix}$$

$$\mathbf{B} = \begin{pmatrix} 1 & -2 & 3 & -1 \\ -2 & 6 & -2 & 3 \\ 3 & -2 & 6 & -2 \\ -1 & 3 & -2 & 9 \end{pmatrix}$$

3. Comment in detail on the program “tqli” in Press et al 11.4.3 on page 588.
4. Not for HW explicitly but please read Ch 12 FFT and Ch 13 Spectrum Applications.

Project Description

Due 4/3/2011

Submit the final project title, abstract and specific details, including the description of the problem and what numerical methods you are going to use. The project can be part of your research project. You can either write the code by yourself or use some exiting packages, but if you use other's packages, you need to make comments in detail on the code.