

ChEg 542
Fall 1998
HW #5
Due 10/8/98

1. 1.29 in V&M
2. 1.30 in V&M
3. **Generalized eigenvectors**

For the matrix,

$$A = \begin{pmatrix} 2 & -2 & 3 & 0 \\ 0 & 3 & -1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & -4 & -1 & 5 \end{pmatrix}$$

- a. Find a linearly independent set of eigenvectors.
- b. Find these also for the transpose of A .
- c. Are the eigenvectors from these problems biorthogonal?
- d. Expand the vector, $z = \{1, 4, 6, 2\}$ in terms of the eigenvectors of A .
- e. Can you use these eigenvectors to diagonalize A ?

4. Generalized eigenvalue problem

For the matrix,

$$A = \begin{pmatrix} 4\lambda & 2 & 3+2\lambda & 6 \\ 1 & 1 & 4\lambda & \lambda \\ 3 & 1 & 6-\lambda & 17 \\ \lambda & 2-2\lambda & 3 & 3-\lambda \end{pmatrix}$$

convert this to the form of a generalized eigenvalue problem and then find the eigenvalues.