SI Session: November 11^{th} & 13^{th} 2008
Mondays: 3:00 PM – 4:30 PM
Tuesdays: 1:30 PM – 3:00 PM
Thursdays: 1:30 PM – 3:00 PM
Room 1239 SNAD

Prof. McCurdy : Linear Algebra
Fall 2008
SI Leader : Neil Jody

[1] Is $\lambda = -2$ an eigenvalue of $\begin{bmatrix} 7 & 3 \\ 3 & -1 \end{bmatrix}$? Why or why not?

[2] Is $\begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$ an eigenvector of $\begin{bmatrix} 3 & 6 & 7 \\ 3 & 3 & 7 \\ 5 & 6 & 5 \end{bmatrix}$? If so, find the eigenvalue.

[3] Is $\lambda = 3$ an eigenvalue of $\begin{bmatrix} 1 & 2 & 2 \\ 3 & -2 & 1 \\ 0 & 1 & 1 \end{bmatrix}$? If so, find one corresponding eigenvector.

[4] For the following, find a basis for the eigenspace corresponding to each listed eigenvalue.

(a) $A = \begin{bmatrix} 10 & -9 \\ 4 & -2 \end{bmatrix}$, $\lambda = 4$

(b) $A = \begin{bmatrix} 7 & 4 \\ -3 & -1 \end{bmatrix}$, $\lambda = 1, 5$

(c) $A = \begin{bmatrix} 1 & 0 & -1 \\ 1 & -3 & 0 \\ 4 & -13 & 1 \end{bmatrix}$, $\lambda = -2$

(d) $A = \begin{bmatrix} 3 & 0 & 2 & 0 \\ 1 & 3 & 1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 4 \end{bmatrix}, \lambda = 4$

[5] Find the eigen values of the following matrix. $\begin{bmatrix} 4 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 0 & -3 \end{bmatrix}$

[6] For each of the following matrices, find the eigenvalues and a basis for each eigenspace. Find the eigenvalues without using a calculator.

(a) $\begin{bmatrix} 3 & 1 & 1 \\ 2 & 4 & 2 \\ 1 & 1 & 3 \end{bmatrix}$

(b) $\begin{bmatrix} -3 & 1 & -1 \\ -7 & 5 & -1 \\ -6 & 6 & -2 \end{bmatrix}$

[7] Find the characteristic polynomial and list the eigenvalues repeated according to algebraic multiplicity.

(a) $\begin{bmatrix} -6 & 0 & 0 \\ 11 & -3 & 0 \\ -3 & 6 & 7 \end{bmatrix}$

(b) $\begin{bmatrix} 2 & 5 & 3 & -6 \\ -2 & 4 & 0 & 2 \\ -4 & -10 & -6 & 12 \\ 1 & 7 & 3 & -5 \end{bmatrix}$