Linear Systems Review Problems

Biller

1) What are the necessary requirements for $A\vec{x} = \vec{b}$ to have a at least one solution?

2: If it can be shown that $A\vec{x} = \vec{b}$ has two unique solutions, can we know if it has infinite solutions?

Blaski

1. Find a matrix having no zero entries whose fully reduced form is
$$\begin{bmatrix} 1 & 0 & 5 \\ 0 & 1 & 3 \\ 0 & 0 & 0 \end{bmatrix}$$
2. Use row reduction to evaluate the determinant of the matrix
$$\begin{bmatrix} 5 & 7 & 4 \\ 1 & 8 & -2 \\ 2 & 6 & 3 \end{bmatrix}$$

Fuentes

1. Suppose the 3 x 3 matrix A is invertible. Write down bases for the four subspaces for A, and also for the 3 by 6 matrix B= [A A].
2. Find unit vectors u_1 and u_2 in the directions of v=(3,1) and w=(2,1,2). Also find unit vectors U_1 and U_2 that are perpendicular to v and w.

Juarez

(1) Find the determinates of these three matrices:

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

$$B = \begin{pmatrix} 0 & -A \\ I & -I \end{pmatrix} \tag{2}$$

$$C = \begin{pmatrix} A & -A \\ I & -I \end{pmatrix} \tag{3}$$

(2) Find a complete set of eigenvalues and eigenvectors for the matrix

$$A = \begin{pmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{pmatrix} \tag{4}$$

Salazar

Smith

1. Evaluate: $\begin{vmatrix} 1 & 2 & -3 & 4 \\ -4 & 2 & 1 & 3 \\ 3 & 0 & 0 & 0 \\ 2 & 0 & -2 & 3 \end{vmatrix}$
2. Find the Inverse of

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

Youn

1. Find the determinant of following.

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

2. Find the eigenvalues and eigenvectors of the following matrix.

$$\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$$