

314, S'09-QUIZ 3

Name:-----

March 12, 2009

1 < 13pts >

Given the vectors

$$\mathbf{x}_1 = \begin{bmatrix} 1 \\ -3 \\ 9 \end{bmatrix}, \mathbf{x}_2 = \begin{bmatrix} -1 \\ 3 \\ 9 \end{bmatrix}, \mathbf{x}_3 = \begin{bmatrix} -1 \\ 3 \\ 27 \end{bmatrix}$$

Give the dimension of $\text{Span}(\mathbf{x}_1, \mathbf{x}_2, \mathbf{x}_3)$ and find a basis.

Solution

2 < 12pts >

Given

$$\mathbf{v}_1 = \begin{bmatrix} 2 \\ 3 \end{bmatrix}, \mathbf{v}_2 = \begin{bmatrix} -1 \\ 2 \end{bmatrix}, S = \begin{bmatrix} 3 & -1 \\ 1 & 3 \end{bmatrix}.$$

Find vectors \mathbf{u}_1 , \mathbf{u}_2 so that $S = V^{-1}U$, the transition matrix from $[\mathbf{u}_1, \mathbf{u}_2]$ to $[\mathbf{v}_1, \mathbf{v}_2]$.

Solution

3 < 15pts >

Find a basis of the row space, column space and null space of

$$A = \begin{bmatrix} 1 & -1 & 2 & 1 & 0 \\ 2 & -1 & 1 & 3 & 1 \\ -1 & 2 & -3 & -1 & 1 \end{bmatrix}$$

and give the dimension of each.

Solution (use reduced row echelon form to find null vectors most easily)