SM_Assignment4, 202135592 한웅재

#1 $u+v = \begin{bmatrix} -4 \\ 1 \end{bmatrix}$

$u-2v = \begin{bmatrix} -1 \\ 2 \end{bmatrix} - 2\begin{bmatrix} -3 \\ -1 \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \end{bmatrix} + \begin{bmatrix} 6 \\ 2 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$

#2 4 vectors are in 2-dimensional space.

A necessary condition to be independence is at most n-vectors in n-dimensional vector.

this problem is linearly dependent.

#3

1.) $\begin{bmatrix} -1 & 4 & -3 \end{bmatrix}\begin{bmatrix} 5 \\ 2 \\ 1 \end{bmatrix} = -5+8-3 = 0$

$\begin{bmatrix} -1 & 4 & -3 \end{bmatrix}\begin{bmatrix} 3 \\ -4 \\ -7 \end{bmatrix} = -3-16+21 = 2$

$\begin{bmatrix} 5 & 2 & 1 \end{bmatrix}\begin{bmatrix} 3 \\ -4 \\ -7 \end{bmatrix} = 15-8-7 = 0$

$\begin{bmatrix} -1 \\ 4 \\ -3 \end{bmatrix}$ is orthosonal with $\begin{bmatrix} 5 \\ 2 \\ 1 \end{bmatrix}$ and $\begin{bmatrix} 3 \\ -4 \\ -7 \end{bmatrix}$

3.) $\begin{bmatrix} 2 & -7 & -1 \end{bmatrix}\begin{bmatrix} -6 \\ -3 \\ 9 \end{bmatrix} = -12+21-9 = 0$

$\begin{bmatrix} 2 & -7 & -1 \end{bmatrix}\begin{bmatrix} 3 \\ 1 \\ -1 \end{bmatrix} = 6-7+1 = 0$

$\begin{bmatrix} -6 & -3 & 9 \end{bmatrix}\begin{bmatrix} 3 \\ 1 \\ -1 \end{bmatrix} = -18-3-9 = -30$

$\begin{bmatrix} 2 \\ -7 \\ -1 \end{bmatrix}$ is orthosonal with $\begin{bmatrix} -6 \\ -3 \\ 9 \end{bmatrix}$ and $\begin{bmatrix} 3 \\ 1 \\ -1 \end{bmatrix}$