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Pertemuan 4

No Date

Soal

Periksa apakah  $w = (2, -2, 3)$  merupakan kombinasi linear dari  $v_1 = (1, -3, 2)$ ,  $v_2 = (2, -4, -1)$ , dan  $v_3 = (1, -5, 7)$ .

$$\vec{w} = k_1 \cdot \vec{v_1} + k_2 \cdot \vec{v_2} + k_3 \cdot \vec{v_3}$$

$$\begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix} = k_1 \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix} + k_2 \begin{bmatrix} 2 \\ -4 \\ -1 \end{bmatrix} + k_3 \begin{bmatrix} 1 \\ -5 \\ 7 \end{bmatrix}$$

$$\begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix} = \begin{bmatrix} k_1 + k_2 + 2k_3 \\ k_1 + k_2 - k_3 \\ k_1 + 2k_2 + k_3 \end{bmatrix}$$

maka menjadi 3 Persamaan Yaitu :

$$k_1 + k_2 + 2k_3 = 2 \quad (\text{Persamaan 1})$$

$$k_1 + k_2 - k_3 = -2 \quad (\text{Persamaan 2})$$

$$k_1 + 2k_2 + k_3 = 3 \quad (\text{Persamaan 3})$$

Eliminasi persamaan 1 dan 2

$$\begin{array}{r} k_1 + k_2 + 2k_3 = 2 \\ k_1 + k_2 - k_3 = -2 \\ \hline 3k_3 = 4 \end{array}$$

$$k_3 = \frac{4}{3}$$

Eliminasi persamaan 2 dan 3

$$\begin{array}{r} k_1 + k_2 - k_3 = -2 \\ k_1 + 2k_2 + k_3 = 3 \\ \hline -k_2 - 2k_3 = -5 \end{array}$$

Subtitusi nilai nilai  $u_3 = \frac{4}{3}$  pada persamaan diatas

$$-u_2 - 2u_3 = -5$$

$$-u_2 - 2 \cdot \left(\frac{4}{3}\right) = -5$$

$$-u_2 - \frac{8}{3} = -5$$

$$-u_2 = -5 + \frac{8}{3}$$

$$-u_2 = -\frac{7}{3}$$

$$u_2 = \frac{7}{3}$$

Subtitusikan nilai  $u_2 = \frac{7}{3}$  dan  $u_3 = \frac{4}{3}$  pada persamaan 1

$$u_1 + u_2 + 2u_3 = 2$$

$$u_1 + \frac{7}{3} + 2 \cdot \left(\frac{4}{3}\right) = 2$$

$$u_1 + \frac{7}{3} + \frac{8}{3} = 2$$

$$u_1 + \frac{15}{3} = 2$$

$$u_1 + 5 = 2$$

$$u_1 = 2 - 5$$

$$u_1 = -3$$

Maka  $u_1 = -3$ ,  $u_2 = \frac{7}{3}$ , dan  $u_3 = \frac{4}{3}$

Uji Persamaan 1, 2 dan 3 dengan nilai  $u$

Persamaan 1

$$u_1 + u_2 + 2u_3 = 2$$

$$-3 + \frac{7}{3} + 2 \cdot \left(\frac{4}{3}\right) = 2$$

$$-3 + \frac{15}{3} = 2$$

$$-3 + 5 = 2$$

$$2 = 2$$

( Benar )

Persamaan 2

$$u_1 + u_2 - u_3 = -2$$

$$-3 + \frac{7}{3} - \frac{4}{3} = -2$$

$$-3 + \frac{3}{3} = -2$$

$$-3 + 1 = -2$$

$$-2 = -2$$

( Benar )

Persamaan 3

$$u_1 + 2u_2 + u_3 = 3$$
$$-3 + 2\left(\frac{7}{3}\right) + \frac{4}{3} = 3$$

$$-3 + \frac{14}{3} + \frac{4}{3} = 3$$

$$-3 + \frac{18}{3} = 3$$

$$-3 + 6 = 3$$

$$3 = 3$$

(Benar)

Karena ke 3 persamaan benar dan memenuhi  
nilai  $u_1$ ,  $u_2$ , dan  $u_3$  maka  $\vec{w}$  merupakan  
kombinasi linier  $\vec{v}_1$ ,  $\vec{v}_2$ , dan  $\vec{v}_3$ .