27/10/23   Atividade - Independencia linear

1) a) $(10, 2, 8) = \alpha(5, -2, 1) + \beta(0, 4, 6) + \gamma(-5, 8, 8)$

$$\begin{cases} 10 = 5\alpha - 5\gamma \\ 2 = -2\alpha + 4\beta + 8\gamma \\ 8 = \alpha + 6\beta + 8\gamma \end{cases} \sim \begin{cases} \alpha - \gamma = 2 \\ -\alpha + 2\beta + 4\gamma = 1 \\ \alpha + 6\beta + 8\gamma = 8 \end{cases}$$

$\alpha = \gamma + 2$ $\begin{cases} 2\beta + 3\gamma = 3 \\ 6\beta + 9\gamma = 6 \end{cases} \sim \begin{cases} 2\beta + 3\gamma = 3 \\ 2\beta + 3\gamma = 2 \end{cases}$ SI

$S = \emptyset$

não é combinação linear

1) $(10, -2, 5) = \alpha(5, -2, 1) + \beta(0, 4, 6) + \gamma(-5, 8, 8)$

$$\begin{cases} 10 = 5\alpha - 5\gamma \\ -2 = -2\alpha + 4\beta + 8\gamma \\ 5 = \alpha + 6\beta + 8\gamma \end{cases} \sim \begin{cases} 2 = \alpha - \gamma \\ -1 = -\alpha + 2\beta + 4\gamma \\ 5 = \alpha + 6\beta + 8\gamma \end{cases}$$

$\alpha = \gamma + 2$ $\quad \begin{cases} 3\gamma + 2\beta = 1 \\ 9\gamma + 6\beta = 3 \end{cases} \sim \begin{cases} 3\gamma + 2\beta = 1 \\ 3\gamma + 2\beta = 1 \end{cases}$

$2\beta = 1 - 3\gamma$ $\quad\quad \gamma = \omega$ $\quad\quad\quad S = \begin{bmatrix} \omega + 2 \\ \frac{1 - 3\omega}{2} \\ \omega \end{bmatrix}$, $\omega \in \mathbb{R}$

$\beta = \dfrac{1 - 3\gamma}{2}$

É combinação linear

2) $\alpha(5, -2, 1) + \beta(0, 4, 6) + \gamma(-5, 8, 8) = \bar{0}$

$$\begin{cases} 5\alpha - 5\gamma = 0 \\ -2\alpha + 4\beta + 8\gamma = 0 \\ \alpha + 6\beta + 8\gamma = 0 \end{cases} \sim \begin{cases} \alpha - \gamma = 0 \\ -\alpha + 2\beta + 4\gamma = 0 \\ \alpha + 6\beta + 8\gamma = 0 \end{cases} \quad\quad \alpha = \gamma$$

$$\begin{cases} 2\beta + 3\gamma = 0 \\ 6\beta + 9\gamma = 0 \end{cases} \sim \begin{cases} 2\beta + 3\gamma = 0 \\ 2\beta + 3\gamma = 0 \end{cases}$$

$2\beta = -3\gamma$ $\quad\quad \gamma = \omega$ $\quad\quad\quad S = \begin{bmatrix} \omega \\ \frac{-3\gamma}{2} \\ \omega \end{bmatrix}$ $\quad$ LD

$\beta = \dfrac{-3\gamma}{2}$

$$V \qquad\qquad V_1 \qquad\qquad V_2$$

$$(0,4,6) = \alpha(5,-2,1) + \beta(-5,8,8)$$

$$\begin{cases} 5\alpha - 5\beta = 0 \to \alpha = \beta \\ -2\alpha + 8\beta = 4 \\ \alpha + 8\beta = 6 \end{cases} \sim \quad \begin{cases} 6\beta = 4 \\ 9\beta = 6 \end{cases} \to \beta = \dfrac{2}{3} = \alpha$$

$$V = \frac{2}{3}V_1 + \frac{2}{3}V_2$$