

Tarefa básica - Matrizes inversa

Nome: Vinícius Feliciano da Silva
Turma: CT11317

$$1) A = \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix} \cdot B = \begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$3x + y = 1$$
$$-x + 2 = 0$$

$$15 + 3y = 0$$
$$-5 + 6 = 1$$

$$-x = -2 \quad (-1)$$
$$[x = 2]$$

$$3 \cdot 2 + y = 1 \quad (+1) \cdot 3$$
$$6 + y = 1$$
$$y = -5$$

$$x + y =$$

$$2 - 5 = -3$$

(c)

02 - (UNESP-2005)

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

$$\begin{bmatrix} 1 & 0 & 1 & 1 & 0 \\ k & 1 & 3 & k & 1 \\ 1 & k & 3 & 1 & k \end{bmatrix} = 0$$

$$x^2 + 3x - 2 = 0$$

$$3 - k^2 - (3k + 1) = 0$$

$$3 - k^2 - 3k - 1 = 0$$

$$\Delta = 3^2 - 4 \cdot 1 \cdot (-2)$$

$$\Delta = 25$$

$$k = \frac{-3 \pm \sqrt{1}}{2 \cdot 1}$$

$$k_1 = \frac{-2}{2} = -1$$

(c)

$$k_2 = \frac{-4}{-2} = -2$$

03 - (Mack)

$$A = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$$

$$\det A = 12 - 10 = 2$$

$$B = A^{-1} = \begin{bmatrix} 4 & -5 \\ -2 & 3 \end{bmatrix} \cdot \frac{1}{2} = \begin{bmatrix} 2 & -\frac{5}{2} \\ -1 & \frac{3}{2} \end{bmatrix}$$

(c)

04 - (UNITAU)

$$\begin{bmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{bmatrix}$$

$$\det A \neq 0$$

~~$$\begin{bmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{bmatrix} \neq 0$$~~

~~$$x^2 + 20 + 6 - 20 + 2x + 3x \neq 0$$~~

~~$$x^2 + 5x + 6 \neq 0$$~~

$$\Delta = (-5)^2 - 4 \cdot 1 \cdot 6$$

$$\Delta = 25 - 24 = 1$$

$$x = \frac{5 \pm \sqrt{1}}{2 \cdot 1}$$

$$x_1 \neq 3$$

$$x_2 \neq 2$$

(A)

S - (UNISA)

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

$$\rightarrow \begin{bmatrix} -1 & -1 & 2 & | & 1 & 1 \\ 2 & 1 & -2 & | & 2 & 1 \\ 1 & 1 & -1 & | & 1 & 1 \end{bmatrix} = 7 - 6 = 1$$

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

$$\det A = -1$$

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

$$A + A^{-1}$$

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

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

Q7 -

$$[(X A)^t] = [B] A^t$$

$$(A \cdot B)^{-1} = B^{-1} \cdot A^{-1}$$

$$X \cdot A = B^t$$

$$X \cdot \underbrace{A}_{I} A^{-1} = B^t \cdot A^{-1}$$

$$X = B^t \cdot A^{-1}$$

(B)

Q8 -

$$B = \begin{bmatrix} x \\ y \end{bmatrix} \quad \text{and} \quad C = \begin{bmatrix} 4x + 5y \\ 5x + 6y \end{bmatrix}$$

$$\begin{bmatrix} a \\ b \\ c \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4x + 5y \\ 5x + 6y \end{bmatrix} \quad ?$$

R:E

$$= 0$$

$$(-1) = 2$$

9)

$$\begin{bmatrix} 2 & K \\ -2 & 1 \end{bmatrix}$$

$$\det A + \det A^T = -1 + (-1) = 2$$

$$2 - (-2K)$$

$$2 + 2K = 0$$

$$2K = -2$$

$$K = \frac{-2}{2} = -1$$

10) (FgV) $\det(A) = 0$ & $\det(B) = 0$

a) $(A+B) \cdot (A-B)$

$$(A+B) \cdot (A-B) = A^2 - AB + BA - B^2$$

b) $(A+B)^2 = A^2 + 2AB + B^2$

$$(A+B) = (A+B) \cdot (A+B) = A^2 + AB + BA + B^2$$

$$\cancel{A^2} + AB + BA + \cancel{B^2} = \cancel{A^2} + 2AB + \cancel{B^2}$$

$$\cancel{AB} + BA = \cancel{(A+B)} \cdot \cancel{(A+B)}$$

$$BA = AB$$