

Tarefa básica - Matriz inversa

Nome: Vinícius Feliciano da Silveira
 Turma: CT11317

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

$$\begin{aligned} 3x + y &= 1 \\ -x + 2 &= 0 \end{aligned}$$

$$\begin{aligned} 15 + 3y &= 0 \\ -5 + 6 &= 1 \end{aligned}$$

$$\begin{aligned} 3x + y &= 1 \quad | -3x \\ 6 + y &= 1 \quad | -6 \\ -x &= -2 \quad | \cdot (-1) \quad | +x \\ x &= 2 \end{aligned}$$

$$x = y + 3 \quad | -3$$

02 - (UNESP-2005)

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

~~$$\begin{bmatrix} 1 & 0 & 1 & 1 \\ K & 1 & 3 & 1 \\ 1 & K & 3 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 3-K & 0 \\ 0 & K-1 & 2 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 3-K & 0 \\ 0 & 0 & 2K-1 & 0 \end{bmatrix} \rightarrow 2K-1 = 0 \rightarrow K = \frac{1}{2}$$~~

$$x^2 + 3x - 2 = 0 \quad | \Delta = b^2 - 4ac$$

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

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

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

$$\Delta = 25$$

$$-K^2 - 3K + 2 = 0 \quad (at)$$

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

$$K_1 = \frac{-3 + 1}{2} = -1$$

$$K_2 = \frac{-3 - 1}{2} = -2$$

11

03 - (MACK)

$$A = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix} \quad \det A = 12 - 10 = 2$$

$$B = A^{-1} = \begin{bmatrix} 4 & -5 \\ -2 & 4 \end{bmatrix} \div 2 \rightarrow \begin{bmatrix} 2 & -5 \\ -1 & 2 \end{bmatrix}$$

(C)

04 - (UNITAU)

$$\begin{bmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{bmatrix} \quad \det A \neq 0$$

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

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

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

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

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

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

$$x_1 \neq 3$$

$$x_2 \neq 2$$

(A)

5 - (UNISA)

$$\begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix} \rightarrow \begin{bmatrix} -1 & -1 & 2 & | & 1 & 1 & -1 \\ 2 & 1 & -2 & | & 2 & 1 & 5 \\ 1 & 1 & -1 & | & 1 & 1 & 1 \end{bmatrix} \quad 7 - 6 = 1$$

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

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

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

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

Q7 -

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

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

$$\cancel{X \cdot A} = B^t$$

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

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

(B)

Q8 -

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

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

R:E

9)

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

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

$$2 - (-2K)$$

$$2 + 2K = 0$$

$$2K = -2$$

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

10) (FqV) $\det(A) \approx 0$ und $\det(B) = 0$

a) $(A+B), (A-B)$

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

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

$$(A+B) = (A+B), (A+B) = A^2 + AB + BA + B^2$$

~~$$A^2 + AB + BA + B^2 = A^2 + 2AB + B^2$$~~

~~$$AB + BA = (A+B), (A+B)$$~~

~~$$BA = AB$$~~