Tarefa básica - Matriz inversa

Nome: Vinicius Feliciano da Silva
Turma: CT11317

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

$3x + y = 1$ $\qquad$ $15 + 3y = 0$

$-x + 2 = 0$ $\qquad$ $-5 + 6 = 1$

$3 \cdot 2 + y = 1$

$6 + y = 1$

$-x = -2 \quad (-1)$ $\qquad$ $y = -5$

$\boxed{x = 2}$

$x + y$

$2 - 5 = -3$

(C)

02 - (UNESP-2005)

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

$\begin{vmatrix} 1 & 0 & 1 \\ K & 1 & 3 \\ 1 & K & 3 \end{vmatrix} \begin{matrix} 1 & 0 \\ K & 1 \\ 1 & K \end{matrix} = 0$

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

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

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

$\Delta = 25$ $\qquad$ $-K^2 - 3K + 2 = 0 \quad (-1)$

$K = \frac{-3 \pm \sqrt{1}}{2 \cdot 1}$ $\qquad$ $K_1 = \frac{-2}{2} = -1$

$K_2 = \frac{-4}{-2} = -2$

(C)

spiral

S T Q Q S S D

__/__/__

03 - (MACK)

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

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

(c)

04 - (UNITAU)

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

$\begin{vmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{vmatrix} \begin{matrix} x & 1 \\ 3 & 1 \\ 10 & 1 \end{matrix} \neq 0$

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

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

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

$\Delta = 25 - 24 = 1$

$x = \frac{5 \pm \sqrt{1}}{2 \cdot 1}$ $\quad x_1 \neq 3$, $\quad x_2 \neq 2$

(A)

5 - (UNISA)

$$\begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix} \rightarrow \left|\begin{array}{ccc|cc} -1 & -1 & 2 & -1 & -1 \\ 2 & 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 1 & 1 \end{array}\right| = 7 - 6 = 1$$

$$\det A = 1$$

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

$A + A^{-1}$?

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

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

__/__/__ S T Q Q S S D

07 -

$[(X A)^t = B] \; A^{-1}$ $\qquad (A \cdot B)^{-1} = B^{-1} \cdot A^{-1}$

$X \cdot A = B^t$

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

$\boxed{X = B^t \cdot A^{-1}}$ $\qquad (B)$

08 -

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

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

R: E

9)

$$\begin{vmatrix} 2 & K \\ -2 & 1 \end{vmatrix} \qquad \det A + \det A^{-1} = -1 + (-1) = 2$$

$2 - (-2K)$

$2 + 2K = 0$

$2K = -2$

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

10) (FGV) $\det(A) = 0$ e $\det(B) = 0$

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

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

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

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

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

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

$BA = AB$

c)

Se A é uma matriz de ordem 2, logo:

$det(-A) = (-1)^2$

$det(A) \neq 0$

$$\frac{det(A)}{det(-A)} \rightarrow \frac{det(A)}{det(A)} = 1$$

d)

B inversa a A, logo:

$det(AB) = 1$

$det(A) \cdot det(B) = 1$

$$det(B) = \frac{1}{det(A)}$$