PROFESSOR FERRETTO

Dadas as matrizes $A = \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 3 \\ 2 & -2 \end{pmatrix}$ e $C = \begin{pmatrix} 0 & 2 \\ 5 & 8 \end{pmatrix}$, calcule, se existir:

1. $A + B =$

$$\begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix} + \begin{pmatrix} 1 & 3 \\ 2 & -2 \end{pmatrix} = \begin{pmatrix} 1+3 & 2+3 \\ -1+2 & 4-2 \end{pmatrix} \qquad A+B = \begin{pmatrix} 4 & 5 \\ 1 & 2 \end{pmatrix}$$

2. $B + C =$

$$\begin{pmatrix} 1 & 3 \\ 2 & -2 \end{pmatrix} + \begin{pmatrix} 0 & 2 \\ 5 & 8 \end{pmatrix} = \begin{pmatrix} 1+0 & 3+2 \\ 2+5 & -2+8 \end{pmatrix}$$

$$B+C = \begin{pmatrix} 1 & 5 \\ 7 & 6 \end{pmatrix}$$

3. $C - A =$

$$\begin{pmatrix} 0 & 2 \\ 5 & 8 \end{pmatrix} - \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix} = \begin{pmatrix} 0-3 & 2-2 \\ 5-(-1) & 8-4 \end{pmatrix}$$

$$C-A = \begin{pmatrix} -3 & 0 \\ 6 & 4 \end{pmatrix}$$

Dadas as matrizes $A = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \end{pmatrix}$ e $B = \begin{pmatrix} 1 & 2 \\ 2 & 1 \\ 3 & 3 \end{pmatrix}$, calcule, se existir:

4. $A + B =$ ✕

Não é possível fazer a soma, pois a ordem das matrizes são diferentes:

A_{2x3} e B_{3x2}

5. $A^t + B =$

troca linha por coluna

$$A = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \end{pmatrix} \qquad A^t = \begin{pmatrix} 1 & 2 \\ 1 & 3 \\ 1 & 4 \end{pmatrix}$$

$$A^t + B = \begin{pmatrix} 1 & 2 \\ 1 & 3 \\ 1 & 4 \end{pmatrix} + \begin{pmatrix} 1 & 2 \\ 2 & 1 \\ 3 & 3 \end{pmatrix} = \begin{pmatrix} 1+1 & 2+2 \\ 1+2 & 3+1 \\ 1+3 & 4+3 \end{pmatrix}$$

$$A^t + B = \begin{pmatrix} 2 & 4 \\ 3 & 4 \\ 4 & 7 \end{pmatrix}$$

6. $A + B^t =$

$$B = \begin{pmatrix} 1 & 2 \\ 2 & 1 \\ 3 & 3 \end{pmatrix} \qquad B^t = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix}$$

$$A + B^t = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 3 & 4 \end{pmatrix} + \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix} = \begin{pmatrix} 1+1 & 1+2 & 1+3 \\ 2+2 & 3+1 & 4+3 \end{pmatrix}$$

$$A + B^t = \begin{pmatrix} 2 & 3 & 4 \\ 4 & 4 & 7 \end{pmatrix}$$

Dadas as matrizes: $A = \begin{pmatrix} 3 & 1 & 3 \\ 2 & 4 & 2 \end{pmatrix}$ e $B = \begin{pmatrix} -1 & 2 & 0 \\ 4 & -2 & 1 \end{pmatrix}$, determine a matriz X nos casos a seguir, sendo:

7. $X + B = A$ → $X = A - B$

$$\begin{pmatrix} x_{11} + (-1) & x_{12} + 2 & x_{13} + 0 \\ x_{21} + 4 & x_{22} + (-2) & x_{23} + 1 \end{pmatrix} = \begin{pmatrix} 3 & 1 & 3 \\ 2 & 4 & 2 \end{pmatrix}$$

$$X = \begin{pmatrix} 3+1 & 1-2 & 3-0 \\ 2-4 & 4-(-2) & 2-1 \end{pmatrix} \qquad X = \begin{pmatrix} 4 & -1 & 3 \\ -2 & 6 & 1 \end{pmatrix}$$

8. $X + A^t = B^t$

$$A = \begin{pmatrix} 3 & 1 & 3 \\ 2 & 4 & 2 \end{pmatrix} \qquad A^t = \begin{pmatrix} 3 & 2 \\ 1 & 4 \\ 3 & 2 \end{pmatrix}$$

$$B = \begin{pmatrix} -1 & 2 & 0 \\ 4 & -2 & 1 \end{pmatrix} \qquad B^t = \begin{pmatrix} -1 & 4 \\ 2 & -2 \\ 0 & 1 \end{pmatrix}$$

$X + A^t = B^t$ → $X = B^t - A^t$

$$X = \begin{pmatrix} -1 & 4 \\ 2 & -2 \\ 0 & 1 \end{pmatrix} - \begin{pmatrix} 3 & 2 \\ 1 & 4 \\ 3 & 2 \end{pmatrix} = \qquad X = \begin{pmatrix} -4 & 2 \\ 1 & -6 \\ -3 & -1 \end{pmatrix}$$

9. $X + A + B = 0$ → $X = -A - B$ → $X = -(A+B)$

$$X = -\left[\begin{pmatrix} 3 & 1 & 3 \\ 2 & 4 & 2 \end{pmatrix} + \begin{pmatrix} -1 & 2 & 0 \\ 4 & -2 & 1 \end{pmatrix}\right]$$

$$X = -\begin{pmatrix} 2 & 3 & 3 \\ 6 & 2 & 3 \end{pmatrix} \qquad X = \begin{pmatrix} -2 & -3 & -3 \\ -6 & -2 & -3 \end{pmatrix}$$

10. Dadas as matrizes: $A = \begin{bmatrix} 3 & 1 \\ 2 & 7 \end{bmatrix}$ e $B = \begin{bmatrix} -1 & \frac{1}{2} \\ \frac{1}{2} & 2 \end{bmatrix}$, determine a matriz X e Y para:

$$\begin{cases} X + A^t = B \\ Y - X = B^t \end{cases}$$

$X = B - A^t$

$$X = \begin{pmatrix} -1 & 1/2 \\ 1/2 & 2 \end{pmatrix} - \begin{pmatrix} 3 & 2 \\ 1 & 7 \end{pmatrix} \qquad X = \begin{pmatrix} -4 & -3/2 \\ -1/2 & -5 \end{pmatrix}$$

$Y - X = B^t$ → $Y = B^t + X$

$B = B^t$

$$Y = \begin{pmatrix} -1 & 1/2 \\ 1/2 & 2 \end{pmatrix} + \begin{pmatrix} -4 & -3/2 \\ -1/2 & -5 \end{pmatrix} \qquad Y = \begin{pmatrix} -5 & -1 \\ 0 & -3 \end{pmatrix}$$

11. Dada $A = \begin{bmatrix} 2 & 1 & 1 \\ -1 & 3 & 1 \\ -1 & -1 & 4 \end{bmatrix}$, calcule a matriz:

$5(2A)^t - 3(-A)$. → $5.2.A^t - 3.(-A)$ (10) (+)

$$10.\begin{pmatrix} 2 & -1 & -1 \\ 1 & 3 & -1 \\ 1 & 1 & 4 \end{pmatrix} + 3.\begin{pmatrix} 2 & 1 & 1 \\ -1 & 3 & 1 \\ -1 & -1 & 4 \end{pmatrix}$$

$$\begin{pmatrix} 20 & -10 & -10 \\ 10 & 30 & -10 \\ 10 & 10 & 40 \end{pmatrix} + \begin{pmatrix} 6 & 3 & 3 \\ -3 & 9 & 3 \\ -3 & -3 & 12 \end{pmatrix}$$

$$= \begin{pmatrix} 26 & -7 & -7 \\ 7 & 39 & -7 \\ 7 & 7 & 52 \end{pmatrix}$$

12. Resolva a equação $2A - 5X = B^t$, sendo dadas as matrizes $A = \begin{pmatrix} 1 & 1 \\ 1 & 9 \end{pmatrix}$ e $B = \begin{pmatrix} 1 & 2 \\ -2 & 0 \end{pmatrix}$.

$2A - 5X = B^t$ → $5X = 2A - B^t$ → $X = \frac{2}{5}A - \frac{1}{5}B^t$

$$X = \frac{2}{5}\cdot\begin{pmatrix} 1 & 1 \\ 1 & 9 \end{pmatrix} - \frac{1}{5}\cdot\begin{pmatrix} 1 & -2 \\ 2 & 0 \end{pmatrix}$$

$$X = \begin{pmatrix} 2/5 & 2/5 \\ 2/5 & 18/5 \end{pmatrix} - \begin{pmatrix} 1/5 & -2/5 \\ 2/5 & 0 \end{pmatrix} \qquad X = \begin{pmatrix} 1/5 & 4/5 \\ 0 & 18/5 \end{pmatrix}$$