Elabore as resoluções

① Construa a matriz $A=(a_{ij})_{2\times2}$ tal que $a_{ij}=2i+j$

Resolução

$$A=\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}=\begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$$

$a_{11}=2i+j$

$a_{11}=2.1+1$

$a_{11}=2+1$

$a_{11}=3$

$a_{12}=2i+j$

$a_{12}=2.1+2$

$a_{12}=2+2$

$a_{12}=4$

$a_{21}=2i+j$

$a_{21}=2.2+1$

$a_{21}=4+1$

$a_{21}=5$

$a_{22}=2.2+2$

$a_{22}=4+2$

$a_{22}=6$

② Construa a matriz $B=(b_{ij})_{2\times2}$, tal que $a_{ij}=(i-j)^2$

Resolução

$$B=\begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}=\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

$b_{11}=(i-j)^2$

$b_{11}=(1-1)^2$

$b_{11}=(0)^2$

$b_{11}=0$

$b_{12}=(i-j)^2$

$b_{12}=(1-2)^2$

$b_{12}=(-1)^2$

$b_{12}=1$

$b_{21}=(i-j)^2$

$b_{21}=(2-1)^2$

$b_{21}=(1)^2$

$b_{21}=1$

$b_{22}=(2-2)^2$

$b_{22}=(0)^2$

$b_{22}=0$

Q3 Construo a matriz $C = (c_{ij})_{2\times 3}$, com $c_{ij} = i + j - 2$

Resolução

$$C = \begin{bmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \end{bmatrix} = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$$

$c_{11} = i + j - 2$
$c_{11} = 1 + 1 - 2$
$c_{11} = 2 - 2$
$c_{11} = 0$

$c_{12} = i + j - 2$
$c_{12} = 1 + 2 - 2$
$c_{12} = 3 - 2$
$c_{12} = 1$

$c_{13} = i + j - 2$
$c_{13} = 1 + 3 - 2$
$c_{13} = 4 - 2$
$c_{13} = 2$

$c_{21} = i + j - 2$
$c_{21} = 2 + 1 - 2$
$c_{21} = 3 - 2$
$c_{21} = 1$

$c_{22} = i + j - 2$
$c_{22} = 2 + 2 - 2$
$c_{22} = 4 - 2$
$c_{22} = 2$

$c_{23} = i + j - 2$
$c_{23} = 2 + 3 - 2$
$c_{23} = 5 - 2$
$c_{23} = 3$

Q4 Escreva a matriz M^T e $(-M^T)^T$, sendo $M = (m_{ij})_{3\times 2}$, definida

$$m_{ij} = \begin{cases} i + j, & \text{se } i = j \\ i - j, & \text{se } i \neq j \end{cases}$$

resolução

$$M = \begin{bmatrix} m_{11} & m_{12} \\ m_{21} & m_{22} \\ m_{31} & m_{32} \end{bmatrix} = \begin{bmatrix} 2 & -1 \\ 1 & 4 \\ 2 & 1 \end{bmatrix}$$

$m_{11} = i + j$
$m_{11} = 1 + 1$
$m_{11} = 2$

$m_{12} = i - j$
$m_{12} = 1 - 2$
$m_{12} = -1$

$m_{21} = i - j$
$m_{21} = 2 - 1$
$m_{21} = 1$

$m_{22} = i + j$
$m_{22} = 2 + 2$
$m_{22} = 4$

$m_{31} = i - j$
$m_{31} = 3 - 1$
$m_{31} = 2$

$m_{32} = i - j$
$m_{32} = 3 - 2$
$m_{32} = 1$

$$M^T = \begin{bmatrix} 2 & 1 & 2 \\ -1 & 4 & 1 \end{bmatrix}$$

$$(-M^T) = \begin{bmatrix} -2 & -1 & -2 \\ 1 & -4 & -1 \end{bmatrix}$$

$$(-M^T)^T = \begin{bmatrix} -2 & 1 \\ -1 & -4 \\ -2 & -1 \end{bmatrix}$$

(5) Dadas as matrizes $A = (a_{ij})_{2\times 2}$, sendo $a_{ij} = i^j$ e $B = (b_{ij})_{2\times 2}$, sendo $b_{ij} = j^i$, determine:

a) $a_{11} + b_{11}$

$1 + 2 = 2$

$a_{11} = i^j$
$a_{11} = 1^1$
$a_{11} = 1$

$b_{11} = j^i$
$b_{11} = 1^1$
$b_{11} = 1$

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b) $a_{12} - b_{21}$

$1 - 1 = 0$

$a_{12} = i^j$
$a_{12} = 1^2$
$a_{12} = 1$

$b_{21} = j^i$
$b_{21} = 1^1$
$b_{21} = 1$

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c) $a_{21} \cdot b_{21}$

$2 \cdot 1 = 2$

$a_{21} = i^j$
$a_{21} = 2^1$
$a_{21} = 2$

$b_{21} = 1$

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d) $a_{22}(b_{11} + b_{22})$

$4 \cdot (1 + 4) =$
$4 \cdot (5) = 20$

$a_{22} = i^j$
$a_{22} = 2^2$
$a_{22} = 4$

$b_{11} = 1$
e
$b_{22} = j^i$
$b_{22} = 2^2$
$b_{22} = 4$

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(6) Escreva a matriz $A = (a_{ij})_{2\times 2}$, tal que:

$$a_{ij} = \begin{cases} \text{sen } i\frac{\pi}{2}, \text{ se } i = j \\ \cos j \cdot \pi, \text{ se } i \neq j \end{cases}$$

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -1 & 0 \end{bmatrix}$$

$a_{11} = \text{sen}(1 \cdot \frac{\pi}{2})$
$a_{11} = \text{sen}\frac{\pi}{2} = 1$

$a_{22} = \text{sen}(2 \cdot \frac{\pi}{2})$
$a_{22} = \text{sen}\,\pi = 0$

$a_{12} = \cos j \cdot \pi$
$a_{12} = \cos(2 \cdot \pi)$
$a_{12} = \cos 2\pi = 1$

$a_{21} = \cos(j \cdot \pi)$
$a_{21} = \cos(1 \cdot \pi)$
$a_{21} = \cos \pi = -1$