

Proves de matrius i complexos

Reference 4fq09iX2U / jll42x91 . Nom i llinatges:

1. Opera els complexos

a) $(7 - 5i) \cdot (3i)$

b) $\frac{1}{-2 + 7i}$

c) $(-6 - 4i) \cdot (-4 - 3i)$

d) $\frac{1}{7 - 5i}$

e) $\frac{(10 + 5i) \cdot (9 + 9i)}{4 + 3i - 2 - 8i}$

f) $(10 + 8i + 4 + 10i) \cdot (-2 - 3i - (5 + 7i))$

g) $(6 - 10i) \cdot \left(-7 + 9i + \frac{10 - 3i}{10 - 5i} \right)$

h) $(-2 - 8i + 1 + 5i)^2$

2. Calcula la inversa de les matrius (si existeix)

a) $M = \begin{pmatrix} -4 & 5 \\ -5 & 1 \end{pmatrix}$

b) $M = \begin{pmatrix} -3 & -3 \\ 4 & 4 \end{pmatrix}$

c) $M = \begin{pmatrix} -3 & 0 & -4 \\ 3 & -4 & -4 \\ -2 & -2 & 2 \end{pmatrix}$

d) $M = \begin{pmatrix} -4 & 4 & -5 \\ -4 & 3 & 5 \\ 1 & -2 & 4 \end{pmatrix}$

3. Resol les equacions matricials

$$\text{a) } A \cdot X = B, \quad \text{essent} \quad A = \begin{pmatrix} -2 & -5 \\ -5 & 5 \end{pmatrix}, B = \begin{pmatrix} -2 & 4 \\ -1 & 0 \end{pmatrix}$$

$$\text{b) } X \cdot A = B, \quad \text{essent} \quad A = \begin{pmatrix} -2 & -3 & -1 \\ 0 & 1 & -3 \\ 0 & 0 & 3 \end{pmatrix}, B = \begin{pmatrix} 1 & -4 & 5 \\ -5 & -5 & -3 \\ -3 & -1 & 5 \end{pmatrix}$$

$$\text{c) } X \cdot A = X + B^2, \quad \text{essent} \quad A = \begin{pmatrix} -4 & -2 \\ 2 & 2 \end{pmatrix}, B = \begin{pmatrix} -4 & -2 \\ -5 & 3 \end{pmatrix}$$

$$\text{d) } X \cdot A = X + B^2, \quad \text{essent} \quad A = \begin{pmatrix} -2 & -1 \\ 3 & -2 \end{pmatrix}, B = \begin{pmatrix} 5 & 2 \\ -2 & -2 \end{pmatrix}$$

4. Calcula tots els possibles productes amb les matrius següents

$$\text{a) } A = \begin{pmatrix} -4 & -1 \\ -5 & -5 \end{pmatrix}, B = \begin{pmatrix} -3 & -3 \\ 5 & 3 \end{pmatrix}, C = \begin{pmatrix} 2 & -2 & -4 \\ -2 & 3 & 0 \\ -2 & 1 & 2 \end{pmatrix}$$

$$\text{b) } A = \begin{pmatrix} 3 \\ 2 \end{pmatrix}, B = \begin{pmatrix} -4 & -3 \\ -5 & -3 \end{pmatrix}, C = \begin{pmatrix} 2 & 2 & -2 \\ 0 & -4 & -3 \\ -1 & -4 & 5 \end{pmatrix}$$

$$5. \quad \text{a) } y = x^2 - 10x - 1$$

$$\text{b) } y = -x^2 - 2x - 10$$

Respostes

$$1. \quad \text{a) } 15 + 21i$$

$$\text{b) } -\frac{2}{53} - \frac{7}{53}i$$

$$\text{c) } 12 + 34i$$

$$\text{d) } \frac{7}{74} + \frac{5}{74}i$$

$$\text{e) } -\frac{585}{29} + \frac{495}{29}i$$

$$\text{f) } 82 - 266i$$

$$\text{g) } \frac{1378}{25} + \frac{2894}{25}i$$

$$\text{h) } -8 + 6i$$

$$2. \quad \text{a) } \begin{pmatrix} \frac{1}{21} & -\frac{5}{21} \\ \frac{5}{21} & -\frac{4}{21} \end{pmatrix}$$

$$\text{b) } \nexists M^{-1}$$

$$\text{c) } \begin{pmatrix} -\frac{2}{13} & \frac{1}{13} & -\frac{2}{13} \\ \frac{1}{52} & -\frac{7}{52} & -\frac{3}{13} \\ -\frac{7}{52} & -\frac{3}{52} & \frac{3}{26} \end{pmatrix}$$

$$\text{d) } \begin{pmatrix} -\frac{22}{29} & \frac{6}{29} & -\frac{35}{29} \\ -\frac{21}{29} & \frac{11}{29} & -\frac{40}{29} \\ -\frac{5}{29} & \frac{4}{29} & -\frac{4}{29} \end{pmatrix}$$

3.

a) $\begin{pmatrix} \frac{3}{7} & -\frac{4}{7} \\ \frac{8}{35} & -\frac{4}{7} \end{pmatrix}$

b) $\begin{pmatrix} -\frac{1}{2} & -\frac{11}{2} & -4 \\ \frac{5}{2} & \frac{5}{2} & \frac{7}{3} \\ \frac{3}{2} & \frac{7}{2} & \frac{17}{3} \end{pmatrix}$

c) $\begin{pmatrix} 0 & -2 \\ 11 & 25 \end{pmatrix}$

d) $\begin{pmatrix} -\frac{7}{4} & -\frac{1}{12} \\ 1 & \frac{1}{3} \end{pmatrix}$

4. a) $A \cdot A = \begin{pmatrix} 21 & 9 \\ 45 & 30 \end{pmatrix}, \quad A \cdot B = \begin{pmatrix} 7 & 9 \\ -10 & 0 \end{pmatrix},$
 $B \cdot A = \begin{pmatrix} 27 & 18 \\ -35 & -20 \end{pmatrix}, \quad B \cdot B = \begin{pmatrix} -6 & 0 \\ 0 & -6 \end{pmatrix},$
 $C \cdot C = \begin{pmatrix} 16 & -14 & -16 \\ -10 & 13 & 8 \\ -10 & 9 & 12 \end{pmatrix},$
 b) $B \cdot A = \begin{pmatrix} -18 \\ -21 \end{pmatrix}, \quad B \cdot B = \begin{pmatrix} 31 & 21 \\ 35 & 24 \end{pmatrix},$
 $C \cdot C = \begin{pmatrix} 6 & 4 & -20 \\ 3 & 28 & -3 \\ -7 & -6 & 39 \end{pmatrix},$

5.

