

MATEMÁTICAS CCSS II
ÁLGEBRA
PROBLEMA 15

JULIO 2013 A

Problema 1. Sean las matrices:

$$A = \begin{pmatrix} 1 & 2 \\ 0 & 3 \end{pmatrix}, \quad B = \begin{pmatrix} 2 & -1 \\ 1 & 2 \end{pmatrix} \quad \text{y} \quad C = \begin{pmatrix} 0 & 1 \\ -1 & 2 \end{pmatrix}.$$

Resuelve la ecuación $XAB - XC = 2C$.

$$XAB - XC = 2C$$

$$X(AB - C) = 2C$$

$$X \cancel{(AB - C)} (AB - C)^{-1} = 2C (AB - C)^{-1}$$

$$X = 2C (AB - C)^{-1}$$

$$AB - C = \begin{pmatrix} 1 & 2 \\ 0 & 3 \end{pmatrix} \begin{pmatrix} 2 & -1 \\ 1 & 2 \end{pmatrix} - \begin{pmatrix} 0 & 1 \\ -1 & 2 \end{pmatrix}$$

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

$$\dot{\text{¿}} M^{-1} \text{?} \quad |M| = 16 - 8 = 8$$

$$\text{Adj}(M) = \begin{pmatrix} 4 & -4 \\ -2 & 4 \end{pmatrix} \rightarrow [\text{Adj}(M)]^t = \begin{pmatrix} 4 & -2 \\ -4 & 4 \end{pmatrix}$$

$$M^{-1} = \frac{1}{8} \begin{pmatrix} 4 & -2 \\ -4 & 4 \end{pmatrix}$$

$$X = 2 \begin{pmatrix} 0 & 1 \\ -1 & 2 \end{pmatrix} \cdot \frac{1}{8} \begin{pmatrix} 4 & -2 \\ -4 & 4 \end{pmatrix} =$$

$$= \frac{1}{4} \begin{pmatrix} 0 & 1 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} 4 & -2 \\ -4 & 4 \end{pmatrix} = \frac{1}{4} \begin{pmatrix} -4 & 4 \\ -12 & 10 \end{pmatrix} = \begin{pmatrix} -1 & 1 \\ -3 & 5/2 \end{pmatrix}$$