

# Inversa d'una matriu 2x2

- Utilitzant Gauss-Jordan -

1  $A = \begin{pmatrix} 2 & 5 \\ 3 & 5 \end{pmatrix} \Rightarrow A^{-1}?$

Utilitzem el mètode de Gauss-Jordan

$$\left( \begin{array}{cc|cc} 2 & 5 & 1 & 0 \\ 3 & 5 & 0 & 1 \end{array} \right) \xrightarrow[\substack{F_2 = 2p_2 - 3p_1}]{F_1 = p_1} \left( \begin{array}{cc|cc} 2 & 5 & 1 & 0 \\ 0 & -5 & -3 & 2 \end{array} \right) \xrightarrow[\substack{F_2 = p_2}]{F_1 = -5p_1 - 5p_2} \left( \begin{array}{cc|cc} -10 & 0 & 10 & -10 \\ 0 & -5 & -3 & 2 \end{array} \right)$$

$$\xrightarrow[\substack{F_2 = -p_2/5}]{F_1 = -p_1/10} \left( \begin{array}{cc|cc} 1 & 0 & -10/10 & 10/10 \\ 0 & 1 & 3/5 & -2/5 \end{array} \right) \xrightarrow[\substack{\text{tenim que}}]{\text{Simplificant}} \left( \begin{array}{cc|cc} 1 & 0 & -1 & 1 \\ 0 & 1 & 3/5 & -2/5 \end{array} \right)$$

$$\Rightarrow A^{-1} = \begin{pmatrix} -1 & 1 \\ 3/5 & -2/5 \end{pmatrix}$$

2  $A = \begin{pmatrix} 3 & 3 \\ 4 & 3 \end{pmatrix} \Rightarrow A^{-1}?$

Utilitzem el mètode de Gauss-Jordan

$$\left( \begin{array}{cc|cc} 3 & 3 & 1 & 0 \\ 4 & 3 & 0 & 1 \end{array} \right) \xrightarrow[\substack{F_2 = 3p_2 - 4p_1}]{F_1 = p_1} \left( \begin{array}{cc|cc} 3 & 3 & 1 & 0 \\ 0 & -3 & -4 & 3 \end{array} \right) \xrightarrow[\substack{F_2 = p_2}]{F_1 = -3p_1 - 3p_2} \left( \begin{array}{cc|cc} -9 & 0 & 9 & -9 \\ 0 & -3 & -4 & 3 \end{array} \right)$$

$$\xrightarrow[\substack{F_2 = -p_2/3}]{F_1 = -p_1/9} \left( \begin{array}{cc|cc} 1 & 0 & -9/9 & 9/9 \\ 0 & 1 & 4/3 & -3/3 \end{array} \right) \xrightarrow[\substack{\text{tenim que}}]{\text{Simplificant}} \left( \begin{array}{cc|cc} 1 & 0 & -1 & 1 \\ 0 & 1 & 4/3 & -1 \end{array} \right)$$

$$\Rightarrow A^{-1} = \begin{pmatrix} -1 & 1 \\ 4/3 & -1 \end{pmatrix}$$

3  $A = \begin{pmatrix} 2 & -3 \\ -5 & 5 \end{pmatrix} \Rightarrow A^{-1}?$

Utilitzem el mètode de Gauss-Jordan

$$\left( \begin{array}{cc|cc} 2 & -3 & 1 & 0 \\ -5 & 5 & 0 & 1 \end{array} \right) \xrightarrow[\substack{F_2 = 2p_2 + 5p_1}]{F_1 = p_1} \left( \begin{array}{cc|cc} 2 & -3 & 1 & 0 \\ 0 & -5 & 5 & 2 \end{array} \right) \xrightarrow[\substack{F_2 = p_2}]{F_1 = -5p_1 + 3p_2} \left( \begin{array}{cc|cc} -10 & 0 & 10 & 6 \\ 0 & -5 & 5 & 2 \end{array} \right)$$

$$\xrightarrow[\substack{F_2 = -p_2/5}]{F_1 = -p_1/10} \left( \begin{array}{cc|cc} 1 & 0 & -10/10 & -6/10 \\ 0 & 1 & -5/5 & -2/5 \end{array} \right) \xrightarrow[\substack{\text{tenim que}}]{\text{Simplificant}} \left( \begin{array}{cc|cc} 1 & 0 & -1 & -3/5 \\ 0 & 1 & -1 & -2/5 \end{array} \right)$$

$$\Rightarrow A^{-1} = \begin{pmatrix} -1 & -3/5 \\ -1 & -2/5 \end{pmatrix}$$

