

$$\begin{aligned} a_{11}x_1 + a_{12}x_2 + a_{13}x_3 &= b_1 \\ a_{21}x_1 + a_{22}x_2 + a_{23}x_3 &= b_2 \\ a_{31}x_1 + a_{32}x_2 + a_{33}x_3 &= b_3 \end{aligned}$$

La representación matricial

$$AX = b$$

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \quad X = [x_1, x_2, x_3]$$

$$b = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$$

Sea D el determinante de A

1ª solución

$$x_1 = \frac{\begin{vmatrix} b_1 & a_{12} & a_{13} \\ b_2 & a_{22} & a_{23} \\ b_3 & a_{32} & a_{33} \end{vmatrix}}{D}$$

$$D = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$$

$$D = a_{11} \begin{vmatrix} a_{22} & a_{23} \\ a_{32} & a_{33} \end{vmatrix} - a_{12} \begin{vmatrix} a_{21} & a_{23} \\ a_{31} & a_{33} \end{vmatrix} + a_{13} \begin{vmatrix} a_{21} & a_{22} \\ a_{31} & a_{32} \end{vmatrix}$$

$$x_2 = \frac{\begin{vmatrix} a_{11} & b_1 & a_{13} \\ a_{21} & b_2 & a_{23} \\ a_{31} & b_3 & a_{33} \end{vmatrix}}{D}$$

$$x_3 = \frac{\begin{vmatrix} a_{11} & a_{12} & b_1 \\ a_{21} & a_{22} & b_2 \\ a_{31} & a_{32} & b_3 \end{vmatrix}}{D}$$

$$\begin{aligned} \text{Ej } 0.3x_1 + 0.52x_2 + x_3 &= -0.01 \\ 0.5x_1 + x_2 + 1.9x_3 &= 0.67 \\ 0.1x_1 + 0.3x_2 + 0.5x_3 &= 0.44 \end{aligned}$$

$$A = \begin{bmatrix} 0.3 & 0.52 & 1 \\ 0.5 & 1 & 1.9 \\ 0.1 & 0.3 & 0.5 \end{bmatrix} \quad X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \quad b = \begin{bmatrix} -0.01 \\ 0.67 \\ 0.44 \end{bmatrix}$$

$$D = 0.3 \begin{vmatrix} 1 & 1.9 \\ 0.3 & 0.5 \end{vmatrix} - 0.52 \begin{vmatrix} 0.5 & 1.9 \\ 0.1 & 0.5 \end{vmatrix} + \begin{vmatrix} 0.5 & 1 \\ 0.1 & 0.3 \end{vmatrix} = 0.3(0.5 - 0.57) - 0.52(0.25 - 0.19) + (0.15 - 0.1)$$

$$= 0.3(0.07) - 0.52(0.06) + 0.05 = -2.2 \times 10^{-3} = -0.0022$$

$$x_1 = \frac{\begin{vmatrix} -0.01 & 0.52 & 1 \\ 0.67 & 1 & 1.9 \\ 0.44 & 0.3 & 0.5 \end{vmatrix}}{-0.0022} = \frac{-0.01(0.5 - 0.3(1.9)) + 0.52((0.67)(0.5) - 0.44(1.9)) + ((0.67)(0.3) + 0.44)}{-0.0022} = -14.9$$

$$X_2 = \begin{vmatrix} 0.3 & -0.01 & 1 \\ 0.5 & 0.67 & 1.9 \\ 0.1 & -0.44 & 0.5 \end{vmatrix} = 0.3((0.5)(0.67) - (-0.44)(1.9)) + 0.01((0.5)(0.5) - ((1.9)(0.1))) + ((0.5)(-0.44)) - ((0.1)(0.67))$$

$$X_2 = \frac{0.9649}{-0.0022} = -29.5$$

$$X_3 = \begin{vmatrix} 0.3 & 0.52 & -0.01 \\ 0.5 & 1 & 0.67 \\ 0.1 & 0.3 & -0.44 \end{vmatrix} = 0.3((1)(-0.44) - (0.3)(0.67)) - (0.52)((0.5)(-0.44) - (0.1)(0.67)) \dots$$

$$X_3 = \frac{-0.04356}{-0.0022} = 19.8$$