1 Cálculo de la inversa mediante cofactores y adjunta

Se muestra el procedimiento paso a paso. Cada paso presenta la operación y la matriz resultante o la expresión matemática en modo display.

1.1 Paso 1: Matriz original

$$A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \\ 3 & 4 & 1 \end{bmatrix}$$

1.2 Paso 2: Determinante

$$\det(A) = 1$$

1.3 Paso 3: Menores y Cofactores (cada M_{ij}, \det(M_{ij}) y C_{ij})

Menor M_{11}

$$\begin{bmatrix} 0 & 2 \\ 4 & 1 \end{bmatrix}$$

$$\det(M_{11}) = -8$$

$$C_{11} = (-1)^{1+1} \det(M_{11}) = -8$$

Menor M_{12}

$$\begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$$

$$\det(M_{12}) = -5$$

$$C_{12} = (-1)^{1+2} \det(M_{12}) = 5$$

Menor M_{13}

$$\begin{bmatrix} 1 & 0 \\ 3 & 4 \end{bmatrix}$$

$$\det(M_{13}) = 4$$

$$C_{13} = (-1)^{1+3} \det(M_{13}) = 4$$

Menor M_{21}

$$\begin{bmatrix} 1 & 3 \\ 4 & 1 \end{bmatrix}$$

$$\det(M_{21}) = -11$$

$$C_{21} = (-1)^{2+1} \det(M_{21}) = 11$$

Menor M_{22}

$$\begin{bmatrix} 2 & 3 \\ 3 & 1 \end{bmatrix}$$

$$\det(M_{22}) = -7$$

$$C_{22} = (-1)^{2+2} \det(M_{22}) = -7$$

Menor M_{23}

$$\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$$

$$\det(M_{23}) = 5$$

$$C_{23} = (-1)^{2+3} \det(M_{23}) = -5$$

Menor M_{31}

$$\begin{bmatrix} 1 & 3 \\ 0 & 2 \end{bmatrix}$$

$$\det(M_{31}) = 2$$

$$C_{31} = (-1)^{3+1} \det(M_{31}) = 2$$

Menor M_{32}

$$\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

$$\det(M_{32}) = 1$$

$$C_{32} = (-1)^{3+2} \det(M_{32}) = -1$$

Menor M_{33}

$$\begin{bmatrix} 2 & 1 \\ 1 & 0 \end{bmatrix}$$

$$\det(M_{33}) = -1$$

$$C_{33} = (-1)^{3+3} \det(M_{33}) = -1$$

1.4 Paso 4: Matriz de cofactores C

$$C = \begin{bmatrix} -8 & 5 & 4 \\ 11 & -7 & -5 \\ 2 & -1 & -1 \end{bmatrix}$$

1.5 Paso 5: Adjunta (adjugate)

$$\operatorname{adj}(A) = C^T = \begin{bmatrix} -8 & 11 & 2 \\ 5 & -7 & -1 \\ 4 & -5 & -1 \end{bmatrix}$$

1.6 Paso 6: Fórmula de la inversa

$$A^{-1} = \frac{1}{\det(A)}\,\mathrm{adj}(A) = \frac{1}{1}\begin{bmatrix} -8 & 11 & 2 \\ 5 & -7 & -1 \\ 4 & -5 & -1 \end{bmatrix}$$

1.7 Paso 7: Matriz inversa (entradas explícitas)

$$A^{-1} = \begin{bmatrix} -8 & 11 & 2 \\ 5 & -7 & -1 \\ 4 & -5 & -1 \end{bmatrix}$$