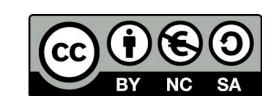


MATEMÀTIQUES II

Lliurament 1

Càlcul de determinants desenvolupant per una fila o columna

Josep Mulet Pol



... per Sarrus



$$\begin{vmatrix} 1 & -2 & 3 \\ 5 & 0 & 6 \\ -1 & 2 & -4 \end{vmatrix} = \begin{cases} 1 \cdot 0 \cdot (-4) + 5 \cdot 2 \cdot 3 + (-2) \cdot 6 \cdot (-1) \\ -1 \cdot 0 \cdot 3 + 2 \cdot 6 \cdot 1 + 5 \cdot (-2) \cdot (-4) \end{cases} =$$

$$= 0 + 30 + 12 - [0 + 12 + 40] = 42 - 52 = -10$$

... desenvolupant 2a fila



$$\begin{vmatrix} 1 & -2 & 3 \\ 5 & 0 & 6 \\ -1 & 2 & -4 \end{vmatrix} = 5 \cdot A_{21} + 0 \cdot A_{22} + 6 \cdot A_{23}$$

$$= -5 \cdot \begin{vmatrix} -2 & 3 \\ 2 & -4 \end{vmatrix} - 6 \cdot \begin{vmatrix} 1 - 2 \\ -1 & 2 \end{vmatrix} =$$

$$= -5 \cdot (8 - 6) - 6 \cdot (2 - 2) =$$

$$= -5 \cdot 2 - 0 = -10$$

... desenvolupant 2a columna



$$\begin{vmatrix} 1 & -2 & 3 \\ 5 & 0 & 6 \\ -1 & 2 & -4 \end{vmatrix} = -(-2) \cdot \begin{vmatrix} 5 & 6 \\ -1 & -4 \end{vmatrix} + 0 \cdot \begin{vmatrix} 1 & 3 \\ -1 & -4 \end{vmatrix} = -(-2) \cdot \begin{vmatrix} 5 & 6 \\ -1 & -4$$

$$\begin{bmatrix} + & + \\ - & + \\ + & - \end{bmatrix} = 2 \left(-20 + 6 \right) - 2 \cdot \left(6 - 15 \right) =$$

$$= 2 \cdot \left(-14 \right) - 2 \cdot \left(-9 \right) = -28 + 18 = \boxed{-10}$$

Determinant 4x4



$$\begin{vmatrix} 3 & 2 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 \end{vmatrix} = +3 \cdot \begin{vmatrix} 0 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{vmatrix} - 2 \cdot \begin{vmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix} =$$

Determinant 4x4



$$\begin{vmatrix} 3 & 2 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{vmatrix} = +1 \cdot \begin{vmatrix} 3 & 2 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{vmatrix} = -1 \begin{vmatrix} 3 & 2 \\ 0 & 1 \end{vmatrix} + 1 \cdot \begin{vmatrix} 3 & 2 \\ 1 & 0 \end{vmatrix} = -1 \begin{vmatrix} 3 & 2 \\ 0 & 1 \end{vmatrix} = -1 \begin{vmatrix} 3 & 2 \\ 0 &$$

$$= -(3-0) + 1(0-2) =$$

$$= -3 - 2 = -5$$

Resoleu l'equació



$$\left| egin{array}{cccc} 1 & -1 & -1 \ 2 & m & m^2 \ 1 & -1 & m^2 - 2m \end{array}
ight| = 0$$
 Sarrus $ightarrow = m \cdot (m^2 - 2m) + 2 - m^2 + m + m^2 + 2(m^2 - 2m)$

$$\begin{vmatrix} 1 & -1 & -1 \\ 2 & m & m^{2} \\ 1 & -1 & m^{2} - 2m \end{vmatrix} \rightarrow [3^{a}] - [1^{a}] = \begin{vmatrix} 1 & -1 & -1 \\ 2 & m & m^{2} \\ 0 & 0 & m^{2} - 2m + 1 \end{vmatrix} =$$

$$= (m^{2} - 2m + 1) \cdot \begin{vmatrix} 1 & -1 \\ 2 & m \end{vmatrix} = (m^{2} - 2m + 1) \cdot (m + 2) =$$

$$= (m - 1)^{2} \cdot (m + 2) = 0 \qquad m = 1$$

$$= -2$$



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