

①

$$\begin{vmatrix} P & 2 & 2 & P & 2 \\ P & 4 & 4 & P & 4 \\ P & 4 & 1 & P & 4 \end{vmatrix} = -18$$

$$= (4P + 8P + 8P - 8P - 16P - 2P) = -18$$

$$20P - 26P = -18$$

$$-6P = -18$$

$$P = -18 / -6$$

$$\underline{\underline{P = 3}}$$

$$\begin{vmatrix} P & -1 & 2 & P & -1 \\ P & -2 & 4 & P & -2 \\ P & -2 & 1 & P & -2 \end{vmatrix} = \begin{vmatrix} 3 & -1 & 2 & 3 & -1 \\ 3 & -2 & 4 & 3 & -2 \\ 3 & -2 & 1 & 3 & -2 \end{vmatrix}$$

$$\begin{vmatrix} 3 & -1 & 2 & 3 & -1 \\ 3 & -2 & 4 & 3 & -2 \end{vmatrix}$$

$$= (-6 - 12 - 12 + 12 + 24 + 3)$$

$$dt = (-30 + 33)$$

$$\boxed{dt = 3}$$

②

$$2A = 2^k$$

$k = \text{order}$



$$\det(2A) = 2^4 \cdot \det(A) = 16 \cdot (-6) = -96$$

$$-96 = x - 97$$

$$x = 1$$

$$x = 1$$

③

propriété 3 des matrices:

$$\hookrightarrow \det B = k \cdot \det A$$

$$\frac{A}{x} = \frac{1}{x} \cdot A$$

$$\det B = \left(\frac{1}{x}\right) \cdot y \cdot \det A \rightarrow \det B = \left(\frac{y}{x}\right) \cdot \det A$$

$$= \det B = \frac{\det A}{\frac{x}{y}}$$

$$\frac{\frac{x}{y}}{y}$$

4)

$$\begin{vmatrix} 2 & 1 & 0 & 2 & 1 \\ k & k & k & k & k \\ 1 & 2 & -2 & 1 & 2 \end{vmatrix}$$

$\rightarrow 0 \rightarrow 4k$
 $\rightarrow -2k$
 $\rightarrow 0$
 $\rightarrow -4k$

$$\left. \begin{aligned} \det &= -4k + k + 4k + 2k = 10 \\ -5k &= 10 \\ k &= \frac{-10}{5} \\ k &= 2 \end{aligned} \right\}$$

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

$\rightarrow 12$
 $\rightarrow -3$
 $\rightarrow 4$

$$\rightarrow \det = -4 - 3 + 12 + 14$$

$$\det = 16 - 7 = 9$$

$$\det = 9$$

⑤ Propriedade do determinante = 0

$$\left. \begin{array}{ccc} (C1) & 1 & (C2) -11 & (C3) 6 \\ -2 & 4 & -3 \\ -3 & -7 & 2 \end{array} \right\} \begin{array}{l} C1 = 2 \cdot (C3) + (C2) \\ 1 = 12 - 11 \end{array}$$

↳ isso prova que a matriz tem a combinação linear de outras duas filas paralelas

⑥

$$\left| \begin{array}{ccc|ccc} 1 & x & x^2 & 1 & x & 9x \\ 1 & 2 & 4 & 1 & 2 & \\ 1 & -3 & 9 & 1 & -3 & \end{array} \right|$$

$2x^2$
 -12
 $9x$
 18
 $4x$
 $-3x^2$

$$18 + 4x - 3x^2 - 2x^2 + 12 - 9x = 0$$

$$-5x^2 - 5x + 30 = 0$$

$$5$$

$$= -x^2 - x + 6 = 0$$

$$\frac{-3}{-3} + \frac{2}{-3} = -1$$

$$\frac{-3}{-3} \cdot \frac{2}{-3} = -6$$

$$S = \{-3, 2\}$$

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$$\begin{vmatrix} 1 & 0 & 0 & 0 & 0 \\ 2 & 2 & 0 & 0 & 0 \\ 3 & 2 & 1 & 0 & 0 \\ 4 & 2 & 3 & -2 & 0 \\ 5 & 1 & 2 & 3 & 3 \end{vmatrix}$$

-12 \Rightarrow $\det = -12$