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Logo

$$A^{10} = \begin{bmatrix} 1 & 1 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1024 \end{bmatrix} \begin{bmatrix} 2/3 & -1/3 \\ 1/3 & 1/3 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 1024 \\ * & * \end{bmatrix} \begin{bmatrix} 2/3 & -1/3 \\ 1/3 & 1/3 \end{bmatrix} = \begin{bmatrix} 342 & 341 \\ * & * \end{bmatrix}$$

$$342 + 341 = 683 //$$

Q8)

$$A = [T]_{\text{can}} = \begin{bmatrix} 1 & 1 & k \\ 0 & 1 & k \\ 0 & 1 & 1 \end{bmatrix}$$

$T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ linear

$$P_A(x) = \det \begin{bmatrix} (1-x) & 1 & k \\ 0 & (1-x) & k \\ 0 & 1 & (1-x) \end{bmatrix} = (1-x) \left[(1-x)^2 - k \right]$$

$$P_A(x) = 0 \Leftrightarrow x = 1 \quad \text{ou} \quad (x-1)^2 = k$$

Se $k > 0$ todas as raízes são distintas.

E se $k = 0$?

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$y = -z$$

$$x = z$$

$$\ker(T - I) = [(1, -1, 1)]$$

Logo $k > 0$