__/__/__ S T Q Q S S D

Eduardo S. Moreira

1) a) $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ $a = d$, $c = a+b$ $\quad A_2 = \begin{bmatrix} x & y \\ z & w \end{bmatrix}$ $x = w$, $z = x+y$

$A+B = \begin{bmatrix} a+x & b+y \\ c+z & d+w \end{bmatrix} \Rightarrow \in W$ $\Rightarrow c+z = a+b + x+y \rightarrow$ satisfaz
$\Rightarrow a+x = d+w \rightarrow$ satisfaz

$kA = \begin{bmatrix} ka & kb \\ kc & kd \end{bmatrix} \Rightarrow ka = kd \Rightarrow a = d$
$kc = ka + kb \Rightarrow c = a+b$
$\hookrightarrow \in W$

b) $U(c^2, -c^2, k)$, $V(x^2, -y^2, z)$

$U+V = (c^2 + x^2, -(c^2+y^2), c+z) \notin U \quad a^2+b^2 \neq (a+b)^2$

como não é fechado para soma: U não é subspaço de V.

2) $c_1 v_1 + c_2 v_2 + c_3 v_3 + c_4 v_4 = 0$

$$\left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 0 \\ -1 & -2 & 0 & -3 & 0 \\ 1 & 3 & 1 & 4 & 0 \\ -1 & 0 & -1 & 1 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 0 \\ 1 & 3 & 0 & 3 & 0 \\ 0 & 4 & 1 & 4 & 0 \\ 0 & 1 & 1 & 1 & 0 \end{array}\right]$$

$$\Rightarrow \left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 4 & 1 & 4 & 0 \\ 0 & 1 & 1 & 1 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{array}\right]$$

$S = \{(x, y, z, t) \in \mathbb{R}^4 \,/\, x+t=0,\ y+t=0,\ z=0\}$

spiral