Vinícius Mosquini
Prova

1) $u = (1, 2, 1)$ e $v = (-1, 0, 2)$

$w = (5, 4, -4) = a(1, 2, 1) + b(-1, 0, 2)$

$(5, 4, -4) = (a, 2a, a) + (-b, 0, 2b)$
$(5, 4, -4) = (a-b, 2a, a+2b)$

$\begin{cases} a - b = 5 \\ 2a + 0 = 4 \\ a + 2b = -4 \end{cases}$ $a = \frac{4}{2}$ $\boxed{a = 2}$

$2 + 2b = -4 \Rightarrow 2b = -6$

$\boxed{b = -3}$

$\boxed{w = 2u + (-3 \cdot v)}$

2) $A = \{(1, -1, 2), (2, 3, -3), (1, 4, -5)$

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

$(-15 + 3 + 16) - (6 + 10 - 12)$

$4 - 4 = \boxed{0}$

L.D

$u = (x, y, z) \quad v = (a, b, c)$

3-) $\mathbb{R}^3 \to \mathbb{R}^2 =$

$(x, y, z) = (x+y, x \cdot z)$

i) $\vec{0}$ $T(0,0,0) = (0+0, 0 \cdot 0) = (0,0)$

ii) $T(u+v) = T(u) + T(v)$

$u+v = (x+a, y+b, z+c)$

$T(u+v) = ((x+a)+(y+b), (x+a) \cdot (z+c))$

$T(x+a+y+b, xz+xc+az+ac)$

falha na prop II

$T(u) = (x+y, xz)$

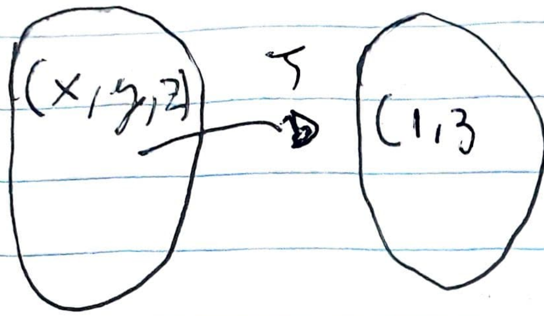
$T(v) = (a+b, ac)$

$T(\cancel{x}+y+a+b, xz+ac)$

não é T.L.

4-) $T: \mathbb{R}^3 \to \mathbb{R}^2 : T(x,y,z) = (x+z, y+z)$

$T(v) = (1,3)$



Supon $v = (x,y,z)$

$T(x+z, y+z) = (1,3)$

$$\begin{cases} x+z = 1 \\ y+z = 3 \end{cases} \quad \boxed{x = -z+1} \quad \boxed{z = 1-x}$$

$$\boxed{z = 3-y} \quad \boxed{y = 3-z}$$

$(x,y,z) = (1-z, 3-z, z)$

$z = 1 \quad = (1-1, 3-1, 1) = (0,2,1)$

$T(0,2,1) = (1,3)$ //

$v = (1-z, 3-z, z)$ //

5-) Determine T. L. $\mathbb{R}^2 \to \mathbb{R}^3$. $T(1,0) = (2,-1,0)$

$T(0,1) = (0,0,1)$

e

$T_1(1,0) = (2,-1,0)$

$T_2(0,1) = (0,0,1)$

T_1

$T(x,y) = \cancel{T}(\cancel{1},0) + \cancel{T}(0,1)$

$T(x,y) = x(2,-1,0) + y(0,0,1)$

$T(x,y) = (2x,-x,0) + (0,0,y)$

$\boxed{T(x,y) = (2x,-x,y)}$ //

$T(1,0) = (2\cdot 1,-1,0) = (2,-1,0)$

$T(0,1) = (2\cdot 0,-0,1) = (0,0,1)$

6-) Determine a Imagem do Vetor (4,2) sobre o qual se Aplica uma rotação $z = 90°$ no sentido antihorario. $T(x,y) = (x\cos(z) - y\,\text{sen}(z),\ y\cos(z) + x\,\text{Sen}(z))$

$T(4,2) = (4 \cdot 0 - 2 \cdot 1,\ 2 \cdot 0 + 4 \cdot 1)$

$T(4,2)\ (0 - 2,\ 2 \cdot 0 + 4 \cdot 1) = (-2, 4)$ //

$$\begin{vmatrix} 4 \\ 2 \end{vmatrix} \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} -2 \\ 4 \end{pmatrix} //$$

7-) $A = (1,2)$, $B = (3,2)$, $C = (2,3)$

a) Reflexão no eixo x $(T(x,y) = (x,-y))$

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

$A_1 = (1,-2)$
$B_1 = (3,-2)$
$C_1 = (2,-3)$

b) Dilatação de fator $\alpha = 2$ $(T(x,y) = (\alpha x, \alpha y))$

$$\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} \begin{pmatrix} 1 & 3 & 2 \\ -2 & -2 & -3 \end{pmatrix} = \begin{pmatrix} 2 & 6 & 4 \\ -4 & -4 & -6 \end{pmatrix}$$

$A_2 = (2,-4)$
$B_2 = (6,-4)$
$C_2 = (4,-6)$