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Trabalho 9
Algebra Linear

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3. (a) $T(3,0,0) = (2,1) = -2(-1,1) + 3(0,3)$
$T(2,-1,0) = (3,0) = -3(-1,3) + 3(0,3)$
$T(0,3,3) = (0,2) \quad 0(-1,3) + 2(0,3)$

$$[T]_B^A = \begin{bmatrix} -2 & -3 & 0 \\ 3 & 3 & 2 \end{bmatrix}$$

(b) $[T(v)]_B = [T]_B^A \cdot [v]_A$

$$\begin{bmatrix} -2 & -3 & 0 \\ 3 & 3 & 2 \end{bmatrix} \cdot \begin{bmatrix} -2 \\ 3 \end{bmatrix} \times \begin{bmatrix} 4 \\ -3 \\ -3 \end{bmatrix} = \begin{pmatrix} 1 \\ 9 \end{pmatrix}$$

7 $[T]_{A,B}$

$T(-1,1) = (-3,2,-2) = -3(0,0,3) + -1(0,3,-3) + 3(3,1,0)$
$T(2,3) = (3,5,-2) = 0(0,0,3) + 2(0,3,-3) + 3(3,3,0)$

$$[T]_{A,B} = \begin{bmatrix} -3 & 0 \\ 1 & 2 \\ 3 & 3 \end{bmatrix}$$

$[T]_{A,C}$

$T(-1,1) = (-3,2,-2) = -3(1,0,0) + 2(0,3,0) + 2(0,0,3)$
$T(2,3) = (3,5,-2) = 3(1,0,0) + 5(0,3,0) + -2(0,0,3)$

$T(3,3) \quad T(2,3)$

$$[T]_{A,C} = \begin{bmatrix} -3 & 3 \\ 2 & 5 \\ -2 & -2 \end{bmatrix}$$

8 (a) $T(0,1,1) = 1(-1,0) + (-1)(0,-1) = (-1,1)$

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

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

$-1 = x \quad y \quad z \qquad 0x - 2y + z$

$1 = x \quad y \quad z \qquad -x + y$

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

(b) $\mathcal{Y}_{Im}(t) = \{t(x,y,z) : x,y,z \in \mathbb{R}^3\} =$

$(-2y + z, -x + y) \; x,y,z \in \mathbb{R}$

$x(0,-1) + y(-2,1) + z(1,0)$

$[(0,-1), (-2,1), (1,0)]$

(c) $-2y + z = 0 \qquad z = 2y$

$-x + y = 0 \qquad y = x$

$x \quad y$

$x = y$

$z = 2y$

$Ker(T) = \{(x,y,2y) \forall \; x = y \wedge z = 2y\}$