
Exercise 1 Find the standard matrix M of a linear transformation $T_M : \mathbb{R}^3 \rightarrow \mathbb{R}^2$ if

$$T \left(\begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} \right) = \begin{bmatrix} 3 \\ 0 \end{bmatrix} ; \quad T \left(\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} \right) = \begin{bmatrix} 1 \\ 4 \end{bmatrix} ; \quad T \left(\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \right) = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$$

$$M = \begin{bmatrix} \dots & \dots & \dots \\ \dots & \dots & \dots \end{bmatrix}$$