

Consider the matrix given below.

$$[T] = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

1) What is the domain of the associated linear operator T ?

$$\mathbb{R}^3$$

2) What is codomain of T ?

$$\mathbb{R}^4$$

3) Is $\begin{bmatrix} 239587983479829820245\pi \\ 2387238936849423905609 \\ 3495489349804509.34 \\ 0 \end{bmatrix}$ in the range of T ?

No, as the second and third components are always equal.

4) What is the rank of $[T]$?

$$3$$

5) What is the null space of $[T]$?

$$\{\vec{0}\}$$