

MA511 HW10 Sol.

2.4.4 Describe the four subspaces in three-dimensional space associated with

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

Sol.

$C(A)$ is the xy -plane

$N(A)$ is the x -axis

$C(A^T)$ is the yz -plane

$N(A^T)$ is the z -axis

2.4.8

Suppose the solution to $Ax = 0$ (m equations in n unknowns) is $x = 0$. What's the rank and why? The columns of A are linearly _____?

Sol.

Rank n

$$N(A) = 0 \Rightarrow n - r = 0 \Rightarrow r = n \Rightarrow \underline{\text{independent columns}}$$