

Problem 1

Explain why $\alpha = \left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \right\}$ does not form a basis for \mathbb{R}^3 . Check that the two vectors are linearly

independent, and find another vector, v , such that $\beta = \left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, v \right\}$ is a basis for \mathbb{R}^3 .

Problem 2

For the matrix $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 3 \end{bmatrix}$, find a basis for $NS(A)$ and $\dim(NS(A))$.

Problem 3

For the matrix $A = \begin{bmatrix} 1 & 0 & 0 & 4 & 5 \\ 0 & 1 & 0 & 3 & 2 \\ 0 & 0 & 1 & 3 & 2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$, find a basis for $NS(A)$ and $\dim(NS(A))$.