

Problem 1

Find a basis for the nullspace of the matrix $A = \begin{bmatrix} 1 & -1 & 2 \\ 4 & -4 & -8 \\ 3 & -3 & -10 \end{bmatrix}$.

Problem 2

For the matrix $A = \begin{bmatrix} 2 & 1 & -5 & 3 & 2 \\ 1 & 1 & -3 & -3 & -1 \\ 0 & 1 & 2 & 4 & 0 \end{bmatrix}$, 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 $RS(A)$ and $\dim(RS(A))$. Verify that

$$\dim(NS(A)) + \text{Rank}(A) = 5.$$