

Column Spaces and Null Spaces

Linear Algebra

College of the Atlantic

$$A = \begin{bmatrix} 0 & 2 & 0 & -4 & 0 & 6 \\ 0 & -4 & -1 & 7 & 0 & -16 \\ 0 & 6 & 0 & -12 & 3 & 15 \\ 0 & 4 & -1 & -9 & 0 & 8 \end{bmatrix} \sim \begin{bmatrix} 0 & 1 & 0 & -2 & 0 & 3 \\ 0 & 0 & 1 & 1 & 0 & 4 \\ 0 & 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

A matrix A and its RREF form is shown above.

1. The null space $\text{Nul}(A)$ is a subspace of \mathbb{R}^p for what value of p ?
2. The column space $\text{Col}(A)$ is a subspace of \mathbb{R}^p for what value of p ?
3. What are the dimensions of the null and column spaces for A .
4. Find a basis for the column space of A .
5. Find a basis for the null space of A .