

Homework 13 MATH 304 Section 3

Assigned: Monday, October 20.

Potentially Collected: Monday, October 27.

1. For each of the following matrix, find a basis for the Null Space, Row Space, and the Column Space. What is the dimension of each of the subspaces?

$$M = \begin{bmatrix} 1 & 0 & -3 & 2 \\ 0 & 1 & -5 & 4 \\ 3 & -2 & 1 & -2 \end{bmatrix}$$

2. (i) If M is a 4×7 matrix, what is the largest dimension of the column space? What are the bounds of the dimension of the null space?
(ii) If M is a 6×10 matrix that is onto, what is the dimension of the null space?
(iii) If M is a 10×6 matrix that is 1-to-1, what is the dimension of the column space?
(iv) Suppose that $A\vec{x} = \vec{b}$ is a system of linear equations where A is a 7×4 matrix whose null space has dimension zero. How many solutions can this system have? What is the dimension of the column space of A ?