

Discussion - Sep 2

1. Find a vector \vec{b} so that $\left(\begin{array}{ccc|c} 1 & 2 & 3 & b_1 \\ 4 & 5 & 6 & b_2 \\ 7 & 8 & 9 & b_3 \end{array}\right)$ is inconsistent.
2. Describe all such \vec{b} .
3. For an $m \times n$ matrix, can $A\vec{x} = \vec{b}$ be consistent for all $\vec{b} \in \mathbb{R}^m$ when (a) $m > n$ (b) $m = n$ (c) $m < n$?
Give an example of such an A when possible, otherwise give a reason it is not.
4. What are all possible sets of pivot positions for a 3×5 matrix whose columns span \mathbb{R}^3 ?
5. For an $m \times n$ matrix, can $A\vec{x} = \vec{b}$ have at most one solution when (a) $m > n$ (b) $m = n$ (c) $m < n$?
(Give an ex., etc. etc.)
6. Give the solution set to

$$\begin{bmatrix} 1 & 2 & 8 & 14 \\ 2 & 0 & 4 & 8 \\ 2 & -1 & 1 & 3 \end{bmatrix} \vec{x} = \vec{0}$$

in parametric vector form and as a span.