Linear. Test 2, Review.

Also study the quizzes, and homework problems!

Consider the following subsets of $\mathbb{R}^3$

$$S = \left\{ \left[\begin{array}{c} 0 \\ x-y \\ 3y \end{array} \right] \middle| \, x, y \in \mathbb{R} \right\}, \; T = \left\{ \left[\begin{array}{c} x \\ 7y \\ y+3 \end{array} \right] \middle| \, x, y \in \mathbb{R} \right\}, \; U = \left\{ \left[\begin{array}{c} x \\ y \\ x^2+y^2 \end{array} \right] \middle| \, x, y \in \mathbb{R} \right\}$$

Which is a subspace? Recall: subspaces are subsets that can be written as spans, and subspaces are planes or lines containing the origin $\mathbf{0}$ (or just the origin, or the whole space.)

[2] Consider the following matrices: `Find the Null space and Column space for each.`

$$A = \begin{bmatrix} 0 & 0 & 0 & 1 \\ 6 & 0 & 1 & 0 \\ 3 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 7 & 0 & 2 & 0 \\ 0 & 2 & 0 & 0 & 10 \\ 0 & 0 & -3 & 0 & 6 \\ 0 & 0 & 4 & 4 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 2 & 3 & 1 \\ 0 & 0 & 4 & 1 & 2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$