MATH 2130 LINEAR ALGEBRA
HOMEWORK 5
DUE 2025 SEPTEMBER 28

Problem 1 (S3)

Use the Subspace Test to show that

$$V = \left\{ (x, y, z) \in \mathbb{R}^3 \;\middle|\; 2x - y + 5z = 0 \right\}$$

is a subspace of $\mathbb{R}^3$.

Problem 2 (S3)

Use the Subspace Test to show that

$$V = \left\{ \begin{bmatrix} a + 2b & a + b \\ 2a & 3b \end{bmatrix} \;\middle|\; a, b \in \mathbb{R} \right\}$$

is a subspace of $\mathrm{Mat}_{2\times 2}$.

Problem 3 (S4)

Does the set

$$A = \{(2, 1, -2), (4, 2, 1), (2, 1, 3)\}$$

span $\mathbb{R}^3$?

Problem 4 (S4)

Does the set

$$A = \{(0, 1, 1), (2, 1, 3), (0, 2, 1)\}$$

span $\mathbb{R}^3$?

Problem 5 (S5)

Show that $\{(1, 7, 2), (3, 6, 1), (8, 11, 1)\}$ is linearly dependent in $\mathbb{R}^3$.