

Practice problems.

- (1) Explain why the collection of 2×2 upper triangular matrices is a subspace of $M_{2 \times 2}(\mathbb{R})$.
- (2) Explain why the collection of 2×2 matrices of determinant zero is **not** a subspace of $M_{2 \times 2}(\mathbb{R})$.
- (3) Explain why the collection of polynomials $p \in \mathbb{P}_4$ satisfying $p(x) = p(-x)$ for all x is a subspace of \mathbb{P}_4 .
- (4) Explain why the transpose map $A \mapsto A^T$ is a linear transformation from $M_{m \times n}(\mathbb{R})$ to $M_{n \times m}(\mathbb{R})$. What is its kernel?