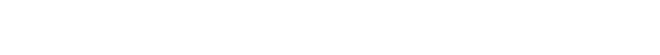


examples that are not vector spaces









examples that are not vector spaces

- Vectors without zero vector: The set of all n-tuples of real numbers (e.g., \mathbb{R}^2 , \mathbb{R}^3) with standard addition and scalar multiplication • Example: the set $V = \{\vec{u} \in \mathbb{R}^2 \mid u_1 + u_2 = 1\}$ because $\vec{0} \not\in V$, so it is not a vector space.
- Subset of \mathbb{R}^n closed under addition but not scalar multiplication
 - Example: $W = \{ \vec{u} \in \mathbb{R}^2 \mid u_1 \ge 0, u_2 \ge 0 \}$ because $\vec{u} = [1,1] \in W$ but $-1\vec{u} = [-1,-1] \not\in W$
- Finite set of vectors
 - \circ Example: $F = \{[1,0],[0,1]\}$ because finite sets of vectors are generally not closed under addition and scalar multiplication
- Set of matrices without closure
 - \circ Example: $H=\{A\in M_{2\times 2}\mid \det(A)=1\}$ because adding two matrices in H does not necessarily result in another matrix with $\det(A)=1$

examples that are not vector spaces

exercise 1

Why is the set of polynomials of degree n not a vector space?