Vector Spaces

Definition of Vector Space: A vector space is a nonempty set V of objects, called vectors, with two operations defined on them, addition and scalar multiplication and are subject to ten axioms. These axioms must hold for all vectors, $\mathbf{u}, \mathbf{v}, \mathbf{w}$ and all scalars c and d.

Axioms:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Examples of Vector Spaces:

Subspaces: A subspace of a vector space V is a subset H of V that satisfies these three properties.

1.

2.

3.

Examples of Subspaces:

Subspace Spanned by a Set:

Theorem 1:

Examples 14.2: