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Testing Theorem Boxes

This entry demonstrates the colorful theorem environments provided by theorem_boxes.sty.

Definition 1. A **vector space** over a field F is a set V together with operations of addition and scalar multiplication that satisfy the vector space axioms.

Theorem 1. Every finite-dimensional vector space has a basis.

Proof. Let V be a finite-dimensional vector space. We can construct a basis by taking a maximal linearly independent set of vectors. □

Example 1. The set $\mathbb{R}^n$ with standard addition and scalar multiplication forms a vector space over $\mathbb{R}$.

Remark 1. The dimension of a vector space is well-defined and equals the cardinality of any basis.

Important Note

This is a custom colored box that can be used for highlighting important information.

Lemma 1. If $T : V \to W$ is a linear transformation and $\{v_1, v_2, \ldots, v_n\}$ is linearly independent in V, then $\{T(v_1), T(v_2), \ldots, T(v_n)\}$ is linearly independent in W if and only if T is injective.