

MATH-332: Linear Algebra

Chapter: 4

Vector SpacesSection 4.3: Linearly Independent Sets, Bases

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Lecture: Bases of Vector Spaces**Topics:**

Linear Dependence Relation

Basis/Spanning set

Basis for  $\text{NulA}$ ,  $\text{ColA}$ **Problems**

Prac: 1, 2, 3

Prob: 3, 9, 13, 15, 21, 22, 26, 27

**Section Goals**

- Understand how the concept of linear independence can be used to define a set of basis vectors that can be used to span a vector subspace.
- Using the spanning set theorem, develop a method that will find a basis for the null and column space of a matrix.

**Section Objectives**

- Define the basis of a subspace through the concepts of span and linear independence and define the 'standard basis' for  $\mathbb{R}^n$ .
- Provide an example of these concepts in terms of a second-order linear ordinary differential operator and the polynomial spaces.
- State the spanning set theorem, which characterizes bases as 'efficient' spanning sets, and using it construct bases for null and column spaces.