

MATH-332: Linear Algebra

Chapter: 4

Vector SpacesSection 4.3: Coordinate Systems

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July 13, 2009

Lecture: Coordinate Systems**Topics:**

Unique Representation Theorem

Definition of Coordinates

Coordinate mappings

Problems

Prac: 1, 2

Prob: 3, 7, 13, 15, 16, 17, 27, 31

Section Goals

- Understand how complete bases specify unique representations of vectors from the spaces they span in terms of weights of linear combinations of basis vectors.
- Study the representation of vectors under different bases using the concept of coordinate transformation and from this extrapolate the concept of information equivalence relative to coordinate systems.

Section Objectives

- State the unique representation theorem and its associated vocabulary of coordinates relative to bases.
- Provide an example of coordinate transformation and representation of vectors under different bases of \mathbb{R}^2 .
- Present an example using the standard polynomial basis highlighting its structural equivalence to \mathbb{R}^{n+1} .