

MATH-332: Linear Algebra

Chapter: 4

Vector SpacesSection 4.5: The Dimension of a Vector Space

pgs. 256 - 262

July 13, 2009

Lecture: Finite Dimensional Vector Spaces**Topics:**

Definition of Dimension
 The Basis Theorem
 Dimension of NulA , ColA

Problems

Prac: 1, 2
 Prob: 5, 9, 13, 19, 20, 25, 29, 30

Section Goals

- Understand how the dimension of a vector space is defined and how this number can be used to characterize the properties of that space regardless of the elements found within.
- Study the concept of dimension using the classical matrix spaces and from this understand the interplay between the null and column spaces.

Section Objectives

- Define the dimension of a vector space in terms of equivalency of elements in any basis and provide examples of finite and infinite dimensional spaces.
- State theorem 4.5.11 on page 259, which relates the dimension of a space to its subspaces.
- Calculate the dimension of the null and column spaces of a matrix and begin the presentation of the so-called rank-nullity theorem.