MATH-332: Linear Algebra Chapter: 4

Vector Spaces

Section 4.2: Null Spaces, Column Spaces, and Linear Transformations

pgs. 226 - 234 *July 13, 2009*

Lecture: Introduction to Matrix Spaces

Topics:	Definition of null & column space kernel and range of a linear transformation
Problems	Prac: 1, 2 Prob: 1, 5, 11, 17, 23, 25, 26, 28, 29

Section Goals

- Understand how $\mathbf{Ax} = \mathbf{b}$ can be characterized by the null-space and column-space vector spaces.
- Study these concepts from the perspective of linear transformations highlighting how these spaces naturally occur in study of 'abstract linear transformations.'

Section Objectives

- Define the null-space and column-space of a matrix and provide characterization of their elements.
- Compare and contrast the null-space and column-space of a matrix.
- Define the kernel and range of a linear transformation as they relate to the null and column spaces of a matrix transformation.
- Characterize the kernel and range in terms of a second-order linear ordinary differential operator.