MATH-332: Linear Algebra Chapter: 7

Symmetric Matrices and Quadratic Forms

Section 7.1: Diagonalization of Symmetric Matrices

pgs. 449-455 *August 4, 2009*

	Lecture: Symmetric Matrices and Quadratic Forms
Topics:	Orthogonally Diagonalizable The Spectral Theorem Spectral Decomposition
Problems	Prac: 1, 2 Prob: 9, 13, 17, 23, 25, 26, 27, 29, 30

Section Goals

- Understand how symmetric matrices produce orthogonal eigenspaces, which can be used to diagonally decompose a matrix in the most efficient way.
- Using the concept of spectral decomposition characterize the action of a symmetric matrix by the actions in its eigensubsapces.

Section Objectives

- Prove that the eigenvectors of a symmetric matrix are orthogonal or can be made orthogonal by using the Gram-Schmidt process.
- State theorem 7.1.2 on page 451, which states that matrix is symmetric if and only if it is orthogonally diagonalizable.
- Present an example of orthogonal diagonalization,
- State the spectral theorem of symmetric matrices and using its concepts show the spectral decomposition of a matrix highlighting its geometric significance.