

MATH-332: Linear Algebra

Chapter: 5

Eigenvalues and EigenvectorsSection 5.3: Diagonalization

pgs. 319 - 327

July 21, 2009

Lecture: Diagonalization**Topics:**Diagonalization - $A = PDP^{-1}$

Process for diagonalization

Matrices which are not diagonalizable

Problems

Prac: 1, 2

Prob: 3, 7, 9, 11, 19-29(odd)

Section Goals

- Understand how eigenvalue/eigenvector problems can be used to define a similarity transformation and a basis under which the original matrix appears diagonal.
- Develop necessary criteria for a matrix to be diagonalized.

Section Objectives

- Prove theorem 5.3.5 on page 320, which states that if a matrix gives rise to n -many eigenvectors then the matrix possesses a similar matrix, which is diagonal in the eigenvector basis.
- Provide examples matrix diagonalization highlighting the term geometric multiplicity.
- Show how this diagonalization allows one to raise a matrix to an arbitrary power by exploitation of the properties of diagonal matrices.
- State theorems 5.3.6 and 5.3.7, which give diagonalization criteria.