MA 265 Lecture 34

Section 7.2 Diagonalization and Similar Matrices

Definition If A and B are $n \times n$ matrices, we say that B is **similar** to A if

In many situations, we need to compute powers of a matrix A.

Theorem Similar matrices

Proof

Definition If a matrix A is similar to a diagonal matrix, we say

Remark: An $n \times n$ matrix A is diagonalizable if and only if

Example 1. *Are the following matrices diagonalizable?*

$$A = \begin{bmatrix} 1 & 1 \\ -2 & 4 \end{bmatrix}, \qquad B = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$$

If A is similar to a diagonal matrix D, then $P^{-1}AP = D$ for some nonsingular matrix P.

Question: How to construct P?

Example 2. *Let* $A = \begin{bmatrix} 1 & 1 \\ -2 & 4 \end{bmatrix}$ *(the same matrix in Example 1). Find a matrix* P *such that* $P^{-1}AP = D$.