Section 7.2  Diagonalization and Similar Matrices (contd)

Recall

• We say $A$ and $B$ are similar if

• We say $A$ is diagonalizable if

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

• If $D = P^{-1}AP$, how to find $D$ and $P$?

Example 1. Find a nonsingular matrix $P$ such that $P^{-1}AP$ is a diagonal matrix.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 2 & 1 & 2 \end{bmatrix}$$
If an $n \times n$ matrix $A$ has $n$ distinct eigenvalues,

If all roots of the characteristic polynomial of $A$ are not all distinct,

**Example 2.** Determine if the matrix $A$ is diagonalizable, where

$$
A = \begin{bmatrix}
0 & 0 & 1 \\
0 & 1 & 2 \\
0 & 0 & 1
\end{bmatrix}
$$
Example 3. Determine if the matrix $A$ is diagonalizable, where

$$A = \begin{bmatrix}
0 & 0 & 0 \\
0 & 1 & 0 \\
1 & 0 & 1
\end{bmatrix}$$