

## Homework # 10

### Case-II: Repeated Eigenvalues but Not Diagonalizable

1. Find eigenvalues and eigenvectors of the matrix  $A$ , where

$$A = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 2 & -5 & 4 \end{pmatrix}$$

Also write the algebraic and geometric multiplicity of each eigenvalue. Discuss whether  $A$  is diagonalizable or not.

### Case-III: Repeated Eigenvalues but Diagonalizable

2. Find eigenvalues and eigenvectors of the matrix  $A$ , where

$$A = \begin{pmatrix} -1 & 0 & 1 \\ 3 & 0 & -3 \\ 1 & 0 & -1 \end{pmatrix}$$

Also

- (a) write the algebraic and geometric multiplicity of each eigenvalue. Discuss whether  $A$  is diagonalizable or not.

- (b) Compute  $A^{10} \begin{pmatrix} 5 \\ 1 \\ 2 \end{pmatrix}$

- (c) Diagonalize the matrix  $A$

- (d) Compute  $A^{10}$

**Note:** Use the hints given in HW # 9 for parts (a)-(d)