

## Classification of Matrices:-

### Hermitian Property:-

A square matrix  $A$  is said to be hermitian if

$$a_{ij} = \overline{a_{ji}}$$

Every symmetric matrix is hermitian.

Ex:-

$$A = \begin{pmatrix} 1 & 1-i \\ 1+i & 2 \end{pmatrix}$$

$$a_{12} = 1-i = \overline{(1+i)} = \overline{a_{21}}$$

### Skew-hermitian matrix:-

$$a_{ij} = -\overline{a_{ji}}$$

### Diagonal matrix:-

$$A = \begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}, \quad a, b, c \in \mathbb{R}$$

### Scalar matrix:-

$$A = \begin{bmatrix} k & 0 & 0 \\ 0 & k & 0 \\ 0 & 0 & k \end{bmatrix}, \quad k \in \mathbb{R}$$