M.Sc Sem I

3rd Paper Linear Algebra.

Hermitian matrix

conjugate of $z(x+iy) = \bar{z}(x-iy)$

conjugate of $-2-3i = -2+3i$

conjugate of $x-iy$ (ie. $\bar{z}$) $= z$.

$\therefore z\bar{z} = x^2+y^2$

* Conjugate of a matrix

Let A be a matrix. If we replace its elements by the corresponding conjugate complex then the resultant matrix is called conjugate of A. denoted by $\bar{A}$.

<u>Definition</u> Let $A = [a_{ij}]$ be a square matrix then A is called Hermitian if the (i,j)th element of A is equal to the conjugate complex of (j,i)th element of A.

i.e. $a_{ij} = \overline{a}_{ji}$ $\forall i$ and $\forall j$

<u>Example</u> $\begin{bmatrix} 3 & 5+6i \\ 5-6i & 4 \end{bmatrix}$ is a Hermitian matrix.