Hermitian matrix

Real matrix	Complex matrix
a	$a+bi$
$A = A^T \quad \lambda \quad is\ real$	$\overline{A} = A^T\,(Hermitian) \quad \lambda \quad is\ real$
$\lvert \underset{\sim}{x} \rvert^2 = \underset{\sim}{x} \cdot \underset{\sim}{x} = x^T \cdot x$	$\lvert \underset{\sim}{x} \rvert^2 = \underset{\sim}{x} \cdot \underset{\sim}{x} = \overline{x}^T \cdot x$
$(\underset{\sim}{x} \cdot \underset{\sim}{y}) = x^T \cdot y$	$(\underset{\sim}{x} \cdot \underset{\sim}{y}) = \overline{x}^T \cdot y$
$A^T \cdot A = I(orthogonal,$正交矩陣$)$	$\overline{A}^T \cdot A = I(unitary,$酉矩陣$)$
$(A\underset{\sim}{x}) \cdot \underset{\sim}{y} = \underset{\sim}{x} \cdot (A^T\ \underset{\sim}{y})$	$(A\underset{\sim}{x}) \cdot \underset{\sim}{y} = \underset{\sim}{x} \cdot (\overline{A}^T\ \underset{\sim}{y})$
$A = -A^T\ (anti,skew)$ $\lambda = 0 \quad \begin{bmatrix} 0 & \alpha & \beta \\ -\alpha & 0 & \gamma \\ -\beta & -\gamma & 0 \end{bmatrix}$	$-A = \overline{A}^T\ (skew\text{-}Heritian)$ $\begin{bmatrix} ai & d+ei & f+gi \\ -d+ei & bi & h+ji \\ -f+gi & -h+ji & ci \end{bmatrix}$
$\det A = \pm 1$, $A \quad is\ orthogonal$ $\lambda_A = \pm 1$, $A\ is\ orthogonal$	$\det U = \pm 1$, $U\ is\ unitary$ $\lvert \lambda_A \rvert = 1$, $U\ is\ unitary$

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