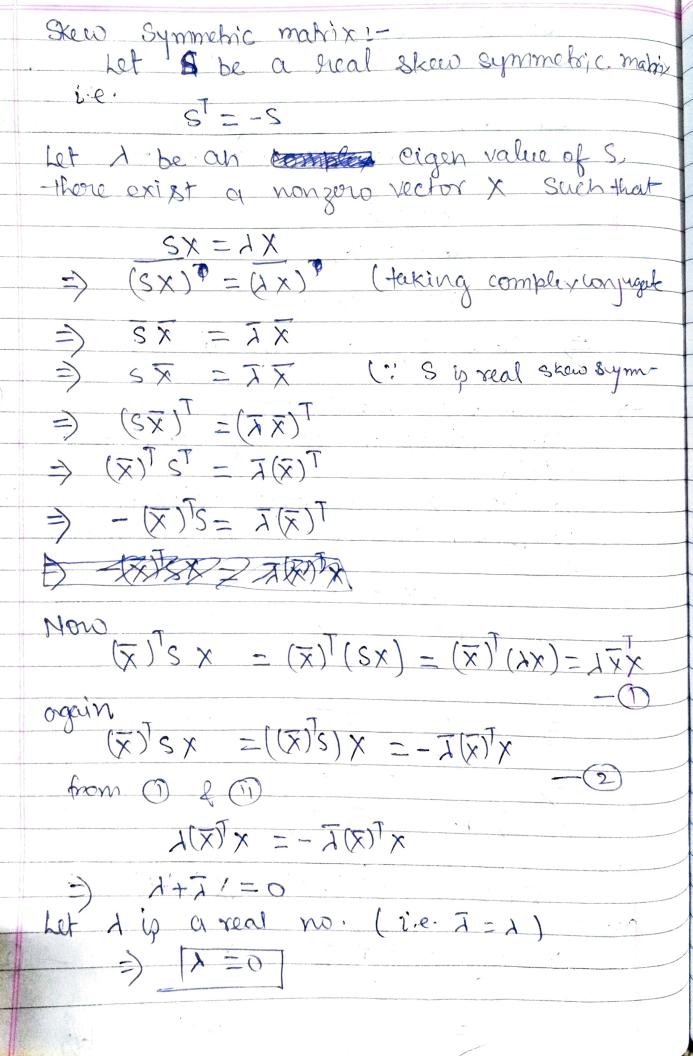
Orthogonal matex:-97 A is real orthogonal mateix then A.A = I A.A = [I] =1 1A1.1A1 = 1 \$ = 1A1 =) 1A12 = 1 =) IA = ±1 Unitary Matrix 1- A matrix is Said to be unitary if $A^DA = AA^D = I$, where $A^D = transpose of complex conjugate of A.$ > 9f & is eigen value of A, there exist a nonzero vector X such that Ax = xA $\Rightarrow (Ax)^{\theta} = (Ax)^{\theta}$ \Rightarrow $X^{\theta}A^{\theta} = \overline{X}X^{\theta}$ X K = XABX E $x^{\theta \chi} \kappa \kappa = x^{\theta \chi}$ (= = xxx (xx-1) (= $\Rightarrow 141 = 1 \qquad (: 37 = 12)$ =) eigen value of unitary matrias are

It is eigen value of a matrix A then at will be the eigen value of an -B Let 2 is eigen value of A there exist a mon-zero vector x such that AX = XX => AAX = (0H)X =) BX = (01) X => at is meigen value of aA=B. Symmetric matrix: Eigen values of Iteal Symmetric matrices are consider & is an eigen value of A which is complex, there exist a nonzero vector & such $AX = \lambda X$ $\Rightarrow \overline{AX} = \overline{\lambda} \overline{X}$ $\Rightarrow \overline{AX} = \overline{\lambda} \overline{X}$ (taking conjugate 3": A is real symmetric. \Rightarrow $A\overline{X} = \overline{A}\overline{X}$ $(AX)^{T} = XX^{T}$ \Rightarrow $\overline{X}^T A = \overline{\lambda} (\overline{X})^T$ \Rightarrow \Rightarrow $\overline{A}^T = A$, as symmetric. Mow $\overline{X}^T A X = (\overline{X})^T (AX) = (\overline{X}^T)(\lambda X) = \lambda(\overline{X}^T X) - 0$ $=(\overline{X}A)X=\overline{X}\overline{X}X - 3$ 1= 7 > 1's a real number.



9f 1 ip complex i.e. 1=a+ib =) = a-ib O= K+K :) 9+ib+ 9-ib = 0 29 =0 i.e. A = Otib = ib => etgen valuer of real symmetric matrices it Involutary Matrix: - A matrix p said to be involutary of A=I Let I be eigen value of A, i.e. there exist x a non zero vector, such that 1 $AX = \lambda X$ $(xk)A - (xA)A \leftarrow$ $\Rightarrow A^2 X = \lambda(AX)$ $(\chi \kappa) \kappa = \chi I \qquad (=$ x = x = x $0 = \chi(1-\chi)$ (= 1 = t =) eigen values of involutory matrices are either