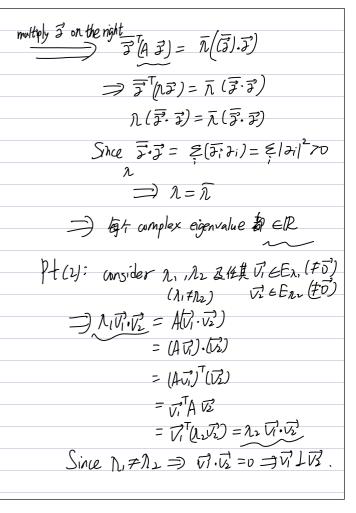


Claim @ pte): if A ER is symmetric,
then A is orthogonally diagble
whonever it is ding hile
acime pt.(3): if AER is symmetric,
then A is diagble
Let A be symmetric,
pt(1); by Fund Thrn of Alegbra,
スァ(x)=o有nケ complex nots, を変重
E SE
let λ be any complex eigenvalue of T
$PUAFEC^h, AF=\lambda F$
\sim
→ F & The Z-eigenvector
一
_
コ ヹ [゙] ゚゚゙゙゙゙゙゙゙゙゙゙゙゙゙゙゙゚゚゙゚゙゚゚゚゚゚゙゚゚゙゚゚゚゙゚゚
A symmetric _TT
A symmetric $\vec{z}^T A = \vec{n} \vec{z}^T$



hl.	
Pt(3): Phone by Induction	$\Rightarrow QAQ = [T]_{v}$
Phone by Induction	注意: $\mathcal{O}(Q^TAQ)^T = Q^TA^TQ = Q^TAQ$
Base case: IXI matrix that diagonal A Symmetric bb	ME -O(C) - UN C - CNO
	图而 QTAQ是 symmetric 的
Inductive step: if the symmetric Rhxn matrix	
TO A northogonally diagable by,	新生: QTAQE, = QTAT)
(ht) ×(ht) for the	$= Q^{T} \lambda \vec{u}$
都是 orthogonally diagable bo, 和b 每个 (p(nH) *(nH) mothing 也是	= 2 Seout
If - EA & (MUX(HI) & symmetric bs	$= \chi S_{\varepsilon \to U} \vec{x}$ $= \chi \vec{e_1} = \begin{bmatrix} \lambda \\ 0 \\ \dot{b} \end{bmatrix}$
含入为A的代表 eigenvalue.	ER QTAQ = $\begin{bmatrix} \lambda & \overline{0}^{\dagger} \end{bmatrix}$ for some $B \in \mathbb{R}^{h \times h}$ By inductive hypothesis, B orthogonally diagble
でお其一个 unit eigenvector	A. B. B. Symmetric bb.
= (u, u,, un)	by inductive hypothesis, B orthogonally diagble
るRati 65-1 orthonormal bowis.	QZ D- DDDT for some officence R
	BR B= RDRT for some orthogonal R the diagonal D
RUTE Q= [u ui un], at orthogonal	
$(Q^7 = Q^{\frac{1}{2}})$	$\Rightarrow Q^{T}AQ = \begin{bmatrix} \lambda & \overrightarrow{v} \\ \overrightarrow{v} & B \end{bmatrix} = \begin{bmatrix} \lambda & \overrightarrow{v} \\ \overrightarrow{v} & RDR^{T} \end{bmatrix}$
注意, Q为 S _{U→E} , B而Q =Q = S _{E→V} .	$= \begin{bmatrix} 1 & P \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & D \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & R^{\dagger} \end{bmatrix}$

Ι. (λ β) , ,
note: [2 D] diagonal,
(D 1
[o R] orthogonal
Lo K 3 -1 227
$(\beta \hat{n}) \left[\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} \right] = \left[\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} \right]^{T}$
$= \begin{bmatrix} 1 & 0 \\ 0 & 12 \end{bmatrix}^{-1}$
Detil of A Bo orthogonal oliagonalization,
Nia conalization
musjon no 1
<u> </u>