D 9-4-18

Find the eigenvalues of eigenvectors of

$$A = \begin{bmatrix} -2 & -6 \\ 2 & 5 \end{bmatrix}$$

eigenvectors 9

$$\lambda = 1 \qquad e_1 = \begin{bmatrix} -2 \\ 1 \end{bmatrix} \quad on \quad \begin{bmatrix} -4 \\ -1 \end{bmatrix} \quad on \quad \begin{bmatrix} -4 \\ 2 \end{bmatrix} \quad on \quad \begin{bmatrix} 6 \\ -3 \end{bmatrix}$$

$$\lambda = 2$$
 $C_2 = \begin{bmatrix} -32 \\ 1 \end{bmatrix}$ on $\begin{bmatrix} -3 \\ 2 \end{bmatrix}$ on $\begin{bmatrix} 3 \\ -2 \end{bmatrix}$ on $\begin{bmatrix} 3 \\ -2 \end{bmatrix}$

$$A \begin{bmatrix} -3 \\ 2 \end{bmatrix} = 2 \begin{bmatrix} -3 \\ 2 \end{bmatrix} \qquad \boxed{1}$$

$$A \begin{bmatrix} 2 \\ -1 \end{bmatrix} = 1 \begin{bmatrix} 2 \\ -1 \end{bmatrix}. \qquad \boxed{2}$$

$$A \begin{bmatrix} -3 & 2 \\ 2 & -1 \end{bmatrix} = \begin{bmatrix} -3 & 2 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$$

(2)

> 5'AS = D.

If s is selected as a matrix whose columns are eigenvectors of A then S'AS is a diagonal matrix D whose entries are eigenvalus.

& Calculate A³

y= A3

 $= A \cdot A \cdot A$

 \Rightarrow $\vec{3}$ y $\vec{5}$ = $\vec{5}$ \vec{A} $\vec{5}$ \vec{A} $\vec{5}$ \vec{A} $\vec{5}$ \vec{A} $\vec{5}$

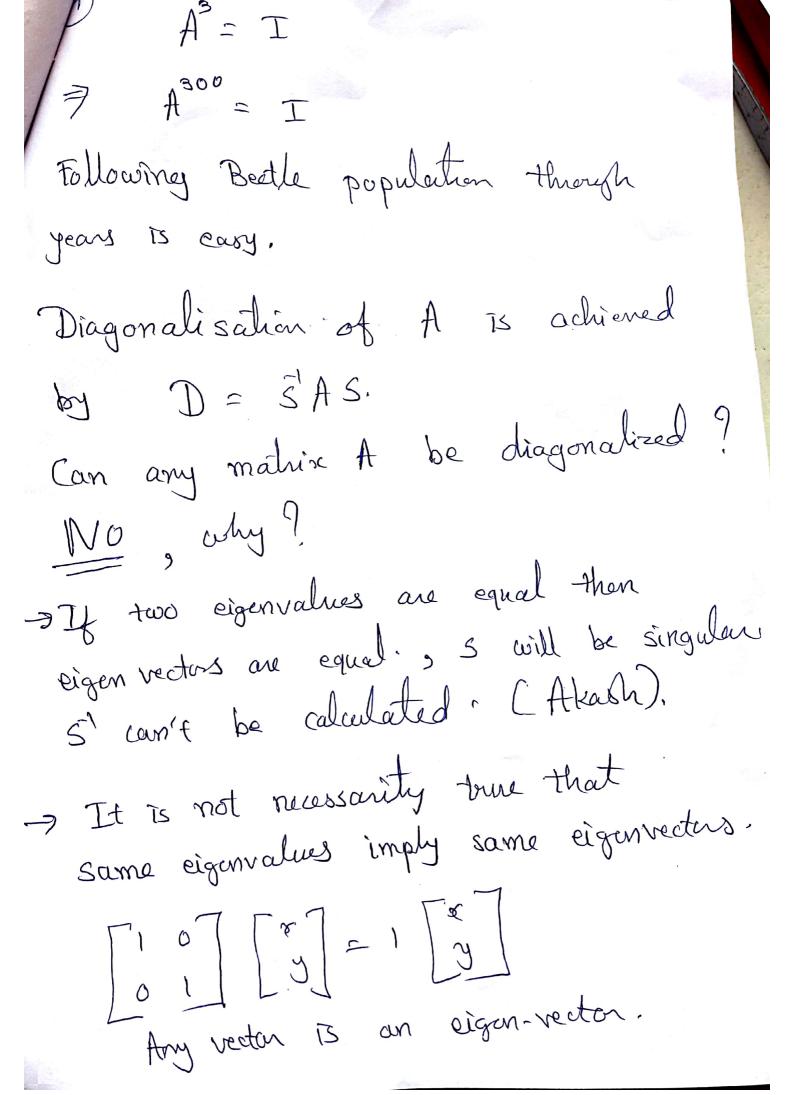
 $= (\vec{s}'As)(\vec{s}'As)(\vec{s}'AS).$

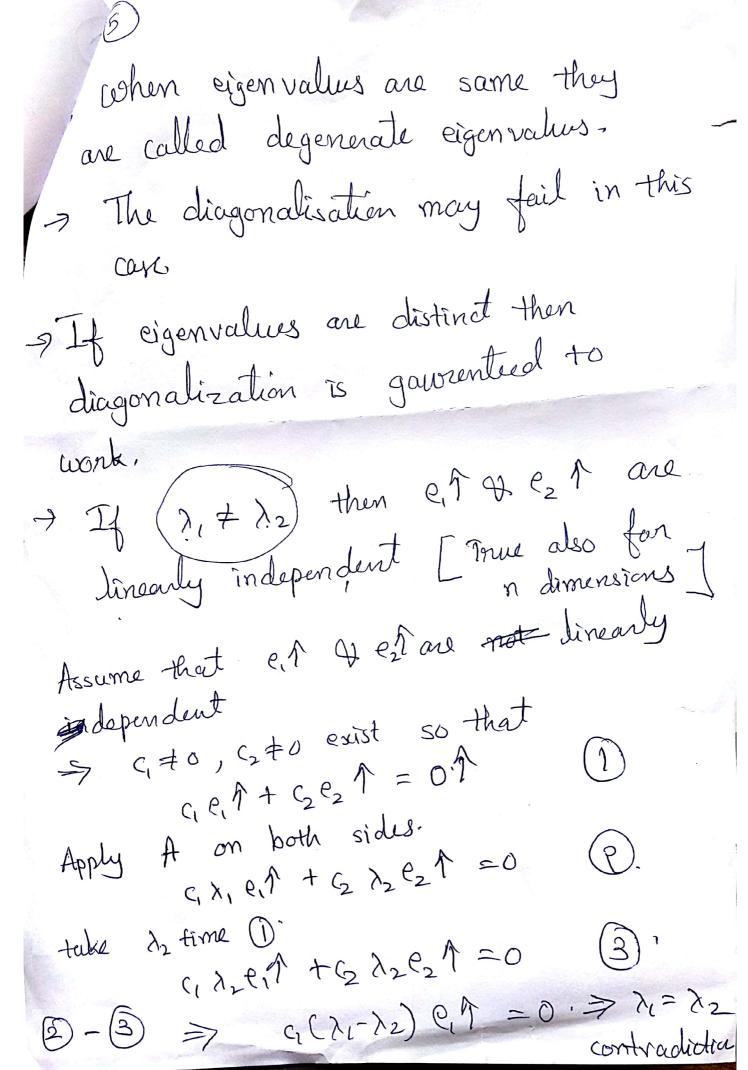
 $5'ys = D^3$

 $\Rightarrow y = 50^3 5^1$

- very easy to

(3)
A kind of beetle lives 3 years.
After the first year. the survival
probability is }
@ After Second year the survival
probability is &
(3) At the end of thind year each beetle
gives birth to 6 babys.
To start with (at year 0)
4.10): Beetles, new borns.
and your old.
9,20): " two year olds.
At year 1
Y, (1): Beetles are new barns
42(1): " one year old.
y3(1): 11 two " "
[4,(1)] = [0 0 6] [4,(0)]
$y_{s(1)} = \frac{1}{2} \frac{1}{3} \frac{1}{0} $ $y_{s(0)} = \frac{1}{3} \frac{1}{0} \frac{1}{3} \frac{1}{0} \frac{1}{0} \frac{1}{3} \frac{1}{0} 1$
Find the matrix.





starting with $\lambda_1 \neq \lambda_2$ we arrived at $\lambda_1 = \lambda_2$ because the assumption that

et 4 et are linearly dependent

is wrong.

Pet 4 et have to be linearly

independent