

Swetha D S

Department of Science and Humanities



CLASS-7

PROBLEMS ON EIGEN VALUES AND EIGEN VECTORS AND CAYLEY-HAMILTON THEOREM

Problem;



modrix
$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

Ard Characteristic (2n is
$$[A-\Sigma]=0$$

$$\begin{vmatrix} 6-\gamma & -2 & 2 \\ -2 & 3-\gamma & -1 \\ 2 & -1 & 3-\gamma \end{vmatrix} = 0 \Rightarrow \lambda^3 - (2\gamma^2 + 36\gamma^2 - 32) = 0$$

$$\begin{vmatrix} 3-\gamma & -2 & 2 \\ -2 & 3-\gamma & -1 \\ 2 & -1 & 3-\gamma \end{vmatrix} = 0 \Rightarrow \lambda^3 - (2\gamma^2 + 36\gamma^2 - 32) = 0$$

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$$\begin{vmatrix} 3-\gamma & -2 & 2 \\ 2 & -1 & 3-\gamma \end{vmatrix}$$

$$8 \overline{\smash{\big)}\ 1 - 12 \ 36 - 32} = 32 = 32 = 32 = 32$$

$$7 - 47 + 4 = 0$$

$$7 - 32 = 32$$

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Consider
$$1A-72/x=0$$

$$-2x+(3-7)y-2=0$$

$$-2x+(3-7)y-2=0$$

$$-2x-2y+2z=0$$
Then $x=8$, $-2x-2y+2z=0$ on solving $x=0$.

$$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 0$$

$$\frac{1}{2} + \frac{1}{2} = 0$$

Litur K, & Ky au arbitrary. & can take and value





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

Aro: The Characteristic Requestion 10 14-251=0

... 7,=0, 72=i, 73=-i are the required eigen Values.

$$-x + 4 + (-1 - y) = 0$$

$$-x + 4 + (-1 - y) = 0$$

$$x - y + 0$$

$$(1 - y) x - 4 + 5 = 0$$



Case 1:- When
$$\lambda = 0$$
 $\lambda = 0$
 $\lambda = 0$



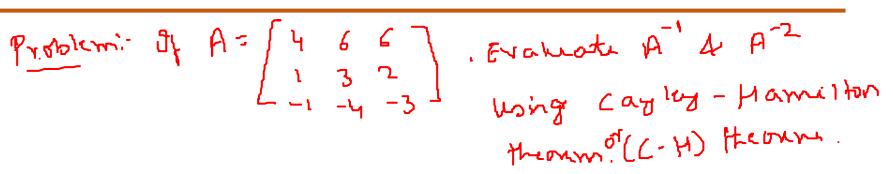
Case 3: When
$$y = -i$$
,

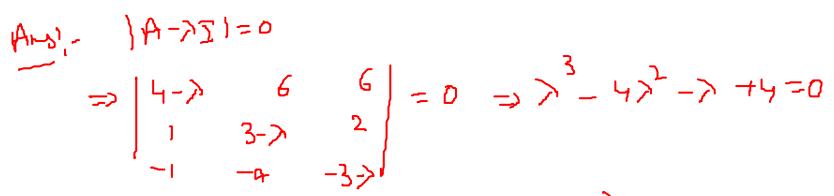
 $(1+2)x - y + 2 = 0$
 $x + iy + 02 = 0$
 $-x + y + (-1+i)2 = 0$

Tight vectors corresponding to $y = 0, i, -i$ is

 $x = [x_1 \ x_2 \ x_3] = [0 \ i \ -i]$
 $x = [x_1 \ x_2 \ x_3] = [0 \ i \ -i]$

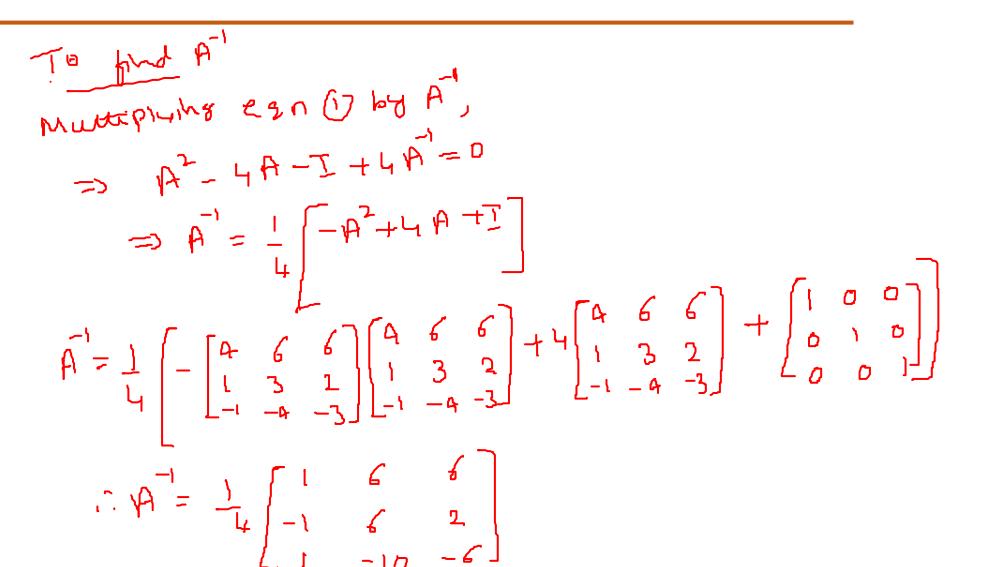






According to C-H theorem (7 -> A) $A^{3} - 4A^{2} - A + 4J = 0 - 3 (7)$ NOW to find A X AT







$$A^{-2} = \frac{1}{16} \begin{cases} -8 & -18 \\ -8 & 10 \end{cases}$$





THANK YOU

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