

SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai Accredited by NAAC-UGC with 'A++' Grade (Cycle III) & Accredited by NBA (B.E - CSE, EEE, ECE, Mech & B.Tech.IT) COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF MATHEMATICS

UNIT I MATRIX EIGEN VALUE PROBLEMS

Characteristic Equations :

Let A be a given matrix.

Let) be a Scalar.

The equation $|A - \lambda I| = 0$ is called the Characteristic equation of the matrix A.

Note:

★ For any Square matrix A, the Sum of the eigen Values of a matrix is equal to trace of the matrix.

* For a 2x2 matrix, the characteristic equation is,

$$\lambda^a - c, \lambda + c_2 = 0$$

where C, = Sum of the main diagonal elements

$$C_2 = |A|$$

 \star For a 3x3 matrix, the characteristic equation is,

$$\lambda^3 - c_1 \lambda^2 + c_2 \lambda - c_3 = 0$$

where $C_1 = Sum$ of the main diagonal elements

C₂ = Sum of the minors of the main diagonal elements

$$C_3 = |A|$$

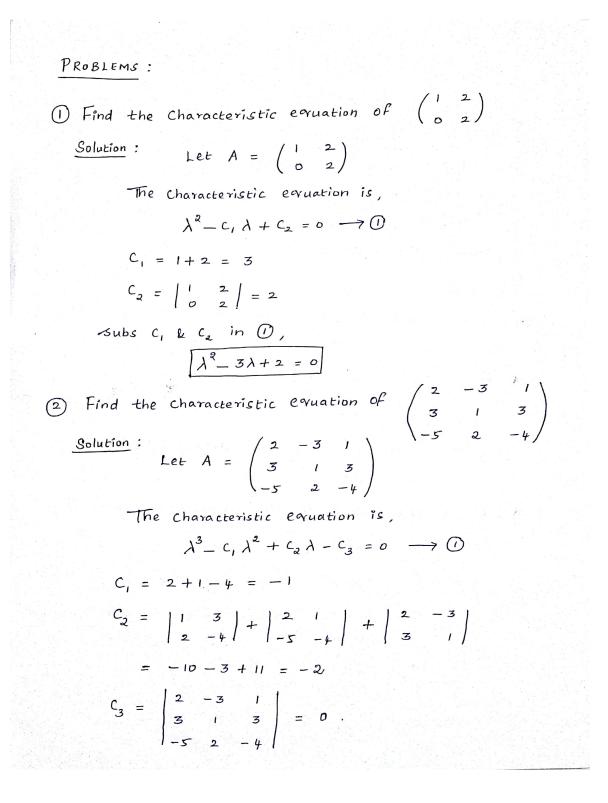


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DEPARTMENT OF MATHEMATICS

Subs
$$C_1, C_2 \& C_3$$
 in \bigcirc
 $\lambda^3 + \lambda^2 - 2\lambda = 0$

Problems :

Find the Characteristic polynomial of

(i) $\begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$ $\leq 0 \ln : \lambda^{2} - 4\lambda - 5$ (2) $\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ $\leq 0 \ln : \lambda^{3} - 5\lambda + 7$ (3) $\begin{pmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{pmatrix}$ $\leq 0 \ln : \lambda^{3} - 18\lambda^{2} + 45\lambda = 0$ (4) $\begin{pmatrix} 11 & -4 & -7 \\ 7 & -2 & -5 \\ 10 & -4 & -6 \end{pmatrix}$ $\leq 0 \ln : \lambda^{3} - 3\lambda^{4} + 8\lambda = 0$ (5) $\begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$ $\leq 0 \ln : \lambda^{3} - 7\lambda^{4} + 3b = 0$