LINEAR ALGEBRA AND ITS APPLICATIONS

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CLASS-6

PROPERTIES OF EIGEN VALUES AND EIGEN VECTORS AND CAYLEY-HAMILTON THEOREM

PROPERTIES OF EIGEN VALUES AND EIGEN VECTORS:

- If λ is an Eigen value of A with x as the corresponding Eigen vector then λ^2 is an Eigen value of A^2 with the same Eigen vector x.

- For a given Eigen vector x, there corresponds only one Eigen value λ.

- For a given Eigen value there corresponds infinitely many Eigen vectors.

- $\lambda = 0$ is an Eigen value of A , if and only if A is singular i.e det(A)=0.

- If λ is an Eigen value of A with x as the Eigen vector then $1/\lambda$ is an Eigen value of A^{-1} provided A^{-1} exists.

- A and its transpose A^T have the same Eigen values.

- The Eigen values of a diagonal matrix are just the diagonal elements of the matrix.

- The Eigen values of an idempotent matrix are either zero or unity.

- The sum of the Eigen values of a matrix is the sum of the elements of the principal diagonal.

- The product of the Eigen values of a matrix A is equal to its determinant.

CAYLEY-HAMILTON THEOREM:

"Every square matrix satisfies its own characteristic equation"

THANK YOU

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