

Lecture-25

→ Symmetric matrices

Eigenvalues / Eigenvectors

→ Start: Positive Definite Matrices

Symmetric Matrices $\Rightarrow A = A^T$

→ Eigen Values → Real

↳ Eigen Vectors \rightarrow Orthogonal
(Can be chosen)

$$A = S \Lambda S^{-1} \quad (\text{q.m. general})$$

$$A = Q \Lambda Q^{-1} = Q \Lambda Q^T \quad \left\{ \begin{array}{l} \text{Symmetric} \\ \text{Matrix} \end{array} \right\}$$

\Rightarrow Every Symmetric matrix is a combination of Projection matrix.

Signs of pivots (for symmetric matrix) are same as sign of eigen value.

\rightarrow Product of pivot = Product of eigen Value
(for Symmetric matrix)

Positive definite ^{Symmetric} metrics

→ all eigen values are real & positive.

→ all pivots are positive.

→ Determinant are positive.

All Sub-