LINEAR ALGEBRA:

EIGENDECOMPOSITION:

SYMMETRIC MATRIX, $A \in \mathbb{R}^{n \times n}$

$$A = Q \Delta Q^T$$

Q: ORTHOGONAL MATRIX

(COLUMNS: EIGENVECTORS)

Δ: DIAGONAL MATRIX

(EIGENVALUES)

$$Q Q^T = Q^T Q = I$$

$$\det(A - \lambda I) = 0$$

$$A v_i = \lambda_i v_i$$

SINGULAR VALUE DECOMPOSITION:

$A \in \mathbb{R}^{m \times n}$ Rank, r (Number of linearly independent columns)

$$A = U \Sigma V^T$$

$U, V = $ ORTHOGONAL

$$\Sigma = \begin{bmatrix} S & 0 \\ 0 & 0 \end{bmatrix}$$

DIAGONAL