REPETITION 16/11

<u>A symmetric</u> $\iff$ $A = A^T$

Diagonalization of A : $A = PDP^{-1}$

- $D = \begin{pmatrix} \lambda_1 & & \\ & \ddots & \\ & & \lambda_n \end{pmatrix}$; λ_i eigenvalues of A (real)

- $P = [\vec{\omega}_1 \cdots \vec{\omega}_n]$; $\vec{\omega}_j$ orthonormal eigenvectors

$$\Rightarrow \boxed{P^{-1} = P^T}$$

Quadratic forms

$$Q(\vec{x}) = \vec{x}^T A \vec{x}$$ A symmetric

<u>Example</u> $Q(\vec{y}) = (x_1 \; x_2) \begin{pmatrix} a & b \\ b & c \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$

$$= a x_1^2 + c x_2^2 + 2b x_1 x_2$$

<u>Change of variable</u> $\vec{x} = P\vec{y}$ $A = PDP^{-1}$

$\Rightarrow$ $Q(\vec{x}) = \vec{x}^T A \vec{x} = \vec{y}^T D \vec{y}$ $\leftarrow$ no cross-product terms