LECTURE 6

OPTIMIZATION THEORY
LAGRANGIANS
DUALITY

HOW APPLIED TO SUPPORTVECTOR MACHINES

MORE ON KERNELS

NO CONSTRAINTS :

GIVEN A FUNCTION f DEFINED ON A DOMAIN $\Omega \subseteq \mathbb{R}^n$.

MINIMIZE $\quad f(w) \quad w \in \Omega$

NECESSARY CONDITION FOR MINIMUM

$$\underset{n \times 1}{\frac{\partial f(w)}{\partial w}} = 0$$

SUFFICIENT CONDITION FOR MINIMUM

$$\frac{\partial f(w)}{\partial w} = 0 \quad \text{AND} \quad \underset{n \times n}{\frac{\partial^2 f(w)}{(\partial w)^2}} \text{ POSITIVE SEMI-DEFINITE}$$

STRICT MIN. IF POSITIVE DEFINITE

$\underset{n \times n}{A}$ SYMMERIC POS. DEFINITE IF

1 - SYMMETRIC
2 - $\forall$ UNIT VECS $\bar{u}$ $\quad \bar{u}^T A u \geq 0$

or $\quad$ 2' - All EIGENVALS ≥ 0