⑥

$$b = \frac{1}{N_M} \sum_{n \in M} \left(t_n - \sum_{m \in S} a_m t_m k(\underline{x}_n, \underline{x}_m) \right)$$

$\mathcal{M}$ SET OF POINTS OF $0 < a_n < C$

PROBLEM: EFFECTIVE SOLUTION METHODS

$K > 2$ MULTI CLASS SVM-S

- K SEPARATE SVM $y_k(\underline{x})$ C_k $(+)$ OTHER $(K-1)$ C_ℓ $(-)$

  $y(\underline{x}) = \max_k y_k(\underline{x})$ ONE-VS-THE REST

  $\hookrightarrow$ MANY PROBLEMS

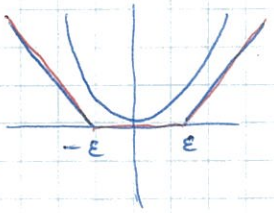
- $K(K-1)/2$ DIFFERENT 2-CLASS SVM - ONE-VS-ONE

  + SOME KIND OF VOTING

- SINGLE-CLASS SVM - BOUNDARY OF THE PERCENTILE OF CLASS DISTRIBUTION

SVM FOR REGRESSION (CH. 7.1.4)

$$\frac{1}{2} \sum_{n=1}^{N} \{y_n - t_n\}^2 + \frac{\lambda}{2} \|\underline{w}\|^2 \longrightarrow C \sum_{n=1}^{N} E_\varepsilon (y(\underline{x}_n) - t_n) + \frac{1}{2} \|\underline{w}\|^2$$



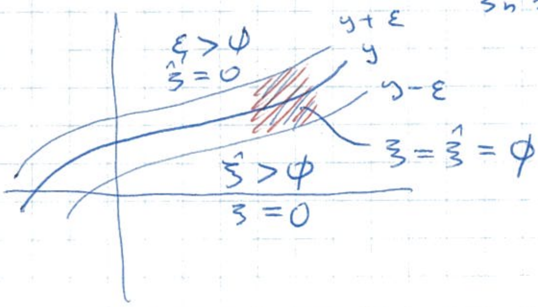
$$E_\varepsilon (y(\underline{x}) - t) = \begin{cases} 0 & \text{IF } |y - t| < \varepsilon \\ |y(\underline{x}) - t| - \varepsilon \end{cases}$$

ε-INSENSITIVE ERROR FUNCTION

SLACK VARIABLES: $\xi_n \geq 0$ $t_n > y(\underline{x}_n) + \varepsilon$

$\hat{\xi}_n \geq 0$ $t_n < y(\underline{x}_n) - \varepsilon$

ε-TUBE



$$\begin{cases} t_n \leq y(\underline{x}_n) + \varepsilon + \xi_n \\ t_n \geq y(\underline{x}_n) - \varepsilon - \hat{\xi}_n \end{cases}$$