

$$\left. \begin{aligned}
 w^*, b^* = \underset{w, b}{\operatorname{argmin}} \quad J(w, b) &= \frac{1}{2} \|w\|^2 + C \sum_{n=1}^N (\xi_n + \hat{\xi}_n) \\
 \text{subj. to } \left\{ \begin{aligned}
 t_n &\geq w^T x_n + b - \varepsilon - \xi_n \\
 t_n &\leq w^T x_n + b + \varepsilon + \hat{\xi}_n
 \end{aligned} \right. & \forall n=1 \dots N \\
 & \xi_n, \hat{\xi}_n \geq 0
 \end{aligned} \right\} \begin{array}{l} \text{Primal} \\ \text{SVP} \end{array}
 \end{aligned}$$

$$\left| \underbrace{(w^T x_n + b)}_{\geq 0} - \underbrace{t_n}_{\geq 0} \right| \leq \varepsilon + \sum \xi_n \quad \text{// within } \varepsilon\text{-insensitive tube, allowing to be outside as well w/ slack } \xi$$

$$-\varepsilon - \xi_n \leq w^T x_n + b - t_n \leq \varepsilon + \xi_n$$

