

$\lambda \in \Lambda_{\text{support vector machines}}?$
 $?$
 $?$

$$\begin{array}{ll} \min_{x \in X, y \in k} & F(x, y) \quad upperlevel \\ s.t. & G(x, y) \leq 0 \quad lowerlevel \\ & y \in y \in Y \quad f(x, y) \\ s.t. & g(x, y) \leq 0 \end{array}$$

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$$\begin{array}{l} F \\ f \\ n \times k \\ G \\ n \times k \\ L \\ l \\ \text{upper} \\ \text{outer} \\ \text{level} \\ \text{lower} \\ \text{user} \\ \text{level} \\ \text{solution} \\ \text{map} \\ S(x) = \\ \{y \in k \mid \\ ? \\ ? \\ ? \\ ? \\ x, y \\ \lambda, C \\ ? \\ ? \\ \tilde{X} \subset^n \\ \text{feature} \\ \text{input} \\ \text{space} \\ \text{output} \\ \text{domain} \\ Y = \\ \{-1, 1\} \\ \text{data} \\ \text{points} \\ \text{labels} \\ \text{examples} \\ \text{response} \\ \text{target} \\ \text{function} \\ f(x) \\ \text{training} \\ \text{data} \\ (X, Y) \\ P(x, y) \\ ? \\ ? \\ ? \\ ? \\ \text{risk} \\ \text{min-} \\ \text{imization} \\ \text{risk} \\ \text{functional} \end{array}$$

$$B(\lambda) = \int \mathcal{L}(y, f_{\lambda}(x)) dP(x, y)$$