$\lambda \in$
Λ
support vector machines
?
?
?

$$\min_{x \in X, y} F(x, y) \qquad upperlevel$$
$$s.t.\ G(x, y) \leq 0 \qquad .lowerlevel$$
$$y \in_{y \in Y} \quad f(x, y)$$
$$s.t.\ g(x, y) \leq 0$$

(1)

upper outer level
lower inner level
?
solution map
$S(x) =$
$\{y \in^k$
$|y$
$\}$
?
?
?
?
?
?
$\tilde{X} \subset^n$
feature input space
output domain
$Y =$
$\{-1, 1\}$
data points
labels
examples
response target
function
$f(x)$
training data
(X, Y)
$P(x, y)$
x
y
?
?
?
risk minimization
risk functional

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

(2)

$\mathcal{L} :^2 \rightarrow$
$f_\lambda :^n$
$\cap_\mathcal{F} \rightarrow$
$, \lambda \in$
Λ
$P(x, y)$
$f_{\bar{\lambda}}(x)$
$\mathcal{F}$