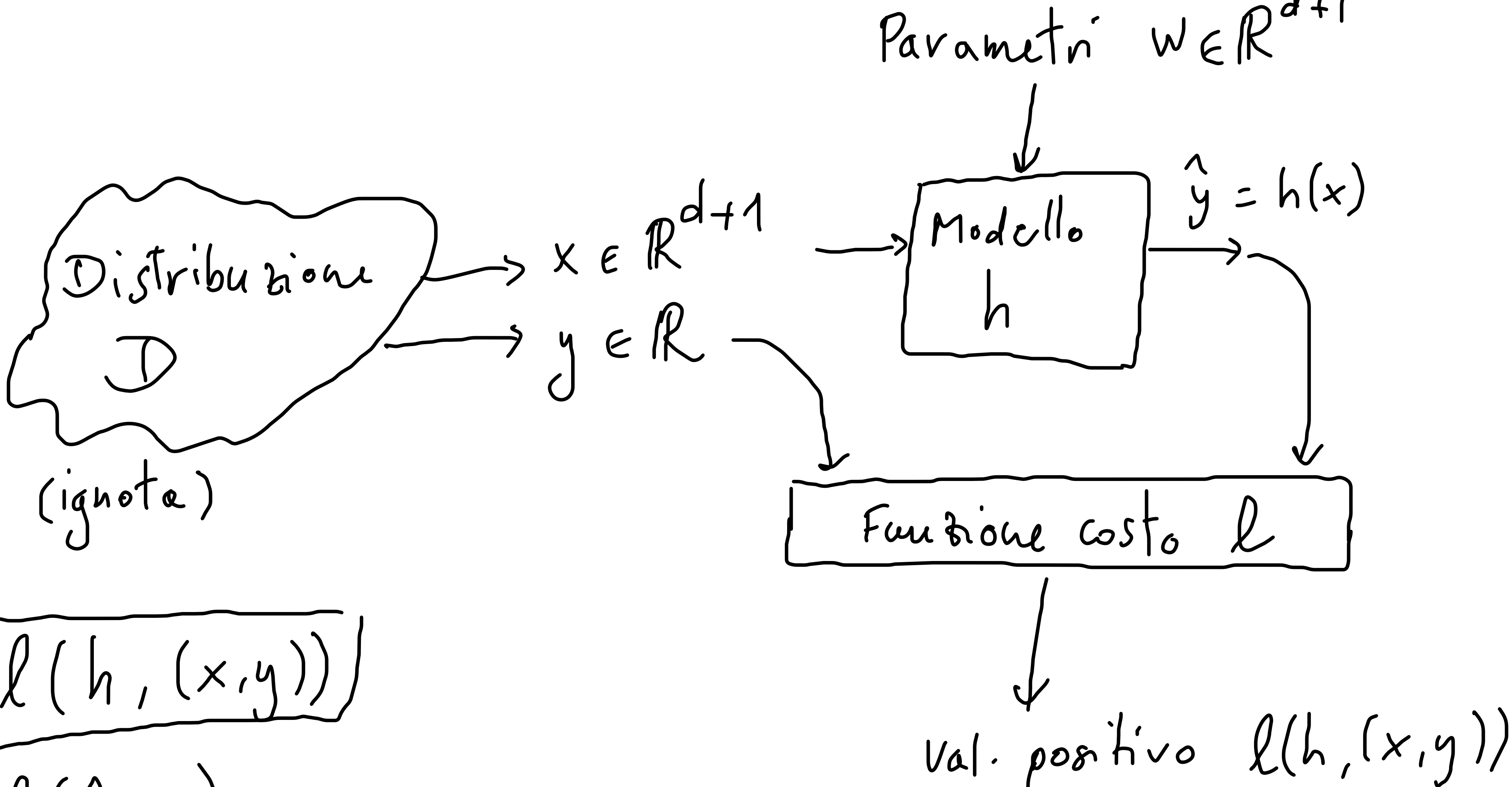


$$\boxed{\ell(h,(x,y))}$$

$$\ell(\hat{y},y)$$

$$h(x) = w_0 x_0 + w_1 x_1 + \dots + w_d x_d = w^T x$$

Rischio atteso : $\mathbb{E}[\ell(h,(x,y))]$

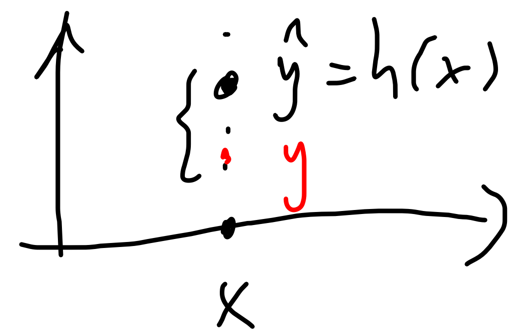
→ Rischio empirico

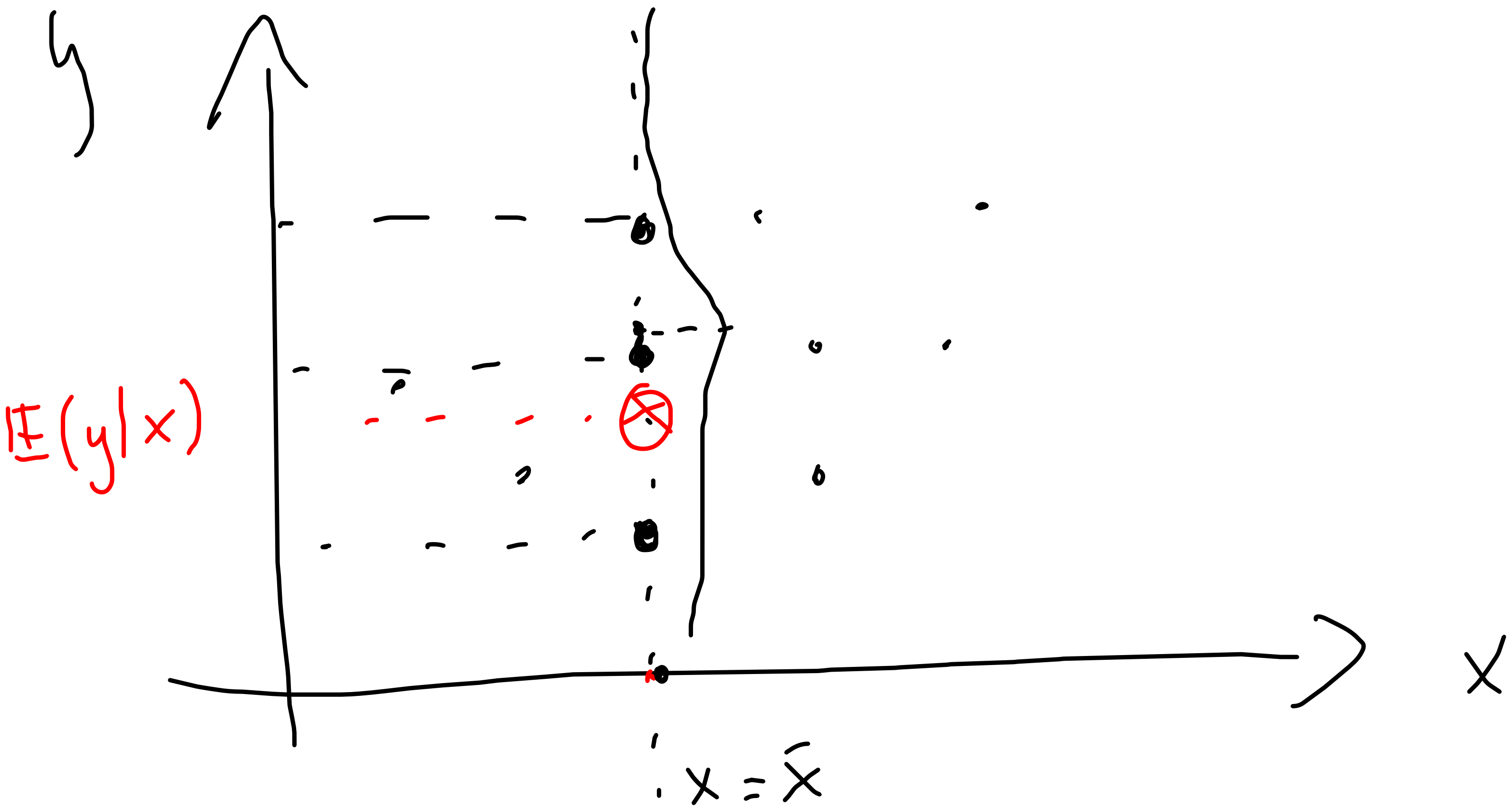
$$L_S(h) = \frac{1}{m}\sum_{i=1}^{m} \ell\left(h,\left(x^{(i)},y^{(i)}\right)\right)$$

$$S = \left\{\left(x^{(1)},y^{(1)}\right), \dots, \left(x^{(m)},y^{(m)}\right)\right\}$$

Regr. lineare

→ $$\ell(h,(x,y)) = (h(x)-y)^2$$



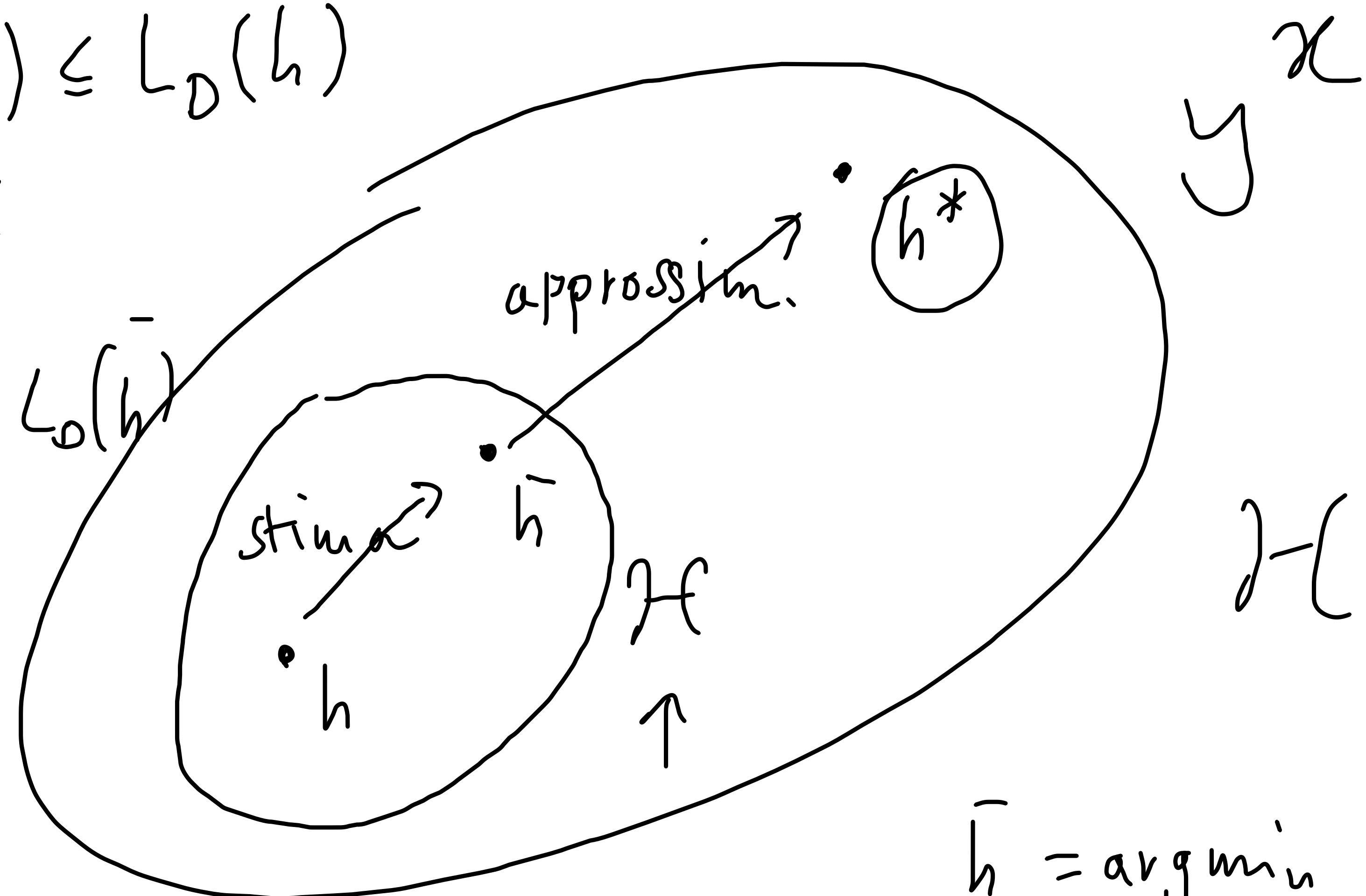


y
$\mathbb{E}(y|x)$
x
$x = \bar{x}$

$L_D(\bar{h}) \leq L_D(h)$

$\bar{h} \in \mathcal{Y}^{\mathcal{X}}$

$L_D(h^*) \leq L_D(\bar{h})$



$\mathcal{H} \subseteq \mathcal{Y}^{\mathcal{X}}$

$$\bar{h} = \underset{h \in \mathcal{H}}{\operatorname{argmin}}\ L_D(h)$$

$L_D(h)$