

LASSO:

$$\hat{P} \ell_{\beta} + \lambda \|\beta\|_1$$

RIDGE:

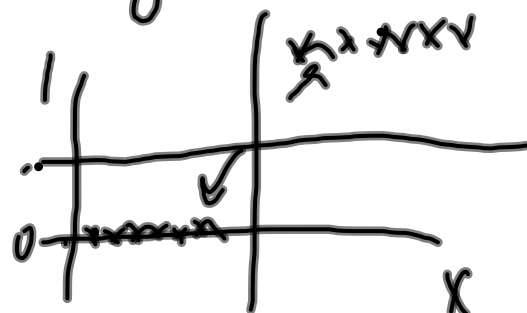
$$\hat{P} \ell_{\beta} + \lambda \|\beta\|_2^2$$

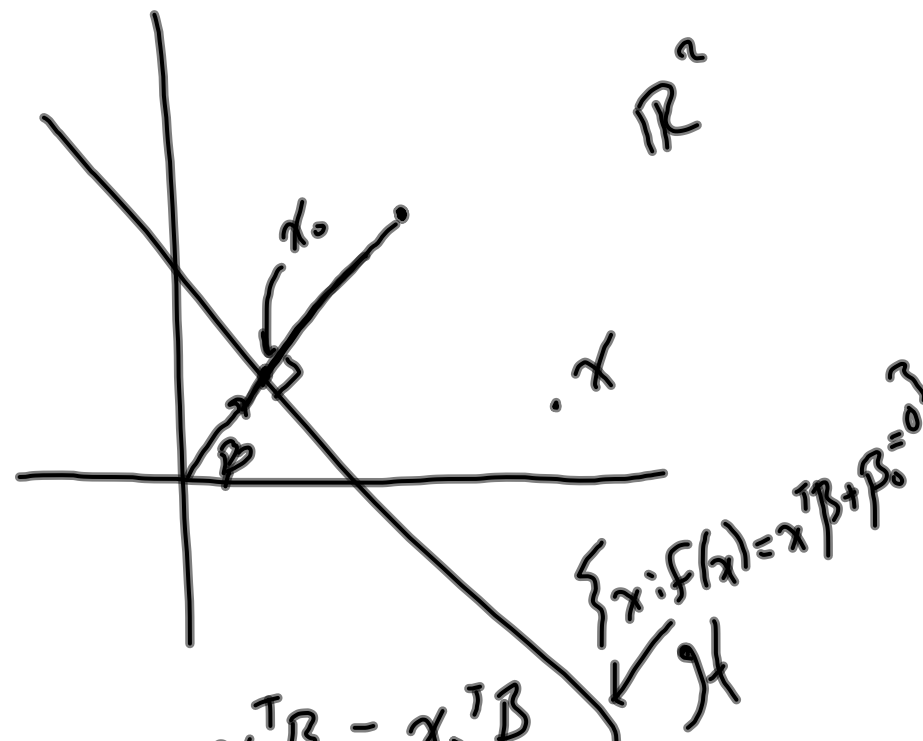
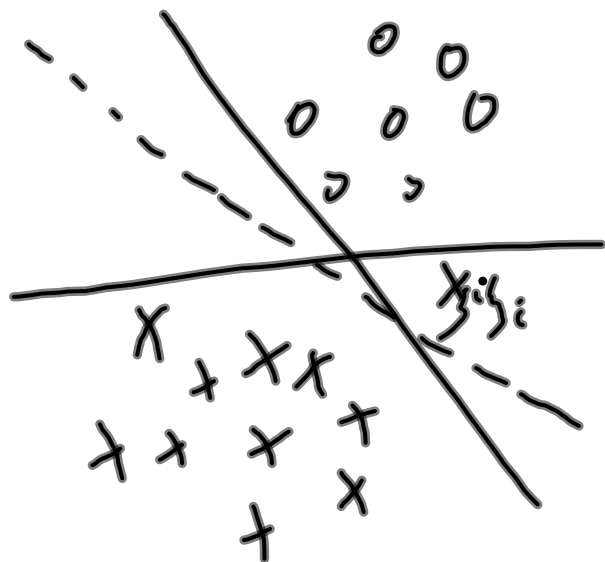
ELASTIC NET

$$\hat{P} \ell_{\beta} + \lambda (\alpha \|\beta\|_1 + (1-\alpha) \|\beta\|_2^2)$$

$$\alpha \in [0, 1]$$

glmnet \rightarrow alpha





$$y_i (x_i^T \beta + \beta_0) \geq M$$

$$y_i \left(x_i^T \left(\frac{\beta}{\|\beta\|_2} \right) + \beta_0 \right) \geq M$$

$$y_i (x_i^T \beta + \beta_0) \geq M \|\beta\|_2$$

$$\begin{aligned} &= 1 = x^T \beta + \beta_0 - \beta_0 - x_0^T \beta \\ &= x^T \beta + \beta_0 = f(x) \end{aligned}$$