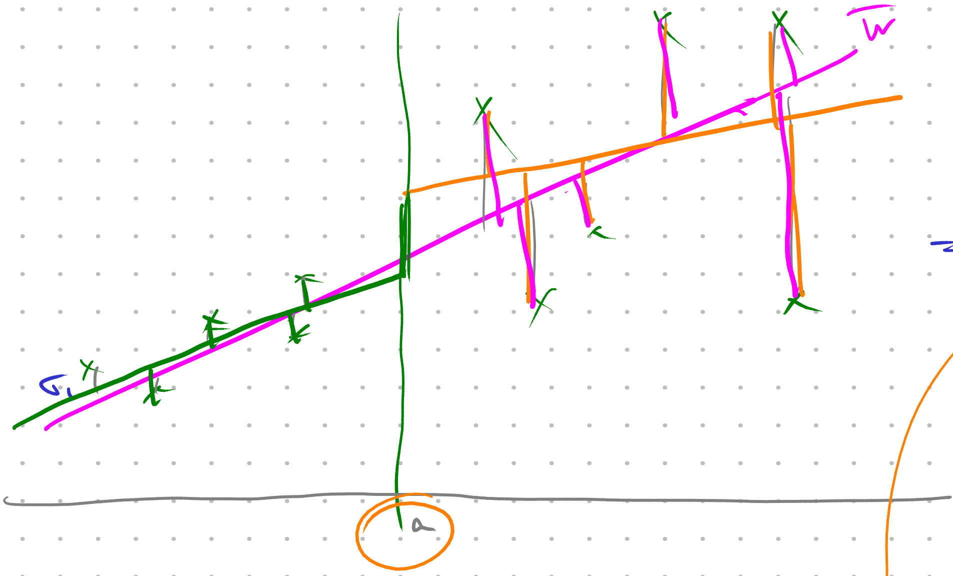


$$\log p(D \mid \bar{w}) = -\frac{1}{2\sigma_1^2} \sum_{\bar{x}_n < a} (\bar{x}_n^T \bar{w} - y_n)^2 - \frac{1}{2\sigma_2^2} \sum_{\bar{x}_n > a} (\bar{x}_n^T \bar{w} - y_n)^2$$

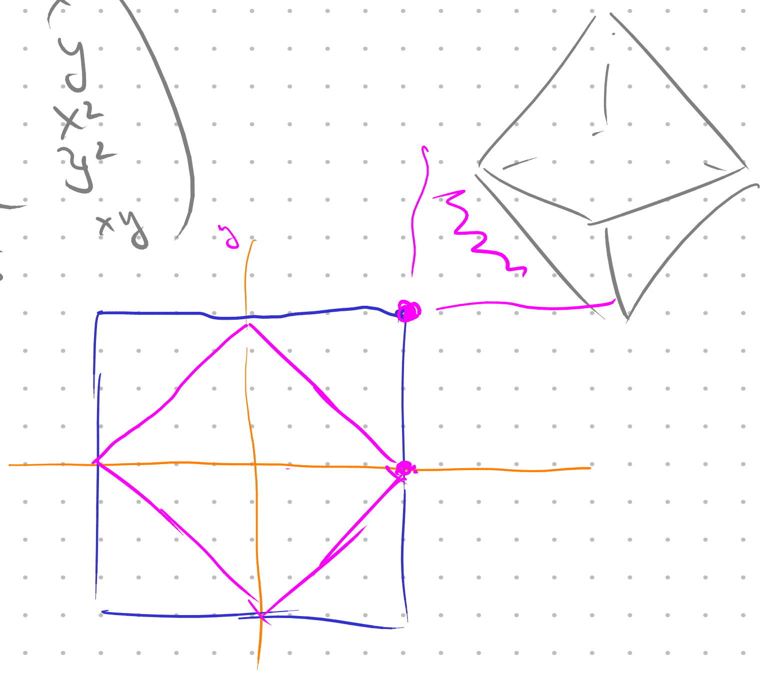
$$\sum_{x_n} \alpha_n (\bar{x}_n^T \bar{w} - y_n)^2$$

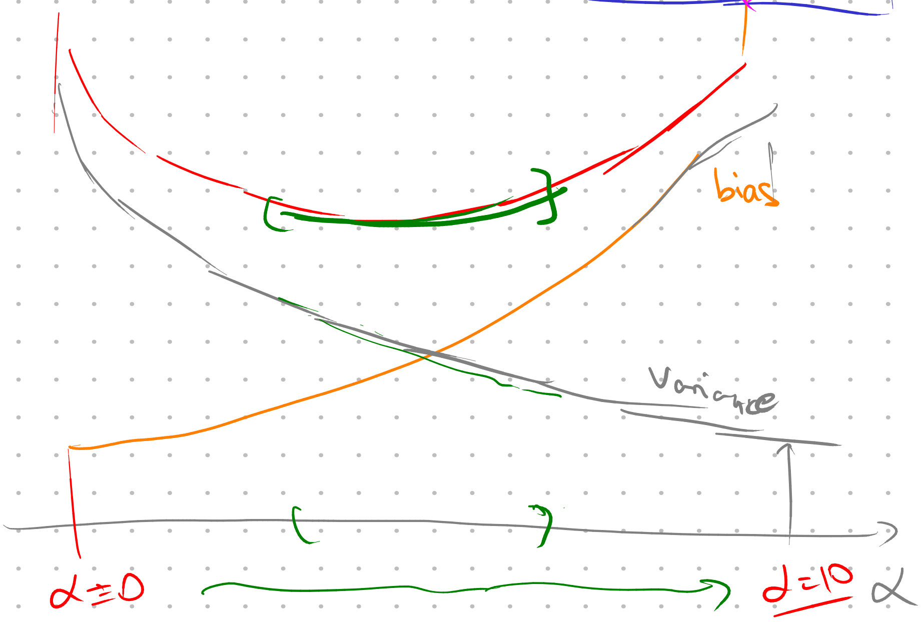
$$D = \{\bar{x}_1, \ldots, \bar{x}_N\}$$

$$\bar{\varphi}(x) = \begin{pmatrix} 1 \\ x^2 \\ x \end{pmatrix}$$

$$\bar{\varphi}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 \\ x \\ y \\ x^2 \\ y^2 \\ xy \end{pmatrix}$$

$$\bar{\varphi} : \mathbb{R}^2 \longrightarrow \mathbb{R}^5$$



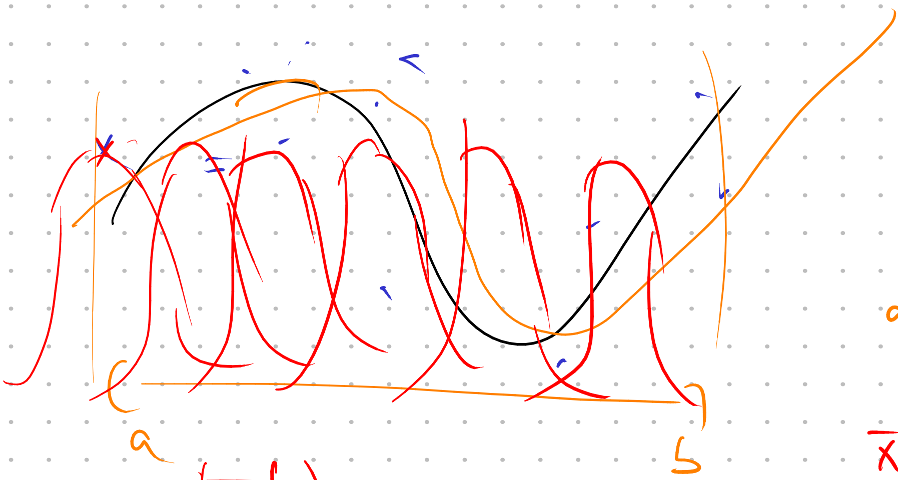


$$X = \{\bar{x}_1, \ldots, \bar{x}_N\}$$

$$D = \{t_1, \ldots, t_N\}$$

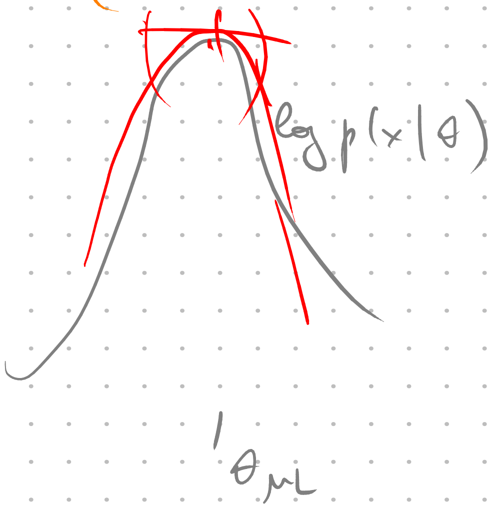
$$t_n \sim \mathcal{N}(t_n \mid \bar{w}^T \bar{x}_n, \sigma^2)$$

$$f(\bar{x}_n) \qquad \sigma^2(\bar{x}_n)$$



$$\int_a^b \left(\hat{f}(x) - f(x)\right)^2 dx \to \min$$

$$\bar{x} \to \begin{pmatrix} \varphi_1(x) \\ \varphi_2(x) \\ \vdots \\ \varphi_K(x) \end{pmatrix}^T \begin{pmatrix} w_1 \\ w_2 \\ \vdots \\ w_K \end{pmatrix} + w_0$$



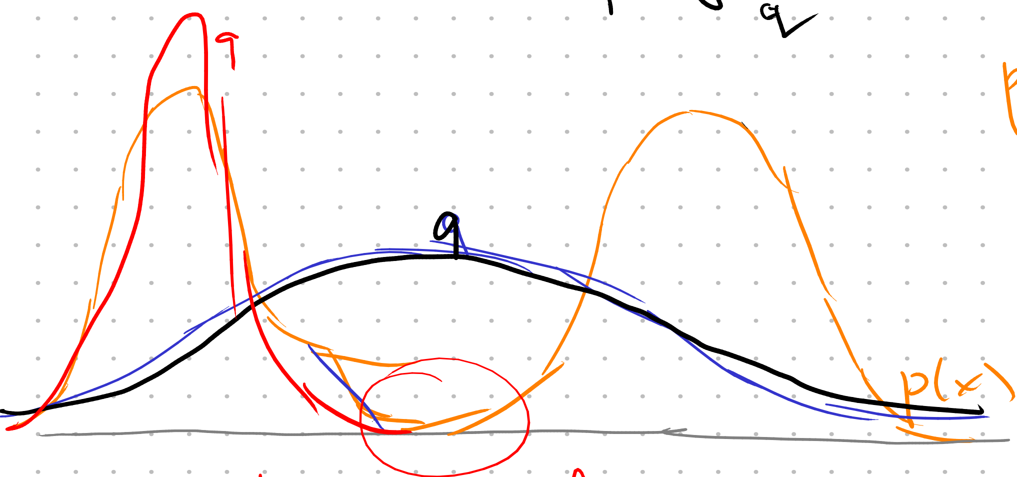
$$t_n \sim \text{LogNormal}(\bar{w}^T \bar{x}_n, \sigma^2)$$

$$\log t_n \sim \mathcal{N}(\bar{w}^T \bar{x}_n, \ —\ )$$

$$p(\bar{w} \mid \bar{t}) \propto p(\bar{w}) \boxed{p(\bar{t} \mid \bar{w})}$$

$$KL(p \| q) = \int p \log \frac{p}{q} \, d\bar{x}$$

$$p_{data}(\bar{x}) = \frac{1}{N} \sum \delta(\bar{x} - \bar{x}_i)$$



$$KL(q \| p) = \int q \log \frac{q}{p} \, d\bar{x}$$

marginal likelihood

$$p(M_i \mid D) \propto p(M_i) \, p(D \mid M_i)$$

$$BIC \approx p(D \mid M)$$