

PART 3

2a) Assuming Gaussian model

$$P_{\text{model}}(y_i | x_i, w) = \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{y_i - w^T x_i}{2\sigma^2}\right)$$

write the expression of the Negative Likelihood Function

The negative log-likelihood function

$$P_{\text{model}}(y_i | x_i, w) = \frac{n}{2} \ln(2\pi) + \frac{n}{2} \ln(\sigma^2) + \sum_{i=1}^n \frac{(x_i - w^T x_i)^2}{2\sigma^2}$$

write the parameters w and the σ^2 that maximize the NLL

$$w, \sigma^2 = \arg \max_{w, \sigma^2} P_{\text{model}}(y_i | x_i, w)$$

$$w, \sigma^2 = \arg \max_{w, \sigma^2} \prod_{i=1}^N P_{\text{model}}(y_i | x_i, w, \sigma^2)$$