

# Logistic Regression

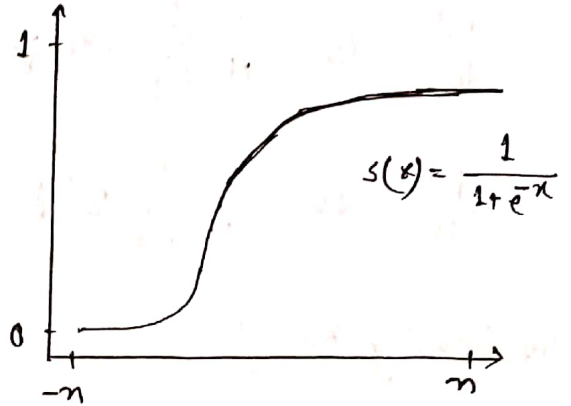
## Approximation:

$$f(w, b) = wx + b$$

$$\hat{y} = h_{\theta}(x) = \frac{1}{1 + e^{-wx + b}}$$

## Sigmoid Function:

$$s(x) = \frac{1}{1 + e^{-x}}$$



## Cost Function:

$$J(w, b) = J(\theta) = \frac{1}{N} \sum_{i=1}^n [y_i \log(h_{\theta}(x_i)) + (1 - y_i) \log(1 - h_{\theta}(x_i))]$$

## Gradient Descent: Check "Linear Regression"

## Learning Rate: Check "Linear Regression"

## Update Rules:

$$w = w - \alpha \cdot dw$$

$$b = b - \alpha \cdot db$$

$$J'(\theta) = \begin{bmatrix} \frac{dJ}{dw} \\ \frac{dJ}{db} \end{bmatrix} = [\dots] = \begin{bmatrix} \frac{1}{N} \sum 2x_i (\hat{y} - y_i) \\ \frac{1}{N} \sum 2(\hat{y} - y_i) \end{bmatrix}$$