Week 4

4 samples: 0 , 2 , 1 , 0   y_test   real or ground truth

→ Train a model

1 2 1   0   y

$$y = w^T x$$

Train the model: w^T

x_train , y_train
y_train

$$\begin{bmatrix} 5 \\ 1 \\ 0 \end{bmatrix}$$

$w = 5 \Rightarrow y = 5x$

if $x = 1 \to y = 5$ $\to$ x_test $\to$ y

$x = 0 \to y = 0$

(x, y) y_test
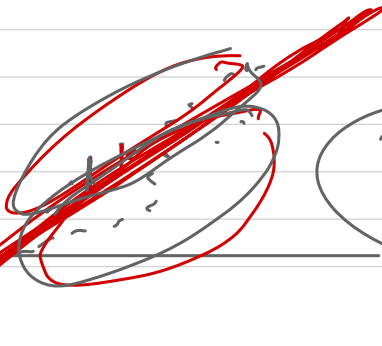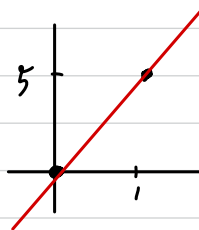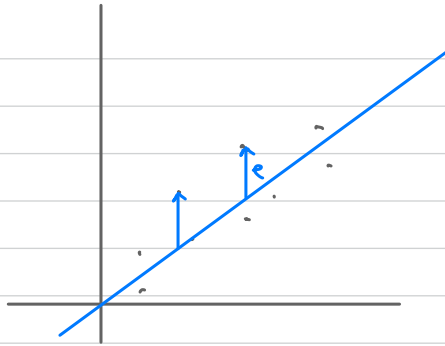
x_train
y_train
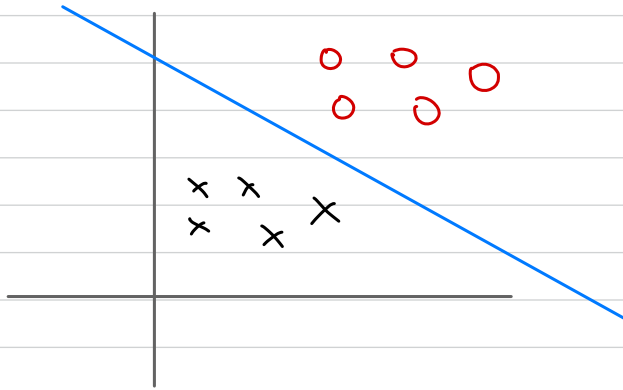
$$F(x_i) = w^T x_i$$

$$E(w) = \frac{1}{N} \sum_{i=1}^{N} (w^T x_i - y_i)^2$$

$$\frac{\partial E(w)}{\partial w} = \frac{2}{N} \sum_{i=1}^{N} (w^T x_i - y_i) x_i$$

$$w = w - a * \frac{\partial E(w)}{\partial w}$$

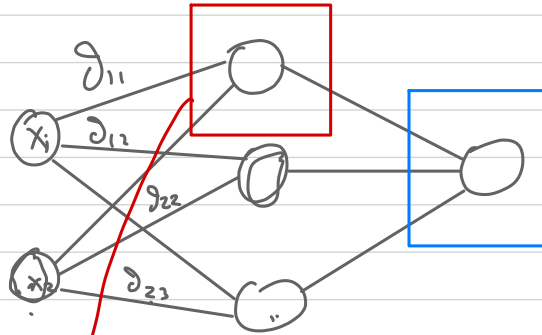# Classification

Dataset: 150 Samples

120 samples
TRAIN

30 Samples
TEST

$$\sigma = \frac{1}{1+e^{-x}}$$

$$\sigma(w^T x) = \frac{1}{1+e^{-w^T x}}$$

$$y[i] \overset{?}{=} y\_test[i]$$

Neural Networks

$$\partial_{1.} x_1 + \partial_2 x_2 \quad \sigma\left(\partial_i x_1 + \partial_2 x_2\right)$$

$$\sigma\left(\partial_{11} x_1 + \partial_{12} x_2\right) + \sigma\left(\partial_{21} x_1 + \partial_{22} x_2\right)$$
$$+ \sigma\left(\partial_{31} x_1 + \partial_{32} x_2\right)$$