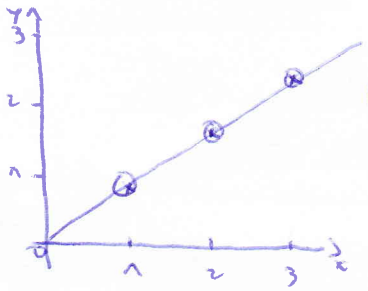
Ejercicio 1

Hypotesis $h_\theta(x) = \theta_0 + \theta_1 x \xrightarrow{(5)} h_\theta(x) = \theta_1 x$ Si escalamos $\theta_1 = 1$

$\rightarrow h_\theta(x) = (1)(x)$

(1)



$\theta_1 = 1$

$y = x$

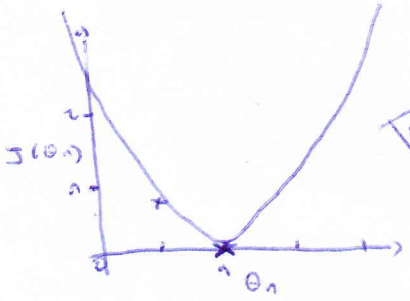
$$J(\theta_1) = \frac{1}{2m} \cdot \sum_1^m (h_\theta(x^i) - y^i)^2$$

$$= \frac{1}{2m} \cdot \sum_1^m (\theta_1 x^i - y^i)^2$$

$$= \frac{1}{2m} \cdot \sum_1^m ((1)x^i - y^i)^2$$

$$= \frac{1}{2m} \sum_1^m (x^i - y^i)^2$$

$$= \frac{1}{2m} (0^2 + 0^2 + 0^2) = 0^2$$

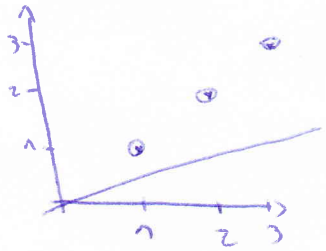


$\theta_1 = 1$ MINIMIZA $J(\theta_1)$

$J(\theta_1) = 0$ ⟺ $J(1) = 0$

(2)

$\theta_1 = 0.5$ $\quad y = 0.5x$



$$J(\theta_1) = J(0.5) = \frac{1}{2m} \sum_1^m (h_\theta(x_1^i) - y^i)^2$$

$$= \frac{1}{2m} \sum_1^m (0.5x^i - y^i)^2$$

$$= \frac{1}{2m} ([0.5 - 1]^2 + [1 - 2]^2 + [1.5 - 3]^2)$$

$$= \frac{1}{2 \cdot 3} (3.5) = \frac{3.5}{6}$$

$(1,1)$; $(2,2)$; $(3,3)$

$J(0) = \theta_1 = 0$

$$J(\theta_1) = J(0) = \frac{1}{2m} \sum_1^m ((0)(x^i) - y^i)^2$$

$$= \frac{1}{6} \sum (-y^i)^2$$

$$= \frac{1}{6} ((-1)^2 + (-2)^2 + (-3)^2) = \frac{1}{6}(1) + (4) + (9) = \frac{14}{6}$$