

Punto 6 - Álgebra lineal

Función de costo:

$$x^2(a_0, a_1) = \sum_{i=1}^n (y_i - (a_0 + a_1 x_i))^2$$

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$$\sum_{i=1}^n (y_i - (a_1 x_i + a_0)) = 0$$

$$\sum_{i=1}^n y_i - \sum_{i=1}^n a_1 x_i + \sum_{i=1}^n a_0 = 0$$

$$\bar{y} - a_1 \bar{x} - a_0 = 0$$

$$a_0 = \bar{y} - a_1 \bar{x}$$

$$\frac{\partial x^2}{\partial a_i} = \sum_{i=1}^n \frac{\partial}{\partial a_i} [y_i - (a_1 x_i + a_0)]^2 = 0$$

$$\sum_{i=1}^n x_i y_i - a_1 \sum_{i=1}^n x_i^2 + a_0 \sum_{i=1}^n x_i = 0$$

Ec. 1

$$-2 \sum_{i=1}^N x_i y_i + a_i \sum_{i=1}^N x_i^2 \left[\frac{-1}{N} \sum y_i - \frac{a_i}{N} \sum_{i=1}^N x_i \right] \sum_{i=1}^N x_i = 0$$

Ec. 2

$$Ec. 1 = Ec. 2 \quad \text{por } 10 + a_1 + 0$$

$$a_i = \frac{2 \sum_{i=1}^N x_i y_i - \frac{1}{N} \sum_{i=1}^N x_i \sum_{i=1}^N y_i}{\sum x_i^2 - \frac{1}{N} \left(\sum_{i=1}^N x_i \right)^2}$$

$$\bullet \frac{\partial x^2}{\partial a_0} = \sum_i \left[\frac{\partial}{\partial a_0} \left[(y_i - (a_0 + a_1 x_i + a_2 x_i^2))^2 \right] \right]$$

$$\sum_{i=1}^N [a_0 + a_1 x_i + a_2 x_i^2 = y_i]$$

$$\bullet \frac{\partial X^2}{\partial a_1} = \sum_{i=1}^N \left[\frac{\partial}{\partial a_1} (y_i - (a_0 + a_1 x_1 + a_2 x_1^2))^2 \right]$$

$$= \sum_{i=1}^N [a_0 x_1 + a_1 x_1^2 + a_2 x_1^3 = x_1 y_i]$$

$$\bullet \frac{\partial X^2}{\partial a_2} = \sum_i \left[\frac{\partial}{\partial a_2} (y_i - (a_0 + a_1 x_1 + a_2 x_1^2))^2 \right]$$

$$= \sum_{i=1}^N [a_0 x_1^2 + a_1 x_1^3 + a_2 x_1^4 = x_1^2 y_i]$$