Scribe

Minimos 6

La funcion a minimizar es:

$$x^2(a_0, a_1, a_2) = \sum_{i=1}^{N} (y_i - (a_0 + a_1 x_i + a_2 x_i^2))^2$$

Hacemos derivadas parciales e igualamos a 0:

a_0:

$$\frac{\partial x^2}{\partial a_0} = -2 \sum_{i=1}^{N} (y_i - (a_0 + a_1 x_i + a_2 x_i^2)) = 0$$

simplificando

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

a_1:

$$\frac{\partial x^2}{\partial a_1} = -2 \sum_{i=1}^{n} x_i (y_i - (a_0 + a_1 x_i + a_2 x_i^2)) = 0$$

Simplificando

$$\sum_{1=1}^{n} x_1 y_1 = \sum_{i=1}^{n} (a_0 x_i + a_1 x_i^2 + a_2 x_i^3)$$

a_2:

$$\frac{\partial x^2}{\partial a_2} = -2 \sum_{i=1}^{n} x_i^2 (y_i - (a_0 + a_1 x_i + a_2 x_i^2)) = 0$$

Simplificando

$$\sum_{i=1}^{n} x_i^2 y_1 = \sum_{i=1}^{n} (a_0 x^2 + a_1 x_i^3 + a_2 x_i^4)$$

PAtA

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

Derivamos Respecto a a_0:

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

Simplificando

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

Con Respecto a a_1:

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

Simplificando

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

Tenemos 2 ecuaciones, Resolviendo y Despejando a_1 tenemos.

$$a_1 = \frac{\Sigma x_i y_i - \frac{\Sigma x_i \Sigma y_i}{N}}{\Sigma x_i^2 - \frac{(\Sigma x_i)^2}{N}}$$

Con a_1 calculamos a_0

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

Siendo $\bar{y} = \frac{\Sigma y_i}{N}$ y $\bar{x} = \frac{\Sigma x_i}{N}$