- $\chi^2_{(a0,a1)} = \sum_{i=1}^{n} (y_i - (a0 + a1 x_i))^2$

$\rightarrow$ Minimo debe estar en $(a0,a1)$ que haga $\nabla \chi^2_{(a0,a1)} = 0$

$$\nabla \chi^2_{(a0,a1)} = \left(\frac{\partial \chi^2_{(a0,a1)}}{\partial a0}, \frac{\partial \chi^2_{(a0,a1)}}{\partial a1} \right) = \left[-2 \sum (y_i - (a0 + a1 x_i)) \left(\frac{\partial M(\vec{a}, x_i)}{\partial a0}, \frac{\partial M(\vec{a}, x_i)}{\partial a1} \right) \right]$$

$$= \left[-2 \sum (y_i - (a0 + a1 x_i)) (1, x_i) \right]$$

- $$\nabla \chi^2_{(a0,a1)} = 0 \begin{cases} \sum (y_i - (a0 + a1 x_i)) = 0 & 1) \\ \sum (y_i - (a0 + a1 x_i)) x_i = 0 & 2) \end{cases}$$

$\Rightarrow$ de 1)

$$\sum^n y - \sum a0 - \sum a1 x_i = 0 \Rightarrow \sum y = n a0 + a1 \sum x_i$$

$$\Rightarrow a0 = \frac{\sum y}{n} - \frac{a1 \sum x}{n} \Rightarrow \boxed{a0 = \bar{y} - a_1 \bar{x}}$$

$\Rightarrow$ Sustituir en 2)

$$\sum (y_i - (a_0 + a1 x_i)) x_i = \sum xy - \left(\frac{\sum y \sum x}{n} - \frac{a1 \sum x \sum x}{n} \right) - a1 \sum x^2$$

$$\Rightarrow \sum xy - \frac{\sum y \sum x}{n} + \frac{a1 (\sum x)^2}{n} - a1 \sum x^2 = 0$$

$$\Rightarrow \boxed{a1 = \frac{\sum xy - \frac{\sum y \sum x}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}}$$

- $$\chi^2(a_0,a_1,a_2) = \sum_{i=1}^{n}\left(y_i - (a_0 + a_1 x_i + a_2 x_i^2)\right)^2$$

$$\nabla \chi^2(a_0,a_1,a_2) = 0 \rightarrow \begin{cases} \sum_{i=1}^{n} (y_i - (a_0 + a_1 x_i + a_2 x_i^2) = 0 & Ec)0 \\ \sum_{i=n}^{n} (y_i - (a_0 + a_1 x_i + a_2 x_i^2) x_i = 0 & Ec)1 \\ \sum_{i=n}^{n} (y_i - (a_0 + a_1 x_i + a_2 x_i^2) x_i^2 = 0 & Ec)2 \end{cases}$$

$$\begin{cases} \sum_{i=1}^{n} (a_0 + a_1 x_i + a_2 x_i^2) = \sum_{i=1}^{n} y_i & Ec)0 \\ \sum_{i=1}^{n} (a_0 x_i + a_1 x_i^2 + a_2 x_i^3) = \sum_{i=1}^{n} y_i x_i & Ec)1 \\ \sum_{i=1}^{n} (a_0 x_i^2 + a_1 x_i^3 + a_2 x_i^4) = \sum_{i=1}^{n} y_i x_i^2 & Ec)2 \end{cases}$$

- Cada ecuacion(J)se pue de escribir como:

$$\sum_{i=n}^{n} y_i x_i^J - \sum_{K=J}^{J+N} \left(\sum_{i=1}^{n} a_{K-J} x_i^K \right) = 0$$

- donde N es el grado Polinomial del modelo del ajuste.