Introdução à Física Experimental (2020/21)

Formulário

Média: $$\bar{x} = \frac{1}{N}\sum_{i=1}^{N} x_i$$

Desvio padrão da amostra: $$s = \sqrt{\frac{\sum_{i=1}^{N}\left(x_i - \bar{x}\right)^2}{N-1}}$$

Desvio padrão da média: $$s_m = \frac{s}{\sqrt{N}}$$

Propagação de incertezas: $$\sigma_G = \sqrt{\left(\frac{\partial G}{\partial x_1}\right)^2 (\sigma_{x_1})^2 + \left(\frac{\partial G}{\partial x_2}\right)^2 (\sigma_{x_2})^2 + \left(\frac{\partial G}{\partial x_3}\right)^2 (\sigma_{x_3})^2 + \cdots}$$

Regressão linear: $y = ax + b$ $$a = \frac{N\sum_{i=1}^{N} x_i y_i - \sum_{i=1}^{N} x_i \sum_{i=1}^{N} y_i}{\Delta}; b = \frac{\sum_{i=1}^{N} x_i^2 \sum_{i=1}^{N} y_i - \sum_{i=1}^{N} x_i \sum_{i=1}^{N} x_i y_i}{\Delta}$$

$$\Delta = N\sum_{i=1}^{N} x_i^2 - \left(\sum_{i=1}^{N} x_i\right)^2$$

Coeficiente de correlação: $$r = \frac{N\sum_{i=1}^{N} x_i\, y_i - \sum_{i=1}^{N} x_i \sum_{i=1}^{N} y_i}{\sqrt{\Delta\left[N\sum_{i=1}^{N} y_i^2 - \left(\sum_{i=1}^{N} y_i\right)^2\right]}}$$

Incerteza no declive, σ_a: $$\sigma_a = a\sqrt{\frac{r^{-2}-1}{N-2}}$$

Incerteza na ordenada na origem, σ_b: $$\sigma_b = \sigma_a \sqrt{\frac{1}{N}\sum_{i=1}^{N} x_i^2}$$