Técnicas Laboratoriais de Física
Formulário 2007/08

Valor medido de $x = x_{best} \pm \delta x$

Incerteza percentual $= \dfrac{\delta x}{|x_{best}|} \times 100$

Nº médio de acontecimentos num tempo T

$= \nu \pm \sqrt{\nu}$

$$\delta q = \sqrt{(\delta x)^2 + (\delta y)^2 + ... + (\delta w)^2}$$

$$\frac{\delta q}{|q|} = \sqrt{\left(\frac{\delta x}{x}\right)^2 + \left(\frac{\delta y}{y}\right)^2 + ... + \left(\frac{\delta w}{w}\right)^2}$$

$$\delta q = |B|\delta x \qquad \frac{\delta q}{|q|} = |n|\frac{\delta x}{|x|}$$

$$\delta q = \sqrt{\left(\frac{\partial q}{\partial x}\delta x\right)^2 + \left(\frac{\partial q}{\partial y}\delta y\right)^2 + ... + \left(\frac{\partial q}{\partial w}\delta w\right)^2}$$

$$\bar{x} = \frac{1}{N}\sum_{i=1}^{N} x_i \qquad \sigma_x = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

$$\delta x = \sigma_x \qquad \sigma_{\bar{x}} = \frac{\sigma_x}{\sqrt{N}}$$

$$\int_{-\infty}^{+\infty} f(x)dx = 1 \qquad \bar{x} = \int_{-\infty}^{+\infty} x f(x)dx$$

$$G_{X,\sigma}(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-(x-X)^2/2\sigma^2}$$

$$Prob\,(dentro\ de\ t\sigma) = \frac{1}{\sqrt{2\pi}}\int_{-t}^{+t} e^{-z^2/2}dz$$

$$t = \frac{|x_{best} - x_{esp}|}{\sigma}$$

$$\bar{x}_p = \frac{\sum_i w_i x_i}{\sum_i w_i} \qquad w_i = \frac{1}{\sigma_i^2}$$

$$\sigma_{\bar{x}_p} = \frac{1}{\sqrt{\sum_i w_i}}$$

$$y = A + Bx$$

$$A = \frac{\sum_i x_i^2 \sum_i y_i - \sum_i x_i \sum_i x_i y_i}{\Delta}$$

$$B = \frac{N\sum_i x_i y_i - \sum_i x_i \sum_i y_i}{\Delta}$$

$$\Delta = N\sum_i x_i^2 - \left(\sum_i x_i\right)^2$$

$$\sigma_y = \sqrt{\frac{1}{N-2}\sum_{i=1}^{N}(y_i - A - Bx_i)^2}$$

$$\sigma_A = \sigma_y\sqrt{\frac{\sum_i x_i^2}{\Delta}} \qquad \sigma_B = \sigma_y\sqrt{\frac{N}{\Delta}}$$

$$y = Bx \qquad B = \frac{\sum_i x_i y_i}{\sum_i x_i^2} \qquad \sigma_B = \frac{\sigma_y}{\sqrt{\sum_i x_i^2}}$$

$$\sigma_y = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(y_i - Bx_i)^2}$$

$$\sigma_{xy} = \frac{1}{N}\sum_i (x_i - \bar{x})(y_i - \bar{y})$$

$$r = \frac{\sigma_{xy}}{\sigma_x\sigma_y} = \frac{\sum_i x_i y_i - N\bar{x}\bar{y}}{\sqrt{\left(\sum_i x_i^2 - N\bar{x}^2\right)\left(\sum_i y_i^2 - N\bar{y}^2\right)}}$$

$$Prob\,(\nu\ sucessos\ em\ n\ tentativas) = B_{n,p}(\nu) = \binom{n}{p} p^{\nu}(1-p)^{n-\nu}$$

$$\binom{n}{p} = \frac{n!}{\nu!(n-\nu)!} \qquad \bar{\nu} = np \qquad \sigma_\nu = \sqrt{np(1-p)}$$

$$B_{n,p}(\nu) \approx G_{X,\sigma}(\nu) \qquad X = np \qquad \sigma = \sqrt{np(1-p)}$$

$$Prob\,(\nu\ contagens\ no\ tempo\ T) = P_\mu(\nu) = e^{-\mu}\frac{\mu^\nu}{\nu!}$$

$$\bar{\nu} = \mu(depois\ de\ muitas\ tentativas) = RT \qquad \sigma_\nu = \sqrt{\mu}$$

$$P_\mu(\nu) \approx G_{X,\sigma}(\nu) \qquad X = \mu \qquad \sigma = \sqrt{\mu}$$

$$\chi^2 = \sum_{k=1}^{n}\frac{(O_k - E_k)^2}{E_k}$$

$$d = n - c \qquad \tilde{\chi}^2 = \frac{\chi^2}{d}$$