formulario per l'elaborazione di dati sperimentali

$$\overline{X} = \frac{\sum_{i=1,N} x_i}{N} \qquad \sigma_s(X) = \sqrt{\frac{\sum_{i=1,N}(x_i - \overline{X})^2}{N-1}} \qquad \sigma_s(\overline{X}) = \frac{\sigma_s(X)}{\sqrt{N}}$$

$$X_p = \frac{\sum_{i=1,N} \frac{x_i}{\sigma_i^2}}{\sum_{i=1,N} \frac{1}{\sigma_i^2}} \pm \frac{1}{\sqrt{\sum_{i=1,N} \frac{1}{\sigma_i^2}}}$$

Medie

$$\Delta = X - m \qquad s = \frac{X - m}{m} \qquad t = \frac{X - m}{\sigma}$$

$$\Delta = X_1 - X_2 \qquad s = \frac{X_1 - X_2}{\frac{X_1 + X_2}{2}} \qquad t = \frac{X_1 - X_2}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$

confronti

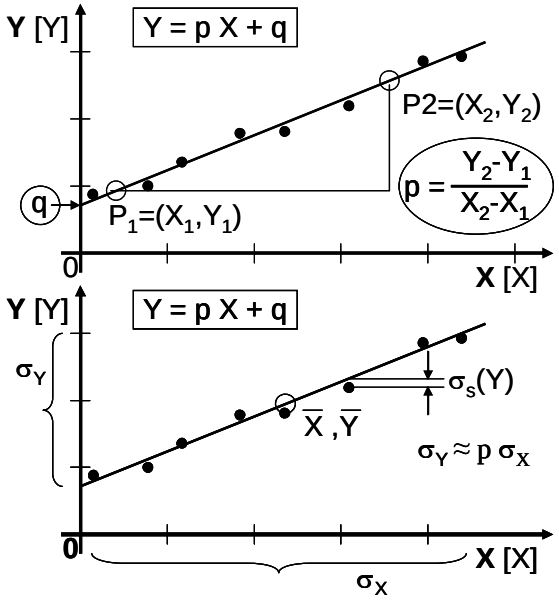
$$p = \frac{N\sum x_i y_i - \sum x_i \sum y_i}{N\sum x_i^2 - \sum x_i \sum x_i}$$

$$q = \frac{\sum x_i^2 \sum y_i - \sum x_i \sum x_i y_i}{N\sum x_i^2 - \sum x_i \sum x_i}$$

$$\sigma_X = \sqrt{\frac{\sum (x_i - \overline{X})^2}{N}} \qquad \sigma_Y = \sqrt{\frac{\sum (y_i - \overline{Y})^2}{N}}$$

$$\sigma_s(Y) = \sqrt{\frac{\sum [y_i - (p\,x_i + q)]^2}{N-2}}$$

$$\sigma_p = \frac{\sigma_s(Y)}{\sqrt{N}\sigma_X} \qquad \sigma_q = \frac{\sigma_s(Y)}{\sqrt{N}}\sqrt{1 + \frac{\overline{X}^2}{\sigma_X^2}}$$



minimi quadrati

$$Y = f(X_1, X_2, \Lambda, X_N) \qquad \sigma(Y) = \sqrt{\sum_{i=1,N}\left(\frac{\partial f}{\partial X_i}\sigma(X_i)\right)^2}$$

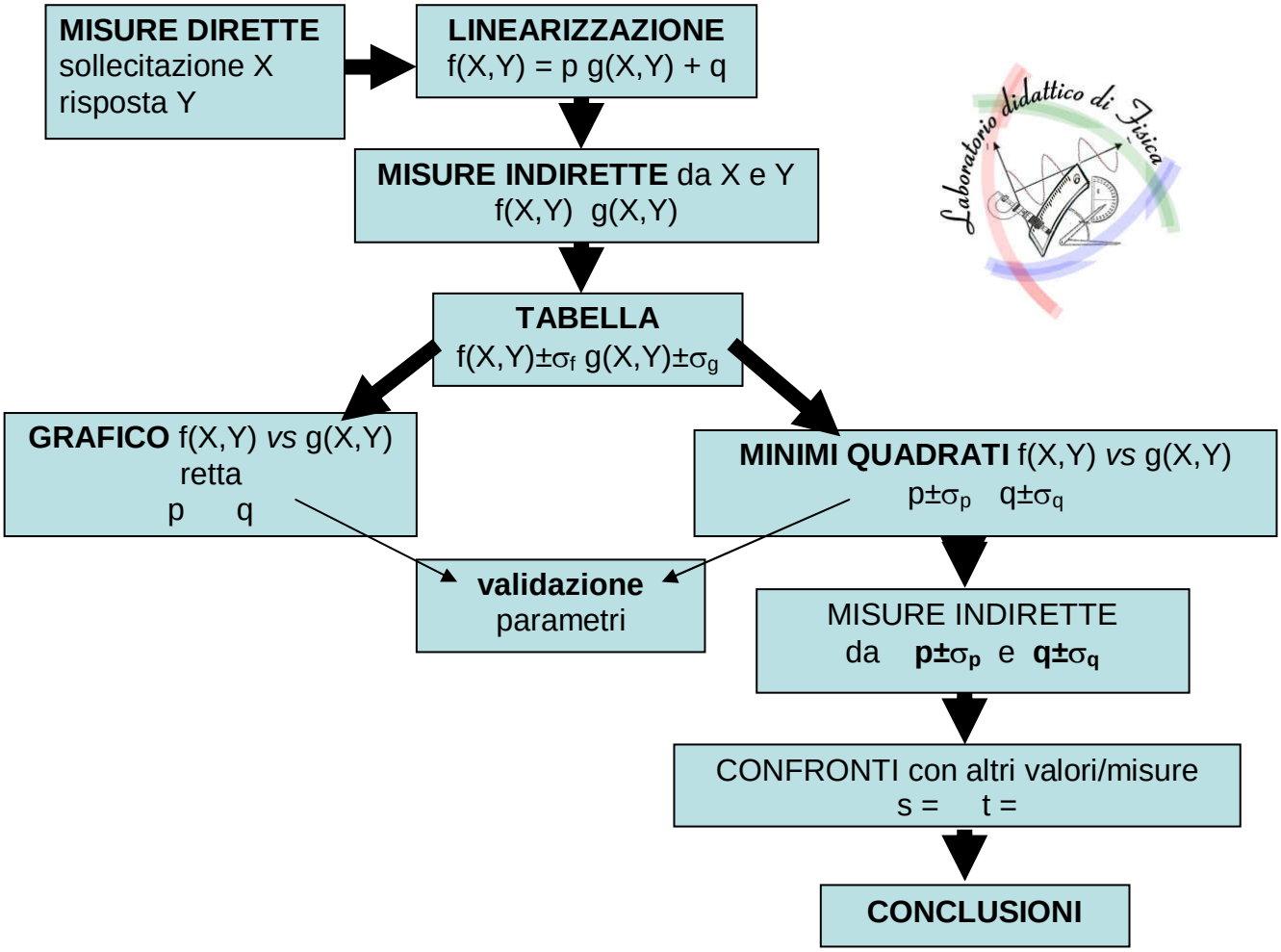
$$Y = cX_1^{p_1}X_2^{p_2}\Lambda\, X_N^{p_N} \qquad \frac{\sigma(Y)}{Y} = \sqrt{\sum_{i=1,N}\left(p_i\frac{\sigma(X_i)}{X_i}\right)^2}$$

misure indirette

$T = (13{,}2 \pm 1{,}0) \times 10^3$ s simbolo - unità di misura - fattore moltiplicativo

2 cifre significative, stesse cifre decimali

notazioni


MISURE DIRETTE
sollecitazione X
risposta Y
LINEARIZZAZIONE
f(X,Y) = p g(X,Y) + q
MISURE INDIRETTE da X e Y
f(X,Y) g(X,Y)
TABELLA
f(X,Y)±σf g(X,Y)±σg
GRAFICO f(X,Y) vs g(X,Y)
retta
p q
MINIMI QUADRATI f(X,Y) vs g(X,Y)
p±σp q±σq
validazione
parametri
MISURE INDIRETTE
da p±σp e q±σq
CONFRONTI con altri valori/misure
s = t =
CONCLUSIONI