FORMULARIO MATEMÁTICO
(TEORÍA DE ERRORES)

MEDIDAS DIRECTAS{X_i}

Valor medio: $\overline{X} = \dfrac{X_1 + X_2 + X_3 + ... + X_n}{n} = \dfrac{\sum_{i=1}^{n} X_i}{n}$

Desviación media: $s(X) = \sqrt{\dfrac{\Sigma(X_i - \overline{X})^2}{n-1}} = \sqrt{\dfrac{n}{n-1}\left(<X^2> - <X>^2\right)}$

Desviación cuadrática media: $s(\overline{X}) = \sqrt{\dfrac{\Sigma(X_i - \overline{X})^2}{n(n-1)}} = \dfrac{s(X)}{\sqrt{n}}$

Intervalo de confianza de Student:

$$\Delta = t\,s\left(\overline{X}\right) = t\sqrt{\frac{\Sigma\left(X_i - \overline{X}\right)^2}{n(n-1)}}\;,\; \overline{X} - t\,s(\overline{X}) \le \mu \le \overline{X} + t\,s(\overline{X})$$

Valores de t_n

En la siguiente tabla encontrarás algunos valores más del factor t_n para distintos valores del número de grados de libertad y $1-\alpha$, siendo α el intervalo de confianza.

	p		
n	0.10	0.05	0.01
1	6,3138	12,706	63,657
2	2,9200	4,3027	9,9248
3	2,3534	3,1825	5,8409
4	2,1318	2,7764	4,6041
5	2,0150	2,5706	4,0321
6	1,9432	2,4469	3,7074
7	1,8946	2,3646	3,4995
8	1,8595	2,3060	3,3554
9	1,8331	2,2622	3,2498
10	1,8125	2,2281	3,1693
11	1,7959	2,2010	3,1058
12	1,7823	2,1788	3,0545
13	1,7709	2,1604	3,0123
14	1,7613	2,1448	2,9768
15	1,7530	2,1315	2,9467
20	1,7247	2,0860	2,8453
40	1,6839	2,0211	2,7045
60	1,6707	2,0003	2,6603
∞	1,6449	1,9600	2,5788

Media Ponderada: $\overline{X}_p = \dfrac{\sum_i^n \omega_i X_i}{\sum_i^n \omega_i}$,, ω_i**=1/s$_i^2$**

Desviación de la media ponderada: $\dfrac{1}{s_p^2} = \Sigma\,\omega_i = \Sigma\,\dfrac{1}{s_i^2}$

MEDIDAS INDIRECTAS Z=f(X,Y,...)

Valor medio: $\overline{Z} = f(\,\overline{X}, \overline{Y}, ...\,)$

Propagación cuadrática: $s_Z = \sqrt{\left[\dfrac{\partial f}{\partial X}\right]^2 s_X^2 + \left[\dfrac{\partial f}{\partial Y}\right]^2 s_Y^2 + ...}$

NUBES DE PUNTOS EXPERIMENTALES {X$_i$,Y$_i$}

Condición de mínimo Y= f(X,p$_j$):

$$\chi^2 = \sum_i \frac{\left(Y_i - f(\,X_i, p_j\,)\right)^2}{s_i^2}, \quad \left\{\frac{\partial \chi^2}{\partial p_j}\right\}_j = 0$$

Regresión lineal Y= mX + p ,, $Y - \overline{Y} = m\left(X - \overline{X}\right)$

$$\begin{cases} m = \dfrac{\Sigma(\,X_i - \overline{X}\,)Y_i}{\Sigma(\,X_i - \overline{X}\,)^2} = \dfrac{n\,\Sigma X_i Y_i - \Sigma X_i \Sigma Y_i}{n\,\Sigma X_i^2 - (\,\Sigma X_i\,)^2} \\[2ex] p = \overline{Y} - m\,\overline{X} = \dfrac{\Sigma X_i^2 \Sigma Y_i - \Sigma X_i \Sigma X_i Y_i}{n\,\Sigma X_i^2 - (\,\Sigma X_i\,)^2} \end{cases}$$

$$\begin{cases} s_m = s\sqrt{\dfrac{n}{n\,\Sigma X_i^2 - (\,\Sigma X_i\,)^2}} \qquad\qquad S_m = \dfrac{m}{r}\sqrt{\dfrac{1 - r^2}{n - 2}} \\[2ex] s_p = s\sqrt{\dfrac{\Sigma X_i^2}{n\,\Sigma X_i^2 - (\,\Sigma X_i\,)^2}} \qquad\qquad S_p = S_m\sqrt{\overline{x}^2 + \sigma_x^2} \\[2ex] s = \sqrt{\dfrac{\Sigma\left(\,Y_i - m\,X_i - p\,\right)^2}{n - 2}} \end{cases}$$