FORMULARIO DE PROBABILIDAD Y ESTADÍSTICA

ESTADÍSTICA

GENERALES

$n = \Sigma f \qquad s = \sqrt{s^2} \qquad CV = \frac{s}{\overline{X}}$

CUALITATIVAS

$\overline{X} = \frac{\Sigma[f]}{r} \qquad s^2 = \frac{\Sigma\lfloor (f-\overline{x})^2 \rfloor}{r-1}$

$P_{Me} = \frac{n}{2} \qquad Mo \text{ es } >f$

$a = \frac{\Sigma\lfloor (f-\overline{x})^3 \rfloor}{s^3(r-1)} \qquad g = \frac{\Sigma\lfloor (f-\overline{x})^4 \rfloor}{s^4(r-1)} - 3$

CUANTITATIVAS NO AGRUPADOS

$Mo \text{ es } >f \qquad P_{Me} = \frac{n}{2} \qquad PMp = \left(\frac{n}{d}\right)p$

$Mp = x + \left[\frac{(\frac{n}{d}) \bullet p - Fa}{f}\right]$

CUANTITATIVAS GENERALES

$\overline{X} = \frac{\Sigma[x \bullet f]}{n} \qquad$ R = M – m

$s^2 = \frac{\Sigma\lfloor f \bullet (x-\overline{x})^2 \rfloor}{n-1}$

$a = \frac{\Sigma\lfloor f \bullet (x-\overline{x})^3 \rfloor}{s^3(n-1)}$

$g = \frac{\Sigma\lfloor f \bullet (x-\overline{x})^4 \rfloor}{s^4(n-1)} - 3$

CUANTITATIVAS AGRUPADOS

Para agrupar datos: $c = \frac{R}{K} \qquad K = \sqrt{n}$

Para datos ya agrupados: $c = Li_2 - Li_1$

$Mo = Li_r + (\frac{\Delta_1}{\Delta_1 + \Delta_2}) \bullet c \qquad P_{Me} = \frac{n}{2}$

$\Delta_1 = f - fant$

$\Delta_2 = f - fpos \qquad PMp = \left(\frac{n}{d}\right)p$

$Mp = Li_r + \left[\frac{(\frac{n}{d}) \bullet p - Fa}{f}\right] \bullet c$

PROBABILIDAD

CONJUNTOS

n(AUB) = n(A)+n(B)–n (A∩B)

n(A-B) = n(A) - n(A∩B)

n(A') = n(U) – n(A)

n(AxB) = n(A) x n(B)

PROBABILIDAD SIMPLE

$P(E) = \frac{n(E)}{n(s)}$

TÉCNICAS DE CONTEO

Para eventos independientes:

P(AUB) = P(A) + P(B)

P(A∩B) = P(A) x P(B)

Permutación:

$n\Pr = \frac{n!}{(n-r)!}$

Combinación:

$nCr = \frac{n!}{r!(n-r)!}$

PROBABILIDAD CONDICIONAL

$P(B/A) = \frac{P(A \cap B)}{P(A)} = \frac{n(A \cap B)}{n(A)}$

TEOREMA DE BAYES

$P(A_i/B) = \frac{P(B/A_i) \bullet P(A_i)}{\sum [P(B/A_i) \bullet P(A_i)]}$

VARIABLE ALEATORIA DISCRETA

$E(x) = \mu_X = \sum[x_i \bullet P(x_i)]$

$s^2 = \sum[x_i^2 \bullet P(x_i)] - (\mu_x)^2 \qquad s = \sqrt{s^2}$

VAR. ALEATORIAS DISCRETAS CONJUNTAS

$E(xy) = \sum[x_i \bullet y_j \bullet P(x_i, y_j)]$

$Cov(xy) = E(xy) - (\mu_x \bullet \mu_y) \qquad \rho = \frac{\text{cov}(xy)}{s_x \bullet s_y}$

DISTRIBUCION BINOMIAL

$b(x; N, p) = {}_N C_x (p^x) q^{(N-x)}$

$E(x) = N \bullet p \qquad$ q = 1 – p

$s^2 = N \bullet p \bullet q \qquad s = \sqrt{s^2}$

DISTRIBUCION DE POISSON

$P(x;\lambda) = \frac{\lambda^x \bullet e^{-\lambda}}{x!} \qquad E(x) = \lambda$

$s^2 = \lambda \qquad s = \sqrt{s^2}$

DISTRIBUCION GEOMÉTRICA

$G(x,p) = p \bullet q^{(x-1)} \qquad E(x) = \frac{1}{p}$

$s^2 = \frac{1-p}{p^2} \qquad s = \sqrt{s^2}$

DISTRIBUCION HIPERGEOMÉTRICA

$H(N,m;n,x) = \frac{{}_m C_x [{}_{(N-m)} C_{(n-x)}]}{{}_N C_n} \qquad s = \sqrt{s^2}$

$E(x) = n(\frac{m}{N}) \qquad s^2 = n\frac{m}{N}(\frac{N-m}{N})(\frac{N-n}{N-1})$

APLICACIÓN EN CONTROL DE CALIDAD

$m = N \bullet p$

Muestra $n = \frac{1}{p}$

Regla de Decisión $x \le n(\frac{m}{N})$

VARIABLE ALEATORIA CONTINUA

Para f(x) si a<x<b

$$E(x)=\mu=\int_a^b[x\bullet f(x)]dx \quad Var(x)=\int_a^b[x^2\bullet f(x)]dx-\mu^2$$

$$\sigma=\sqrt{\mathrm{var}(x)} \quad P(c,d)=\int_c^d f(x)dx \quad F(x)=\int_{-\infty}^x f(t)dt$$

$$P(c,d)=F(d)-F(c)$$

DISTRIBUCION UNIFORME

$$P(a,x)=\frac{x-a}{b-a} \quad \text{Si} \quad a\le x\le b$$

$$P(a,x)=\begin{cases}0 \ si \ x<a\\ 1 \ si \ x>b\end{cases}$$

$$E(X)=\frac{a+b}{2} \qquad s^2=\frac{(b-a)^2}{12}$$

DISTRIBUCION GAMMA

$$P(0,x)=\gamma(\frac{x}{\beta},\alpha)$$

$$\mu=E(x)=\alpha\beta$$

$$s^2=\alpha\beta^2$$

DISTRIBUCION NORMAL ESTÁNDAR

$$z=\frac{(x-\mu)}{s} \qquad \mathrm{P}(\ z>\mathrm{n}\ )=0.5-\mathrm{Tabla(n)} \qquad \mathrm{P}(\ z<\mathrm{n}\ )=0.5+\mathrm{Tabla(n)}$$

$P(n_1 < z < n_2) = \mathrm{Tabla}(n_2) - \mathrm{Tabla}(n_1)$

INFERENCIA ESTADISTICA

Nota: v = n -1 y para comparar 2 muestras la v se toma de la menor n

TAMAÑO DE LA MUESTRA

$$n_0=\frac{z^2\bullet p\bullet q}{E^2} \qquad n_0=\frac{z^2\bullet s^2}{\varepsilon^2} \qquad n=\frac{n_0}{1+[(n_0-1)/N]}$$

BONDAD DE AJUSTE

$$X_J^2=\frac{(f_o-f_e)^2}{fe}$$

$$\sum_{j=1}^{j=n}x_j^2\le x_{i\ (v,\alpha)}^2 \ \text{se ajusta}$$

INTERVALOS DE CONFIANZA ***"IC"***

$$IC\,(-)\Rightarrow\hat\theta_1<\hat\theta_2 \qquad IC\,(+)\Rightarrow\hat\theta_1>\hat\theta_2 \qquad IC\,(-,+)\Rightarrow\hat\theta_1\cong\hat\theta_2$$

Media con D.Normal

$$IC=\overline{X}\pm z_{(\frac{1-\alpha}{2})}(\frac{s}{\sqrt{n}})$$

Diferencia de Medias D. Normal

$$IC=(\overline{X}_1-\overline{X}_2)\pm z_{(\frac{1-\alpha}{2})}\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$$

Proporciones

$$IC=\hat p\pm z_{(\frac{1-\alpha}{2})}\sqrt{\frac{\hat p(\hat q)}{n}}$$

Diferencia de Proporciones $\hat q=1-\hat p$

$$IC=(\hat p_1-\hat p_2)\pm z_{(\frac{1-\alpha}{2})}\sqrt{\frac{\hat p_1\bullet(\hat q_1)}{n_1}+\frac{\hat p_2\bullet(\hat q_2)}{n_2}}$$

Media con D. t-Student

$$IC=\overline{X}\pm t_{(v,1-\frac{\alpha}{2})}(\frac{s}{\sqrt{v}})$$

De Predicción

$$Ip=\overline{X}\pm t_{(v,1-\frac{\alpha}{2})}(s\sqrt{1+\frac{1}{n}})$$

Diferencia de Medias t-Student

$$IC=(\overline{X}_1-\overline{X}_2)\pm t_{(v,1-\frac{\alpha}{2})}\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$$

Varianza con Dist. Xi²

$$IC=[\frac{v(s^2)}{x^2_{i(v,1-\frac{\alpha}{2})}},\frac{v(s^2)}{x^2_{i(v,\frac{\alpha}{2})}}]$$

REGRESION LINEAL SIMPLE

y = mx + b

$$m=\frac{n\sum[xy]-\sum x\bullet\sum y}{n\sum[x^2]-(\sum x)^2} \qquad b=\frac{\sum y-m\sum x}{n}$$

$$r=\frac{n\sum[xy]-\sum x\bullet\sum y}{\sqrt{(n\sum[x^2]-(\sum x)^2)(n\sum[y^2]-(\sum y)^2)}}$$

TIPO PRUEBA	***HIPOTESIS***	***REGLA DE DECISION***	***Z_0***
Cola Derecha	Ha: $\mu>C$ Ho: $\mu\le C$	Acepta Ho si $z_{calc}\le z_0$ Rechaza Ho si $z_{calc}>z_0$	$Z_0 = Z_{(tabla)}$ Tabla = (1-α) - 0.5
Cola Izquierda	Ha: $\mu<C$ Ho: $\mu\ge C$	Acepta Ho si $z_{calc}\ge z_0$ Rechaza Ho si $z_{calc}<z_0$	$Z_0 = -Z_{(tabla)}$ Tabla = (1-α) - 0.5
2 Colas	Ha: $\mu\ne C$ Ho: $\mu=C$	Acepta Ho si $z_{01}\le z_{calc}\le z_{02}$ Rechaza Ho si $z_{calc}<z_{01}$ ó $z_{calc}>z_{02}$	$Z_{02} = Z_{(tabla)}$ tabla = $\frac{1-\alpha}{2}$ $Z_{01} = -Z_{02}$

Z_{calc}

Media

$$z_{calc}=\frac{\bar x-\mu}{s/\sqrt{n}}$$

Proporciones

$$z_{calc}=\frac{\hat p-p}{\sqrt{\frac{p(q)}{n}}}$$

Diferencia de Medias

$$z_{calc}=\frac{(\overline{X}_1-\overline{X}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}}$$