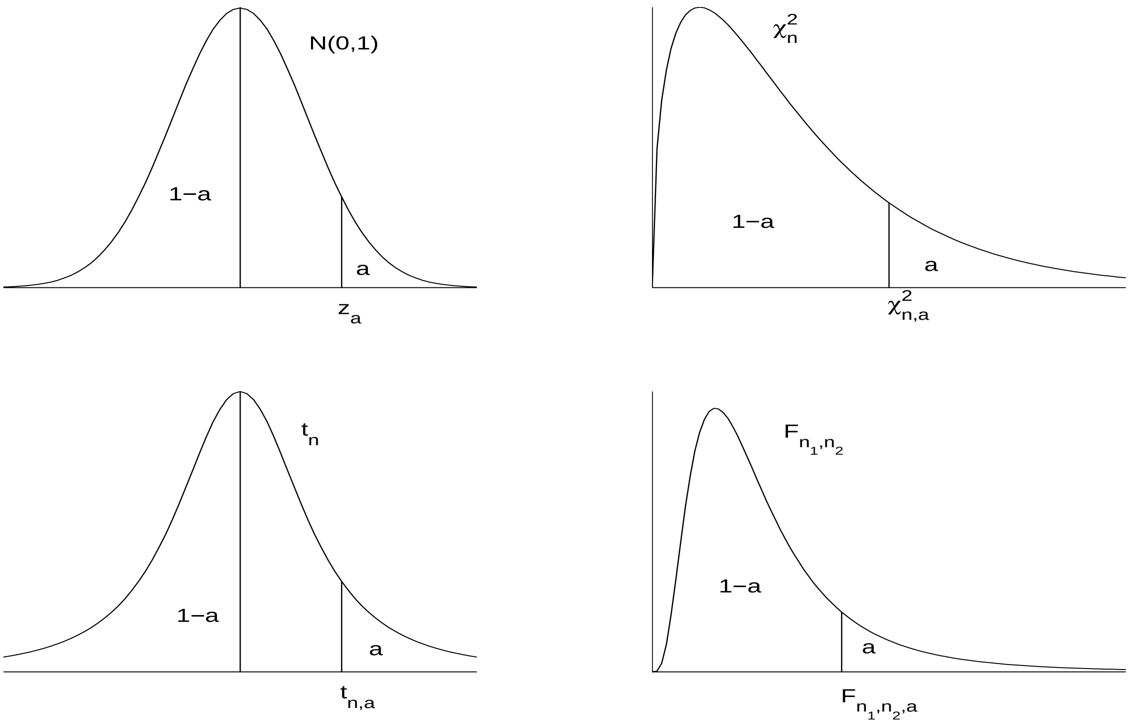
NOTACION:



$(X_1, \ldots, X_n)$ muestra aleatoria de X: $\bar{x} = \dfrac{1}{n}\displaystyle\sum_{i=1}^{n} x_i$

$$s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$$

INTERVALOS DE CONFIANZA

1) $\underline{X \sim N(\mu, \sigma)}$.

* Intervalos de confianza $1-\alpha$ para μ :

a) σ conocida:

$$I = \left[\bar{x} \mp z_{\alpha/2}\,\frac{\sigma}{\sqrt{n}}\right]$$

b) σ desconocida:

$$I = \left[\bar{x} \mp t_{n-1;\alpha/2}\,\frac{s}{\sqrt{n}}\right]$$

* Intervalo de confianza $1-\alpha$ para σ^2 :

$$I = \left[\frac{(n-1)s^2}{\chi^2_{n-1;\alpha/2}}, \frac{(n-1)s^2}{\chi^2_{n-1;1-\alpha/2}}\right]$$

2) $\underline{X \sim B(1,p)}$(muestras grandes).

Intervalo de confianza $1-\alpha$ para p :

$$I = \left[\bar{x} \mp z_{\alpha/2}\,\sqrt{\bar{x}(1-\bar{x})/n}\right]$$

3) $X \sim P(\lambda)$(muestras grandes).

Intervalo de confianza $1-\alpha$ para λ :

$$I = [\bar{x} \mp z_{\alpha/2} \sqrt{\bar{x}/n}]$$

4) Dos poblaciones Normales independientes.

$X \sim N(\mu_1, \sigma_1)$; $(X_1, \ldots, X_{n_1})$ m. a. de X; se calcula $\bar{x}$ y s_1^2.
$Y \sim N(\mu_2, \sigma_2)$; $(Y_1, \ldots, Y_{n_2})$ m. a. de Y; se calcula $\bar{y}$ y s_2^2.

$$s_p^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}$$

* Intervalos de confianza $1-\alpha$ para $\mu_1 - \mu_2$:

a) σ_1, σ_2 conocidas:

$$I = [\bar{x} - \bar{y} \mp z_{\alpha/2} \sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}]$$

b) σ_1, σ_2 desconocidas, $\sigma_1 = \sigma_2$:

$$I = [\bar{x} - \bar{y} \mp t_{n_1+n_2-2;\alpha/2}\, s_p \sqrt{1/n_1 + 1/n_2}]$$

c) σ_1, σ_2 desconocidas, $\sigma_1 \neq \sigma_2$:

$$I = [\bar{x} - \bar{y} \mp t_{f;\alpha/2} \sqrt{s_1^2/n_1 + s_2^2/n_2}]$$

donde f es el entero más próximo a

$$\frac{(s_1^2/n_1 + s_2^2/n_2)^2}{\frac{(s_1^2/n_1)^2}{n_1-1} + \frac{(s_2^2/n_2)^2}{n_2-1}}$$

* Intervalo de confianza $1-\alpha$ para σ_1^2/σ_2^2 :

$$I = \left[\frac{s_1^2/s_2^2}{F_{n_1-1,n_2-1;\alpha/2}}, \frac{s_1^2}{s_2^2} F_{n_2-1,n_1-1;\alpha/2}\right]$$

5) Comparación de proporciones (muestras grandes e independientes).

$X \sim B(1, p_1)$; $(X_1, \ldots, X_{n_1})$ m. a. de X.
$Y \sim B(1, p_2)$; $(Y_1, \ldots, Y_{n_2})$ m. a. de Y.

Intervalo de confianza $1-\alpha$ para $p_1 - p_2$:

$$I = \left[\bar{x} - \bar{y} \mp z_{\alpha/2} \sqrt{\frac{\bar{x}(1-\bar{x})}{n_1} + \frac{\bar{y}(1-\bar{y})}{n_2}}\right]$$

CONTRASTES DE HIPÓTESIS

NOTACION:
α= nivel de significación del contraste.
n= tamaño de la muestra.
H_0= hipótesis nula.
R= región crítica o de rechazo de H_0.

1) $X \sim N(\mu, \sigma)$.

$H_0 : \mu = \mu_0$ (σ conocida); $\quad R = \left\{ |\bar{x} - \mu_0| > z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \right\}$

$H_0 : \mu = \mu_0$ (σ desconocida); $\quad R = \left\{ |\bar{x} - \mu_0| > t_{n-1;\alpha/2} \frac{s}{\sqrt{n}} \right\}$

$H_0 : \mu \leq \mu_0$ (σ conocida); $\quad R = \left\{ \bar{x} - \mu_0 > z_{\alpha} \frac{\sigma}{\sqrt{n}} \right\}$

$H_0 : \mu \leq \mu_0$ (σ desconocida); $\quad R = \left\{ \bar{x} - \mu_0 > t_{n-1;\alpha} \frac{s}{\sqrt{n}} \right\}$

$H_0 : \mu \geq \mu_0$ (σ conocida); $\quad R = \left\{ \bar{x} - \mu_0 < z_{1-\alpha} \frac{\sigma}{\sqrt{n}} \right\}$

$H_0 : \mu \geq \mu_0$ (σ desconocida); $\quad R = \left\{ \bar{x} - \mu_0 < t_{n-1;1-\alpha} \frac{s}{\sqrt{n}} \right\}$

$H_0 : \sigma = \sigma_0$; $\quad R = \left\{ \frac{n-1}{\sigma_0^2} s^2 \notin \left[\chi^2_{n-1;1-\alpha/2} \ , \ \chi^2_{n-1;\alpha/2} \right] \right\}$

$H_0 : \sigma \leq \sigma_0$; $\quad R = \left\{ \frac{n-1}{\sigma_0^2} s^2 > \chi^2_{n-1;\alpha} \right\}$

$H_0 : \sigma \geq \sigma_0$; $\quad R = \left\{ \frac{n-1}{\sigma_0^2} s^2 < \chi^2_{n-1;1-\alpha} \right\}$

2) $X \sim B(1, p)$ (muestras grandes)

$H_0 : p = p_0$; $\quad R = \left\{ |\bar{x} - p_0| > z_{\alpha/2} \sqrt{\frac{p_0(1-p_0)}{n}} \right\}$

$H_0 : p \leq p_0$; $\quad R = \left\{ \bar{x} - p_0 > z_{\alpha} \sqrt{\frac{p_0(1-p_0)}{n}} \right\}$

$H_0 : p \geq p_0$; $\quad R = \left\{ \bar{x} - p_0 < z_{1-\alpha} \sqrt{\frac{p_0(1-p_0)}{n}} \right\}$

3) $X \sim P(\lambda)$ (muestras grandes)

$H_0 : \lambda = \lambda_0$; $\quad R = \left\{ |\bar{x} - \lambda_0| > z_{\alpha/2} \sqrt{\lambda_0/n} \right\}$

$H_0 : \lambda \leq \lambda_0$; $\quad R = \left\{ \bar{x} - \lambda_0 > z_{\alpha} \sqrt{\lambda_0/n} \right\}$

$H_0 : \lambda \geq \lambda_0$; $\quad R = \left\{ \bar{x} - \lambda_0 < z_{1-\alpha} \sqrt{\lambda_0/n} \right\}$

4) Dos poblaciones Normales independientes.

$X \sim N(\mu_1, \sigma_1)$; $(X_1, \ldots, X_{n_1})$ m. a. de X; se calcula $\bar{x}$ y s_1^2.
$Y \sim N(\mu_2, \sigma_2)$; $(Y_1, \ldots, Y_{n_2})$ m. a. de Y; se calcula $\bar{y}$ y s_2^2.

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

$H_0 : \mu_1 = \mu_2$ (σ_1, σ_2 conocidas); $\quad R = \left\{ |\bar{x} - \bar{y}| > z_{\alpha/2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} \right\}$

$H_0 : \mu_1 = \mu_2$ ($\sigma_1 = \sigma_2$); $\quad R = \left\{ |\bar{x} - \bar{y}| > t_{n_1+n_2-2;\alpha/2} \ s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \right\}$

$$H_0 : \mu_1 = \mu_2 \ (\sigma_1 \neq \sigma_2); \qquad R = \left\{ |\bar{x} - \bar{y}| > t_{f;\alpha/2} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \right\}$$

$$H_0 : \mu_1 \leq \mu_2 \ (\sigma_1, \sigma_2 \text{ conocidas}); \qquad R = \left\{ \bar{x} - \bar{y} > z_{\alpha} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} \right\}$$

$$H_0 : \mu_1 \leq \mu_2 \ (\sigma_1 = \sigma_2); \qquad R = \left\{ \bar{x} - \bar{y} > t_{n_1+n_2-2;\alpha} \ s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \right\}$$

$$H_0 : \mu_1 \leq \mu_2 \ (\sigma_1 \neq \sigma_2); \qquad R = \left\{ \bar{x} - \bar{y} > t_{f;\alpha} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \right\}$$

$$H_0 : \mu_1 \geq \mu_2 \ (\sigma_1, \sigma_2 \text{ conocidas}); \qquad R = \left\{ \bar{x} - \bar{y} < z_{1-\alpha} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} \right\}$$

$$H_0 : \mu_1 \geq \mu_2 \ (\sigma_1 = \sigma_2); \qquad R = \left\{ \bar{x} - \bar{y} < t_{n_1+n_2-2;1-\alpha} \ s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \right\}$$

$$H_0 : \mu_1 \geq \mu_2 \ (\sigma_1 \neq \sigma_2); \qquad R = \left\{ \bar{x} - \bar{y} < t_{f;1-\alpha} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \right\}$$

$$H_0 : \sigma_1 = \sigma_2; \qquad R = \left\{ s_1^2/s_2^2 \notin \left[F_{n_1-1;n_2-1;1-\alpha/2} \ , \ F_{n_1-1;n_2-1;\alpha/2} \right] \right\}$$

$$H_0 : \sigma_1 \leq \sigma_2; \qquad R = \left\{ s_1^2/s_2^2 > F_{n_1-1;n_2-1;\alpha} \right\}$$

$$H_0 : \sigma_1 \geq \sigma_2; \qquad R = \left\{ s_1^2/s_2^2 < F_{n_1-1;n_2-1;1-\alpha} \right\}$$

$$\text{donde } f = \text{entero más próximo a } \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{\frac{(s_1^2/n_1)^2}{n_1-1} + \frac{(s_2^2/n_2)^2}{n_2-1}}$$

5) <u>Comparación de proporciones (muestras grandes e independientes).</u>

$X \sim B(1, p_1)$; $(X_1, \ldots X_{n_1})$ m. a. de X.
$Y \sim B(1, p_2)$; $(Y_1, \ldots Y_{n_2})$ m. a. de Y.

$$H_0 : p_1 = p_2; \qquad R = \left\{ |\bar{x} - \bar{y}| > z_{\alpha/2} \sqrt{\bar{p}(1-\bar{p}) \left(\frac{1}{n_1} + \frac{1}{n_2} \right)} \right\}$$

$$H_0 : p_1 \leq p_2; \qquad R = \left\{ \bar{x} - \bar{y} > z_{\alpha} \sqrt{\bar{p}(1-\bar{p}) \left(\frac{1}{n_1} + \frac{1}{n_2} \right)} \right\}$$

$$H_0 : p_1 \geq p_2; \qquad R = \left\{ \bar{x} - \bar{y} < z_{1-\alpha} \sqrt{\bar{p}(1-\bar{p}) \left(\frac{1}{n_1} + \frac{1}{n_2} \right)} \right\}$$

$$\text{donde } \ \bar{p} = \frac{\sum x_i + \sum y_i}{n_1 + n_2} = \frac{n_1 \bar{x} + n_2 \bar{y}}{n_1 + n_2}$$