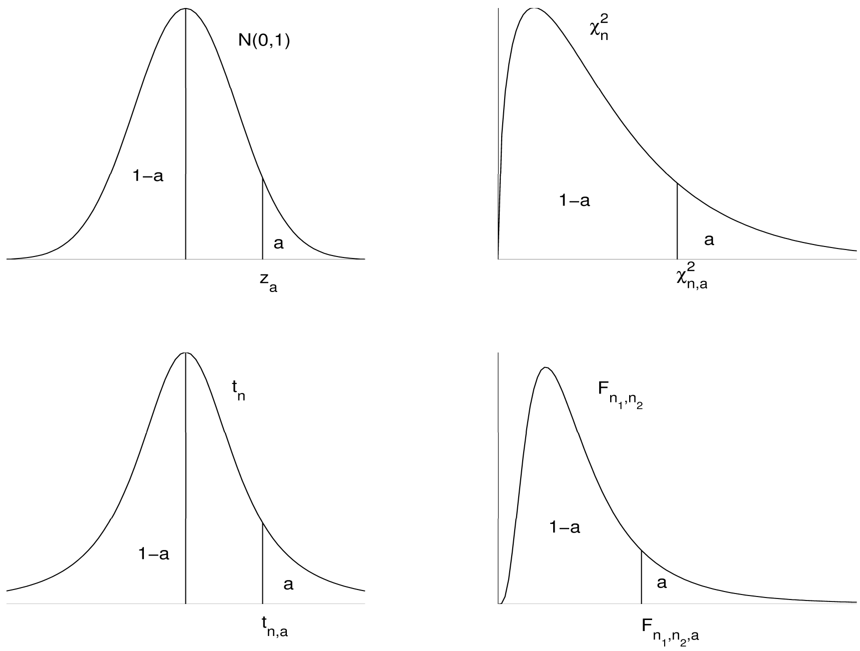

INTERVALOS DE CONFIANZA

NOTACIÓN:

$(X_1, \ldots, X_n)$ muestra aleatoria (m. a.) de X.

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

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

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

a) σ conocida: $I = \left(\bar{x} \pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\right)$

b) σ desconocida: $I = \left(\bar{x} \pm t_{n-1;\alpha/2}\frac{s}{\sqrt{n}}\right)$

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) X ~ Bernoulli(p) (muestras grandes).

Intervalo de confianza $1-\alpha$ para p: $I = \left(\bar{x} \pm z_{\alpha/2}\sqrt{\frac{\bar{x}(1-\bar{x})}{n}}\right)$

3) X ~ Poisson(λ) (muestras grandes).

Intervalo de confianza $1-\alpha$ para λ: $I = \left(\bar{x} \pm z_{\alpha/2}\sqrt{\bar{x}/n}\right)$

4) Dos poblaciones Normales (muestras independientes).

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

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

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

a) $\sigma_1,\ \sigma_2$ conocidas:

$$I = \left(\bar{x} - \bar{y} \pm z_{\alpha/2}\sqrt{\frac{\sigma_1^2}{m} + \frac{\sigma_2^2}{n}}\right)$$

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

$$I = \left(\bar{x} - \bar{y} \pm t_{m+n-2;\alpha/2}\ s_p\sqrt{\frac{1}{m} + \frac{1}{n}}\right)$$

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

$$I = \left(\bar{x} - \bar{y} \pm t_{f;\alpha/2}\sqrt{\frac{s_1^2}{m} + \frac{s_2^2}{n}}\right)$$

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

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

$$I = \left(\frac{s_1^2/s_2^2}{F_{m-1;n-1;\alpha/2}}\ ,\ \frac{s_1^2/s_2^2}{F_{m-1;n-1;1-\alpha/2}}\right)$$

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

$(X_1, \ldots X_m)$ m. a. de $X \sim$ Bernoulli(p_1).
$(Y_1, \ldots Y_n)$ m. a. de $Y \sim$ Bernoulli(p_2).
Intervalo de confianza $1-\alpha$ para $p_1 - p_2$:

$$I = \left(\bar{x} - \bar{y} \pm z_{\alpha/2}\sqrt{\frac{\bar{x}(1-\bar{x})}{m} + \frac{\bar{y}(1-\bar{y})}{n}}\right)$$

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); $R = \left\{ |\bar{x} - \mu_0| > z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \right\}$

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

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

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

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

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

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

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

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

2) $X \sim$ Bernoulli(p) (muestras grandes)

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

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

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

3) $X \sim$ Poisson(λ) (muestras grandes)

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

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

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

4) Dos poblaciones Normales (muestras independientes).

$(X_1,\ldots,X_m)$ m. a. de $X \sim N(\mu_1,\sigma_1)$; se calcula $\bar{x}$ y s_1^2.

$(Y_1,\ldots,Y_n)$ m. a. de $Y \sim N(\mu_2,\sigma_2)$; se calcula $\bar{y}$ y s_2^2.

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

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

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

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

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

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

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

$H_0: \mu_1 \geq \mu_2$ (σ_1, σ_2 conocidas); $\quad R = \left\{ \bar{x}-\bar{y} < z_{1-\alpha}\sqrt{\frac{\sigma_1^2}{m} + \frac{\sigma_2^2}{n}} \right\}$

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

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

$H_0: \sigma_1 = \sigma_2$; $\quad R = \left\{ s_1^2/s_2^2 \notin \left(F_{m-1;n-1;1-\alpha/2}\ ,\ F_{m-1;n-1;\alpha/2}\right) \right\}$

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

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

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

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

$(X_1,\ldots,X_m)$ m. a. de $X \sim$ Bernoulli(p_1).

$(Y_1,\ldots,Y_n)$ m. a. de $Y \sim$ Bernoulli(p_2).

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

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

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

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