FORMULAS CONTRASTES HIPOSTESIS

UNA MUESTRA

Inferencia Estadística: Tests de hipótesis

Contrastes para **una población Normal**:
Contrastes sobre la **media**

Varianza Conocida

Estadístico de contraste

$$Z = \frac{\overline{X} - \mu_0}{\sigma_0 / \sqrt{n}} \rightarrow N(0,1)$$

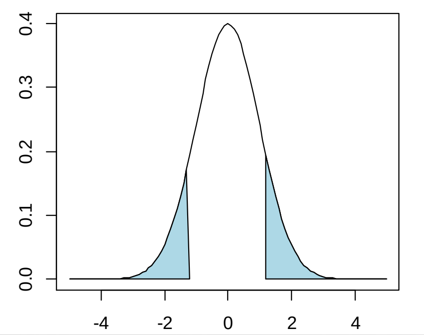
Hipótesis del test

$$H_0 : \mu = \mu_0 \qquad H_1 : \mu \neq \mu_0$$

$$H_0 : \mu \leq \mu_0 \qquad H_1 : \mu > \mu_0$$

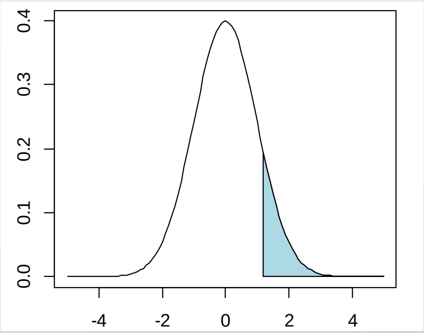
$$H_0 : \mu \geq \mu_0 \qquad H_1 : \mu < \mu_0$$

Criterio de rechazo

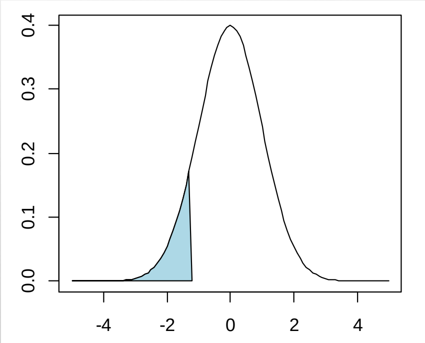


$$z_{exp} \leq -z_{\alpha/2}$$

$$z_{exp} \geq z_{\alpha/2}$$



$$z_{exp} \geq z_{\alpha}$$



$$z_{exp} \leq -z_{\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para **una población** Normal:
Contrastes sobre la **media**

Varianza Desconocida

Estadístico de contraste

$$T = \frac{\overline{X} - \mu_0}{S/\sqrt{n}} \to t_{n-1}$$

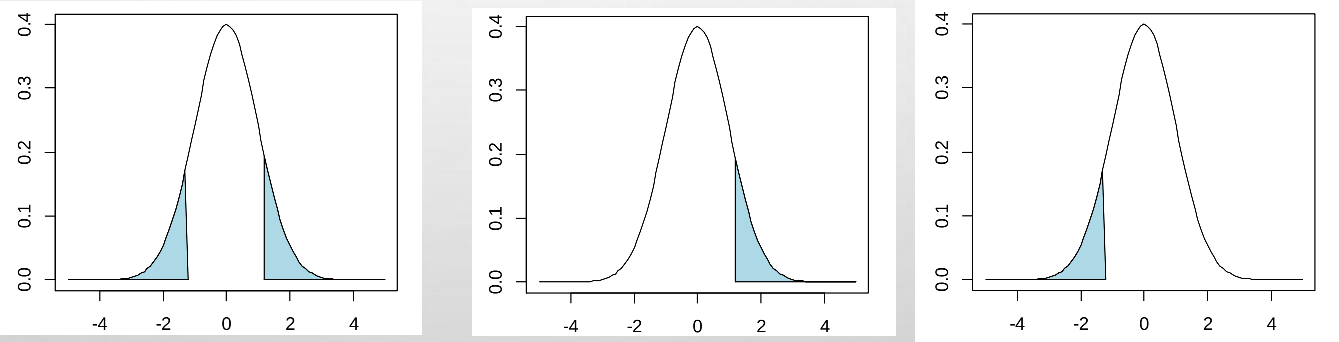
Hipótesis del test

$$H_0: \mu = \mu_0 \qquad H_1: \mu \neq \mu_0$$

$$H_0: \mu \leq \mu_0 \qquad H_1: \mu > \mu_0$$

$$H_0: \mu \geq \mu_0 \qquad H_1: \mu < \mu_0$$

Criterio de rechazo



$$t_{exp} \leq -t_{n-1,\alpha/2} \qquad t_{exp} \geq t_{n-1,\alpha/2}$$

$$t_{exp} \geq t_{n-1,\alpha}$$

$$t_{exp} \leq -t_{n-1,\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para una población Normal:
Contrastes sobre la media

Varianza Desconocida, n > 30

Estadístico de contraste

$$Z = \frac{\overline{X} - \mu_0}{S / \sqrt{n}} \rightarrow N(0,1)$$

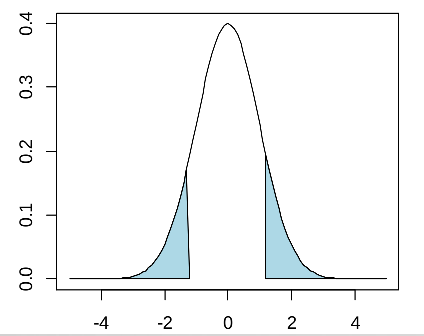
Hipótesis del test

$$H_0 : \mu = \mu_0 \qquad H_1 : \mu \neq \mu_0$$

$$H_0 : \mu \leq \mu_0 \qquad H_1 : \mu > \mu_0$$

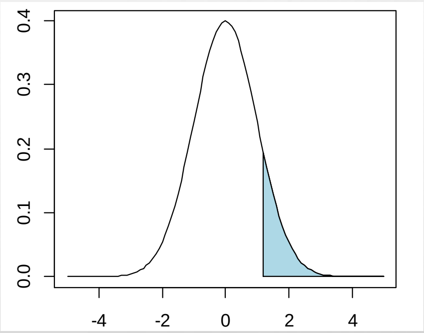
$$H_0 : \mu \geq \mu_0 \qquad H_1 : \mu < \mu_0$$

Criterio de rechazo

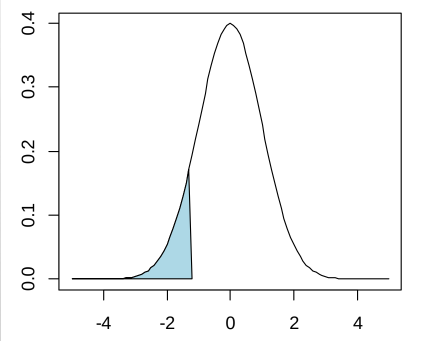


$$Z_{\exp} \leq -Z_{\alpha/2}$$

$$Z_{\exp} \geq Z_{\alpha/2}$$



$$Z_{\exp} \geq Z_{\alpha}$$



$$Z_{\exp} \leq -Z_{\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para **una población** Normal:
Contrastes sobre la **varianza**

Estadístico de contraste

$$\chi^2 = \frac{(n-1)S^2}{\sigma_0^2} \rightarrow \chi^2_{n-1}$$

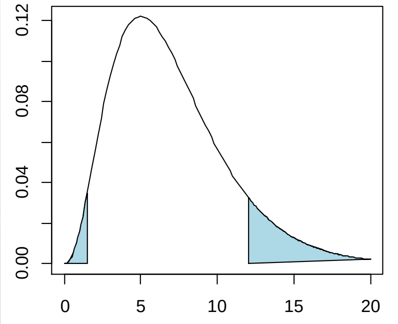
Hipótesis del test

$$H_0 : \sigma^2 = \sigma_0^2 \qquad H_1 : \sigma^2 \neq \sigma_0^2$$

$$H_0 : \sigma^2 \leq \sigma_0^2 \qquad H_1 : \sigma^2 > \sigma_0^2$$

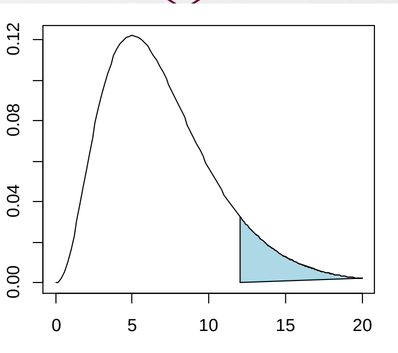
$$H_0 : \sigma^2 \geq \sigma_0^2 \qquad H_1 : \sigma^2 < \sigma_0^2$$

Criterio de rechazo

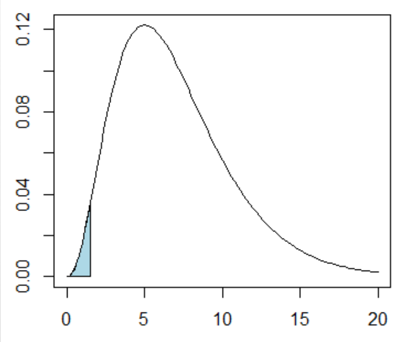


$$\chi^2_{\text{exp}} \leq \chi^2_{n-1,\,1-\alpha/2}$$

$$\chi^2_{\text{exp}} > \chi^2_{n-1,\,\alpha/2}$$



$$\chi^2_{\text{exp}} \geq \chi^2_{n-1,\,\alpha}$$



$$\chi^2_{\text{exp}} \leq \chi^2_{n-1,\,1-\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para una población Binomial:

Contrastes sobre una proporción

Estadístico de contraste

$$Z = \frac{\hat{P} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} \to N(0,1)$$

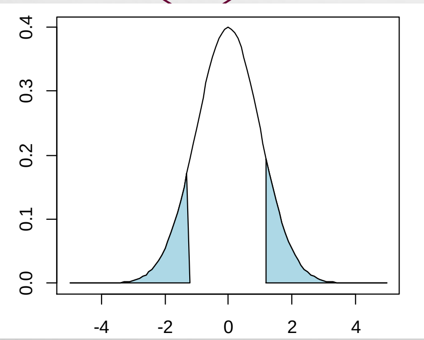
Hipótesis del test

$$H_0 : p = p_0 \qquad H_1 : p \neq p_0$$

$$H_0 : p \leq p_0 \qquad H_1 : p > p_0$$

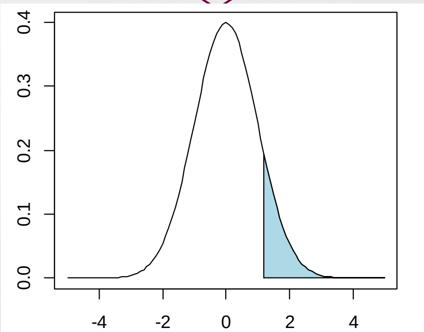
$$H_0 : p \geq p_0 \qquad H_1 : p < p_0$$

Criterio de rechazo

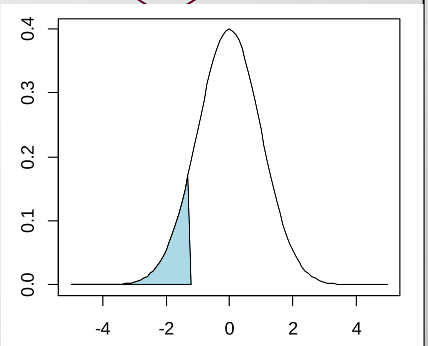


$$Z_{\exp} \leq -Z_{\alpha/2}$$

$$Z_{\exp} \geq Z_{\alpha/2}$$



$$Z_{\exp} \geq Z_{\alpha}$$



$$Z_{\exp} \leq -Z_{\alpha}$$

DOS MUESTRAS INDEPENDIENTES

Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:
Contrastes sobre la diferencia de medias

Varianzas Conocidas

Estadístico de contraste

$$Z = \frac{\left(\overline{X} - \overline{Y}\right) - \mu_0}{\sqrt{\dfrac{\sigma_x^2}{n_x} + \dfrac{\sigma_y^2}{n_y}}} \to N(0,1)$$

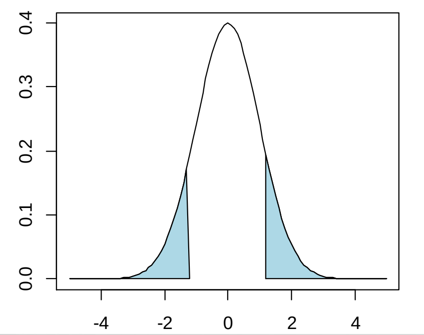
Hipótesis del test

$$H_0 : \mu_x - \mu_y = \mu_0 \qquad H_1 : \mu_x - \mu_y \neq \mu_0$$

$$H_0 : \mu_x - \mu_y \leq \mu_0 \qquad H_1 : \mu_x - \mu_y > \mu_0$$

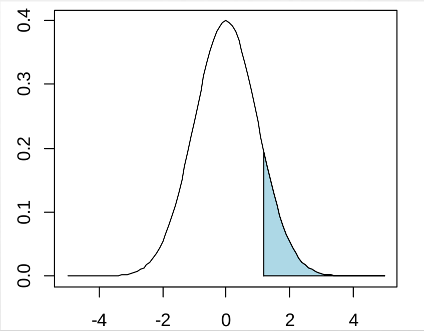
$$H_0 : \mu_x - \mu_y \geq \mu_0 \qquad H_1 : \mu_x - \mu_y < \mu_0$$

Criterio de rechazo

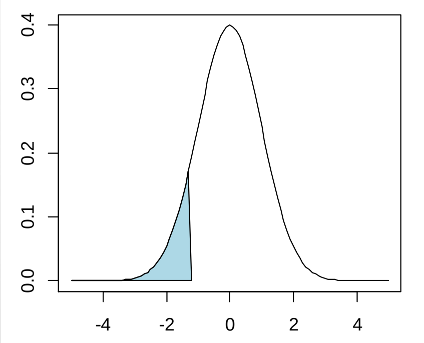


$$Z_{\exp} \leq -Z_{\alpha/2}$$

$$Z_{\exp} \geq Z_{\alpha/2}$$



$$Z_{\exp} \geq Z_{\alpha}$$



$$Z_{\exp} \leq -Z_{\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:
Contrastes sobre la diferencia de medias

Varianzas desconocidas pero iguales

$$S_p = \sqrt{\frac{(n_x - 1)S_x^2 + (n_y - 1)S_y^2}{n_x + n_y - 2}}$$

Estadístico de contraste

$$T = \frac{\overline{X} - \overline{Y} - \mu_0}{S_p \sqrt{\frac{1}{n_x} + \frac{1}{n_y}}} \to t_{n_x + n_y - 2}$$

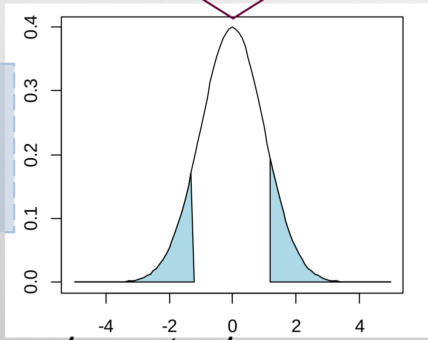
Hipótesis del test

$$H_0 : \mu_x - \mu_y = \mu_0 \qquad H_1 : \mu_x - \mu_y \neq \mu_0$$

$$H_0 : \mu_x - \mu_y \leq \mu_0 \qquad H_1 : \mu_x - \mu_y > \mu_0$$

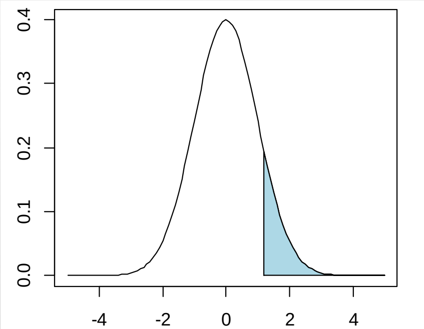
$$H_0 : \mu_x - \mu_y \geq \mu_0 \qquad H_1 : \mu_x - \mu_y < \mu_0$$

Criterio de rechazo

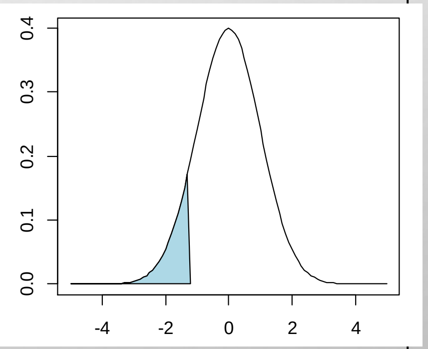


$$t_{\exp} \leq -t_{n_x + n_y - 2, \alpha/2}$$

$$t_{\exp} \geq t_{n_x + n_y - 2, \alpha/2}$$



$$t_{\exp} \geq t_{n_x + n_y - 2, \alpha}$$



$$t_{\exp} \leq -t_{n_x + n_y - 2, \alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:
Contrastes sobre la diferencia de medias

Varianzas desconocidas, distintas o no, tamaños muestrales grandes ($n_x, n_y \geq 30$)

Estadístico de contraste

$$Z = \frac{\left(\overline{X} - \overline{Y}\right) - \mu_0}{\sqrt{\frac{S_x^2}{n_x} + \frac{S_y^2}{n_y}}} \to N(0,1)$$

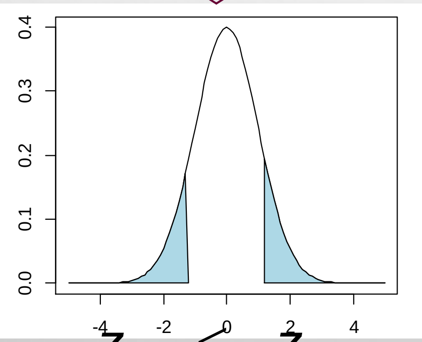
Hipótesis del test

$$H_0 : \mu_x - \mu_y = \mu_0 \qquad H_1 : \mu_x - \mu_y \neq \mu_0$$

$$H_0 : \mu_x - \mu_y \leq \mu_0 \qquad H_1 : \mu_x - \mu_y > \mu_0$$

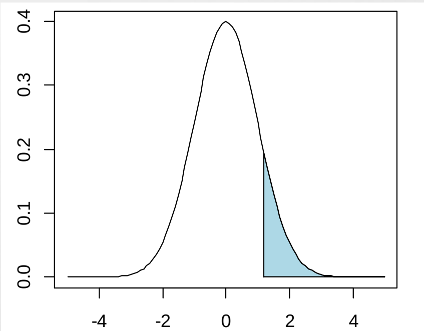
$$H_0 : \mu_x - \mu_y \geq \mu_0 \qquad H_1 : \mu_x - \mu_y < \mu_0$$

Criterio de rechazo

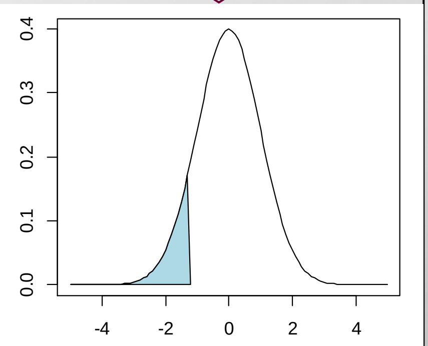


$$z_{\exp} \leq -z_{\alpha/2}$$

$$z_{\exp} \geq z_{\alpha/2}$$



$$z_{\exp} \geq z_{\alpha}$$



$$z_{\exp} \leq -z_{\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Normales:
Contrastes sobre el cociente de varianzas

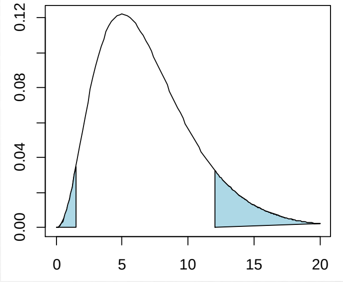
Estadístico de contraste

$$F = \frac{S_x^2}{S_y^2} \rightarrow F_{n_x-1,\, n_y-1}$$

Hipótesis del test

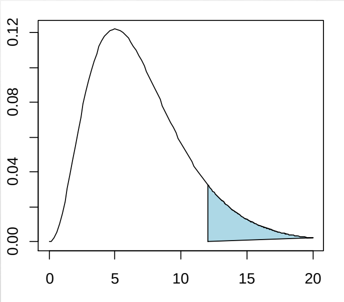
Criterio de rechazo

$$H_0: \sigma_x^2 = \sigma_y^2$$
$$H_1: \sigma_x^2 \neq \sigma_y^2$$



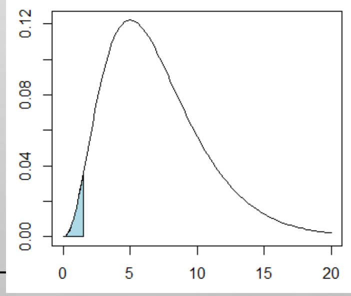
$$F_{\text{exp}} \leq F_{n_x-1,\, n_y-1,\, 1-\alpha/2}$$
$$F_{\text{exp}} \geq F_{n_x-1,\, n_y-1,\, \alpha/2}$$

$$H_0: \sigma_x^2 \leq \sigma_y^2$$
$$H_1: \sigma_x^2 > \sigma_y^2$$



$$F_{\text{exp}} \geq F_{n_x-1,\, n_y-1,\, \alpha}$$

$$H_0: \sigma_x^2 \geq \sigma_y^2$$
$$H_1: \sigma_x^2 < \sigma_y^2$$



$$F_{\text{exp}} \leq F_{n_x-1,\, n_y-1,\, 1-\alpha}$$

Inferencia Estadística: Tests de hipótesis

Contrastes para dos poblaciones Binomiales:

Contrastes sobre la diferencia de proporciones

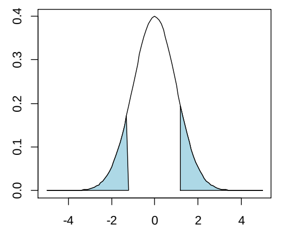
Estadístico de contraste

$$Z = \frac{\left(\hat{P}_X - \hat{P}_y\right) - p_0}{\sqrt{\dfrac{\hat{P}_x\left(1-\hat{P}_x\right)}{n_x} + \dfrac{\hat{P}_y\left(1-\hat{P}_y\right)}{n_y}}} \to N(0,1)$$

Criterio de rechazo

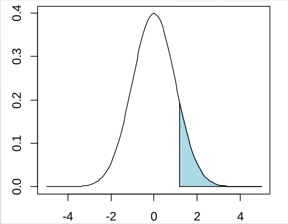
Hipótesis del test

$$H_0 : p_x - p_y = p_0$$
$$H_1 : p_x - p_y \neq p_0$$



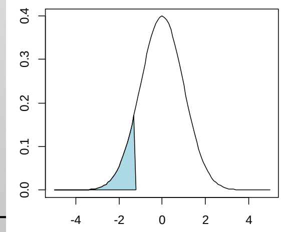
$$z_{\exp} \leq -z_{\alpha/2}$$
$$z_{\exp} \geq z_{\alpha/2}$$

$$H_0 : p_x - p_y \leq p_0$$
$$H_1 : p_x - p_y > p_0$$



$$z_{\exp} \geq z_{\alpha}$$

$$H_0 : p_x - p_y \geq p_0$$
$$H_1 : p_x - p_y < p_0$$



$$z_{\exp} \leq -z_{\alpha}$$