

Estadística descriptiva*Media muestral*

$$\bar{x} = \frac{x_1 + \cdots + x_n}{n}$$

(Cuasi)varianza muestral

$$S^2 = \frac{(x_1 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n - 1} = \frac{n}{n - 1} \left(\frac{x_1^2 + \cdots + x_n^2}{n} - \bar{x}^2 \right)$$

Covarianza

$$S_{xy} = \frac{(x_1 - \bar{x})(y_1 - \bar{y}) + \cdots + (x_n - \bar{x})(y_n - \bar{y})}{n - 1} = \frac{n}{n - 1} \left(\frac{x_1 y_1 + \cdots + x_n y_n}{n} - \bar{x} \bar{y} \right)$$

Correlación

$$r_{xy} = \frac{S_{xy}}{S_x S_y}$$

Recta de mínimos cuadrados

$$y - \bar{y} = \frac{S_{xy}}{S_x^2} (x - \bar{x}) \quad \text{ó} \quad y - \bar{y} = r_{xy} \frac{S_y}{S_x} (x - \bar{x})$$

Intervalos de confianza (una muestra)*Media de una pob. normal* (σ conocida): $\left[\bar{x} \mp z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \right]$ *Media de una pob. normal* (σ desconocida): $\left[\bar{x} \mp t_{n-1, \alpha/2} \frac{s}{\sqrt{n}} \right]$ *Media de una pob. general* (σ desconocida): $\left[\bar{x} \mp z_{\alpha/2} \frac{s}{\sqrt{n}} \right]$ (n grande)*Proporción*: $\left[\hat{p} \mp z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \right]$ (n grande)*Parámetro λ de una distribución de Poisson*: $\left[\bar{x} \mp z_{\alpha/2} \sqrt{\frac{\bar{x}}{n}} \right]$ (n grande)*Varianza de una pob. normal*:

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

Intervalos de confianza (dos muestras)

Diferencia de medias (pob. normales, muestras independientes, varianzas iguales):

$$\left[(\bar{x} - \bar{y}) \mp t_{m+n-2; \alpha/2} s_p \sqrt{\frac{1}{m} + \frac{1}{n}} \right],$$

donde

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

Diferencia de medias (pob. normales, datos emparejados): $\left[\bar{d} \mp t_{n-1, \alpha/2} \frac{s_d}{\sqrt{n}} \right], (d_i = x_i - y_i).$

Diferencia de proporciones:

$$\left[(\hat{p}_1 - \hat{p}_2) \mp z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{m} + \frac{\hat{p}_2(1-\hat{p}_2)}{n}} \right] \quad (m \text{ y } n \text{ grandes})$$

Contrastes para la media de una pob. normal

$$H_0 : \mu \leq \mu_0 \quad R = \left\{ \frac{\bar{x} - \mu_0}{s/\sqrt{n}} > t_{n-1, \alpha} \right\}.$$

$$H_0 : \mu \geq \mu_0 \quad R = \left\{ \frac{\bar{x} - \mu_0}{s/\sqrt{n}} < -t_{n-1, \alpha} \right\}.$$

$$H_0 : \mu = \mu_0 \quad R = \left\{ \frac{|\bar{x} - \mu_0|}{s/\sqrt{n}} > t_{n-1, \alpha/2} \right\}.$$

Contrastes para una proporción (n grande)

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

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

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

Contrastes para el parámetro de una dist. de Poisson (n grande)

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

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

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

Contrastes para la varianza de una pob. normal

$$H_0 : \sigma \leq \sigma_0 \quad R = \left\{ \frac{(n-1)s^2}{\sigma_0^2} \geq \chi_{n-1;\alpha}^2 \right\}.$$

$$H_0 : \sigma \geq \sigma_0 \quad R = \left\{ \frac{(n-1)s^2}{\sigma_0^2} \leq \chi_{n-1;1-\alpha}^2 \right\}.$$

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

Contrastes para dos medias (muestras independientes, varianzas iguales)

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

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

Contrastes para dos medias (datos emparejados)

$$H_0 : \mu_1 = \mu_2 \quad R = \left\{ \frac{|\bar{d}|}{S_d/\sqrt{n}} > t_{n-1; \alpha/2} \right\}, \text{ donde } d_i = x_i - y_i.$$

$$H_0 : \mu_1 \leq \mu_2 \quad R = \left\{ \frac{\bar{d}}{S_d/\sqrt{n}} > t_{n-1; \alpha} \right\}.$$

Contrastes para dos proporciones (m y n grandes):

$$H_0 : p_1 = p_2 \quad R = \left\{ \frac{|\hat{p}_1 - \hat{p}_2|}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{m} + \frac{1}{n}\right)}} > z_{\alpha/2} \right\}.$$

$$H_0 : p_1 \leq p_2 \quad R = \left\{ \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{m} + \frac{1}{n}\right)}} > z_{\alpha} \right\}, \text{ donde}$$

$$\bar{p} = \frac{m\hat{p}_1 + n\hat{p}_2}{m+n}.$$

Contraste para dos varianzas de pob. normales

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

Contraste de bondad de ajuste χ^2

$$T = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i} = \sum_{i=1}^k \frac{O_i^2}{E_i} - n$$

$$R = \{T > \chi_{k-1-r; \alpha}^2\}$$