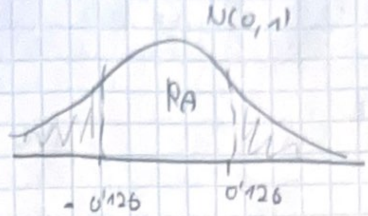
Est contraste

$$\frac{0'52-0'5}{\sqrt{\frac{0'5(1-0'5)}{10}}} = 0'126$$



p valor $= P(Z > 0'126) + P(Z < -0'126)$

$= 2P(Z > 0'126)$

$\alpha <$ p-valor → acepto H_0

$\alpha >$ p-valor → rechazo

8: $\alpha = 0'05$

	Con gafas	Sin gafas
Delincuente juvenil	1	8
No delincuente juvenil	5	2

$P(\bar{D} \cap G) = \frac{5}{7}$ $\quad \hat{p}_x = \frac{5}{7}$ $\quad n = 7$

$P(D)_G = \frac{1}{9}$ $\quad \hat{p}_y = \frac{1}{9}$ $\quad m = 9$

X = " no delincuentes y gafas "

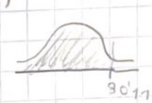
Y = " Delincuentes "

$H_0: p_x > p_y \Rightarrow p_x - p_y \geq 0$

$H_1: p_x - p_y < 0$

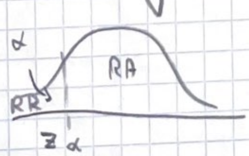
$$\frac{(\hat{p}_x - \hat{p}_y) - (p_x - p_y)}{\sqrt{\frac{p_x q_x}{n} + \frac{p_y q_y}{m}}} \sim N(0,1)$$

pvalor $= P(Z < 3'011)$



$$\frac{\frac{5}{7} - \frac{1}{9}}{\sqrt{\frac{\frac{5}{7}\cdot(1-\frac{5}{7})}{7} + \frac{\frac{1}{9}\cdot(1-\frac{1}{9})}{9}}} = -3'011$$

RR$(-\infty, -1'65)$



$z_{0'05} = -z_{0'95} \Rightarrow -1'65$ $\quad$ RA$(-1'65, \infty)$

acepto H_0

9- $\hat{p} = \frac{35}{500}$ $n = 500$

$\hat{p} = 0'07$

$\hat{p} \sim \left(p, \frac{pq}{n}\right)$

a) $IC\left(\hat{p} \pm z_{1-\frac{\alpha}{2}} \cdot \sqrt{\frac{p \cdot q}{n}}\right)$

$1-\alpha = 0'95$
$\alpha = 0'05$

$IC = \left(0'07 - 1'96\sqrt{\frac{0'07 \cdot 0'93}{500}},\ 0'07 + 1'96\sqrt{\frac{0'07 \cdot 0'93}{500}}\right)$

$I_C = (0'047,\ 0'092)$

En un 95% de las ocasiones la media se encontrará en ese intervalo

b) $H_0:\ p \leq 0'04$

$H_1:\ p > 0'04$

$\frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \frac{0'07 - 0'04}{\sqrt{\frac{0'04 \cdot 0'96}{500}}} = 3'42$

$\in$

z_α
$-1'96$

RR $(-\infty, -1'96)$

RA $(-1'96, \infty)$ no aceptamos el ministro.

10.- $X_1, \dots, X_{50}$ $\quad \bar{X} = 10'5 \quad S_c = 3'25$

a) $\bar{X} \sim N\left(\mu, \frac{\sigma^2}{n}\right) \qquad \frac{(n-1) S_c^2}{\sigma^2} \sim \chi^2_{n-1}$

$$\frac{X}{\sqrt{\frac{Y}{k}}} \sim t_k \qquad \underbrace{\frac{Y}{k}}_{Y \cdot \frac{1}{k}}$$

$$\frac{\frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}}}{\sqrt{\frac{(n-1) S_c^2}{\sigma^2} \cdot \frac{1}{(n-1)}}} \sim t_{n-1}$$

$$IC = \left(\bar{X} \pm t_{n-1, 1-\frac{\alpha}{2}} \cdot \frac{S_c}{\sqrt{n}}\right)$$

$$\frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}} : \frac{S_c}{\sigma}$$

$t_{49, 1-\frac{0'01}{2}} = 2'678$

$$\frac{(\bar{X} - \mu) \cdot \sigma}{\frac{\sigma}{\sqrt{n}} \cdot S_c} = \frac{\bar{X} - \mu}{\frac{S_c}{\sqrt{n}}} \sim t_{n-1}$$

$$I_c = \left(10'5 - 2'678 \cdot \frac{3'25}{\sqrt{50}}\right., \left. 10'5 + 2'678 \cdot \frac{3'25}{\sqrt{50}}\right) = (9'26, 11'73)$$

b) $\bar{X} = 10'5 \qquad \bar{Y} = 9 \qquad H_0: \mu_X > \mu_Y \Rightarrow \mu_X - \mu_Y \geq 0$

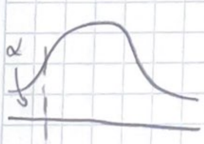
$S_{cX} = 3'25 \qquad S_{cY} = 3'5 \qquad H_1: \mu_X - \mu_Y < 0$

$n = 50 \qquad m = 100$

$$\frac{10'5 - 9}{3'29 \cdot \sqrt{\frac{1}{50} + \frac{1}{100}}} = 2'5613 \qquad \frac{(\bar{X} - \bar{Y}) - (\mu_X - \mu_Y)}{S_T \sqrt{\frac{1}{n} + \frac{1}{m}}}$$

$\alpha = 0'05$

$$S_T^2 = \frac{(n-1) S_{cX}^2 + (m-1) S_{cY}^2}{n + m - 2}$$



RR $(-\infty, -1'960)$

RA $(-1'960, \infty)$

Acepto H_0.

$$S_T = \sqrt{\frac{499 \cdot 3'25^2 + 99 \cdot (3'5)^2}{598}} = 3'29$$

$t_{n+m-2, \frac{\alpha}{2}}$

$t_{598} = 0'005 \qquad -1'960$

p-valor $= P(t_{148} < 2'56)$

11- $n = 100$ $\bar{x} = 1'61$ $S_{cx}^2 = 2'3$

a) $\alpha = 0'05$

$$I_C = \left(\bar{x} \pm t_{n-1, 1-\frac{\alpha}{2}} \frac{S_c}{\sqrt{n}} \right) \qquad t_{99, 0'975} = 1'984$$

$$I_C = \left(1'61 \pm 1'984 \cdot \sqrt{\frac{2'3}{100}} \right) = (1'3, 1'91)$$

b) $m = 200$ $\bar{y} = 1'5$ $S_{cy}^2 = 4$

$H_0: \mu_x - \mu_y = 0$

$H_0: \mu_x - \mu_y \neq 0$

$$\frac{(\bar{x} - \bar{y}) - (\mu_x - \mu_y)}{\sqrt{\frac{S_{cx}^2}{n} + \frac{S_{cy}^2}{m}}} \sim t_{n+m-2-\delta}$$

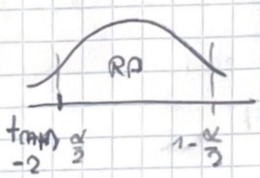
$$\delta_r = \frac{(n-1) S_{cx}^2 + (m-1) \frac{S_{cy}^2}{m}}{(n-1)\left(\frac{S_{cx}^2}{n}\right)^2 + (m-1)\left(\frac{S_{cy}^2}{m}\right)^2}$$

$\downarrow$

$0'4845$

$S_r = 1'85$

$\alpha = 0'1$



$RA = (-1'654, 1'645)$ Ho aceptada.

$RA = (-1'960, 1'960)$ Ho aceptada

$RA = (-2'576, 2'576)$ Ho aceptada.

$\alpha = 0'1$ $1'645$

$\alpha = 0'05$

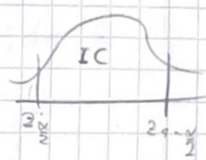
$\alpha = 0'01$

12= $n = 45$ $\hat{p} = \frac{12}{45}$

a) $\alpha = 0'01$

$$\hat{p} \sim N\left(p, \frac{pq}{n}\right) \qquad \frac{\hat{p}-p}{\sqrt{\frac{pq}{n}}} \sim N(0,1)$$

$$I_c = \left(\hat{p} \pm z_{1-\frac{\alpha}{2}} \sqrt{\frac{pq}{n}}\right)$$

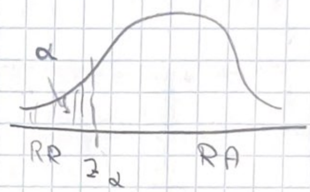


$$I_c = \left(\frac{12}{45} - 2'58\sqrt{\frac{\frac{12}{45}\cdot\frac{33}{45}}{45}},\ \frac{12}{45} + 2'58\sqrt{\frac{\frac{12}{45}\cdot\frac{33}{45}}{45}}\right)$$

$$I_c = (0'096,\ 0'43)$$

b) $H_0: p \geq 0'3$

$H_1: p < 0'3$



$-z_{0'995} = 2'58$

$RA = (-2'58, \infty)$

$RR = (-\infty, -2'58)$

$$\frac{\frac{12}{45} - 0'3}{\sqrt{\frac{0'3 \cdot 0'7}{45}}} = -0'48$$

Confirmo H_0: deberían actuar

$y = a + bx$

13- $y = 3'74 + 0'625x$

a) $x = 4'2 + 0'4y$

$\hat{b}_x = \frac{S_{xy}}{S_x^2}$ $\qquad S_{xy} = S_{xy}$

$\hat{b}_y = \frac{S_{xy}}{S_y^2}$ $\qquad S_x^2 \cdot 0'625 = 0'4 S_y^2$

$a = \bar{y} - \hat{b} \cdot \bar{x}$

$3'74 = \bar{y} - \hat{b}_x \cdot \bar{x}$ $\qquad \bar{y} = 3'74 + 0'625\bar{x}$

$4'2 = \bar{x} - \hat{b}_y \cdot \bar{y}$ $\qquad \bar{y} = \frac{4'2 - \bar{x}}{-0'4}$

$3'74 + 0'625\bar{x} = \frac{4'2 - \bar{x}}{-0'4}$

$7'5946 = \bar{x}$ $\qquad \bar{x} = 7'5946$

$\bar{y} = 8'486$

$r_{xy} = \frac{S_{xy}}{S_x \cdot S_y}$ $\qquad S_{xy} = 0'625 S_x^2$

$r_{xy} = \frac{0'625 S_x}{S_y}$ $\qquad S_y = \sqrt{\frac{0'625}{0'4}} \cdot S_x$

$r_{xy} = \frac{0'625}{\sqrt{\frac{0'625}{0'4}}} = 0'5$

$R^2_{xy} = r_{xy}^2 = 0'25$ $\qquad$ 25% cada modelo

b) Que sea creciente implica que $b_x > 0$
y que la otra decrezc implica $b_y < 0$

$b_x = \frac{S_{xy}}{S_x^2}$ $\qquad b_y = -\frac{S_{xy}}{S_y^2}$

$S_{xy} = S_{xy} \rightarrow S_x^2 b_x = -S_y^2 b_y$

no pueden, además sería contradictorio.
estaria diciendo que en una son dir rel y en otra inv. rel.

14- var. x = {0, 2, 4, 6, 8, 10}

var. y = {439, 439'12, 439'2, 439'31, 439'4, 439'5}

$\bar{x} = 5$

$\bar{y} = 439'256$

$b = \frac{S_{xy}}{S_x^2}$

$S_{xy} = \frac{1}{6} \sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y}) = 0'573$

$a = \bar{y} - \hat{b}\bar{x}$

$y = a + \hat{b}x \qquad y = \bar{y} + b(x - \bar{x})$

$S_x^2 = 11'6$

$b = \frac{0'573}{11'6} = 0'049$

$S_y^2 = 0'02823$

$y = 439'011 + 0'049x$

Coef cor

$r_{xy} = \frac{S_{xy}}{S_x S_y} = \frac{0'573}{\sqrt{11'6 \cdot 0'02823}} = 0'999$ es un buen ajuste

Coef det

$R^2_{xy} = 0'999^2 = 0'998$

Calculadora:

Modo estadistico $y = a + bx$

Regresión { $b = 0'049$ pendiente de nuestra recta

$r = 0'99$ coef de cor.

$a = 439'011$ term indep.

Calc-2-variables { $\bar{x} = 5$ media

$\sigma_x^2 = 11'6$ varianza

$n = 6$ tamaño muestral

$S_x^2 = 14$ cuasivarianza