Descriptiva Bivariante y Regresión

Ejercicio 7.

Descriptiva bivariante y regresión

Sabiendo que:

$$\bar{x} = 3, \qquad s_X^2 = 6, \qquad s_Y^2 = 8$$

Y que la recta de regresión de Y sobre X es:

$$y = 4 - 0.667x$$

a) Obtener la recta de regresión de X sobre Y.

$\beta_1 = r_{xy} \cdot \frac{s_y}{s_x} = \frac{s_{xy}}{s_x \cdot s_y} \cdot \frac{s_y}{s_x} = \frac{s_{xy}}{s_x^2}$

$Y = \underbrace{4}_{\beta_0} - \underbrace{0.667}_{\beta_1} X$

$\beta_0 = \bar{y} - \beta_1 \cdot \bar{x}$

$\beta_1 = \frac{s_{xy}}{s_x^2}$

$X = \tilde{\beta}_0 + \tilde{\beta}_1 \cdot Y$

$\tilde{\beta}_0 = \bar{x} - \tilde{\beta}_1 \cdot \bar{y}$

$\tilde{\beta}_1 = \frac{s_{xy}}{s_y^2}$

$-0.667 = \beta_1 = \frac{s_{xy}}{s_x^2} = \frac{s_{xy}}{6}$

$s_{xy} = -0.667 * 6 = -4$

$4 = \beta_0 = \bar{y} - \beta_1 \cdot \bar{x} = \bar{y} + 0.667 \cdot 3$

$\downarrow$

$\bar{y} = 4 - 0.667 \times 3 = 2$

$\bar{y} = 2$, $\bar{x} = 3$, $S_x^2 = 6$, $S_y^2 = 8$, $S_{xy} = -4$.

$\tilde{\beta}_0 = \bar{x} - \tilde{\beta}_1 \cdot \bar{y} = 3 + 0.5 \times 2 = 4$

$\tilde{\beta}_1 = \frac{S_{xy}}{S_y^2} = \frac{-4}{8} = -0.5$

$X = 4 - 0.5 \cdot Y$