(13) x_n и y_m – незав. случ. вел-ны

$x \sim N(a, \sigma_x^2)$, $\sigma^2 = 2$

$y \sim N(b, \sigma_y^2)$, $\sigma_y^2 = 1$

$x = \{-1{,}11; -6{,}10; 2{,}42\}$

$y = \{-2{,}29; -2{,}91\}$

$H_0: \ a = b$

$H_1: \ a \neq b; \ a > b; \ a < b.$

$$\bar{x} - a \sim N\left(0; \frac{\sigma_x^2}{n}\right); \quad \bar{y} - b \sim N\left(0; \frac{\sigma_y^2}{m}\right)$$

$$\Delta = \bar{x} - \bar{y} - (a - b) \sim N\left(0, \frac{\sigma_x^2}{n} + \frac{\sigma_y^2}{m}\right)$$

$$\frac{\bar{x} - \bar{y} - (a - b)}{\sqrt{\frac{\sigma_x^2}{n} + \frac{\sigma_y^2}{m}}} \sim N(0, 1).$$

$$S_x^2 = \frac{1}{n-1} \Sigma (x_i - \bar{x})^2$$

$$S_y = \frac{1}{m-1} \Sigma (x_i - \bar{x})^2$$

$$\tilde{\Delta} = \frac{\bar{x} - \bar{y}}{\sqrt{\frac{S_x^2}{n} + \frac{S_y^2}{m}}} = 0{,}70$$

$a \neq b$: $\text{p-value} = P(|\Delta| > \tilde{\Delta} \mid H_0) = 2 \cdot \int_{0,7}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-x^2/2} = 0{,}48$

$a > b$: $\text{p-value} = P(\Delta > \tilde{\Delta} \mid H_0) = \int_{0,7}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-x^2/2} = 0{,}24$

$a < b$: p-value $= P(\Delta < \hat{\Delta} | H_0) = 1 - P(\Delta \geq \hat{\Delta} | H_0) =$

$$= 1 - \int_{0,7}^{\infty} \frac{1}{\sqrt{2\pi}} e^{-x^2/2} dx = 0,76.$$

нет оснований отвергать H_0.