1 RS1 2 CAMPIONI

$$S_x^2 = \frac{\sum_{i=1}^{n} (X_i - M_x)^2}{n-1}$$

$$S_y^2 = \frac{\sum_{i=1}^{m} (y_i - M_y)^2}{m-1}$$

$$E(S_x^2) = \sigma^2$$

$$E(S_y^2) = \sigma^2$$

$$S^2 = p_1 S_x^2 + (1-p_1) S_y^2 \qquad 0 \leq p_1 \leq 1$$

$$E(S^2) = p_1 \sigma^2 + (1-p_1)\sigma^2 = \sigma^2$$

$$Var(S^2) = Var(p_1 S_x^2) + Var((1-p_1) S_y^2)$$

$$= Var\left(\frac{p_1 \sigma^2}{n-1} \frac{S_x^2 (n-1)}{\sigma^2}\right) + Var\left(\frac{(1-p_1)\sigma^2}{m-1} \frac{S_y^2 (m-1)}{\sigma^2}\right) =$$

$$= \frac{p_1^2 \sigma^4}{(n-1)^2} 2(n-1) + \frac{(1-p_1)^2 \sigma^4}{(m-1)^2} 2(m-1) =$$

$$= 2\sigma^4 \left(\frac{1}{n-1} p_1^2 + \frac{1}{(m-1)} (1-p_1)^2\right)$$

$$\frac{\delta Var(S^2)}{\delta p_1} = 2\sigma^4 \left[2 p_1 \frac{1}{n-1} + \frac{2(1-p_1)(-1)}{m-1}\right]$$

$$= 4\sigma^2 \left[\frac{p_1}{n-1} + \frac{p_1}{m-1} - \frac{1}{m-1}\right]$$

Совпадение х типа

$$\frac{p_1}{n-1} + \frac{p_1}{m-1} = \frac{1}{m-1}$$

$$p_1 \left(\frac{n+m-2}{(n-1)(m-1)}\right) = \frac{1}{m-1}$$

$$p_1 = \frac{n-1}{m+n-2} \qquad (1-p_1) = \frac{m-1}{n+m-2}$$

$$S^2 = \frac{n-1}{n+m-2} S_x^2 + \frac{m-1}{n+m-2} S_y^2$$

$$= \frac{\sum_1^n (X_i - \mu_x)^2 + \sum_1^m (Y_i - \mu_y)^2}{n+m-2}$$

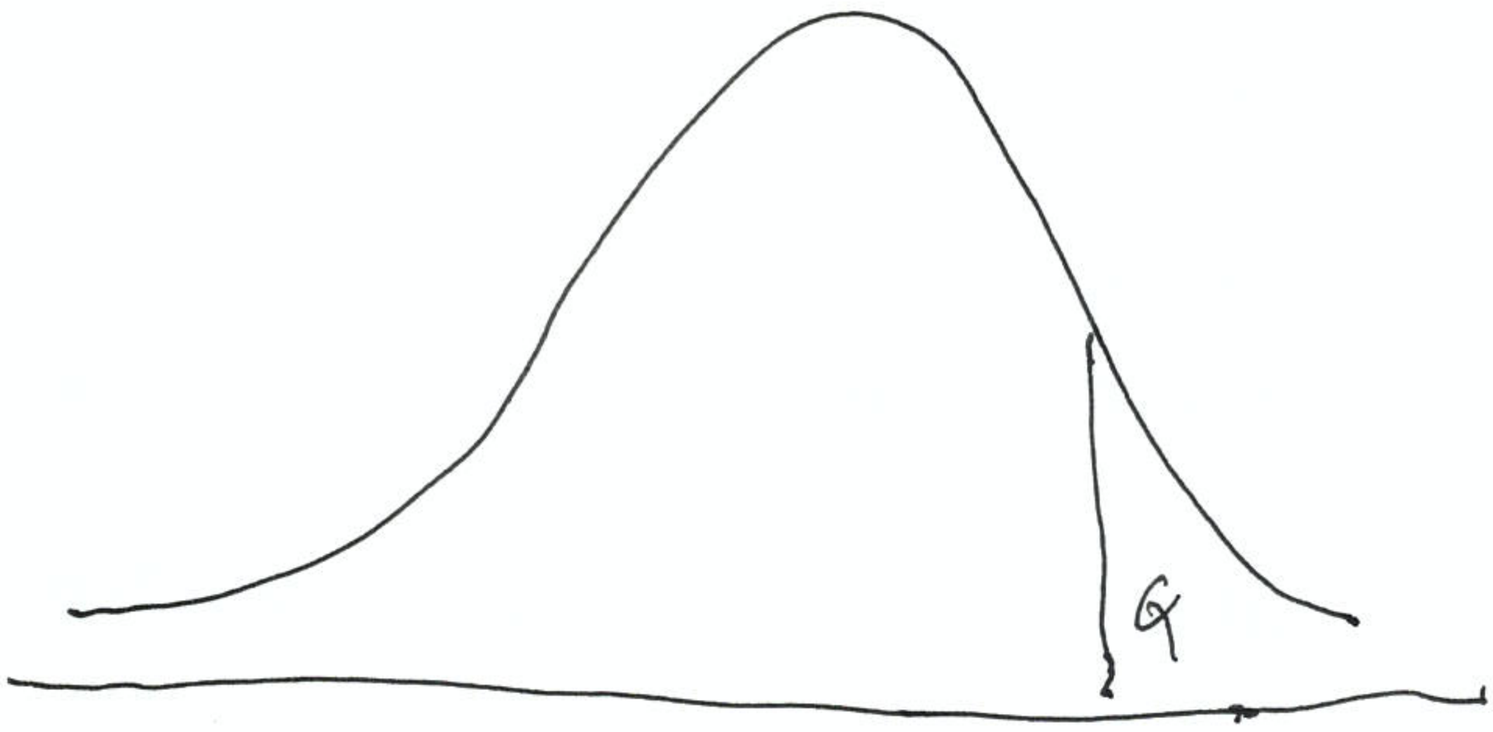
$$\frac{(n+m-2)S^2}{\sigma^2} \quad \boxed{\chi^2 \text{ con } (n+m-2) \text{ g.d.l}}$$

$$\frac{\mu_x - \mu_y - (\mu_x - \mu_y)}{\left[\sigma^2 \left(\frac{1}{n} + \frac{1}{m}\right)\right]^{1/2}} \quad \boxed{\text{Normale Standard}}$$

$$\frac{\frac{\mu_x - \mu_y}{\sigma} \cdot \frac{1}{\left(\frac{1}{n} + \frac{1}{m}\right)^{1/2}}}{\sqrt{\frac{S^2}{\sigma^2}}} \quad \boxed{\text{t Student } n+m-2 \text{ g.d.l}}$$

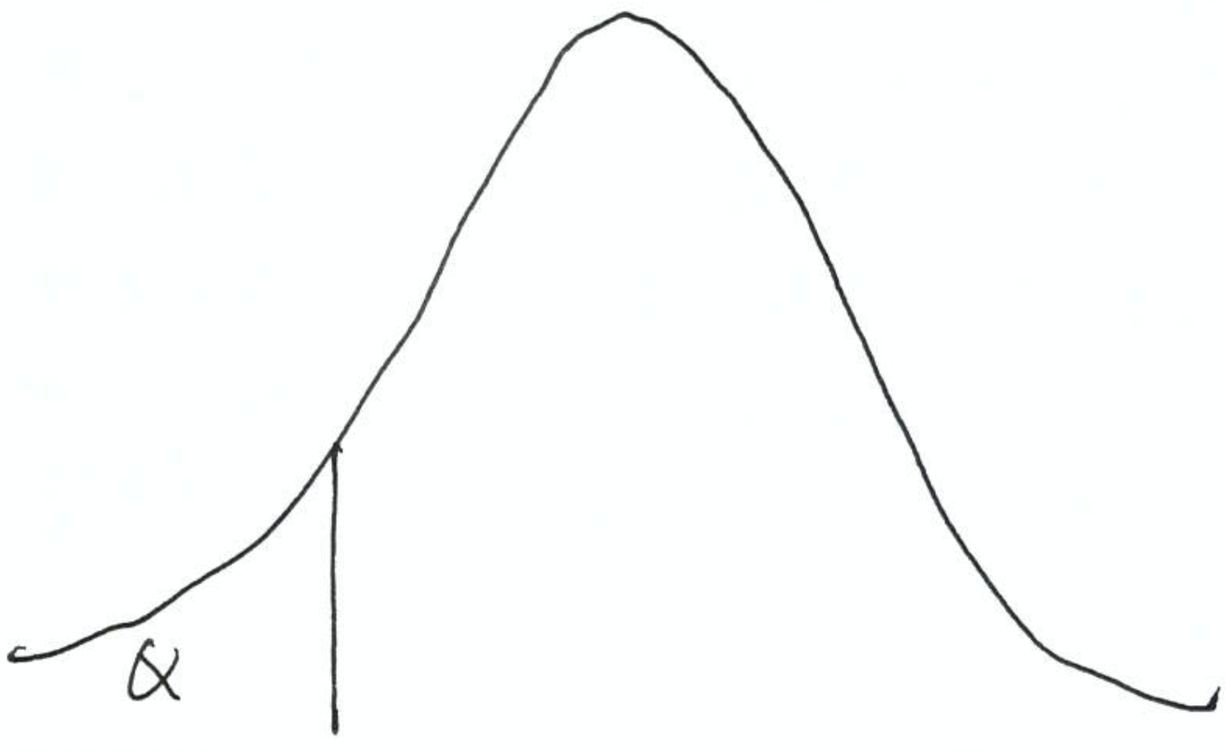
$$H_0 \div \mu_x - \mu_y = 0$$

$$T = \frac{\mu_x - \mu_y}{\sqrt{S^2 \left(\frac{1}{n} + \frac{1}{m} \right)}}$$



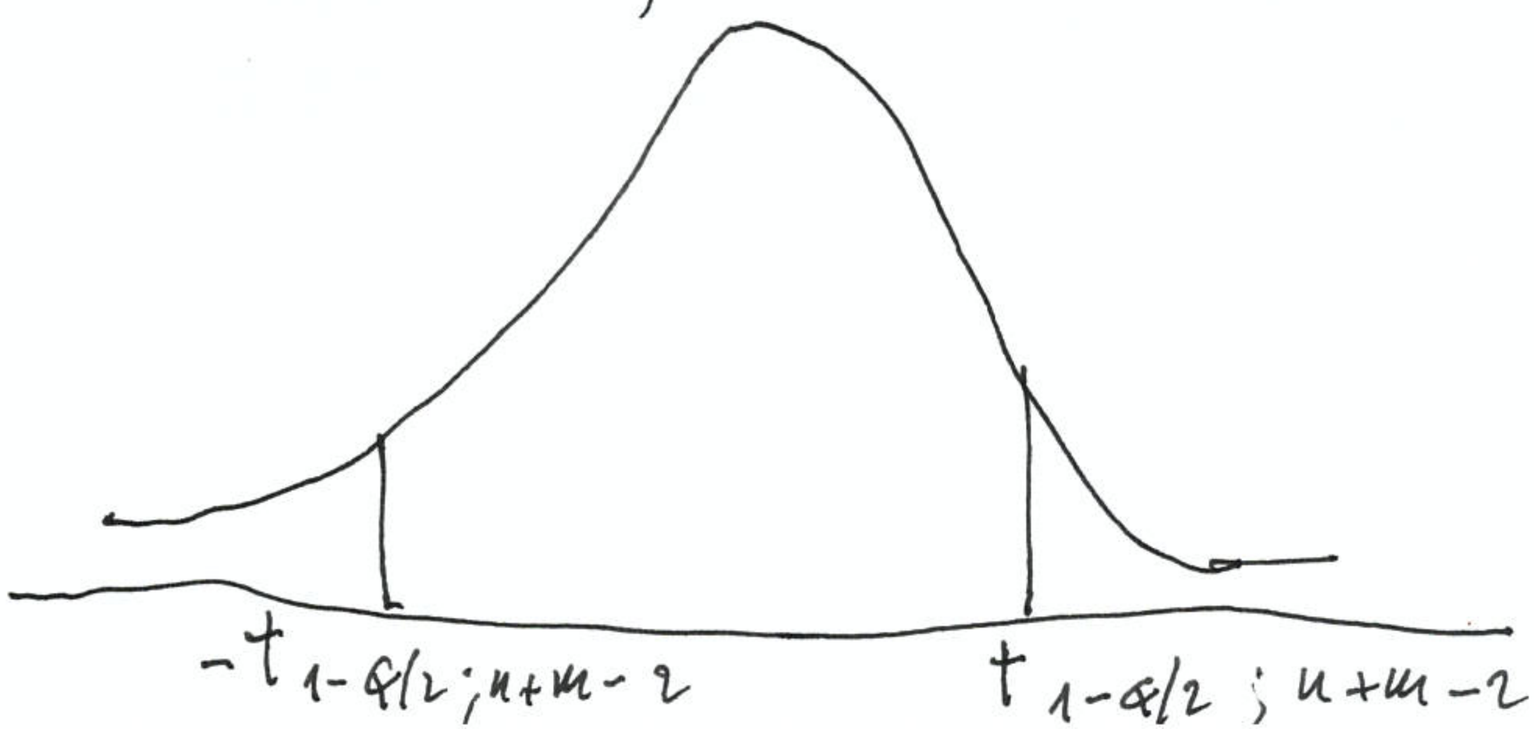
DX

$t_{1-\alpha;\, n+m-2}$



SX

$-t_{1-\alpha;\, n+m-2}$



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