

## Meritve 1:

Merilni pogrešek:

*absolutni:*  $E = x_i - x$      *relativni:*  $e = \frac{E}{x} = \frac{x_i - x}{x}$      *procentualni:*  $e = 100 \frac{E}{x} = 100 \frac{x_i - x}{x}$

Aritmetična sredina:  $\bar{x} = \frac{1}{n} \sum_{j=1}^n x_{i,j} = \frac{1}{n} \sum_{j=1}^m f_j x_{i,j} \approx \bar{x} + E_s$

Eksperimentalni standardni odklon:

$$s(x) = \sqrt{\frac{\sum_{j=1}^n (x_{i,j} - \bar{x})^2}{n-1}} \approx \sqrt{\frac{\sum_{j=1}^n E_{r,j}^2}{n}}$$

Skupni eksperimentalni standardni odklon:

$$s_p = \sqrt{\frac{(n_1 - 1)s_1^2(x) + (n_2 - 1)s_2^2(x) + \dots + (n_r - 1)s_r^2(x)}{(n_1 - 1) + (n_2 - 1) + \dots + (n_r - 1)}}$$

Relativna frekvenca:  $f'_k = \frac{f_k}{n}$

Standardni odklon aritmetične sredine:  $\sigma(\bar{x}) = \frac{\sigma}{\sqrt{n}}$

Eksperimentalni standardni odklon aritmetične sredine:  $s(\bar{x}) = \frac{s(x)}{\sqrt{n}} = u(x)$

Raven ali stopnja zaupanja:

*Gaussova (normalna) porazdelitev:*  $\mu = \bar{x} \pm z\sigma(\bar{x}) = \bar{x} \pm \frac{z\sigma}{\sqrt{n}}$

*Studentova (t) porazdelitev:*  $\mu = \bar{x} \pm ts(\bar{x}) = \bar{x} \pm \frac{ts(x)}{\sqrt{n}}$

Meja pogreška:

*absolutna:*  $M_x = \pm \frac{r}{100} x_D = \pm \frac{r}{100} x_i = \pm \frac{r}{100} x_R = \pm \frac{r}{100} \frac{l_D}{S} = \pm (ax_i + bx_D)$

*relativna:*  $m_x = \frac{M_x}{x_i}$

Merilna negotovost:  $u = \sqrt{u_A^2 + u_B^2}$

**standardna negotovost tipa A:**  $u(x) = \frac{s_p}{\sqrt{n}}$

**standardna negotovost tipa B:**

enakomerna porazdelitev:  $u(x) = \sigma = \frac{a}{\sqrt{3}}$

Studentova porazdelitev:  $u(x) = \frac{ts(x)/\sqrt{n}}{t}$

trapezna porazdelitev:  $u(x) = \frac{a\sqrt{1+\beta^2}}{\sqrt{6}}$

Gaussova porazdelitev:  $u(x) = \frac{z\sigma/\sqrt{n}}{z}$

trikotna porazdelitev:  $u(x) = \sigma = \frac{a}{\sqrt{6}}$

Standardna negotovost izhodne veličine:

**medsebojno neodvisne vhodne veličine:**

$$u_c(y) = \sqrt{u_1^2(y) + u_2^2(y) + \dots + u_N^2(y)} = \sqrt{[c_1 u(x_1)]^2 + [c_2 u(x_2)]^2 + \dots + [c_N u(x_N)]^2}$$

koeficienti občutljivosti:  $c_1 = \frac{\partial y}{\partial x_1}, c_2 = \frac{\partial y}{\partial x_2}, \dots, c_N = \frac{\partial y}{\partial x_N}$

**relativna negotovost:**  $\frac{u_c(y)}{y} = w_c(y) = \sqrt{w^2(x_1) + w^2(x_2)}$

**medsebojno odvisne vhodne veličine:**

$$u(x_1, x_2) = \frac{1}{n(n+1)} \sum_{i=1}^n (x_{1,i} - \bar{x}_1)(x_{2,i} - \bar{x}_2)$$

koeficient korelacije:  $r = \frac{u(x_1, x_2)}{u(x_1)u(x_2)} \quad -1 \leq r \leq 1$

vhodni veličini:  $X_1 = f(q_1, q_2, \dots, q_L) \quad X_2 = g(q_1, q_2, \dots, q_L)$

varianci vhodnih veličin:  $u^2(x_1) = \sum_{i=1}^L \left( \frac{\partial f}{\partial q_i} \right)^2 u^2(q_i) \quad u^2(x_2) = \sum_{i=1}^L \left( \frac{\partial g}{\partial q_i} \right)^2 u^2(q_i)$

kovarianca vhodnih veličin:  $u(x_1, x_2) = \sum_{i=1}^L \left( \frac{\partial f}{\partial q_i} \frac{\partial g}{\partial q_i} \right) u^2(q_i)$

$$u_c(y) = \sqrt{\sum_{i=1}^N [c_i u(x_i)]^2 + 2 \sum_{i=1}^{N-1} \sum_{j=i+1}^N c_i c_j r(x_i, x_j) u(x_i) u(x_j)}$$

Razširjena negotovost:  $U = k u_c(y)$

število stopenj prostosti:  $\nu = n - 1$

število efektivnih stopenj prostosti:  $\nu_{eff} = \frac{u_c^4(y)}{\sum_{i=1}^N u_i^4(y)/\nu_i} \leq \sum_{i=1}^N \nu_i$

$$U_p = k_p u_c(y) = t_p(\nu_{eff}) u_c(y)$$