STATISTIKA

VZORCE

Popisná statistika

Rozdělení četností

$$p_i = \frac{n_i}{n} \qquad \sum_{i=1}^{k} n_i = n \qquad \sum_{i=1}^{k} p_i = 1 \qquad i = 1, 2, ..., k$$

Kvantily $\tilde{x}_p$

$$n \cdot \frac{p}{100} < m_p < n \cdot \frac{p}{100} + 1$$

Průměry

$$\overline{x} = \frac{\sum_{i=1}^{n} x_i}{n} \qquad\qquad \overline{x} = \frac{\sum_{i=1}^{k} x_i \, n_i}{\sum_{i=1}^{k} n_i} \qquad\qquad \overline{x} = \sum_{i=1}^{k} x_i p_i$$

$$\overline{x}_H = \frac{n}{\sum_{i=1}^{n} \frac{1}{x_i}} \qquad\qquad \overline{x}_H = \frac{\sum_{i=1}^{k} n_i}{\sum_{i=1}^{k} \frac{n_i}{x_i}} \qquad\qquad \overline{x}_H = \frac{1}{\sum_{i=1}^{k} \frac{p_i}{x_i}}$$

$$\overline{x}_G = \sqrt[n]{\prod_{i=1}^{n} x_i} = \sqrt[n]{x_1 \cdot x_2 \cdot ... \cdot x_n} \qquad \overline{x}_G = \sqrt[n]{\prod_{i=1}^{k} x_i^{n_i}} = \sqrt[n]{x_1^{n_1} \cdot x_2^{n_2} \cdot ... \cdot x_k^{n_k}}$$

Rozpětí $\qquad R = x_{\max} - x_{\min} \qquad R_Q = \tilde{x}_{75} - \tilde{x}_{25}$

Rozptyl $\qquad s_x^2 = \frac{\sum_{i=1}^{n} (x_i - \overline{x})^2}{n} \qquad\qquad\qquad s_x^2 = \frac{\sum_{i=1}^{k} (x_i - \overline{x})^2 n_i}{\sum_{i=1}^{k} n_i}$

$$s_x^2 = \sum_{i=1}^{k} (x_i - \overline{x})^2 p_i$$

Směrodatná odchylka $\qquad s_x = \sqrt{s_x^2} \qquad$ variační koeficient $\qquad v_x = \frac{s_x}{\overline{x}}$

Analýza závislostí

Regrese a korelace
Regresní přímka

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$$

$$b_1 = \frac{n\sum y_i x_i - \sum x_i \sum y_i}{n\sum x_i^2 - (\sum x_i)^2} = \frac{\overline{xy} - \overline{x}\,\overline{y}}{\overline{x^2} - \overline{x}^2}$$

$$b_0 = \overline{y} - b_{yx}\overline{x}$$

korelační koeficient

$$r_{yx} = r_{xy} = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sqrt{n\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2}\sqrt{n\sum_{i=1}^{n} y_i^2 - (\sum_{i=1}^{n} y_i)^2}}$$

Časové řady

$$\Delta y_t = y_t - y_{t-1}$$

$$\overline{\Delta} = \frac{(y_2 - y_1) + (y_3 - y_2) + \ldots + (y_T - y_{T-1})}{T-1} = \frac{y_T - y_1}{T-1}$$

$$\delta_t = k_t - 1$$

$$k_t = \frac{y_t}{y_{t-1}}$$

$$\overline{k} = {}^{T-1}\!\sqrt{k_2 k_3 \ldots k_T} = {}^{T-1}\!\sqrt{\frac{y_T}{y_1}}$$