

List of statistical formulas without description

Data sampling & sorting

$$f_i = \frac{n_i}{n} \cdot 100[\%]$$

$$N_1 = n_1; N_2 = N_1 + n_2; N_3 = N_2 + n_3; \dots$$

$$F_1 = f_1; F_2 = F_1 + f_2; F_3 = F_2 + f_3; \dots$$

$$h = \frac{(\max - \min)}{m}$$

$$m = \sqrt{n}$$

Descriptive statistics

$$\mu = \frac{\sum x_i}{N} \text{ or } \mu = \frac{\sum x_i \cdot n_i}{N}$$

$$\bar{x} = \frac{\sum x_i}{n} \text{ or } \bar{x} = \frac{\sum x_i \cdot n_i}{n}$$

$$\text{IQR} = Q3 - Q1$$

$$R = \max - \min$$

$$\sigma^2 = \frac{\sum (x_i - \mu)^2}{N} \text{ or } \sigma^2 = \frac{\sum (x_i - \mu)^2 \cdot n_i}{N}$$

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1} \text{ or } s^2 = \frac{\sum (x_i - \bar{x})^2 \cdot n_i}{n-1}$$

$$\sigma = \sqrt{\sigma^2}$$

$$s = \sqrt{s^2}$$

$$CV_s = \frac{s}{\bar{x}} \cdot 100[\%]$$

$$\gamma_1 = \frac{\sum (x_i - \bar{x})^3}{s^3 \cdot n} \text{ or } \gamma_1 = \frac{\sum (x_i - \bar{x})^3 \cdot n_i}{s^3 \cdot n}$$

$$\gamma_2 = \frac{\sum (x_i - \bar{x})^4}{s^4 \cdot n} - 3 \text{ or } \gamma_2 = \frac{\sum (x_i - \bar{x})^4 \cdot n_i}{s^4 \cdot n} - 3$$

Theory of probability

no formulas

Point and interval estimate

$$\text{est } \mu = \bar{x}$$

$$\text{est } \sigma^2 = s_1^2$$

$$\text{est } \sigma = s_1$$

$$P(\bar{x} - \Delta < \mu < \bar{x} + \Delta) = 1 - \alpha$$

$$\Delta = u_{(1-\alpha/2)} \cdot \frac{s_1}{\sqrt{n}}$$

$$\Delta = t_{(\alpha; n-1)} \cdot \frac{s_1}{\sqrt{n}}$$

$$P\left(\frac{(n-1) \cdot s_1^2}{\chi_{(\alpha/2; n-1)}^2} < \sigma^2 < \frac{(n-1) \cdot s_1^2}{\chi_{(1-\alpha/2; n-1)}^2}\right) = 1 - \alpha$$

$$P\left(\sqrt{\frac{(n-1) \cdot s_1^2}{\chi_{(\alpha/2; n-1)}^2}} < \sigma < \sqrt{\frac{(n-1) \cdot s_1^2}{\chi_{(1-\alpha/2; n-1)}^2}}\right) = 1 - \alpha$$

$$n = u_{(1-\alpha/2)}^2 \cdot \frac{s_1^2}{\Delta^2}$$

Hypothesis testing (tests for mean)

$$u = \frac{\bar{x} - \mu_0}{\frac{s_1}{\sqrt{n}}}$$

$$t = \frac{\bar{x} - \mu_0}{\frac{s_1}{\sqrt{n}}}$$

$$u = \frac{\bar{x}_1 - \bar{x}_2 - (\mu_1 - \mu_2)}{\sqrt{\frac{n_2 s_{11}^2 + n_1 s_{12}^2}{n_1 \cdot n_2}}} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{n_2 s_{11}^2 + n_1 s_{12}^2}{n_1 \cdot n_2}}}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1 - 1)s_{11}^2 + (n_2 - 1)s_{12}^2}{n_1 + n_2 - 2}}} \cdot \sqrt{\frac{n_1 \cdot n_2}{n_1 + n_2}}$$

$$t = \frac{\bar{d}}{\sqrt{\frac{\sum_{i=1}^n (d_i - \bar{d})^2}{n \cdot (n-1)}}$$