$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} \qquad \bar{x} = \frac{\sum_{i=1}^{k} \dot{x}_i n_i}{n} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}(x_i-\mu)^2}{n} \qquad S^2 = \frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1} \qquad S^2 = \frac{\sum_{i=1}^{k}(\dot{x}_i-\bar{x})^2 n_i}{n-1}$$

$$H = \frac{n}{\sum_{i=1}^{n}\frac{1}{x_i}} \qquad G = \sqrt[k]{\prod_{i=1}^{k} x_i} \qquad D = x_D + \frac{n_D-n_{D-1}}{(n_D-n_{D-1})+(n_D-n_{D+1})} i_D \qquad M_e = x_{\frac{n+1}{2}} \qquad M_e = \frac{1}{2}(x_{\frac{n}{2}}+x_{\frac{n}{2}+1})$$

$$R(x) = x_{max} - x_{min} \qquad R_q(x) = Q_3(x) - Q_1(x) \qquad d = \frac{\sum_{i=1}^{n}|x_i-\bar{x}|}{n-1} \qquad V = \frac{S}{\bar{x}} \qquad Q = \frac{Q_3-Q_1}{2}$$

$$V(d) = \frac{Q}{Me} \qquad W = \bar{x} - D \qquad A_s = \frac{\bar{x}-D}{S_x} \qquad A_d = \frac{\bar{x}-D}{d}$$

$$P_n = n! \qquad W_n^k = n^k \qquad V_n^k = \frac{n!}{(n-k)!} \qquad C_n^k = \binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$P(A|B) = \frac{P(A\cap B)}{P(B)} \qquad P(A\cap B) = P(B)P(A|B)$$

$$P(A\cap B) = P(A)P(B|A) \qquad P(A\cap B) = P(A)P(B) \qquad P(B) = P(A_1\cap B) + P(A_2\cap B) + \cdots + P(A_n\cap B)$$

$$P(B) = P(A_1)P(B|A_1) + P(A_2)P(B|A_2) + \cdots + P(A_n)P(B|A_n) \qquad P(A_i|B) = \frac{P(A_i)P(B|A_i)}{\sum_{k=1}^{n} P(A_k)P(B|A_k)} = \frac{P(A_i)P(B|A_i)}{P(B)}$$

$$P(k) = \binom{n}{k} p^k (1-p)^{n-k} \qquad n \geq (u_{1-\frac{\alpha}{2}} \cdot \frac{\sigma}{d})^2 \qquad n \geq (u_{1-\frac{\alpha}{2}} \cdot \frac{S}{d})^2 \qquad n \geq (t_{1-\frac{\alpha}{2}}^{n_0-1} \cdot \frac{S}{d})^2$$

$$n \geq u_{1-\frac{\alpha}{2}}^2 \cdot \frac{p_0(1-p_0)}{d^2} \qquad n \geq u_{1-\frac{\alpha}{2}}^2 \cdot \frac{1}{4d^2} \qquad N = \frac{nL}{l} \qquad z = \frac{\bar{x}-\mu_0}{\sigma}\sqrt{n} \qquad z = \frac{\bar{x}-\mu_0}{S}\sqrt{n-1} \qquad t = \frac{p-p_0}{S_p} \qquad p = \frac{m}{n}$$

$$S_p = \sqrt{\frac{p_0(1-p_0)}{n}} \qquad \chi^2 = \frac{(n-1)S^2}{\sigma_0^2}$$

$U = \sqrt{2\chi^2} - \sqrt{2n-3}$ $\quad$ $z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$ $\quad$ $t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{n_1 S_1^2 + n_2 S_2^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$ $\quad$ $t = \frac{\bar{d}}{S_d}\sqrt{n-1}$ $\quad$ $\bar{d} = \frac{\sum_{i=1}^{n} d_i}{n}$

$d_i = x_{1i} - x_{2i}$ $\quad$ $S_d = \sqrt{\frac{\sum_{i=1}^{n}(d_i - \bar{d})^2}{n-1}}$

$P\left(\bar{x} - u_{\frac{\alpha}{2}}\frac{\sigma}{\sqrt{n}}, \bar{x} + u_{1-\frac{\alpha}{2}}\frac{\sigma}{\sqrt{n}}\right) = 1 - \alpha$ $\quad$ $P\left(\bar{x} - u_{\frac{\alpha}{2}}\frac{S}{\sqrt{n}}, \bar{x} + u_{\frac{\alpha}{2}}\frac{S}{\sqrt{n}}\right) = 1 - \alpha$ $P\left(\bar{x} - t_{\frac{\alpha}{2}, n-1}\frac{S}{\sqrt{n}}, \bar{x} + t_{\frac{\alpha}{2}, n-1}\frac{S}{\sqrt{n}}\right) = 1 - \alpha$

$\bar{x}_1 - \bar{x}_2 - z_\alpha S_{\bar{x}_1 - \bar{x}_2} < \mu_1 - \mu_2 < \bar{x}_1 - \bar{x}_2 + z_\alpha S_{\bar{x}_1 - \bar{x}_2}$ $\quad$ $P\left(\bar{x}_1 - \bar{x}_2 - z_\alpha S_{\bar{x}_1 - \bar{x}_2}, \bar{x}_1 - \bar{x}_2 + z_\alpha S_{\bar{x}_1 - \bar{x}_2}\right) = 1 - \alpha$

$S_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{n_1 S_1^2 + n_2 S_2^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$ $\quad$ $S_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$ $\quad$ $d_n = x_{1n} - x_{2n}$ $\quad$ $\bar{d} - z_\alpha \frac{S_d}{\sqrt{n}} < \mu_1 - \mu_2 < \bar{d} + z_\alpha \frac{S_d}{\sqrt{n}}$

$t = \frac{\frac{m_1}{n_1} - \frac{m_2}{n_2}}{\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}}$ $\quad$ $n = \frac{n_1 n_2}{n_1 + n_2}$ $\quad$ $\bar{p} = \frac{m_1 + m_2}{n_1 + n_2}$ $\quad$ $F = \frac{S_1^2}{S_2^2}$ $\quad$ $r = \frac{cov(x,y)}{\sigma_x \sigma_y}$ $\quad$ $r = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sqrt{n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}\sqrt{n\sum_{i=1}^{n} y_i^2 - \left(\sum_{i=1}^{n} y_i\right)^2}}$

$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}}$ $\quad$ $r_s = 1 - \frac{6 \cdot \sum_{i=1}^{n} d_i^2}{n(n^2 - 1)}$ $\quad$ $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ $\quad$ $u = r\sqrt{n-1}$ $\quad$ $u = \frac{x_{i\,MAX} - \bar{x}}{S}$ $\quad$ $n_i^t = p_i n$

$\chi^2 = \sum_{i=1}^{k}\frac{(n_i - n_i^t)^2}{n_i^t}$ $\quad$ $F(x) = \frac{n_{skumulowane}}{n}$ $\quad$ $F(u) = \phi(x)$ $\quad$ $F(u) = 1 - \phi(x)$ $\quad$ $\lambda = |F(x) - F(u)|_{max}\sqrt{n}$

$W = \frac{\left[\sum_{i=1}^{n/2} a_i(n)(x_{n-i+1} - x_i)\right]^2}{\sum_{j=1}^{n}(x_j - \bar{x})^2}, gdzie\ \frac{n}{2} \in C$ (zaokr. w dół) $\quad$ $P\left(\frac{(n-1)S^2}{\chi^2_{1-\alpha/2;\,n-1}} < \sigma^2 < \frac{(n-1)S^2}{\chi^2_{\alpha/2;\,n-1}}\right) = 1 - \alpha$

$$P\left(\frac{s}{1+\frac{u_{\alpha/2}}{\sqrt{2n}}} < \sigma < \frac{s}{1-\frac{u_{\alpha/2}}{\sqrt{2n}}}\right) = 1-\alpha$$

$$\hat{a} = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \cdot \sum_{i=1}^{n} y_i}{n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}$$

$$\hat{a} = \frac{\sum_{i=1}^{n}(x_i-\bar{x})(y_i-\bar{y})}{\sum_{i=1}^{n}(x_i-\bar{x})^2}$$

$$\hat{a} = \frac{cov(X,Y)}{\sigma_x^2}$$

$$\hat{b} = \bar{y} - \bar{x}a$$

$$S_r = \sqrt{\frac{1}{n-2}\sum_{i=1}^{n}(y_i - ax_i - b)^2}$$

$$\hat{y} = \frac{S_Y^2 - S_x^2 + \sqrt{\left(S_Y^2 - S_x^2\right)^2 + 4cov^2(X,Y)}}{2cov(X,Y)} \cdot (x-\bar{x}) + \bar{y}$$

$$S_x^2 = \frac{1}{n}\sum_{i=1}^{l} x_i^2 n_{i\cdot} - \bar{x}^2$$

$$S_y^2 = \frac{1}{n}\sum_{k=1}^{m} y_k^2 n_{\cdot k} - \bar{y}^2$$

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{l} \bar{x}_i\, n_{i\cdot}$$

$$\bar{y} = \frac{1}{n}\sum_{k=1}^{m} \bar{y}_k\, n_{\cdot k}$$

$$a = \frac{cov(x,y)}{S_x^2}$$

$$a' = \left(\frac{cov(x,y)}{S_y^2}\right)^{-1}$$

$$cov(x,y) = \frac{1}{n}\sum_{k=1}^{m} \bar{y}_k \sum_{i=1}^{l} \bar{x}_i n_{ik} - \bar{x}\bar{y}$$

$$\varphi = arctg\left|\frac{cov^2(x,y) - S_x^2 S_y^2}{cov(x,y)(S_x^2 + S_y^2)}\right|$$

$$(a-a_o)^2 S_x^2 + (b-\bar{y})^2 \leq \frac{2}{n-2} V_r F(1-\alpha; 2; n-2)$$

$$V_r = S_y^2(1-R^2)$$

$$S'_{y_i} = \sqrt{\frac{S_y^2(1-R^2)}{S_x^2(n-2)}} \cdot \sqrt{S_x^2 + (x_i-\bar{x})^2}$$

$$P\left(y_i - S'_{y_i} \cdot t_{1-\alpha/2;\, n-2} < y_i < y_i + S'_{y_i} \cdot t_{1-\alpha/2;\, n-2}\right) = 1-\alpha$$

$$S_a = \sqrt{\frac{S_y^2(1-R^2)}{S_x^2(n-2)}}$$

$$S_b = \sqrt{\frac{S_y^2(1-R)}{S_x^2(n-2)}\left(S_x^2 + \bar{x}^2\right)}$$

$$P\left(a - S_a \cdot t_{1-\alpha/2;\, n-2} < a < a + S_a \cdot t_{1-\alpha/2;\, n-2}\right) = 1-\alpha$$

$$R = \frac{cov(x,y)}{S_x S_y}$$

$$P\left(b - S_b \cdot t_{1-\alpha/2;\, n-2} < b < b + S_b \cdot t_{1-\alpha/2;\, n-2}\right) = 1-\alpha$$