

FORMELSAMMLUNG (Stand: 2012.12.28.)

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n}$$

$$x_{\text{med}} = \begin{cases} x_{(n+1)/2} & \text{falls } n \text{ ungerade} \\ (x_{n/2} + x_{(n/2+1)})/2 & \text{falls } n \text{ gerade} \end{cases}$$

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{Q_{xx}}{n-1}}$$

$$p(E) = \frac{g}{m}$$

$$p(A) = \frac{k}{n}$$

$$p(A|B) = \frac{p(A \text{ und } B)}{p(B)}$$

$$RR = \frac{p(K_+|R_+)}{p(K_+|R_-)} = \frac{\frac{a}{a+b}}{\frac{c}{c+d}} = \frac{a(c+d)}{c(a+b)}$$

$$OR = \frac{\frac{p(K_+|R_+)}{p(K_-|R_+)}}{\frac{p(K_+|R_-)}{p(K_-|R_-)}} = \frac{ad}{bc}$$

$$\mu = \sum_i x_i p(x_i)$$

$$\mu = \int_{-\infty}^{+\infty} x f(x) dx$$

$$\sigma^2 = \sum_i (x_i - \mu)^2 p(x_i)$$

$$\sigma^2 = \int_{-\infty}^{+\infty} (x - \mu)^2 f(x) dx$$

$$p(x_i) = 1/n$$

$$\mu = \frac{n+1}{2}$$

$$\sigma^2 = \frac{n^2 - 1}{12}$$

$$f(x) = \begin{cases} \frac{1}{b-a}, & \text{für } a \leq x \leq b \\ 0, & \text{sonst} \end{cases}$$

$$\mu = \frac{a+b}{2}$$

$$\sigma^2 = \frac{(b-a)^2}{12}$$

$$p_k = \binom{n}{k} p^k (1-p)^{n-k}$$

$$\mu = np$$

$$\sigma^2 = np(1-p)$$

$$p_k = \frac{\lambda^k}{k!} e^{-\lambda}$$

$$\mu = \lambda$$

$$\sigma^2 = \lambda$$

$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$p(\mu - \sigma \leq x \leq \mu + \sigma) = 68\%$$

$$p(\mu - 2\sigma \leq x \leq \mu + 2\sigma) = 95\%$$

$$p(\mu - 3\sigma \leq x \leq \mu + 3\sigma) = 99,7\%$$

$$f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}} = N(0,1)$$

$$\chi_n^2 = x_1^2 + x_2^2 + \dots + x_n^2$$

$$\mu = n$$

$$\sigma^2 = 2n$$

$$t_n = \frac{x}{\sqrt{\frac{(x_1^2 + x_2^2 + \dots + x_n^2)}{n}}}$$

$$\mu_n=0$$

$$\sigma^2 = \frac{n}{n-2}$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

$$s_{\bar{x}} = \frac{s_x}{\sqrt{n}}$$

$$\bar{x} \pm 2 \frac{\sigma}{\sqrt{n}} \text{ --- 95\%}$$

$$\bar{x} \pm 2s_{\bar{x}} \text{ --- 95\%}$$

$$\bar{x} \pm t_{5\%} s_{\bar{x}} \text{ --- 95\%}$$

$$p \pm 2\sqrt{p(1-p)/n} \text{ --- 95\%}$$

$$t_{[n-1]} = \frac{\bar{x}}{s_{\bar{x}}}$$

$$t_{[n-1]} = \frac{\bar{x} - \mu_0}{s_{\bar{x}}}$$

$$t_{[n_1+n_2-2]} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{Q_1 + Q_2}{n_1 + n_2 - 2}}} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{n_1 n_2}{n_1 + n_2}}}$$

$$Q_1 = \sum_{i=1}^{n_1} (x_{1i} - \bar{x}_1)^2 \text{ und } Q_2 = \sum_{i=1}^{n_2} (x_{2i} - \bar{x}_2)^2$$

$$F_{[n_1-1; n_2-1]} = \frac{s_{\text{größer}}^2}{s_{\text{kleiner}}^2}$$

$$F_{[h-1; N-h]} = \frac{s_g^2}{s_i^2}$$

$$s_g^2 = \frac{\sum_{j=1}^h n_j (\bar{x}_j - \bar{x})^2}{h-1} = \frac{Q_g}{h-1}$$

$$s_i^2 = \frac{\sum_{j=1}^h Q_j}{N-h} = \frac{\sum_{j=1}^h \sum_{i=1}^{n_j} (x_{ij} - \bar{x}_j)^2}{N-h} = \frac{Q_i}{N-h}$$

$$t_{[n-1]} = \frac{\bar{R}}{\frac{s}{\sqrt{n}}}$$

$$z = \frac{T_1 - \mu}{\sigma} = \frac{T_1 - \frac{n_1(n_1 + n_2 + 1)}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

$$Q(a, b) = \sum_{i=1}^n [y_i - (ax_i + b)]^2$$

$$a^* = \frac{Q_{xy}}{Q_{xx}} = \frac{s_{xy}^2}{s_x^2}$$

$$Q_{xy} = \sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})$$

$$Q_{xx} = \sum_{i=1}^n (x_i - \bar{x})^2$$

$$s_{xy}^2 = \frac{Q_{xy}}{n-1}$$

$$b^* = \bar{y} - a^* \bar{x}$$

$$r = \frac{Q_{xy}}{\sqrt{Q_{xx} Q_{yy}}} = \frac{s_{xy}^2}{s_x s_y}$$

$$t_{[n-2]} = r \sqrt{\frac{n-2}{1-r^2}}$$

$$\chi^2 = \sum_i \frac{(O_i - E_i)^2}{E_i}$$

$$\chi_{[1]}^2 = \frac{n(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$$

$$I(p) = \log_2\left(\frac{1}{p}\right) = -\log_2(p)$$

$$I = \sum_{k=1}^m n_k I_k = -\sum_{k=1}^m [n_k \cdot \log_2(p_k)]$$

$$H = \bar{I} = -\sum_{k=1}^m [p_k \cdot \log_2(p_k)]$$

$$w = \frac{RP + FN}{RP + FP + FN + RN}$$

$$se = \frac{RP}{RP + FN}$$

$$sp = \frac{RN}{RN + FP}$$

$$de = \frac{RP + RN}{RP + FP + FN + RN} = se \cdot w + sp \cdot (1 - w)$$

$$PPV = \frac{RP}{RP + FP} = \frac{se \cdot w}{se \cdot w + (1 - sp) \cdot (1 - w)}$$

$$NPV = \frac{RN}{RN + FN} = \frac{sp \cdot (1 - w)}{sp \cdot (1 - w) + (1 - se) \cdot w}$$

$$n = 10 \cdot \lg \frac{P_2}{P_1} = 20 \cdot \lg \frac{U_2}{U_1}$$

$$V_P = \frac{P_{\text{aus}}}{P_{\text{ein}}}$$

$$V_U = \frac{U_{\text{aus}}}{U_{\text{ein}}}$$

$$V_P^* = \frac{V_P}{1 - K \cdot V_P}$$

STATISTISCHE TABELLEN

t-VERTEILUNG

| Freiheits- grad (FG) | <i>p</i> (Irrtumswahrscheinlichkeit, einseitiger Test) | | | | | | |
|----------------------------|---|-------------|------------|-------------|--------------|-------------|--------------|
| | 0,4 | 0,25 | 0,1 | 0,05 | 0,025 | 0,01 | 0,005 |
| | <i>p</i> (Irrtumswahrscheinlichkeit, zweiseitiger Test) | | | | | | |
| | 0,8 | 0,5 | 0,2 | 0,1 | 0,05 | 0,02 | 0,01 |
| 1 | 0,325 | 1,000 | 3,078 | 6,314 | 12,70 | 31,82 | 63,65 |
| 2 | 0,289 | 0,816 | 1,886 | 2,920 | 4,303 | 6,965 | 9,925 |
| 3 | 0,277 | 0,765 | 1,638 | 2,353 | 3,182 | 4,541 | 5,841 |
| 4 | 0,271 | 0,741 | 1,533 | 2,132 | 2,776 | 3,747 | 4,604 |
| 5 | 0,267 | 0,727 | 1,476 | 2,015 | 2,571 | 3,365 | 4,032 |
| 6 | 0,265 | 0,718 | 1,440 | 1,943 | 2,447 | 3,143 | 3,707 |
| 7 | 0,263 | 0,711 | 1,415 | 1,895 | 2,365 | 2,998 | 3,499 |
| 8 | 0,262 | 0,706 | 1,397 | 1,860 | 2,306 | 2,896 | 3,355 |
| 9 | 0,261 | 0,703 | 1,383 | 1,833 | 2,262 | 2,821 | 3,250 |
| 10 | 0,260 | 0,700 | 1,372 | 1,812 | 2,228 | 2,764 | 3,169 |
| 11 | 0,260 | 0,697 | 1,363 | 1,796 | 2,201 | 2,718 | 3,106 |
| 12 | 0,259 | 0,695 | 1,356 | 1,782 | 2,179 | 2,681 | 3,055 |
| 13 | 0,259 | 0,694 | 1,350 | 1,771 | 2,160 | 2,650 | 3,012 |
| 14 | 0,258 | 0,692 | 1,345 | 1,761 | 2,145 | 2,624 | 2,977 |
| 15 | 0,258 | 0,691 | 1,341 | 1,753 | 2,131 | 2,602 | 2,947 |
| 16 | 0,258 | 0,690 | 1,337 | 1,746 | 2,120 | 2,583 | 2,921 |
| 17 | 0,257 | 0,689 | 1,333 | 1,740 | 2,110 | 2,567 | 2,898 |
| 18 | 0,257 | 0,688 | 1,330 | 1,734 | 2,101 | 2,552 | 2,878 |
| 19 | 0,257 | 0,688 | 1,328 | 1,729 | 2,093 | 2,539 | 2,861 |
| 20 | 0,257 | 0,687 | 1,325 | 1,725 | 2,086 | 2,528 | 2,845 |
| 21 | 0,257 | 0,686 | 1,323 | 1,721 | 2,080 | 2,518 | 2,831 |
| 22 | 0,256 | 0,686 | 1,321 | 1,717 | 2,074 | 2,508 | 2,819 |
| 23 | 0,256 | 0,685 | 1,319 | 1,714 | 2,069 | 2,500 | 2,807 |
| 24 | 0,256 | 0,685 | 1,318 | 1,711 | 2,064 | 2,492 | 2,797 |
| 25 | 0,256 | 0,684 | 1,316 | 1,708 | 2,060 | 2,485 | 2,787 |
| 26 | 0,256 | 0,684 | 1,315 | 1,706 | 2,056 | 2,479 | 2,779 |
| 27 | 0,256 | 0,684 | 1,314 | 1,703 | 2,052 | 2,473 | 2,771 |
| 28 | 0,256 | 0,683 | 1,313 | 1,701 | 2,048 | 2,467 | 2,763 |
| 29 | 0,256 | 0,683 | 1,311 | 1,699 | 2,045 | 2,462 | 2,756 |
| 30 | 0,256 | 0,683 | 1,310 | 1,697 | 2,042 | 2,457 | 2,750 |
| 40 | 0,255 | 0,681 | 1,303 | 1,684 | 2,021 | 2,423 | 2,704 |
| 60 | 0,255 | 0,679 | 1,296 | 1,671 | 2,000 | 2,390 | 2,66 |
| 120 | 0,254 | 0,677 | 1,289 | 1,658 | 1,980 | 2,358 | 2,617 |
| ∞ | 0,250 | 0,674 | 1,282 | 1,645 | 1,960 | 2,326 | 2,576 |

χ^2 (CHI-QUADRAT)-VERTEILUNG:

| Freiheits- grad (FG) | <i>p</i> (Irrtumswahrscheinlichkeit) | | | | | | |
|----------------------------|--------------------------------------|--------------|-------------|-------------|--------------|-------------|--------------|
| | 0,99 | 0,975 | 0,95 | 0,05 | 0,025 | 0,01 | 0,001 |
| 1 | 0,0000157 | 0,0000982 | 0,000393 | 3,84 | 5,02 | 6,63 | 10,83 |
| 2 | 0,0201 | 0,0506 | 0,103 | 5,99 | 7,88 | 9,21 | 13,82 |
| 3 | 0,115 | 0,216 | 0,352 | 7,81 | 9,35 | 11,34 | 16,27 |
| 4 | 0,297 | 0,484 | 0,711 | 9,49 | 11,14 | 13,28 | 18,47 |
| 5 | 0,554 | 0,831 | 1,15 | 11,07 | 12,83 | 15,09 | 20,51 |
| 6 | 0,872 | 1,24 | 1,64 | 12,59 | 14,45 | 16,81 | 22,46 |
| 7 | 1,24 | 1,69 | 2,17 | 14,07 | 16,01 | 18,47 | 24,32 |
| 8 | 1,65 | 2,18 | 2,73 | 15,51 | 17,53 | 20,09 | 26,13 |
| 9 | 2,09 | 2,70 | 3,33 | 16,92 | 19,02 | 21,67 | 27,88 |
| 10 | 2,56 | 3,25 | 3,94 | 18,31 | 20,48 | 23,21 | 29,59 |
| 11 | 3,05 | 3,61 | 4,57 | 19,68 | 21,92 | 24,72 | 31,26 |
| 12 | 3,57 | 4,40 | 5,23 | 21,03 | 23,34 | 26,22 | 32,91 |
| 13 | 4,11 | 5,01 | 5,89 | 22,36 | 24,74 | 27,69 | 34,53 |
| 14 | 4,66 | 5,63 | 6,57 | 23,68 | 26,12 | 29,14 | 36,12 |
| 15 | 5,23 | 6,26 | 7,26 | 25,00 | 27,49 | 30,58 | 37,70 |
| 16 | 5,81 | 6,91 | 7,96 | 26,33 | 28,85 | 32,00 | 39,25 |
| 17 | 6,41 | 7,56 | 8,67 | 27,59 | 30,19 | 33,41 | 40,79 |
| 18 | 7,01 | 8,23 | 9,39 | 28,87 | 31,53 | 34,81 | 42,31 |
| 19 | 7,63 | 8,91 | 10,12 | 30,14 | 32,85 | 36,19 | 43,82 |
| 20 | 8,26 | 9,59 | 10,85 | 31,41 | 34,17 | 37,57 | 45,31 |
| 21 | 8,90 | 10,28 | 11,59 | 32,67 | 35,48 | 38,93 | 46,80 |
| 22 | 9,54 | 10,98 | 12,34 | 33,92 | 36,78 | 40,29 | 48,27 |
| 23 | 10,20 | 11,69 | 13,09 | 35,17 | 38,08 | 41,64 | 49,73 |
| 24 | 10,86 | 12,40 | 13,85 | 36,42 | 39,36 | 42,98 | 51,18 |
| 25 | 11,52 | 13,12 | 14,61 | 37,65 | 40,65 | 44,31 | 52,62 |
| 26 | 12,20 | 13,84 | 15,38 | 38,89 | 41,92 | 45,64 | 54,05 |
| 27 | 12,88 | 14,57 | 16,15 | 40,11 | 43,19 | 46,96 | 55,48 |
| 28 | 13,56 | 15,31 | 16,93 | 41,34 | 44,46 | 48,28 | 56,89 |
| 29 | 14,26 | 16,05 | 17,71 | 42,56 | 45,72 | 49,59 | 58,30 |
| 30 | 14,95 | 16,79 | 18,49 | 43,77 | 46,98 | 50,89 | 59,70 |
| 31 | 15,66 | 17,54 | 19,28 | 44,99 | 48,23 | 52,19 | 61,10 |
| 32 | 16,36 | 18,29 | 20,07 | 46,19 | 49,48 | 53,49 | 62,49 |
| 33 | 17,07 | 19,05 | 20,87 | 47,40 | 50,73 | 54,78 | 63,87 |
| 34 | 17,79 | 19,81 | 21,66 | 48,60 | 51,97 | 56,06 | 65,25 |
| 35 | 18,51 | 20,57 | 22,47 | 49,80 | 53,20 | 57,34 | 66,62 |
| 40 | 22,16 | 24,43 | 26,51 | 55,76 | 59,34 | 63,69 | 73,40 |
| 50 | 29,71 | 32,36 | 34,76 | 67,51 | 71,42 | 76,15 | 86,66 |
| 60 | 37,48 | 40,48 | 43,19 | 79,08 | 83,30 | 88,38 | 99,61 |
| 100 | 70,06 | 74,22 | 77,93 | 124,3 | 129,5 | 135,8 | 149,4 |