

8. Prilozi

8.1. Formule iz Poslovne statistike

$$i = \frac{X_{max} - X_{min}}{k}$$

$$k = 1 + 3,3 \log N$$

$$\bar{X} = \frac{\sum_{i=1}^N x_i}{N}$$

$$\bar{X} = \frac{\sum f_i x_i}{N = \sum f_i}$$

$$G = \sqrt[N]{\frac{\sum \log x}{n}}$$

$$G = \sqrt[N]{\frac{\sum f \cdot \log x}{\sum f}}$$

$$H = \frac{N}{\sum \frac{1}{x_i}}$$

$$H = \frac{N}{\sum \frac{f_i}{x_i}}$$

$$R = x_{max} - x_{min}$$

$$Me = L + \frac{\frac{N}{2} - \sum f_i < m}{f_m} i,$$

$$Mo = L + \frac{(f_2 - f_1)}{(f_2 - f_1) + (f_2 - f_3)} i,$$

$$SD = \frac{\sum |x_i - \bar{X}|}{N}$$

$$SD = \frac{\sum f_i |x_i - \bar{X}|}{N}$$

$$\sigma^2 = \frac{\sum (x_i - \bar{X})^2}{N}$$

$$\sigma^2 = \frac{\sum x_i^2}{N} - \bar{X}^2,$$

$$\sigma^2 = \frac{\sum f_i (x_i - \bar{X})^2}{N}$$

$$\sigma^2 = \frac{\sum f_i x_i^2}{N} - \bar{X}^2,$$

$$Mk = \frac{\sum (x_i - \bar{X})^k}{N}$$

$$Mk = \frac{\sum f_i (x_i - \bar{X})^k}{N}$$

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

$$V(x) = \frac{\sigma}{\bar{x}} 100\%,$$

$$V(x)^2 = \frac{\sigma^2}{\bar{x}^2} 100\%,$$

$$\alpha_3 = \frac{M^3}{\sigma^3},$$

$$\alpha_4 = \frac{M^4}{\sigma^4},$$

$$m - Z_{1-\alpha/2} \frac{\sigma}{\sqrt{n}} \leq \bar{x} \leq m + Z_{1-\alpha/2} \frac{\sigma}{\sqrt{n}},$$

$$\sqrt{\frac{N-n}{N-1}},$$

$$Sn / \sqrt{n-1},$$

$$m - t_{n-1;\alpha/2} \frac{S_n}{\sqrt{n-1}} \leq \bar{X} \leq m + t_{n-1;\alpha/2} \frac{S_n}{\sqrt{n-1}}, \quad S_n = \sqrt{\frac{\sum (xi-m)^2}{n}}$$

$$S_n = \sqrt{\frac{\sum f_i(xi-m)^2}{n}}, \quad S_n^2 = \frac{\sum xi^2}{n} - m^2, \quad S_n^2 = \frac{\sum f_i xi^2}{n} - m^2,$$

$$np_0, \quad n(1-p_0),$$

$$P - Z_{1-\alpha/2} Sp \leq p \leq P + Z_{1-\alpha/2} Sp, \quad Sp = \sqrt{\frac{p(1-p)}{n}}, \quad P = \frac{f}{n},$$

$$P - t_{n-1;\alpha/2} Sp \leq p \leq P + t_{n-1;\alpha/2} Sp$$

$$Z = \frac{m - \bar{X}}{\frac{\sigma}{\sqrt{n}}}, \quad t_{n-1} = \frac{m - \bar{X}}{S_n} \sqrt{n-1}, \quad Z = \frac{P - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}},$$

$$y_i = B_0 + B_1 X, \quad B_1 = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2}, \quad B_0 = \frac{\sum x^2 \sum y - \sum x \sum xy}{n \sum x^2 - (\sum x)^2},$$

$$B_0 = \bar{y} - B_1 \bar{X}, \quad R^2 = B_1^2 \frac{\sum x^2 - n \bar{X}^2}{\sum y^2 - n \bar{y}^2}, \quad Se = \sqrt{\frac{\sum y^2 - B_0 \sum y - B_1 \sum xy}{n-2}},$$

$$y_c - Z_{1-\alpha/2} Se \leq y' \leq y_c + Z_{1-\alpha/2} Se,$$

$$y_c - t_{n-2;\alpha/2} Se \leq y' \leq y_c + t_{n-2;\alpha/2} Se,$$

$$r = \frac{N \sum XY - \sum X \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \sqrt{N \sum Y^2 - (\sum Y)^2}}$$

$$R = \frac{n \sum xy - \sum x \sum y}{\sqrt{n \sum x^2 - (\sum x)^2} \sqrt{n \sum y^2 - (\sum y)^2}},$$

$$r_s = 1 - \frac{6 \sum di^2}{N(N^2-1)}, \quad \bar{X} = \bar{Y} = \frac{1+N}{2}, \quad \sigma_x = \sigma_y = \frac{N^2-1}{12},$$

$$\sigma_e^2 = \frac{\sum(y - \hat{y})^2}{N}$$

$$\sigma_{xy} = \frac{N^2 - 1}{12} - \frac{1}{2N} \sum di^2$$

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

$$\sigma_{y'}^2 = \frac{\sum(\hat{y} - \bar{y})^2}{N}$$

$$\sigma_y^2 = \frac{\sum(y - \bar{y})^2}{N}$$

$$\sigma_y^2 = \sigma_{y'}^2 + \sigma_e^2$$

$$S_{y_{sp}} = Se \sqrt{\frac{1}{n} + \frac{(x_p - \bar{X})^2}{\sum x^2 - n\bar{X}^2}}$$

$$y_{cp} - z_{1-\alpha/2} S_{y_{sp}} \leq \hat{y} \leq y_{cp} + z_{1-\alpha/2} S_{y_{sp}}$$

$$y_{cp} - t_{n-2; \alpha/2} S_{y_{sp}} \leq \hat{y} \leq y_{cp} + t_{n-2; \alpha/2} S_{y_{sp}}$$

$$S_{y_p} = Se \sqrt{1 + \frac{1}{n} + \frac{(x_p - \bar{X})^2}{\sum x^2 - n\bar{X}^2}}$$

$$y_p - z_{1-\alpha/2} S_{y_p} \leq \hat{y} \leq y_p + z_{1-\alpha/2} S_{y_p}$$

$$y_p - t_{n-2; \alpha/2} S_{y_p} \leq \hat{y} \leq y_p + t_{n-2; \alpha/2} S_{y_p}$$

$$S_{B_0} = Se \sqrt{\frac{\sum x^2}{n(\sum x^2 - n\bar{X}^2)}}$$

$$S_{B_1} = \frac{Se}{\sqrt{\sum x^2 - n\bar{X}^2}}$$

$$b_0 - t_{n-2; \alpha/2} S_{B_0} \leq \hat{y} \leq b_0 + t_{n-2; \alpha/2} S_{B_0}$$

$$r = \frac{\sigma_{xy}}{\sigma_x \sigma_y}$$

$$\sigma_{xy} = \frac{\sum(x - \bar{X}_x)(y - \bar{X}_y)}{N}$$

$$\sigma_x^2 = \frac{\sum(x - \bar{X}_x)^2}{N}$$

$$\sigma_y^2 = \frac{\sum(y - \bar{X}_y)^2}{N}$$

$$R = \frac{S_{xy}}{S_x S_y}$$

$$S_{xy} = \frac{\sum(x - \bar{X})(y - \bar{Y})}{n-1}$$

$$S_x = \sqrt{\frac{\sum(x - \bar{X})^2}{n-1}}$$

$$S_y = \sqrt{\frac{\sum(y - \bar{Y})^2}{n-1}}$$

$$y_t = b_0 + b_1 x$$

$$b_0 = \frac{\sum y}{N}$$

$$b_1 = \frac{\sum xy}{\sum x^2}$$

$$S_y = \sqrt{\frac{\sum(y - y_t)^2}{N}}$$

$$R_s = \left(\sqrt[n-1]{\frac{y_n}{y_1}} - 1 \right) * 100\%$$

$$y_t = b_0 + b_1 X + b_2 X^2 \quad b_0 = \frac{\sum y - b_2 \sum x^2}{N}$$

$$b_1 = \frac{\sum xy}{\sum x^2} \quad b_2 = \frac{N \sum x^2 y - \sum y \sum x^2}{N \sum x^4 - (\sum x^2)^2} \quad y_t = b_0 * b_1^x$$

$$b_0 = \sqrt[n]{\frac{\sum \log y}{n}} \quad b_0 = \sqrt[n]{\frac{\sum x \log y}{\sum x^2}} \quad r_e = (b_1 - 1) * 100\%$$

$$K_{ek} = \frac{\text{Ostvareno vreme rada}}{\text{Moguće vreme rada}} * 100\%$$

$$K_{ik} = \frac{\text{Ostvarena proizvodnja po jedinici kapaciteta}}{\text{Moguća proizvodnja po jedinici kapaciteta}} * 100\%$$

$$K_{iik} = \frac{\text{Ostvarena godišnja proizvodnja}}{\text{Mogući godišnji kapacitet}} * 100\%$$

$$\bar{C} = \frac{C_1 Q_1 + C_2 Q_2 + \dots + C_n Q_n}{Q_1 + Q_2 + \dots + Q_n}$$

$$\bar{Z} = \frac{\sum Vt}{\sum t}$$

$$\beta_o = \frac{Vku}{\bar{Z}}$$

$$V_o = \frac{Bd}{\beta_o}$$

$$\text{Koeficijent iskorišćenosti sirovina} = \frac{\text{Normirani - stvarni utrošak}}{\text{Ukupni normirani utrošak}} * 100\%$$

$$\text{Koeficijent fluktuacije} = \frac{\text{Broj zamenjenih radnika}}{\text{Ukupan broj radnika}} * 100\%$$

$$K_{irs} = \frac{\text{Prosečan broj zaposlenih radnika}}{\text{Ukupan broj zaposlenih radnika}} * 100\%$$

$$K_{ird} = \frac{\text{Prosečno trajanje radnog dana}}{7 (8)} * 100\%$$

$$K_{iirv} = \frac{\text{Ostvareni efektivni časovi rada radnika}}{\text{Mogući fond časova rada radnika}} * 100\%$$

$$I_i = \frac{y_i}{y_o} * 100\%$$

$$V_i = \frac{y_i}{y_i - 1} * 100\%$$

$$I_i' = \frac{I_i}{I_o} * 100\%$$

$$I_i = \frac{I_{i-1} * V_i}{100} \quad I_{i-1} = \frac{I_i}{V_i} * 100\% \quad I_q = \frac{q_i}{q_o} * 100\%$$

$$I_p = \frac{p_i}{p_o} * 100\% \quad oI_q = \frac{\sum q_i p_o}{\sum q_o p_o} * 100\% \quad iI_p = \frac{\sum q_i p_i}{\sum q_o p_i} * 100\%$$

$$oI_q = \frac{\sum \frac{q_i}{q_o} q_o p_o}{\sum q_o p_o} * 100\% \quad iI_q = \frac{\sum q_i p_i}{\sum \frac{q_o}{q_i} q_i p_i} * 100\%$$

$$fI_q = \left(\sqrt{\frac{\sum q_i p_o}{\sum q_o p_o} \frac{\sum q_i p_i}{\sum q_o p_i}} \right) * 100\%$$

$$oI_p = \frac{\sum p_i q_o}{\sum p_o q_o} * 100\%$$

$$iI_p = \frac{\sum p_i q_i}{\sum p_o q_i} * 100\%$$

$$oI_p = \frac{\sum \frac{p_i}{p_o} q_o p_o}{\sum q_o p_o} * 100\%$$

$$iI_p = \frac{\sum q_i p_i}{\sum \frac{p_o}{p_i} q_i p_i} * 100\%$$

$$fI_p = \left(\sqrt{\frac{\sum p_i q_o}{\sum p_o q_o} \frac{\sum p_i q_i}{\sum p_o q_i}} \right) * 100\%$$

$$I_{qp} = \frac{p_i q_i}{p_o q_o} * 100\%$$

$$I_{pq} = \frac{\sum p_i q_i}{\sum p_o q_o} * 100\%$$

$$I_p = \frac{\sum p_i q}{\sum p_o q} * 100\%$$

$$I_{pe}(z) = \frac{\sum \bar{x}_i}{\sum x_o} * 100\%$$

$$\bar{x}_i = \frac{x_i}{R_i} \quad \bar{x}_o = \frac{x_o}{R_o}$$

$$i\bar{X}_{pl}(z) = \frac{\sum x_i}{\sum R_i} * 100\%$$

$$o\bar{X}_{pl}(z) = \frac{\sum x_o}{\sum R_o} * 100\%$$

$$I_{pe}(z) = \frac{\sum \bar{x}_i}{\sum x_o} * 100\%$$

$$I'_{pe}(z) = \frac{\sum I_{pe}(z) * R_i}{\sum R_i} * 100\%$$

$$\frac{I_{pe}(z)}{I'_{pe}(z)}$$

$$G = \sqrt[n-1]{\frac{\sum \log L}{n-1}} - 100$$

$$\chi^2 = \sum \frac{(f_i - f_i')^2}{f_i'}$$

8.3. Tabela T2. Kritične vrednosti χ^2 rasporeda

ν α	0,995	0,975	0,95	0,10	0,05	0,025	0,01	0,005
1	0,00004	0,00098	0,00393	2,706	3,841	5,024	6,635	7,879
2	0,0100	0,0506	0,103	4,605	5,991	7,378	9,210	10,597
3	0,0717	0,216	0,352	6,251	7,815	9,348	11,345	12,838
4	0,207	0,484	0,711	7,779	9,488	11,143	13,277	14,860
5	0,412	0,831	1,145	9,236	11,070	12,832	15,086	16,750
6	0,676	1,237	1,635	10,645	12,592	14,449	16,812	18,548
7	0,989	1,690	2,167	12,017	14,067	16,013	18,475	20,278
8	1,344	2,180	2,733	13,362	15,507	17,535	20,090	21,955
9	1,735	2,700	3,325	14,684	16,919	19,023	21,666	23,589
10	2,156	3,247	3,940	15,987	18,307	20,483	23,209	25,188
11	2,603	3,816	4,575	17,275	19,675	21,92	24,725	26,757
12	3,074	4,404	5,226	18,549	21,026	23,336	26,217	28,300
13	3,565	5,009	5,892	19,812	22,362	24,736	27,688	29,819
14	4,075	5,629	6,571	21,064	23,685	26,119	29,141	31,319
15	4,601	6,262	7,261	22,307	24,996	27,488	30,578	32,801
16	5,142	6,908	7,962	23,542	26,296	28,845	32,000	34,267
17	5,697	7,564	8,672	24,769	27,587	30,191	33,409	35,718
18	6,265	8,231	9,390	25,989	28,869	31,526	34,805	37,156
19	6,844	8,907	10,117	27,204	30,144	32,852	36,191	38,582
20	7,434	9,591	10,851	28,412	31,410	34,17	37,566	39,997
21	8,034	10,283	11,591	29,615	32,671	35,479	38,932	41,401
22	8,643	10,982	12,338	30,813	33,924	36,781	40,289	42,796
23	9,260	11,688	13,091	32,007	35,172	38,076	41,638	44,181
24	9,886	12,401	13,848	33,196	36,415	39,364	42,980	45,558
25	10,520	13,120	14,611	34,382	37,652	40,646	44,314	46,928
26	11,160	13,844	15,379	35,563	38,885	41,923	45,642	48,290
27	11,808	14,573	16,151	36,741	40,113	43,194	46,963	49,645
28	12,461	15,308	16,928	37,916	41,337	44,461	48,278	50,993
29	13,121	16,047	17,708	39,087	42,557	45,722	49,588	52,336
30	13,787	16,791	18,493	40,256	43,773	46,979	50,892	53,672
35	17,192	20,569	22,465	46,059	49,802	53,203	57,342	60,275
40	20,707	24,433	26,509	51,805	55,758	59,342	63,691	66,766
45	24,311	28,366	30,612	57,505	61,656	65,410	69,957	73,166
50	27,991	32,357	34,764	63,167	67,505	71,420	76,154	79,490
60	35,535	40,482	43,188	74,397	79,082	83,298	88,379	91,952
70	43,275	48,758	51,739	85,527	90,531	95,023	100,425	104,215
80	51,172	57,153	60,391	96,578	101,879	106,629	112,329	116,321
90	59,196	65,647	69,126	107,565	113,145	118,136	124,116	128,299
100	67,328	74,222	77,929	118,498	124,342	129,561	135,807	140,169

8.4. Tabela T3. Kritične vrednosti Studentovog t rasporeda

ν α	0,1	0,05	0,025	0,01	0,005
1	3,078	6,3138	2,706	31,821	63,657
2	1,886	2,9200	4,3027	6,965	9,9248
3	1,638	2,3534	3,1825	4,541	5,8409
4	1,533	2,1318	2,7764	3,747	4,6041
5	1,476	2,0150	2,5706	3,365	4,0321
6	1,440	1,9432	2,4469	3,143	3,7074
7	1,415	1,8946	2,3646	2,998	3,4995
8	1,397	1,8595	2,3060	2,896	3,3554
9	1,383	1,8331	2,2622	2,821	3,2498
10	1,372	1,8125	2,2281	2,764	3,1693
11	1,363	1,7959	2,2010	2,718	3,1058
12	1,356	1,7823	2,1788	2,681	3,0545
13	1,350	1,7709	2,1604	2,650	3,0123
14	1,345	1,7613	2,1448	2,624	2,9768
15	1,341	1,7531	2,1315	2,602	2,9467
16	1,337	1,7459	2,1199	2,583	2,9208
17	1,333	1,7396	2,1098	2,567	2,8982
18	1,330	1,7341	2,1009	2,552	2,8784
19	1,328	1,7291	2,0930	2,539	2,8609
20	1,325	1,7247	2,0860	2,528	2,8453
21	1,323	1,7207	2,0796	2,518	2,8314
22	1,321	1,7171	2,0739	2,508	2,8188
23	1,319	1,7139	2,0687	2,500	2,8073
24	1,318	1,7109	2,0639	2,492	2,7969
25	1,316	1,7081	2,0595	2,485	2,7874
26	1,315	1,7056	2,0555	2,479	2,7787
27	1,314	1,7033	2,0518	2,473	2,7707
28	1,313	1,7011	2,0484	2,467	2,7633
29	1,311	1,6991	2,0452	2,462	2,7564
30	1,310	1,6973	2,0423	2,457	2,7500
140	1,288	1,6558	1,9771	2,353	2,6114
160	1,287	1,6545	1,9749	2,350	2,6070
180	1,286	1,6534	1,9733	2,347	2,6035
200	1,286	1,6525	1,9719	2,345	2,6006
∞	1,282	1,6450	1,96	2,326	2,576