

Konfidenzintervall, σ bekannt

$$\mu \in \left[\bar{x} - \frac{K\sigma}{\sqrt{n}}, \bar{x} + \frac{K\sigma}{\sqrt{n}} \right], K = \Phi^{-1}\left(1 - \frac{\alpha}{2}\right).$$

Konfidenzintervall, σ unbekannt

$$\mu \in \left[\bar{x} - \frac{Ks}{\sqrt{n}}, \bar{x} + \frac{Ks}{\sqrt{n}} \right], K = F^{-1}\left(1 - \frac{\alpha}{2}\right), F \text{ von } t(n-1).$$

Konfidenzintervall für σ^2

$$\sigma^2 \in \left[\frac{(n-1)s^2}{F^{-1}\left(1 - \frac{\alpha}{2}\right)}, \frac{(n-1)s^2}{F^{-1}\left(\frac{\alpha}{2}\right)} \right], F \text{ von } \chi^2(n-1).$$

Konfidenzintervall für Bernoulli

$$p \in \left[\hat{p} - \frac{Ks}{\sqrt{n}}, \hat{p} + \frac{Ks}{\sqrt{n}} \right], K = \Phi^{-1}\left(1 - \frac{\alpha}{2}\right), s = \sqrt{\hat{p}(1 - \hat{p})}.$$

Zweiseitiger t -Test

$$H_0: \mu = \mu_0, \text{ wenn } |\bar{x} - \mu_0| \frac{\sqrt{n}}{s} \leq F^{-1}\left(1 - \frac{\alpha}{2}\right), \\ F \text{ von } t(n-1).$$

Einseitiger t -Test

$$H_0: \mu \geq \mu_0, \text{ wenn } (\mu_0 - \bar{x}) \frac{\sqrt{n}}{s} \leq F^{-1}(1 - \alpha), \\ F \text{ von } t(n-1).$$

Doppelter t -Test

$$H_0: \mu_1 = \mu_2, \text{ wenn } \frac{|\bar{x}_1 - \bar{x}_2|}{\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}} \leq F^{-1}\left(1 - \frac{\alpha}{2}\right), F \text{ von } t_{n_1+n_2-2}. \\ \text{Wenn } n_1 = n_2: |\bar{x}_1 - \bar{x}_2| \sqrt{\frac{n}{s_1^2 + s_2^2}} \leq F^{-1}\left(1 - \frac{\alpha}{2}\right).$$

ANOVA

$$H_0: \mu_1 = \mu_2 = \dots = \mu_m, \text{ wenn } \frac{s_{\bar{x}}^2}{s^2} \leq F^{-1}(1 - \alpha), \\ \bar{s}^2 := \frac{1}{n-m} \sum_i (n_i - 1) s_i^2, s_{\bar{x}}^2 := \frac{1}{m-1} (\sum_i n_i \bar{x}_i^2 - n \bar{x}^2), \\ F \text{ von } F(m-1, n-m).$$

Binomialtest

$$H_0: p \geq p_0, \text{ wenn } P(X > k) < 1 - \alpha, X \sim B(n, p_0). \\ H_0: p = p_0, \text{ wenn } P(X \in (2np - k, k)) < 1 - \alpha.$$

χ^2 -Anpassungstest

$$H_0: X \sim V, \text{ wenn } \sum_{i=1}^m \frac{(n_i - np_i)^2}{np_i} \leq F^{-1}(1 - \alpha), \\ F \text{ aus } \chi^2(m-1).$$

χ^2 -Unabhängigkeitstest

$$H_0: i, j \text{ unabhängig, wenn für } \tilde{H}_{i,j} = H_{i,\cdot} H_{\cdot,j} / n: \\ \sum_{i=1}^l \sum_{j=1}^m \frac{(H_{i,j} - \tilde{H}_{i,j})^2}{\tilde{H}_{i,j}} \leq F^{-1}(1 - \alpha), \\ F \text{ von } \chi^2((l-1)(m-1)).$$

Kolmogorow-Smirnow-Anpassungstest

$$H_0: X \sim V, \text{ wenn } \max_k \max(|F_X(x_k) - F_V(x_k)|, \\ |F_X(x_{k-1}) - F_V(x_k)|) \leq \Delta_n \left(1 - \frac{\alpha}{2}\right).$$

Kolmogorow-Smirnow-Homogenitätstest

$$H_0: X \sim Y, \text{ wenn } \\ \max_k |F_X(x_k) - F_Y(y_k)| \leq \Delta_{n_x, n_y} \left(1 - \frac{\alpha}{2}\right).$$

F-Verteilung $F(n_1, n_2)$: $F^{-1}(p)$

$p = 0.9$	$n_2 \backslash n_1$	1	2	3	4	5	10	20	50	100
	1	39.86	49.5	53.59	55.83	57.24	60.19	61.74	62.69	63.01
	2	8.526	9	9.162	9.243	9.293	9.392	9.441	9.471	9.481
	3	5.538	5.462	5.391	5.343	5.309	5.23	5.184	5.155	5.144
	4	4.545	4.325	4.191	4.107	4.051	3.92	3.844	3.795	3.778
	5	4.06	3.78	3.619	3.52	3.453	3.297	3.207	3.147	3.126
	10	3.285	2.924	2.728	2.605	2.522	2.323	2.201	2.117	2.087
	20	2.975	2.589	2.38	2.249	2.158	1.937	1.794	1.69	1.65
	50	2.809	2.412	2.197	2.061	1.966	1.729	1.568	1.441	1.388
	100	2.756	2.356	2.139	2.002	1.906	1.663	1.494	1.355	1.293

$p = 0.95$	$n_2 \backslash n_1$	1	2	3	4	5	10	20	50	100
	1	161.4	199.5	215.7	224.6	230.2	241.9	248	251.8	253
	2	18.51	19	19.16	19.25	19.3	19.4	19.45	19.48	19.49
	3	10.13	9.552	9.277	9.117	9.013	8.786	8.66	8.581	8.554
	4	7.709	6.944	6.591	6.388	6.256	5.964	5.803	5.699	5.664
	5	6.608	5.786	5.409	5.192	5.05	4.735	4.558	4.444	4.405
	10	4.965	4.103	3.708	3.478	3.326	2.978	2.774	2.637	2.588
	20	4.351	3.493	3.098	2.866	2.711	2.348	2.124	1.966	1.907
	50	4.034	3.183	2.79	2.557	2.4	2.026	1.784	1.599	1.525
	100	3.936	3.087	2.696	2.463	2.305	1.927	1.676	1.477	1.392

$p = 0.99$	$n_2 \backslash n_1$	1	2	3	4	5	10	20	50	100
	1	4052	5000	5403	5625	5764	6056	6209	6303	6334
	2	98.5	99	99.17	99.25	99.3	99.4	99.45	99.48	99.49
	3	34.12	30.82	29.46	28.71	28.24	27.23	26.69	26.35	26.24
	4	21.2	18	16.69	15.98	15.52	14.55	14.02	13.69	13.58
	5	16.26	13.27	12.06	11.39	10.97	10.05	9.553	9.238	9.13
	10	10.04	7.559	6.552	5.994	5.636	4.849	4.405	4.115	4.014
	20	8.096	5.849	4.938	4.431	4.103	3.368	2.938	2.643	2.535
	50	7.171	5.057	4.199	3.72	3.408	2.698	2.265	1.949	1.825
	100	6.895	4.824	3.984	3.513	3.206	2.503	2.067	1.735	1.598

Standardnormalverteilung $N(0, 1)$: $\Phi(x)$

	+0.00	+0.01	+0.02	+0.03	+0.04	+0.05	+0.06	+0.07	+0.08	+0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
	+0.00	+0.02	+0.04	+0.06	+0.08	+0.10	+0.12	+0.14	+0.16	+0.18
1.0	0.8413	0.8461	0.8508	0.8554	0.8599	0.8643	0.8686	0.8729	0.8770	0.8810
1.2	0.8849	0.8888	0.8925	0.8962	0.8997	0.9032	0.9066	0.9099	0.9131	0.9162
1.4	0.9192	0.9222	0.9251	0.9279	0.9306	0.9332	0.9357	0.9382	0.9406	0.9429
1.6	0.9452	0.9474	0.9495	0.9515	0.9535	0.9554	0.9573	0.9591	0.9608	0.9625
1.8	0.9641	0.9656	0.9671	0.9686	0.9699	0.9713	0.9726	0.9738	0.9750	0.9761
	+0.00	+0.05	+0.10	+0.15	+0.20	+0.25	+0.30	+0.35	+0.40	+0.45
2.0	0.9772	0.9798	0.9821	0.9842	0.9861	0.9878	0.9893	0.9906	0.9918	0.9929
2.5	0.9938	0.9946	0.9953	0.9960	0.9965	0.9970	0.9974	0.9978	0.9981	0.9984
3.0	0.9987	0.9989	0.9990	0.9992	0.9993	0.9994	0.9995	0.9996	0.9997	0.9997
3.5	0.9998	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	1.0000	1.0000

Student- t -Verteilung t_n : $F^{-1}(p)$

n	0.9	0.95	0.975	0.99	0.995	0.999
1	3.078	6.314	12.706	31.821	63.657	318.309
2	1.886	2.920	4.303	6.965	9.925	22.327
3	1.638	2.353	3.182	4.541	5.841	10.215
4	1.533	2.132	2.776	3.747	4.604	7.173
5	1.476	2.015	2.571	3.365	4.032	5.893
6	1.440	1.943	2.447	3.143	3.707	5.208
7	1.415	1.895	2.365	2.998	3.499	4.785
8	1.397	1.860	2.306	2.896	3.355	4.501
9	1.383	1.833	2.262	2.821	3.250	4.297
10	1.372	1.812	2.228	2.764	3.169	4.144
11	1.363	1.796	2.201	2.718	3.106	4.025
12	1.356	1.782	2.179	2.681	3.055	3.930
13	1.350	1.771	2.160	2.650	3.012	3.852
14	1.345	1.761	2.145	2.624	2.977	3.787
15	1.341	1.753	2.131	2.602	2.947	3.733
16	1.337	1.746	2.120	2.583	2.921	3.686
17	1.333	1.740	2.110	2.567	2.898	3.646
18	1.330	1.734	2.101	2.552	2.878	3.610
19	1.328	1.729	2.093	2.539	2.861	3.579
20	1.325	1.725	2.086	2.528	2.845	3.552
22	1.321	1.717	2.074	2.508	2.819	3.505
24	1.318	1.711	2.064	2.492	2.797	3.467
25	1.316	1.708	2.060	2.485	2.787	3.450
29	1.311	1.699	2.045	2.462	2.756	3.396
30	1.310	1.697	2.042	2.457	2.750	3.385
40	1.303	1.684	2.021	2.423	2.704	3.307
50	1.299	1.676	2.009	2.403	2.678	3.261
100	1.290	1.660	1.984	2.364	2.626	3.174
200	1.286	1.653	1.972	2.345	2.601	3.131
∞	1.282	1.645	1.960	2.326	2.576	3.090

Chiquadrat-Verteilung $\chi^2(n)$: $F^{-1}(p)$

n	.005	0.01	.025	0.05	0.95	0.975	0.99	0.995
1	0.00	0.00	0.00	0.00	3.84	5.02	6.63	7.88
2	0.01	0.02	0.05	0.10	5.99	7.38	9.21	10.60
3	0.07	0.11	0.22	0.35	7.81	9.35	11.34	12.84
4	0.21	0.30	0.48	0.71	9.49	11.14	13.28	14.86
5	0.41	0.55	0.83	1.15	11.07	12.83	15.09	16.75
6	0.68	0.87	1.24	1.64	12.59	14.45	16.81	18.55
7	0.99	1.24	1.69	2.17	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	15.51	17.53	20.09	21.95
9	1.73	2.09	2.70	3.33	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	26.30	28.85	32.00	34.27
19	6.84	7.63	8.91	10.12	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	31.41	34.17	37.57	40.00
24	9.89	10.86	12.40	13.85	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	37.65	40.65	44.31	46.93
29	13.12	14.26	16.05	17.71	42.56	45.72	49.59	52.34
30	13.79	14.95	16.79	18.49	43.77	46.98	50.89	53.67
40	20.71	22.16	24.43	26.51	55.76	59.34	63.69	66.77
50	27.99	29.71	32.36	34.76	67.50	71.42	76.15	79.49
100	67.33	70.06	74.22	77.93	124.3	129.6	135.8	140.2
200	152.2	156.4	162.7	168.3	234.0	241.0	249.5	255.3