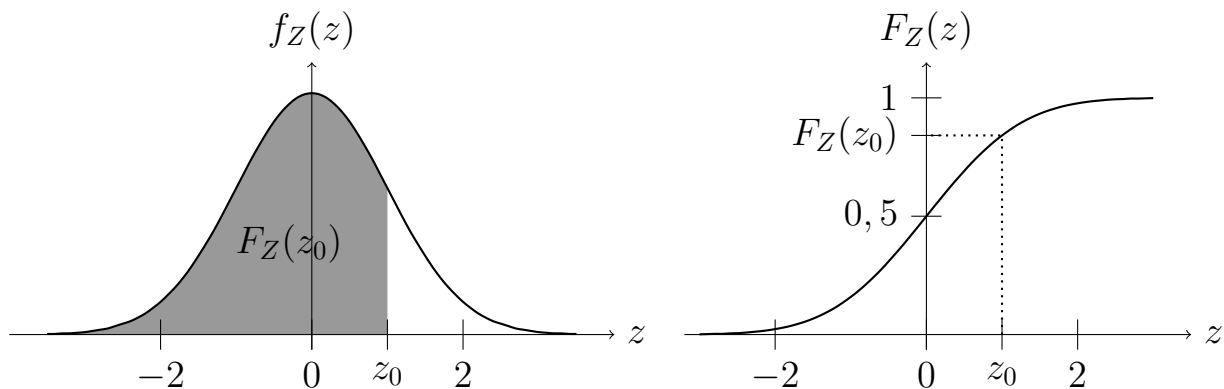


Anhang A: Verteilungstabellen

A.1 Standardnormalverteilung

z	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
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999

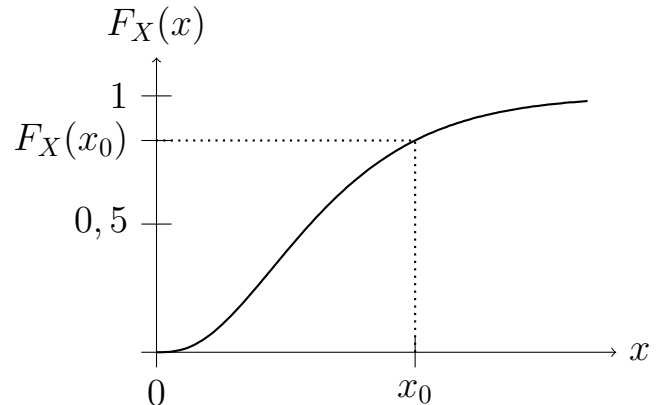
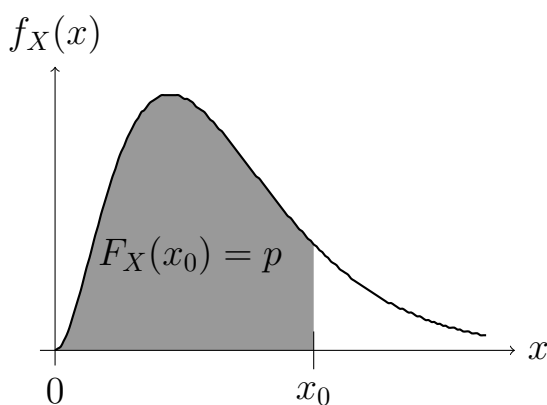
Tabelle 1: Für eine standardnormalverteilte Zufallsvariable $Z \sim \mathcal{N}(0, 1)$ sind die Werte der Verteilungsfunktion $F_Z(z)$ für $0 \leq z \leq 3.89$ tabelliert. Ablesebeispiel: $F_Z(2.13) = 0.9834$.



A.2 χ^2 -Verteilung

n	Werte p der Verteilungsfunktion											
	0.001	0.005	0.025	0.05	0.1	0.5	0.9	0.95	0.975	0.99	0.995	0.999
1	0.000	0.000	0.001	0.004	0.016	0.455	2.706	3.841	5.024	6.635	7.879	10.828
2	0.002	0.010	0.051	0.103	0.211	1.386	4.605	5.991	7.378	9.210	10.597	13.816
3	0.024	0.072	0.216	0.352	0.584	2.366	6.251	7.815	9.348	11.345	12.838	16.266
4	0.091	0.207	0.484	0.711	1.064	3.357	7.779	9.488	11.143	13.277	14.860	18.467
5	0.210	0.412	0.831	1.145	1.610	4.351	9.236	11.070	12.833	15.086	16.750	20.515
6	0.381	0.676	1.237	1.635	2.204	5.348	10.645	12.592	14.449	16.812	18.548	22.458
7	0.598	0.989	1.690	2.167	2.833	6.346	12.017	14.067	16.013	18.475	20.278	24.322
8	0.857	1.344	2.180	2.733	3.490	7.344	13.362	15.507	17.535	20.090	21.955	26.124
9	1.152	1.735	2.700	3.325	4.168	8.343	14.684	16.919	19.023	21.666	23.589	27.877
10	1.479	2.156	3.247	3.940	4.865	9.342	15.987	18.307	20.483	23.209	25.188	29.588
11	1.834	2.603	3.816	4.575	5.578	10.341	17.275	19.675	21.920	24.725	26.757	31.264
12	2.214	3.074	4.404	5.226	6.304	11.340	18.549	21.026	23.337	26.217	28.300	32.909
13	2.617	3.565	5.009	5.892	7.042	12.340	19.812	22.362	24.736	27.688	29.819	34.528
14	3.041	4.075	5.629	6.571	7.790	13.339	21.064	23.685	26.119	29.141	31.319	36.123
15	3.483	4.601	6.262	7.261	8.547	14.339	22.307	24.996	27.488	30.578	32.801	37.697
16	3.942	5.142	6.908	7.962	9.312	15.338	23.542	26.296	28.845	32.000	34.267	39.252
17	4.416	5.697	7.564	8.672	10.085	16.338	24.769	27.587	30.191	33.409	35.718	40.790
18	4.905	6.265	8.231	9.390	10.865	17.338	25.989	28.869	31.526	34.805	37.156	42.312
19	5.407	6.844	8.907	10.117	11.651	18.338	27.204	30.144	32.852	36.191	38.582	43.820
20	5.921	7.434	9.591	10.851	12.443	19.337	28.412	31.410	34.170	37.566	39.997	45.315
21	6.447	8.034	10.283	11.591	13.240	20.337	29.615	32.671	35.479	38.932	41.401	46.797
22	6.983	8.643	10.982	12.338	14.041	21.337	30.813	33.924	36.781	40.289	42.796	48.268
23	7.529	9.260	11.689	13.091	14.848	22.337	32.007	35.172	38.076	41.638	44.181	49.728
24	8.085	9.886	12.401	13.848	15.659	23.337	33.196	36.415	39.364	42.980	45.559	51.179
25	8.649	10.520	13.120	14.611	16.473	24.337	34.382	37.652	40.646	44.314	46.928	52.620
26	9.222	11.160	13.844	15.379	17.292	25.336	35.563	38.885	41.923	45.642	48.290	54.052
27	9.803	11.808	14.573	16.151	18.114	26.336	36.741	40.113	43.195	46.963	49.645	55.476
28	10.391	12.461	15.308	16.928	18.939	27.336	37.916	41.337	44.461	48.278	50.993	56.892
29	10.986	13.121	16.047	17.708	19.768	28.336	39.087	42.557	45.722	49.588	52.336	58.301
30	11.588	13.787	16.791	18.493	20.599	29.336	40.256	43.773	46.979	50.892	53.672	59.703
40	17.916	20.707	24.433	26.509	29.051	39.335	51.805	55.758	59.342	63.691	66.766	73.402
50	24.674	27.991	32.357	34.764	37.689	49.335	63.167	67.505	71.420	76.154	79.490	86.661
60	31.738	35.534	40.482	43.188	46.459	59.335	74.397	79.082	83.298	88.379	91.952	99.607
70	39.036	43.275	48.758	51.739	55.329	69.334	85.527	90.531	95.023	100.425	104.215	112.317
80	46.520	51.172	57.153	60.391	64.278	79.334	96.578	101.879	106.629	112.329	116.321	124.839
90	54.155	59.196	65.647	69.126	73.291	89.334	107.565	113.145	118.136	124.116	128.299	137.208
100	61.918	67.328	74.222	77.929	82.358	99.334	118.498	124.342	129.561	135.807	140.169	149.449

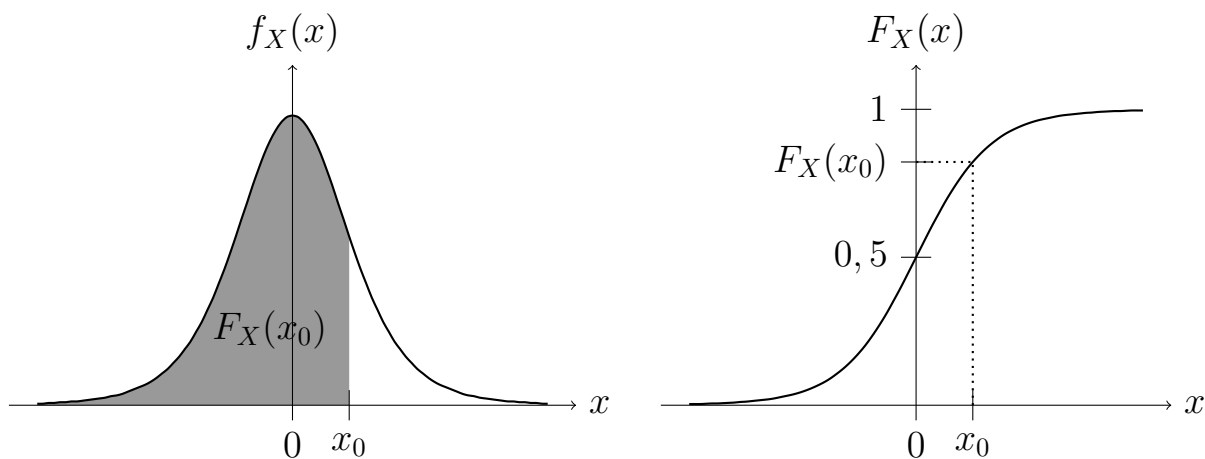
Tabelle 2: Für ausgewählte Wahrscheinlichkeiten $p \in \{0.001; 0.005; \dots; 0.999\}$ sind die Abszissenwerte einer χ^2 -Verteilung mit n Freiheitsgraden tabelliert. D.h. für gegebenes p ist das $x \in \mathbb{R}_{\geq 0}$ tabelliert, für das $P(X \leq x) = p$ (mit $X \sim \chi^2(n)$) gilt. Ablesebeispiel: Sei $X \sim \chi^2(21)$. Dann ist $P(X \leq 11.591) = F_X(11.591) = 0.05$.



A.3 t -Verteilung

n	Werte p der Verteilungsfunktion					
	0.9	0.95	0.975	0.995	0.999	0.9995
1	3.078	6.314	12.706	63.657	318.309	636.619
2	1.886	2.920	4.303	9.925	22.327	31.599
3	1.638	2.353	3.182	5.841	10.215	12.924
4	1.533	2.132	2.776	4.604	7.173	8.610
5	1.476	2.015	2.571	4.032	5.893	6.869
6	1.440	1.943	2.447	3.707	5.208	5.959
7	1.415	1.895	2.365	3.499	4.785	5.408
8	1.397	1.860	2.306	3.355	4.501	5.041
9	1.383	1.833	2.262	3.250	4.297	4.781
10	1.372	1.812	2.228	3.169	4.144	4.587
11	1.363	1.796	2.201	3.106	4.025	4.437
12	1.356	1.782	2.179	3.055	3.930	4.318
13	1.350	1.771	2.160	3.012	3.852	4.221
14	1.345	1.761	2.145	2.977	3.787	4.140
15	1.341	1.753	2.131	2.947	3.733	4.073
16	1.337	1.746	2.120	2.921	3.686	4.015
17	1.333	1.740	2.110	2.898	3.646	3.965
18	1.330	1.734	2.101	2.878	3.610	3.922
19	1.328	1.729	2.093	2.861	3.579	3.883
20	1.325	1.725	2.086	2.845	3.552	3.850
21	1.323	1.721	2.080	2.831	3.527	3.819
22	1.321	1.717	2.074	2.819	3.505	3.792
23	1.319	1.714	2.069	2.807	3.485	3.768
24	1.318	1.711	2.064	2.797	3.467	3.745
25	1.316	1.708	2.060	2.787	3.450	3.725
26	1.315	1.706	2.056	2.779	3.435	3.707
27	1.314	1.703	2.052	2.771	3.421	3.690
28	1.313	1.701	2.048	2.763	3.408	3.674
29	1.311	1.699	2.045	2.756	3.396	3.659
30	1.310	1.697	2.042	2.750	3.385	3.646
40	1.303	1.684	2.021	2.704	3.307	3.551
60	1.296	1.671	2.000	2.660	3.232	3.460
120	1.289	1.658	1.980	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.576	3.090	3.291

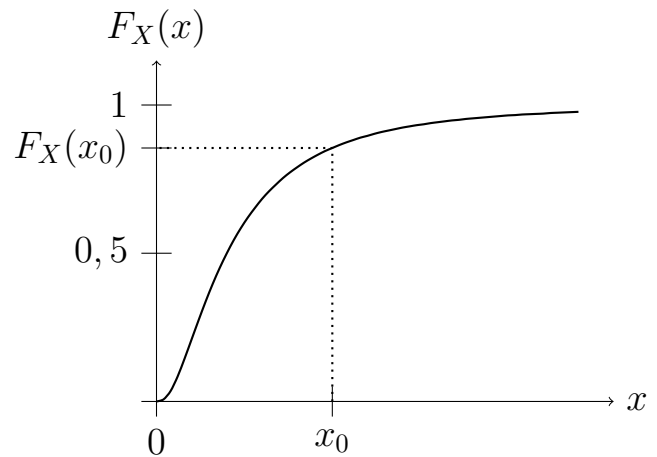
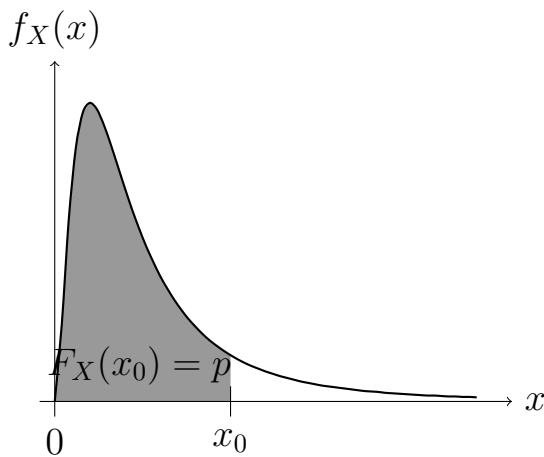
Tabelle 3: Für ausgewählte Wahrscheinlichkeiten $p \in \{0.9, 0.95, \dots, 0.9995\}$ sind die Abszissenwerte einer t -Verteilung mit n Freiheitsgraden tabelliert. D.h. für gegebenes p ist das $x \in \mathbb{R}$ tabelliert, für das $P(X \leq x) = p$ (mit $X \sim t(n)$) gilt. Ablesebeispiel: Sei $X \sim t(16)$. Dann ist $P(X \leq 1.746) = F_X(1.746) = 0.95$.



A.4 F -Verteilung

$m \backslash n$	1	2	3	4	5	6	7	8	9	10	11	12
1	648.00	799.00	864.00	900.00	922.00	937.00	948.00	957.00	963.00	969.00	973.00	977.00
2	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39	39.40	39.41	39.41
3	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47	14.42	14.37	14.34
4	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.79	8.75
5	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68	6.62	6.57	6.52
6	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.41	5.37
7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.71	4.67
8	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.24	4.20
9	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.91	3.87
10	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.66	3.62
11	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.47	3.43
12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.32	3.28
13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.20	3.15
14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.09	3.05
15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	3.01	2.96
16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.93	2.89
17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.87	2.82
18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.81	2.77
19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.76	2.72
20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.72	2.68
22	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76	2.70	2.65	2.60
24	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70	2.64	2.59	2.54
26	5.66	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65	2.59	2.54	2.49
28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	2.69	2.61	2.55	2.49	2.45
30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.46	2.41
40	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.33	2.29
50	5.34	3.97	3.39	3.05	2.83	2.67	2.55	2.46	2.38	2.32	2.26	2.22
60	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.22	2.17
80	5.22	3.86	3.28	2.95	2.73	2.57	2.45	2.35	2.28	2.21	2.16	2.11
100	5.18	3.83	3.25	2.92	2.70	2.54	2.42	2.32	2.24	2.18	2.12	2.08
200	5.10	3.76	3.18	2.85	2.63	2.47	2.35	2.26	2.18	2.11	2.06	2.01
300	5.07	3.73	3.16	2.83	2.61	2.45	2.33	2.23	2.16	2.09	2.04	1.99
500	5.05	3.72	3.14	2.81	2.59	2.43	2.31	2.22	2.14	2.07	2.02	1.97
1000	5.04	3.70	3.13	2.80	2.58	2.42	2.30	2.20	2.13	2.06	2.01	1.96
∞	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.99	1.94

Tabelle 4: Für die Wahrscheinlichkeit $p = 0.975$ sind die Abszissenwerte einer F -Verteilung mit n und m Freiheitsgraden tabelliert. D.h. für gegebenes $p = 0.975$ ist das $x \in \mathbb{R}_{\geq 0}$ tabelliert, für das $P(X \leq x) = 0.975$ (mit $X \sim F(n, m)$) gilt. Ablesebeispiel: Sei $X \sim F(9, 8)$. Dann ist $P(X \leq 4.36) = F_X(4.36) = 0.975$.



$m \backslash n$	13	14	15	16	18	20	30	40	50	100	500	∞
1	980.00	983.00	985.00	987.00	990.00	993.00	1001.00	1006.00	1008.00	1013.00	1017.00	1018.00
2	39.42	39.43	39.43	39.44	39.44	39.45	39.46	39.47	39.48	39.49	39.50	39.50
3	14.30	14.28	14.25	14.23	14.20	14.17	14.08	14.04	14.01	13.96	13.91	13.90
4	8.71	8.68	8.66	8.63	8.59	8.56	8.46	8.41	8.38	8.32	8.27	8.26
5	6.49	6.46	6.43	6.40	6.36	6.33	6.23	6.18	6.14	6.08	6.03	6.02
6	5.33	5.30	5.27	5.24	5.20	5.17	5.07	5.01	4.98	4.92	4.86	4.85
7	4.63	4.60	4.57	4.54	4.50	4.47	4.36	4.31	4.28	4.21	4.16	4.14
8	4.16	4.13	4.10	4.08	4.03	4.00	3.89	3.84	3.81	3.74	3.68	3.67
9	3.83	3.80	3.77	3.74	3.70	3.67	3.56	3.51	3.47	3.40	3.35	3.33
10	3.58	3.55	3.52	3.50	3.45	3.42	3.31	3.26	3.22	3.15	3.09	3.08
11	3.39	3.36	3.33	3.30	3.26	3.23	3.12	3.06	3.03	2.96	2.90	2.88
12	3.24	3.21	3.18	3.15	3.11	3.07	2.96	2.91	2.87	2.80	2.74	2.72
13	3.12	3.08	3.05	3.03	2.98	2.95	2.84	2.78	2.74	2.67	2.61	2.60
14	3.01	2.98	2.95	2.92	2.88	2.84	2.73	2.67	2.64	2.56	2.50	2.49
15	2.92	2.89	2.86	2.84	2.79	2.76	2.64	2.59	2.55	2.47	2.41	2.40
16	2.85	2.82	2.79	2.76	2.72	2.68	2.57	2.51	2.47	2.40	2.33	2.32
17	2.79	2.75	2.72	2.70	2.65	2.62	2.50	2.44	2.41	2.33	2.26	2.25
18	2.73	2.70	2.67	2.64	2.60	2.56	2.44	2.38	2.35	2.27	2.20	2.19
19	2.68	2.65	2.62	2.59	2.55	2.51	2.39	2.33	2.30	2.22	2.15	2.13
20	2.64	2.60	2.57	2.55	2.50	2.46	2.35	2.29	2.25	2.17	2.10	2.09
22	2.56	2.53	2.50	2.47	2.43	2.39	2.27	2.21	2.17	2.09	2.02	2.00
24	2.50	2.47	2.44	2.41	2.36	2.33	2.21	2.15	2.11	2.02	1.95	1.94
26	2.45	2.42	2.39	2.36	2.31	2.28	2.16	2.09	2.05	1.97	1.90	1.88
28	2.41	2.37	2.34	2.32	2.27	2.23	2.11	2.05	2.01	1.92	1.85	1.83
30	2.37	2.34	2.31	2.28	2.23	2.20	2.07	2.01	1.97	1.88	1.81	1.79
40	2.25	2.21	2.18	2.15	2.11	2.07	1.94	1.88	1.83	1.74	1.66	1.64
50	2.18	2.14	2.11	2.08	2.03	1.99	1.87	1.80	1.75	1.66	1.57	1.55
60	2.13	2.09	2.06	2.03	1.98	1.94	1.82	1.74	1.70	1.60	1.51	1.48
80	2.07	2.03	2.00	1.97	1.92	1.88	1.75	1.68	1.63	1.53	1.43	1.40
100	2.04	2.00	1.97	1.94	1.89	1.85	1.71	1.64	1.59	1.48	1.38	1.35
200	1.97	1.93	1.90	1.87	1.82	1.78	1.64	1.56	1.51	1.39	1.27	1.23
300	1.95	1.91	1.88	1.85	1.80	1.75	1.62	1.54	1.48	1.36	1.23	1.18
500	1.93	1.89	1.86	1.83	1.78	1.74	1.60	1.52	1.46	1.34	1.19	1.14
1000	1.92	1.88	1.85	1.82	1.77	1.72	1.58	1.50	1.45	1.32	1.16	1.09
∞	1.90	1.87	1.83	1.80	1.75	1.71	1.57	1.48	1.43	1.30	1.13	1.00

Tabelle 5: Für die Wahrscheinlichkeit $p = 0.975$ sind die Abszissenwerte einer F -Verteilung mit n und m Freiheitsgraden tabelliert. D.h. für gegebenes $p = 0.975$ ist das $x \in \mathbb{R}_{\geq 0}$ tabelliert, für das $P(X \leq x) = 0.975$ (mit $X \sim F(n, m)$) gilt. Ablesebeispiel: Sei $X \sim F(16, 28)$. Dann ist $P(X \leq 2.32) = F_X(2.32) = 0.975$.

