Tabelas de Probabilidades e Estatística / Métodos Estatísticos

Instituto Superior de Engenharia de Coimbra

Conteúdo

Distribuições

Discretas

Binomial

Se $X \sim \mathcal{B}(n,p)$ então:

- $P(X=k) = \binom{n}{k} p^k (1-p)^{n-k}, \quad k = 0, 1, \ldots, n$
- $\mathrm{E}(X) = np \quad \mathrm{V}(X) = np(1-p) \quad \phi_X(t) = ((1-p) + pe^t)^n, \ t \in \mathbb{R}$

Hipergeométrica

Se $X \sim \mathcal{H}(n,N,M)$ então:

- $P(X=k) = \dfrac{\binom{M}{k}\binom{N-M}{n-k}}{\binom{N}{n}}, \quad k = \max(0, n-(N-M)), 1, \ldots, \min(n,M)$
- $\mathrm{E}(X) = np \quad \mathrm{V}(X) = np(1-p)\left(\frac{N-n}{N-1}\right)$ com $p = \frac{M}{N}$

Poisson

Se $X \sim \mathcal{P}(\lambda), \ \lambda > 0$ então:

- $P(X=k) = \frac{e^{-\lambda}\lambda^k}{k!}, \quad k \in \mathbb{N}_0$
- $\mathrm{E}\,(X) = \mathrm{V}\,(X) = \lambda \quad \phi_X(t) = e^{(e^t-1)\lambda}, \ t \in \mathbb{R}$

Contínuas

Uniforme

Se $X \sim \mathcal{U}_{[a,b]}$ então:

- $f(x) = \frac{1}{b-a} \ \mathbb{I}_{[a,b]}$
- $\mathrm{E}(X) = \frac{b+a}{2} \quad \mathrm{V}(X) = \frac{(b-a)^2}{12} \quad \phi_X(t) = \frac{e^{bt}-e^{at}}{(b-a)t}$

Exponencial

Se $X \sim \mathcal{E}(\lambda), \ \lambda > 0$ então:

- $f(x) = \lambda e^{-\lambda x} \ \mathbb{I}_{[0,+\infty[}$
- $\mathrm{E}(X) = \frac{1}{\lambda} \quad \mathrm{V}(X) = \frac{1}{\lambda^2} \quad \phi_X(t) = \frac{\lambda}{\lambda - t}, \ t < \lambda.$

Normal

Se $X \sim \mathcal{N}(\mu,\sigma)$ então:

- $f(x) = \dfrac{1}{\sqrt{2\pi}\sigma} e^{\frac{-1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}, \ \forall x \in \mathbb{R}$
- $\phi_X(t) = e^{\mu t + \frac{\sigma^2 t^2}{2}}, \ t \in \mathbb{R}$

Modelo de Regressão Linear $Y_i = \beta_0 + \beta_1 x_i + \epsilon_i, \quad \epsilon_i \sim \mathcal{N}(0,\sigma^2), \ i = 1, \ldots, n$

- $S_{xY} = \sum_{i=1}^{n} x_i Y_i - n\ \overline{x}\ \overline{Y}$
- $\hat{\sigma}^2 = \dfrac{1}{n-2}\left(S_{YY} - \hat{\beta}_1^2 S_{xx}\right)$
- $R^2 = \dfrac{S_{xY}^2}{S_{xx} S_{YY}}$
- $\hat{\beta}_1 = \dfrac{S_{xY}}{S_{xx}}$
- $\hat{\beta}_0 = \overline{Y} - \hat{\beta}_1 \overline{x}$

Aproximações

- Se $X \sim \mathcal{H}(n,N,M)$ com $\frac{n}{N} \leq 0.1$ então $X \dot{\sim} \mathcal{B}\left(n, \frac{M}{N}\right)$
- Se $X \sim \mathcal{B}(n,p)$
  - com $p \leq 0.1$ então $X \dot{\sim} \mathcal{P}(np)$
  - com $p \in]0.1, 0.9[$ e $n > 20$ então $X \dot{\sim} \mathcal{N}(np, \sqrt{np(1-p)})$
  - com $p \geq 0.9$ então $Y = n - X \dot{\sim} \mathcal{P}(n(1-p))$
- Se $X \sim \mathcal{P}(\lambda)$ com $\lambda > 20$ então $X \dot{\sim} \mathcal{N}(\lambda, \sqrt{\lambda})$

1.2 Características amostrais e Variáveis fulcrais

Características amostrais

- $\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$;
- $S_n^2 = \frac{1}{n-1}\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2 = \frac{1}{n-1}\sum_{i=1}^{n} X_i^2 - \frac{n}{n-1}\overline{X}^2$.

Variáveis fulcrais

Para a média:

σ	Z_n	Lei de X	Dimensão da amostra	Lei de Z_n
conhecido	$\sqrt{n}\ \frac{\overline{X}-\mu}{\sigma}$	$\mathcal{N}(\mu,\sigma)$	qualquer	$Z_n \sim \mathcal{N}(0,1)$
		qualquer	$n > 30$	$Z_n \dot{\sim} \mathcal{N}(0,1)$
desconhecido	$\sqrt{n}\ \frac{\overline{X}-\mu}{S_n}$	$\mathcal{N}(\mu,\sigma)$	qualquer	$Z_n \sim t_{n-1}$
		qualquer	$n > 30$	$Z_n \dot{\sim} \mathcal{N}(0,1)$

Para a variância:

μ	Z_n	Lei de Z_n
conhecido	$\sum_{i=1}^{n}\left(\frac{X_i-\mu}{\sigma}\right)^2$	$Z_n \sim \chi^2_n$
desconhecido	$\frac{n-1}{\sigma^2}\ S_n^2$	$Z_n \sim \chi^2_{n-1}$

Para o quociente de variâncias:

Z_n	Lei de Z_n
$\frac{S_1^2}{S_2^2}\cdot\frac{\sigma_2^2}{\sigma_1^2}$	$Z_n \sim F_{n_1-1,n_2-1}$

2 Tabelas

2.1 Distribuição Binomial

$$\text{Se } X \sim \mathcal{B}(n,p) \text{ então } F_X(x) = \sum_{k=0}^{x} \left(\begin{array}{c} n \\ k \end{array} \right) p^k (1-p)^{n-k}$$

n	$x \backslash p$	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
1	0	0.9900	0.9800	0.9700	0.9600	0.9500	0.9400	0.9300	0.9200	0.9100	0.9000	0.8500	0.8000	0.7500	0.7000	0.6500	0.6000	0.5500	0.5000
	1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	0	0.9801	0.9604	0.9409	0.9216	0.9025	0.8836	0.8649	0.8464	0.8281	0.8100	0.7225	0.6400	0.5625	0.4900	0.4225	0.3600	0.3025	0.2500
	1	0.9999	0.9996	0.9991	0.9984	0.9975	0.9964	0.9951	0.9936	0.9919	0.9900	0.9775	0.9600	0.9375	0.9100	0.8775	0.8400	0.7975	0.7500
	2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	0	0.9703	0.9412	0.9127	0.8847	0.8574	0.8306	0.8044	0.7787	0.7536	0.7290	0.6141	0.5120	0.4219	0.3430	0.2746	0.2160	0.1664	0.1250
	1	0.9997	0.9988	0.9974	0.9953	0.9928	0.9896	0.9860	0.9818	0.9772	0.9720	0.9393	0.8960	0.8438	0.7840	0.7183	0.6480	0.5748	0.5000
	2	1.0000	1.0000	1.0000	0.9999	0.9999	0.9998	0.9997	0.9995	0.9993	0.9990	0.9966	0.9920	0.9844	0.9730	0.9571	0.9360	0.9089	0.8750
	3				1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4	0	0.9606	0.9224	0.8853	0.8493	0.8145	0.7807	0.7481	0.7164	0.6857	0.6561	0.5220	0.4096	0.3164	0.2401	0.1785	0.1296	0.0915	0.0625
	1	0.9994	0.9977	0.9948	0.9909	0.9860	0.9801	0.9733	0.9656	0.9570	0.9477	0.8905	0.8192	0.7383	0.6517	0.5630	0.4752	0.3910	0.3125
	2	1.0000	1.0000	0.9999	0.9998	0.9995	0.9992	0.9987	0.9981	0.9973	0.9963	0.9880	0.9728	0.9492	0.9163	0.8735	0.8208	0.7585	0.6875
	3			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9995	0.9984	0.9961	0.9919	0.9850	0.9744	0.9590	0.9375
	4									1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5	0	0.9510	0.9039	0.8587	0.8154	0.7738	0.7339	0.6957	0.6591	0.6240	0.5905	0.4437	0.3277	0.2373	0.1681	0.1160	0.0778	0.0503	0.0313
	1	0.9990	0.9962	0.9915	0.9852	0.9774	0.9681	0.9575	0.9456	0.9326	0.9185	0.8352	0.7373	0.6328	0.5282	0.4284	0.3370	0.2562	0.1875
	2	1.0000	0.9999	0.9997	0.9994	0.9988	0.9980	0.9969	0.9955	0.9937	0.9914	0.9734	0.9421	0.8965	0.8369	0.7648	0.6826	0.5931	0.5000
	3		1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9998	0.9997	0.9995	0.9978	0.9933	0.9844	0.9692	0.9460	0.9130	0.8688	0.8125
	4						1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9997	0.9990	0.9976	0.9947	0.9898	0.9815	0.9688
	5											1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6	0	0.9415	0.8858	0.8330	0.7828	0.7351	0.6899	0.6470	0.6064	0.5679	0.5314	0.3771	0.2621	0.1780	0.1176	0.0754	0.0467	0.0277	0.0156
	1	0.9985	0.9943	0.9875	0.9784	0.9672	0.9541	0.9392	0.9227	0.9048	0.8857	0.7765	0.6554	0.5339	0.4202	0.3191	0.2333	0.1636	0.1094
	2	1.0000	0.9998	0.9995	0.9988	0.9978	0.9962	0.9942	0.9915	0.9882	0.9842	0.9527	0.9011	0.8306	0.7443	0.6471	0.5443	0.4415	0.3438
	3		1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9995	0.9992	0.9987	0.9941	0.9830	0.9624	0.9295	0.8826	0.8208	0.7447	0.6563
	4					1.0000	1.0000	1.0000	1.0000	1.0000	0.9999	0.9996	0.9984	0.9954	0.9891	0.9777	0.9590	0.9308	0.8906
	5										1.0000	1.0000	0.9999	0.9998	0.9993	0.9982	0.9959	0.9917	0.9844
	6												1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
7	0	0.9321	0.8681	0.8080	0.7514	0.6983	0.6485	0.6017	0.5578	0.5168	0.4783	0.3206	0.2097	0.1335	0.0824	0.0490	0.0280	0.0152	0.0078
	1	0.9980	0.9921	0.9829	0.9706	0.9556	0.9382	0.9187	0.8974	0.8745	0.8503	0.7166	0.5767	0.4449	0.3294	0.2338	0.1586	0.1024	0.0625
	2	1.0000	0.9997	0.9991	0.9980	0.9962	0.9937	0.9903	0.9860	0.9807	0.9743	0.9262	0.8520	0.7564	0.6471	0.5323	0.4199	0.3164	0.2266
	3		1.0000	1.0000	0.9999	0.9998	0.9996	0.9993	0.9988	0.9982	0.9973	0.9879	0.9667	0.9294	0.8740	0.8002	0.7102	0.6083	0.5000
	4				1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9998	0.9988	0.9953	0.9871	0.9712	0.9444	0.9037	0.8471	0.7734
	5								1.0000	1.0000	1.0000	0.9999	0.9996	0.9987	0.9962	0.9910	0.9812	0.9643	0.9375
	6											1.0000	1.0000	0.9999	0.9998	0.9994	0.9984	0.9963	0.9922
	7													1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
8	0	0.9227	0.8508	0.7837	0.7214	0.6634	0.6096	0.5596	0.5132	0.4703	0.4305	0.2725	0.1678	0.1001	0.0576	0.0319	0.0168	0.0084	0.0039
	1	0.9973	0.9897	0.9777	0.9619	0.9428	0.9208	0.8965	0.8702	0.8423	0.8131	0.6572	0.5033	0.3671	0.2553	0.1691	0.1064	0.0632	0.0352
	2	0.9999	0.9996	0.9987	0.9969	0.9942	0.9904	0.9853	0.9789	0.9711	0.9619	0.8948	0.7969	0.6785	0.5518	0.4278	0.3154	0.2201	0.1445
	3	1.0000	1.0000	0.9999	0.9998	0.9996	0.9993	0.9987	0.9978	0.9966	0.9950	0.9786	0.9437	0.8862	0.8059	0.7064	0.5941	0.4770	0.3633
	4			1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9997	0.9996	0.9971	0.9896	0.9727	0.9420	0.8939	0.8263	0.7396	0.6367
	5							1.0000	1.0000	1.0000	1.0000	0.9998	0.9988	0.9958	0.9887	0.9747	0.9502	0.9115	0.8555
	6											1.0000	0.9999	0.9996	0.9987	0.9964	0.9915	0.9819	0.9648
	7												1.0000	1.0000	0.9999	0.9998	0.9993	0.9983	0.9961
	8														1.0000	1.0000	1.0000	1.0000	1.0000
9	0	0.9135	0.8337	0.7602	0.6925	0.6302	0.5730	0.5204	0.4722	0.4279	0.3874	0.2316	0.1342	0.0751	0.0404	0.0207	0.0101	0.0046	0.0020
	1	0.9966	0.9869	0.9718	0.9522	0.9288	0.9022	0.8729	0.8417	0.8088	0.7748	0.5995	0.4362	0.3003	0.1960	0.1211	0.0705	0.0385	0.0195
	2	0.9999	0.9994	0.9980	0.9955	0.9916	0.9862	0.9791	0.9702	0.9595	0.9470	0.8591	0.7382	0.6007	0.4628	0.3373	0.2318	0.1495	0.0898
	3	1.0000	1.0000	0.9999	0.9997	0.9994	0.9987	0.9977	0.9963	0.9943	0.9917	0.9661	0.9144	0.8343	0.7297	0.6089	0.4826	0.3614	0.2539
	4			1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9995	0.9991	0.9944	0.9804	0.9511	0.9012	0.8283	0.7334	0.6214	0.5000
	5						1.0000	1.0000	1.0000	1.0000	0.9999	0.9994	0.9969	0.9900	0.9747	0.9464	0.9006	0.8342	0.7461
	6										1.0000	1.0000	0.9997	0.9987	0.9957	0.9888	0.9750	0.9502	0.9102
	7												1.0000	0.9999	0.9996	0.9986	0.9962	0.9909	0.9805
	8													1.0000	1.0000	0.9999	0.9997	0.9992	0.9980
	9															1.0000	1.0000	1.0000	1.0000
10	0	0.9044	0.8171	0.7374	0.6648	0.5987	0.5386	0.4840	0.4344	0.3894	0.3487	0.1969	0.1074	0.0563	0.0282	0.0135	0.0060	0.0025	0.0010
	1	0.9957	0.9838	0.9655	0.9418	0.9139	0.8824	0.8483	0.8121	0.7746	0.7361	0.5443	0.3758	0.2440	0.1493	0.0860	0.0464	0.0233	0.0107
	2	0.9999	0.9991	0.9972	0.9938	0.9885	0.9812	0.9717	0.9599	0.9460	0.9298	0.8202	0.6778	0.5256	0.3828	0.2616	0.1673	0.0996	0.0547
	3	1.0000	1.0000	0.9999	0.9996	0.9990	0.9980	0.9964	0.9942	0.9912	0.9872	0.9500	0.8791	0.7759	0.6496	0.5138	0.3823	0.2660	0.1719
	4			1.0000	1.0000	0.9999	0.9998	0.9997	0.9994	0.9990	0.9984	0.9901	0.9672	0.9219	0.8497	0.7515	0.6331	0.5044	0.3770
	5					1.0000	1.0000	1.0000	1.0000	0.9999	0.9999	0.9986	0.9936	0.9803	0.9527	0.9051	0.8338	0.7384	0.6230
	6									1.0000	1.0000	0.9999	0.9991	0.9965	0.9894	0.9740	0.9452	0.8980	0.8281
	7											1.0000	0.9999	0.9996	0.9984	0.9952	0.9877	0.9726	0.9453
	8												1.0000	1.0000	0.9999	0.9995	0.9983	0.9955	0.9893
	9														1.0000	1.0000	0.9999	0.9997	0.9990
	10																1.0000	1.0000	1.0000

n	$x\backslash p$	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
11	0	0.8953	0.8007	0.7153	0.6382	0.5688	0.5063	0.4501	0.3996	0.3544	0.3138	0.1673	0.0859	0.0422	0.0198	0.0088	0.0036	0.0014	0.0005
	1	0.9948	0.9805	0.9587	0.9308	0.8981	0.8618	0.8228	0.7819	0.7399	0.6974	0.4922	0.3221	0.1971	0.1130	0.0606	0.0302	0.0139	0.0059
	2	0.9998	0.9988	0.9963	0.9917	0.9848	0.9752	0.9630	0.9481	0.9305	0.9104	0.7788	0.6174	0.4552	0.3127	0.2001	0.1189	0.0652	0.0327
	3	1.0000	1.0000	0.9998	0.9993	0.9984	0.9970	0.9947	0.9915	0.9871	0.9815	0.9306	0.8389	0.7133	0.5696	0.4256	0.2963	0.1911	0.1133
	4			1.0000	1.0000	0.9999	0.9997	0.9995	0.9990	0.9983	0.9972	0.9841	0.9496	0.8854	0.7897	0.6683	0.5328	0.3971	0.2744
	5					1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9973	0.9883	0.9657	0.9218	0.8513	0.7535	0.6331	0.5000
	6								1.0000	1.0000	1.0000	0.9997	0.9980	0.9924	0.9784	0.9499	0.9006	0.8262	0.7256
	7											1.0000	0.9998	0.9988	0.9957	0.9878	0.9707	0.9390	0.8867
	8												1.0000	0.9999	0.9994	0.9980	0.9941	0.9852	0.9673
	9													1.0000	1.0000	0.9998	0.9993	0.9978	0.9941
	10															1.0000	1.0000	0.9998	0.9995
	11																	1.0000	1.0000
12	0	0.8864	0.7847	0.6938	0.6127	0.5404	0.4759	0.4186	0.3677	0.3225	0.2824	0.1422	0.0687	0.0317	0.0138	0.0057	0.0022	0.0008	0.0002
	1	0.9938	0.9769	0.9514	0.9191	0.8816	0.8405	0.7967	0.7513	0.7052	0.6590	0.4435	0.2749	0.1584	0.0850	0.0424	0.0196	0.0083	0.0032
	2	0.9998	0.9985	0.9952	0.9893	0.9804	0.9684	0.9532	0.9348	0.9134	0.8891	0.7358	0.5583	0.3907	0.2528	0.1513	0.0834	0.0421	0.0193
	3	1.0000	0.9999	0.9997	0.9990	0.9978	0.9957	0.9925	0.9880	0.9820	0.9744	0.9078	0.7946	0.6488	0.4925	0.3467	0.2253	0.1345	0.0730
	4		1.0000	1.0000	0.9999	0.9998	0.9996	0.9991	0.9984	0.9973	0.9957	0.9761	0.9274	0.8424	0.7237	0.5833	0.4382	0.3044	0.1938
	5				1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9995	0.9954	0.9806	0.9456	0.8822	0.7873	0.6652	0.5269	0.3872
	6							1.0000	1.0000	1.0000	0.9999	0.9993	0.9961	0.9857	0.9614	0.9154	0.8418	0.7393	0.6128
	7										1.0000	0.9999	0.9994	0.9972	0.9905	0.9745	0.9427	0.8883	0.8062
	8											1.0000	0.9999	0.9996	0.9983	0.9944	0.9847	0.9644	0.9270
	9												1.0000	1.0000	0.9998	0.9992	0.9972	0.9921	0.9807
	10														1.0000	0.9999	0.9997	0.9989	0.9968
	11															1.0000	1.0000	0.9999	0.9998
	12																	1.0000	1.0000
13	0	0.8775	0.7690	0.6730	0.5882	0.5133	0.4474	0.3893	0.3383	0.2935	0.2542	0.1209	0.0550	0.0238	0.0097	0.0037	0.0013	0.0004	0.0001
	1	0.9928	0.9730	0.9436	0.9068	0.8646	0.8186	0.7702	0.7206	0.6707	0.6213	0.3983	0.2336	0.1267	0.0637	0.0296	0.0126	0.0049	0.0017
	2	0.9997	0.9980	0.9938	0.9865	0.9755	0.9608	0.9422	0.9201	0.8946	0.8661	0.6920	0.5017	0.3326	0.2025	0.1132	0.0579	0.0269	0.0112
	3	1.0000	0.9999	0.9995	0.9986	0.9969	0.9940	0.9897	0.9837	0.9758	0.9658	0.8820	0.7473	0.5843	0.4206	0.2783	0.1686	0.0929	0.0461
	4		1.0000	1.0000	0.9999	0.9997	0.9993	0.9987	0.9976	0.9959	0.9935	0.9658	0.9009	0.7940	0.6543	0.5005	0.3530	0.2279	0.1334
	5				1.0000	1.0000	0.9999	0.9999	0.9997	0.9995	0.9991	0.9925	0.9700	0.9198	0.8346	0.7159	0.5744	0.4268	0.2905
	6						1.0000	1.0000	1.0000	0.9999	0.9999	0.9987	0.9930	0.9757	0.9376	0.8705	0.7712	0.6437	0.5000
	7									1.0000	1.0000	0.9998	0.9988	0.9944	0.9818	0.9538	0.9023	0.8212	0.7095
	8											1.0000	0.9998	0.9990	0.9960	0.9874	0.9679	0.9302	0.8666
	9												1.0000	0.9999	0.9993	0.9975	0.9922	0.9797	0.9539
	10													1.0000	0.9999	0.9997	0.9987	0.9959	0.9888
	11														1.0000	1.0000	0.9999	0.9995	0.9983
	12																1.0000	1.0000	0.9999
	13																		1.0000
14	0	0.8687	0.7536	0.6528	0.5647	0.4877	0.4205	0.3620	0.3112	0.2670	0.2288	0.1028	0.0440	0.0178	0.0068	0.0024	0.0008	0.0002	0.0001
	1	0.9916	0.9690	0.9355	0.8941	0.8470	0.7963	0.7436	0.6900	0.6368	0.5846	0.3567	0.1979	0.1010	0.0475	0.0205	0.0081	0.0029	0.0009
	2	0.9997	0.9975	0.9923	0.9833	0.9699	0.9522	0.9302	0.9042	0.8745	0.8416	0.6479	0.4481	0.2811	0.1608	0.0839	0.0398	0.0170	0.0065
	3	1.0000	0.9999	0.9994	0.9981	0.9958	0.9920	0.9864	0.9786	0.9685	0.9559	0.8535	0.6982	0.5213	0.3552	0.2205	0.1243	0.0632	0.0287
	4		1.0000	1.0000	0.9998	0.9996	0.9990	0.9980	0.9965	0.9941	0.9908	0.9533	0.8702	0.7415	0.5842	0.4227	0.2793	0.1672	0.0898
	5				1.0000	1.0000	0.9999	0.9998	0.9996	0.9992	0.9985	0.9885	0.9561	0.8883	0.7805	0.6405	0.4859	0.3373	0.2120
	6						1.0000	1.0000	1.0000	0.9999	0.9998	0.9978	0.9884	0.9617	0.9067	0.8164	0.6925	0.5461	0.3953
	7									1.0000	1.0000	0.9997	0.9976	0.9897	0.9685	0.9247	0.8499	0.7414	0.6047
	8											1.0000	0.9996	0.9978	0.9917	0.9757	0.9417	0.8811	0.7880
	9												1.0000	0.9997	0.9983	0.9940	0.9825	0.9574	0.9102
	10													1.0000	0.9998	0.9989	0.9961	0.9886	0.9713
	11														1.0000	0.9999	0.9994	0.9978	0.9935
	12															1.0000	0.9999	0.9997	0.9991
	13																1.0000	1.0000	0.9999
	14																		1.0000
15	0	0.8601	0.7386	0.6333	0.5421	0.4633	0.3953	0.3367	0.2863	0.2430	0.2059	0.0874	0.0352	0.0134	0.0047	0.0016	0.0005	0.0001	0.0000
	1	0.9904	0.9647	0.9270	0.8809	0.8290	0.7738	0.7168	0.6597	0.6035	0.5490	0.3186	0.1671	0.0802	0.0353	0.0142	0.0052	0.0017	0.0005
	2	0.9996	0.9970	0.9906	0.9797	0.9638	0.9429	0.9171	0.8870	0.8531	0.8159	0.6042	0.3980	0.2361	0.1268	0.0617	0.0271	0.0107	0.0037
	3	1.0000	0.9998	0.9992	0.9976	0.9945	0.9896	0.9825	0.9727	0.9601	0.9444	0.8227	0.6482	0.4613	0.2969	0.1727	0.0905	0.0424	0.0176
	4		1.0000	0.9999	0.9998	0.9994	0.9986	0.9972	0.9950	0.9918	0.9873	0.9383	0.8358	0.6865	0.5155	0.3519	0.2173	0.1204	0.0592
	5			1.0000	1.0000	0.9999	0.9999	0.9997	0.9993	0.9987	0.9978	0.9832	0.9389	0.8516	0.7216	0.5643	0.4032	0.2608	0.1509
	6					1.0000	1.0000	1.0000	0.9999	0.9998	0.9997	0.9964	0.9819	0.9434	0.8689	0.7548	0.6098	0.4522	0.3036
	7								1.0000	1.0000	1.0000	0.9994	0.9958	0.9827	0.9500	0.8868	0.7869	0.6535	0.5000
	8											0.9999	0.9992	0.9958	0.9848	0.9578	0.9050	0.8182	0.6964
	9											1.0000	0.9999	0.9992	0.9963	0.9876	0.9662	0.9231	0.8491
	10												1.0000	0.9999	0.9993	0.9972	0.9907	0.9745	0.9408
	11													1.0000	0.9999	0.9995	0.9981	0.9937	0.9824
	12														1.0000	0.9999	0.9997	0.9989	0.9963
	13															1.0000	1.0000	0.9999	0.9995
	14																	1.0000	1.0000
16	0	0.8515	0.7238	0.6143	0.5204	0.4401	0.3716	0.3131	0.2634	0.2211	0.1853	0.0743	0.0281	0.0100	0.0033	0.0010	0.0003	0.0001	0.0000
	1	0.9891	0.9601	0.9182	0.8673	0.8108	0.7511	0.6902	0.6299	0.5711	0.5147	0.2839	0.1407	0.0635	0.0261	0.0098	0.0033	0.0010	0.0003
	2	0.9995	0.9963	0.9887	0.9758	0.9571	0.9327	0.9031	0.8689	0.8306	0.7892	0.5614	0.3518	0.1971	0.0994	0.0451	0.0183	0.0066	0.0021
	3	1.0000	0.9998	0.9989	0.9968	0.9930	0.9868	0.9779	0.9658	0.9504	0.9316	0.7899	0.5981	0.4050	0.2459	0.1339	0.0651	0.0281	0.0106
	4		1.0000	0.9999	0.9997	0.9991	0.9981	0.9962	0.9932	0.9889	0.9830	0.9209	0.7982	0.6302	0.4499	0.2892	0.1666	0.0853	0.0384
	5			1.0000	1.0000	0.9999	0.9998	0.9995	0.9990	0.9981	0.9967	0.9765	0.9183	0.8103	0.6598	0.4900	0.3288	0.1976	0.1051
	6					1.0000	1.0000	0.9999	0.9999	0.9997	0.9995	0.9944	0.9733	0.9204	0.8247	0.6881	0.5272	0.3660	0.2272
	7							1.0000	1.0000	1.0000	0.9999	0.9989	0.9930	0.9729	0.9256	0.8406	0.7161	0.5629	0.4018
	8										1.0000	0.9998	0.9985	0.9925	0.9743	0.9329	0.8577	0.7441	0.5982
	9											1.0000	0.9998	0.9984	0.9929	0.9771	0.9417	0.8759	0.7728
	10												1.0000	0.9997	0.9984	0.9938	0.9809	0.9514	0.8949
	11													1.0000	0.9997	0.9987	0.9951	0.9851	0.9616
	12														1.0000	0.9998	0.9991	0.9965	0.9894
	13															1.0000	0.9999	0.9994	0.9979
	14																1.0000	0.9999	0.9997
	15																	1.0000	1.0000

n	$x \backslash p$	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
17	0	0.8429	0.7093	0.5958	0.4996	0.4181	0.3493	0.2912	0.2423	0.2012	0.1668	0.0631	0.0225	0.0075	0.0023	0.0007	0.0002	0.0000	0.0000
	1	0.9877	0.9554	0.9091	0.8535	0.7922	0.7283	0.6638	0.6005	0.5396	0.4818	0.2525	0.1182	0.0501	0.0193	0.0067	0.0021	0.0006	0.0001
	2	0.9994	0.9956	0.9866	0.9714	0.9497	0.9218	0.8882	0.8497	0.8073	0.7618	0.5198	0.3096	0.1637	0.0774	0.0327	0.0123	0.0041	0.0012
	3	1.0000	0.9997	0.9986	0.9960	0.9912	0.9836	0.9727	0.9581	0.9397	0.9174	0.7556	0.5489	0.3530	0.2019	0.1028	0.0464	0.0184	0.0064
	4		1.0000	0.9999	0.9996	0.9988	0.9974	0.9949	0.9911	0.9855	0.9779	0.9013	0.7582	0.5739	0.3887	0.2348	0.1260	0.0596	0.0245
	5			1.0000	1.0000	0.9999	0.9997	0.9993	0.9985	0.9973	0.9953	0.9681	0.8943	0.7653	0.5968	0.4197	0.2639	0.1471	0.0717
	6					1.0000	1.0000	0.9999	0.9998	0.9996	0.9992	0.9917	0.9623	0.8929	0.7752	0.6188	0.4478	0.2902	0.1662
	7							1.0000	1.0000	1.0000	0.9999	0.9983	0.9891	0.9598	0.8954	0.7872	0.6405	0.4743	0.3145
	8										1.0000	0.9997	0.9974	0.9876	0.9597	0.9006	0.8011	0.6626	0.5000
	9											1.0000	0.9995	0.9969	0.9873	0.9617	0.9081	0.8166	0.6855
	10												0.9999	0.9994	0.9968	0.9880	0.9652	0.9174	0.8338
	11												1.0000	0.9999	0.9993	0.9970	0.9894	0.9699	0.9283
	12													1.0000	0.9999	0.9994	0.9975	0.9914	0.9755
	13														1.0000	0.9999	0.9995	0.9981	0.9936
	14															1.0000	0.9999	0.9997	0.9988
	15																1.0000	1.0000	0.9999
	16																		1.0000
18	0	0.8262	0.6951	0.5606	0.4796	0.3774	0.3283	0.2708	0.2051	0.1831	0.1351	0.0456	0.0144	0.0042	0.0011	0.0004	0.0001	0.0000	0.0000
	1	0.9847	0.9505	0.8900	0.8393	0.7547	0.7055	0.6378	0.5440	0.5091	0.4203	0.1985	0.0829	0.0310	0.0104	0.0046	0.0008	0.0003	0.0000
	2	0.9991	0.9948	0.9817	0.9667	0.9335	0.9102	0.8725	0.8092	0.7832	0.7054	0.4413	0.2369	0.1113	0.0462	0.0236	0.0055	0.0025	0.0004
	3	1.0000	0.9996	0.9978	0.9950	0.9868	0.9799	0.9667	0.9398	0.9277	0.8850	0.6841	0.4551	0.2631	0.1332	0.0783	0.0230	0.0120	0.0022
	4		1.0000	0.9998	0.9994	0.9980	0.9966	0.9933	0.9853	0.9814	0.9648	0.8556	0.6733	0.4654	0.2822	0.1886	0.0696	0.0411	0.0096
	5			1.0000	0.9999	0.9998	0.9995	0.9990	0.9971	0.9962	0.9914	0.9463	0.8369	0.6678	0.4739	0.3550	0.1629	0.1077	0.0318
	6				1.0000	1.0000	1.0000	0.9999	0.9996	0.9994	0.9983	0.9837	0.9324	0.8251	0.6655	0.5491	0.3081	0.2258	0.0835
	7							1.0000	0.9999	0.9999	0.9997	0.9959	0.9767	0.9225	0.8180	0.7283	0.4878	0.3915	0.1796
	8								1.0000	1.0000	1.0000	0.9992	0.9933	0.9713	0.9161	0.8609	0.6675	0.5778	0.3238
	9											0.9999	0.9984	0.9911	0.9674	0.9403	0.8139	0.7473	0.5000
	10											1.0000	0.9997	0.9977	0.9895	0.9788	0.9115	0.8720	0.6762
	11												1.0000	0.9995	0.9972	0.9938	0.9648	0.9463	0.8204
	12													0.9999	0.9994	0.9986	0.9884	0.9817	0.9165
	13													1.0000	0.9999	0.9997	0.9969	0.9951	0.9682
	14														1.0000	1.0000	0.9994	0.9990	0.9904
	15																0.9999	0.9999	0.9978
	16																1.0000	1.0000	0.9996
	17																		1.0000
19	0	0.8262	0.6812	0.5606	0.4604	0.3774	0.3086	0.2519	0.2051	0.1666	0.1351	0.0456	0.0144	0.0042	0.0011	0.0003	0.0001	0.0000	0.0000
	1	0.9847	0.9454	0.8900	0.8249	0.7547	0.6829	0.6121	0.5440	0.4798	0.4203	0.1985	0.0829	0.0310	0.0104	0.0031	0.0008	0.0002	0.0000
	2	0.9991	0.9939	0.9817	0.9616	0.9335	0.8979	0.8561	0.8092	0.7585	0.7054	0.4413	0.2369	0.1113	0.0462	0.0170	0.0055	0.0015	0.0004
	3	1.0000	0.9995	0.9978	0.9939	0.9868	0.9757	0.9602	0.9398	0.9147	0.8850	0.6841	0.4551	0.2631	0.1332	0.0591	0.0230	0.0077	0.0022
	4		1.0000	0.9998	0.9993	0.9980	0.9956	0.9915	0.9853	0.9765	0.9648	0.8556	0.6733	0.4654	0.2822	0.1500	0.0696	0.0280	0.0096
	5			1.0000	0.9999	0.9998	0.9994	0.9986	0.9971	0.9949	0.9914	0.9463	0.8369	0.6678	0.4739	0.2968	0.1629	0.0777	0.0318
	6				1.0000	1.0000	0.9999	0.9998	0.9996	0.9991	0.9983	0.9837	0.9324	0.8251	0.6655	0.4812	0.3081	0.1727	0.0835
	7						1.0000	1.0000	0.9999	0.9999	0.9997	0.9959	0.9767	0.9225	0.8180	0.6656	0.4878	0.3169	0.1796
	8								1.0000	1.0000	1.0000	0.9992	0.9933	0.9713	0.9161	0.8145	0.6675	0.4940	0.3238
	9											0.9999	0.9984	0.9911	0.9674	0.9125	0.8139	0.6710	0.5000
	10											1.0000	0.9997	0.9977	0.9895	0.9653	0.9115	0.8159	0.6762
	11												1.0000	0.9995	0.9972	0.9886	0.9648	0.9129	0.8204
	12													0.9999	0.9994	0.9969	0.9884	0.9658	0.9165
	13													1.0000	0.9999	0.9993	0.9969	0.9891	0.9682
	14														1.0000	0.9999	0.9994	0.9972	0.9904
	15															1.0000	0.9999	0.9995	0.9978
	16																1.0000	0.9999	0.9996
	17																	1.0000	1.0000
20	0	0.8179	0.6676	0.5438	0.4420	0.3585	0.2901	0.2342	0.1887	0.1516	0.1216	0.0388	0.0115	0.0032	0.0008	0.0002	0.0000	0.0000	0.0000
	1	0.9831	0.9401	0.8802	0.8103	0.7358	0.6605	0.5869	0.5169	0.4516	0.3917	0.1756	0.0692	0.0243	0.0076	0.0021	0.0005	0.0001	0.0000
	2	0.9990	0.9929	0.9790	0.9561	0.9245	0.8850	0.8390	0.7879	0.7334	0.6769	0.4049	0.2061	0.0913	0.0355	0.0121	0.0036	0.0009	0.0002
	3	1.0000	0.9994	0.9973	0.9926	0.9841	0.9710	0.9529	0.9294	0.9007	0.8670	0.6477	0.4114	0.2252	0.1071	0.0444	0.0160	0.0049	0.0013
	4		1.0000	0.9997	0.9990	0.9974	0.9944	0.9893	0.9817	0.9710	0.9568	0.8298	0.6296	0.4148	0.2375	0.1182	0.0510	0.0189	0.0059
	5			1.0000	0.9999	0.9997	0.9991	0.9981	0.9962	0.9932	0.9887	0.9327	0.8042	0.6172	0.4164	0.2454	0.1256	0.0553	0.0207
	6				1.0000	1.0000	0.9999	0.9997	0.9994	0.9987	0.9976	0.9781	0.9133	0.7858	0.6080	0.4166	0.2500	0.1299	0.0577
	7						1.0000	1.0000	0.9999	0.9998	0.9996	0.9941	0.9679	0.8982	0.7723	0.6010	0.4159	0.2520	0.1316
	8								1.0000	1.0000	0.9999	0.9987	0.9900	0.9591	0.8867	0.7624	0.5956	0.4143	0.2517
	9										1.0000	0.9998	0.9974	0.9861	0.9520	0.8782	0.7553	0.5914	0.4119
	10											1.0000	0.9994	0.9961	0.9829	0.9468	0.8725	0.7507	0.5881
	11												0.9999	0.9991	0.9949	0.9804	0.9435	0.8692	0.7483
	12												1.0000	0.9998	0.9987	0.9940	0.9790	0.9420	0.8684
	13													1.0000	0.9997	0.9985	0.9935	0.9786	0.9423
	14														1.0000	0.9997	0.9984	0.9936	0.9793
	15															1.0000	0.9997	0.9985	0.9941
	16																1.0000	0.9997	0.9987
	17																	1.0000	0.9998
	18																		1.0000

2.2 Distribuição Poisson

$$\text{Se } X \sim \mathcal{P}(\lambda) \text{ então } F_X(x) = \sum_{k=0}^{x} \frac{e^{-\lambda}\lambda^k}{k!}$$

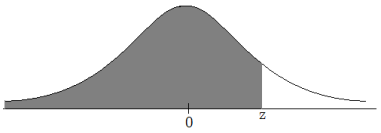
λ	x	0	1	2	3	4	5	6	7	8	9
0.01		0.9900	1.0000								
0.02		0.9802	0.9998	1.0000							
0.03		0.9704	0.9996	1.0000							
0.04		0.9608	0.9992	1.0000							
0.05		0.9512	0.9988	1.0000							
0.06		0.9418	0.9983	1.0000							
0.07		0.9324	0.9977	0.9999	1.0000						
0.08		0.9231	0.9970	0.9999	1.0000						
0.09		0.9139	0.9962	0.9999	1.0000						
0.10		0.9048	0.9953	0.9998	1.0000						
0.15		0.8607	0.9898	0.9995	1.0000						
0.20		0.8187	0.9825	0.9989	0.9999	1.0000					
0.25		0.7788	0.9735	0.9978	0.9999	1.0000					
0.30		0.7408	0.9631	0.9964	0.9997	1.0000					
0.35		0.7047	0.9513	0.9945	0.9995	1.0000					
0.40		0.6703	0.9384	0.9921	0.9992	0.9999	1.0000				
0.45		0.6376	0.9246	0.9891	0.9988	0.9999	1.0000				
0.50		0.6065	0.9098	0.9856	0.9982	0.9998	1.0000				
0.55		0.5769	0.8943	0.9815	0.9975	0.9997	1.0000				
0.60		0.5488	0.8781	0.9769	0.9966	0.9996	1.0000				
0.65		0.5220	0.8614	0.9717	0.9956	0.9994	0.9999	1.0000			
0.70		0.4966	0.8442	0.9659	0.9942	0.9992	0.9999	1.0000			
0.75		0.4724	0.8266	0.9595	0.9927	0.9989	0.9999	1.0000			
0.80		0.4493	0.8088	0.9526	0.9909	0.9986	0.9998	1.0000			
0.85		0.4274	0.7907	0.9451	0.9889	0.9982	0.9997	1.0000			
0.90		0.4066	0.7725	0.9371	0.9865	0.9977	0.9997	1.0000			
0.95		0.3867	0.7541	0.9287	0.9839	0.9971	0.9995	0.9999	1.0000		
1.00		0.3679	0.7358	0.9197	0.9810	0.9963	0.9994	0.9999	1.0000		
1.10		0.3329	0.6990	0.9004	0.9743	0.9946	0.9990	0.9999	1.0000		
1.20		0.3012	0.6626	0.8795	0.9662	0.9923	0.9985	0.9997	1.0000		
1.30		0.2725	0.6268	0.8571	0.9569	0.9893	0.9978	0.9996	0.9999	1.0000	
1.40		0.2466	0.5918	0.8335	0.9463	0.9857	0.9968	0.9994	0.9999	1.0000	
1.50		0.2231	0.5578	0.8088	0.9344	0.9814	0.9955	0.9991	0.9998	1.0000	
1.60		0.2019	0.5249	0.7834	0.9212	0.9763	0.9940	0.9987	0.9997	1.0000	
1.70		0.1827	0.4932	0.7572	0.9068	0.9704	0.9920	0.9981	0.9996	0.9999	1.0000
1.80		0.1653	0.4628	0.7306	0.8913	0.9636	0.9896	0.9974	0.9994	0.9999	1.0000
1.90		0.1496	0.4337	0.7037	0.8747	0.9559	0.9868	0.9966	0.9992	0.9998	1.0000
2.00	0	0.1353	0.4060	0.6767	0.8571	0.9473	0.9834	0.9955	0.9989	0.9998	1.0000
2.20	0	0.1108	0.3546	0.6227	0.8194	0.9275	0.9751	0.9925	0.9980	0.9995	0.9999
	10	1.0000									
2.40	0	0.0907	0.3084	0.5697	0.7787	0.9041	0.9643	0.9884	0.9967	0.9991	0.9998
	10	1.0000									
2.60	0	0.0743	0.2674	0.5184	0.7360	0.8774	0.9510	0.9828	0.9947	0.9985	0.9996
	10	0.9999	1.0000								
2.80	0	0.0608	0.2311	0.4695	0.6919	0.8477	0.9349	0.9756	0.9919	0.9976	0.9993
	10	0.9998	1.0000								
3.00	0	0.0498	0.1991	0.4232	0.6472	0.8153	0.9161	0.9665	0.9881	0.9962	0.9989
	10	0.9997	0.9999	1.0000							
3.20	0	0.0408	0.1712	0.3799	0.6025	0.7806	0.8946	0.9554	0.9832	0.9943	0.9982
	10	0.9995	0.9999	1.0000							
3.40	0	0.0334	0.1468	0.3397	0.5584	0.7442	0.8705	0.9421	0.9769	0.9917	0.9973
	10	0.9992	0.9998	0.9999	1.0000						
3.60	0	0.0273	0.1257	0.3027	0.5152	0.7064	0.8441	0.9267	0.9692	0.9883	0.9960
	10	0.9987	0.9996	0.9999	1.0000						
3.80	0	0.0224	0.1074	0.2689	0.4735	0.6678	0.8156	0.9091	0.9599	0.9840	0.9942
	10	0.9981	0.9994	0.9998	1.0000						
4.00	0	0.0183	0.0916	0.2381	0.4335	0.6288	0.7851	0.8893	0.9489	0.9786	0.9919
	10	0.9972	0.9991	0.9997	0.9999	1.0000					
4.20	0	0.0150	0.0780	0.2102	0.3954	0.5898	0.7531	0.8675	0.9361	0.9721	0.9889
	10	0.9959	0.9986	0.9996	0.9999	1.0000					
4.40	0	0.0123	0.0663	0.1851	0.3594	0.5512	0.7199	0.8436	0.9214	0.9642	0.9851
	10	0.9943	0.9980	0.9993	0.9998	0.9999	1.0000				
4.60	0	0.0101	0.0563	0.1626	0.3257	0.5132	0.6858	0.8180	0.9049	0.9549	0.9805
	10	0.9922	0.9971	0.9990	0.9997	0.9999	1.0000				
4.80	0	0.0082	0.0477	0.1425	0.2942	0.4763	0.6510	0.7908	0.8867	0.9442	0.9749
	10	0.9896	0.9960	0.9986	0.9995	0.9999	1.0000				
5.00	0	0.0067	0.0404	0.1247	0.2650	0.4405	0.6160	0.7622	0.8666	0.9319	0.9682
	10	0.9863	0.9945	0.9980	0.9993	0.9998	0.9999	1.0000			
5.20	0	0.0055	0.0342	0.1088	0.2381	0.4061	0.5809	0.7324	0.8449	0.9181	0.9603
	10	0.9823	0.9927	0.9972	0.9990	0.9997	0.9999	1.0000			
5.40	0	0.0045	0.0289	0.0948	0.2133	0.3733	0.5461	0.7017	0.8217	0.9027	0.9512
	10	0.9775	0.9904	0.9962	0.9986	0.9995	0.9998	0.9999	1.0000		
5.60	0	0.0037	0.0244	0.0824	0.1906	0.3422	0.5119	0.6703	0.7970	0.8857	0.9409
	10	0.9718	0.9875	0.9949	0.9980	0.9993	0.9998	0.9999	1.0000		
5.80	0	0.0030	0.0206	0.0715	0.1700	0.3127	0.4783	0.6384	0.7710	0.8672	0.9292
	10	0.9651	0.9841	0.9932	0.9973	0.9990	0.9996	0.9999	1.0000		

λ	x	0	1	2	3	4	5	6	7	8	9
6.00	0	0.0025	0.0174	0.0620	0.1512	0.2851	0.4457	0.6063	0.7440	0.8472	0.9161
	10	0.9574	0.9799	0.9912	0.9964	0.9986	0.9995	0.9998	0.9999	1.0000	
6.20	0	0.0020	0.0146	0.0536	0.1342	0.2592	0.4141	0.5742	0.7160	0.8259	0.9016
	10	0.9486	0.9750	0.9887	0.9952	0.9981	0.9993	0.9997	0.9999	1.0000	
6.40	0	0.0017	0.0123	0.0463	0.1189	0.2351	0.3837	0.5423	0.6873	0.8033	0.8858
	10	0.9386	0.9693	0.9857	0.9937	0.9974	0.9990	0.9996	0.9999	1.0000	
6.60	0	0.0014	0.0103	0.0400	0.1052	0.2127	0.3547	0.5108	0.6581	0.7796	0.8686
	10	0.9274	0.9627	0.9821	0.9920	0.9966	0.9986	0.9995	0.9998	0.9999	1.0000
6.80	0	0.0011	0.0087	0.0344	0.0928	0.1920	0.3270	0.4799	0.6285	0.7548	0.8502
	10	0.9151	0.9552	0.9779	0.9898	0.9956	0.9982	0.9993	0.9997	0.9999	1.0000
7.00	0	0.0009	0.0073	0.0296	0.0818	0.1730	0.3007	0.4497	0.5987	0.7291	0.8305
	10	0.9015	0.9467	0.9730	0.9872	0.9943	0.9976	0.9990	0.9996	0.9999	1.0000
7.20	0	0.0007	0.0061	0.0255	0.0719	0.1555	0.2759	0.4204	0.5689	0.7027	0.8096
	10	0.8867	0.9371	0.9673	0.9841	0.9927	0.9969	0.9987	0.9995	0.9998	0.9999
	20	1.0000									
7.40	0	0.0006	0.0051	0.0219	0.0632	0.1395	0.2526	0.3920	0.5393	0.6757	0.7877
	10	0.8707	0.9265	0.9609	0.9805	0.9908	0.9959	0.9983	0.9993	0.9997	0.9999
	20	1.0000									
7.60	0	0.0005	0.0043	0.0188	0.0554	0.1249	0.2307	0.3646	0.5100	0.6482	0.7649
	10	0.8535	0.9148	0.9536	0.9762	0.9886	0.9948	0.9978	0.9991	0.9996	0.9999
	20	1.0000									
7.80	0	0.0004	0.0036	0.0161	0.0485	0.1117	0.2103	0.3384	0.4812	0.6204	0.7411
	10	0.8352	0.9020	0.9454	0.9714	0.9859	0.9934	0.9971	0.9988	0.9995	0.9998
	20	0.9999	1.0000								
8.00	0	0.0003	0.0030	0.0138	0.0424	0.0996	0.1912	0.3134	0.4530	0.5925	0.7166
	10	0.8159	0.8881	0.9362	0.9658	0.9827	0.9918	0.9963	0.9984	0.9993	0.9997
	20	0.9999	1.0000								
8.20	0	0.0003	0.0025	0.0118	0.0370	0.0887	0.1736	0.2896	0.4254	0.5647	0.6915
	10	0.7955	0.8731	0.9261	0.9595	0.9791	0.9898	0.9953	0.9979	0.9991	0.9997
	20	0.9999	1.0000								
8.40	0	0.0002	0.0021	0.0100	0.0323	0.0789	0.1573	0.2670	0.3987	0.5369	0.6659
	10	0.7743	0.8571	0.9150	0.9524	0.9749	0.9875	0.9941	0.9973	0.9989	0.9995
	20	0.9998	0.9999	1.0000							
8.60	0	0.0002	0.0018	0.0086	0.0281	0.0701	0.1422	0.2457	0.3728	0.5094	0.6400
	10	0.7522	0.8400	0.9029	0.9445	0.9701	0.9848	0.9926	0.9966	0.9985	0.9994
	20	0.9998	0.9999	1.0000							
8.80	0	0.0002	0.0015	0.0073	0.0244	0.0621	0.1284	0.2256	0.3478	0.4823	0.6137
	10	0.7294	0.8220	0.8898	0.9358	0.9647	0.9816	0.9909	0.9957	0.9981	0.9992
	20	0.9997	0.9999	1.0000							
9.00	0	0.0001	0.0012	0.0062	0.0212	0.0550	0.1157	0.2068	0.3239	0.4557	0.5874
	10	0.7060	0.8030	0.8758	0.9261	0.9585	0.9780	0.9889	0.9947	0.9976	0.9989
	20	0.9996	0.9998	0.9999	1.0000						
9.20	0	0.0001	0.0010	0.0053	0.0184	0.0486	0.1041	0.1892	0.3010	0.4296	0.5611
	10	0.6820	0.7832	0.8607	0.9156	0.9517	0.9738	0.9865	0.9934	0.9969	0.9986
	20	0.9994	0.9998	0.9999	1.0000						
9.40	0	0.0001	0.0009	0.0045	0.0160	0.0429	0.0935	0.1727	0.2792	0.4042	0.5349
	10	0.6576	0.7626	0.8448	0.9042	0.9441	0.9691	0.9838	0.9919	0.9962	0.9983
	20	0.9992	0.9997	0.9999	1.0000						
9.60	0	0.0001	0.0007	0.0038	0.0138	0.0378	0.0838	0.1574	0.2584	0.3796	0.5089
	10	0.6329	0.7412	0.8279	0.8919	0.9357	0.9638	0.9806	0.9902	0.9952	0.9978
	20	0.9990	0.9996	0.9998	0.9999	1.0000					
9.80	0	0.0001	0.0006	0.0033	0.0120	0.0333	0.0750	0.1433	0.2388	0.3558	0.4832
	10	0.6080	0.7193	0.8101	0.8786	0.9265	0.9579	0.9770	0.9881	0.9941	0.9972
	20	0.9987	0.9995	0.9998	0.9999	1.0000					
10.00	0	0.0000	0.0005	0.0028	0.0103	0.0293	0.0671	0.1301	0.2202	0.3328	0.4579
	10	0.5830	0.6968	0.7916	0.8645	0.9165	0.9513	0.9730	0.9857	0.9928	0.9965
	20	0.9984	0.9993	0.9997	0.9999	1.0000					
10.50	0	0.0000	0.0003	0.0018	0.0071	0.0211	0.0504	0.1016	0.1785	0.2794	0.3971
	10	0.5207	0.6387	0.7420	0.8253	0.8879	0.9317	0.9604	0.9781	0.9885	0.9942
	20	0.9972	0.9987	0.9994	0.9998	0.9999	1.0000				
11.00	0	0.0000	0.0002	0.0012	0.0049	0.0151	0.0375	0.0786	0.1432	0.2320	0.3405
	10	0.4599	0.5793	0.6887	0.7813	0.8540	0.9074	0.9441	0.9678	0.9823	0.9907
	20	0.9953	0.9977	0.9990	0.9995	0.9998	0.9999	1.0000			
11.50	0	0.0000	0.0001	0.0008	0.0034	0.0107	0.0277	0.0603	0.1137	0.1906	0.2888
	10	0.4017	0.5198	0.6329	0.7330	0.8153	0.8783	0.9236	0.9542	0.9738	0.9857
	20	0.9925	0.9962	0.9982	0.9992	0.9996	0.9998	0.9999	1.0000		
12.00	0	0.0000	0.0001	0.0005	0.0023	0.0076	0.0203	0.0458	0.0895	0.1550	0.2424
	10	0.3472	0.4616	0.5760	0.6815	0.7720	0.8444	0.8987	0.9370	0.9626	0.9787
	20	0.9884	0.9939	0.9970	0.9985	0.9993	0.9997	0.9999	0.9999	1.0000	
12.50	0	0.0000	0.0001	0.0003	0.0016	0.0053	0.0148	0.0346	0.0698	0.1249	0.2014
	10	0.2971	0.4058	0.5190	0.6278	0.7250	0.8060	0.8693	0.9158	0.9481	0.9694
	20	0.9827	0.9906	0.9951	0.9975	0.9988	0.9994	0.9997	0.9999	1.0000	
13.00	0	0.0000	0.0000	0.0002	0.0011	0.0037	0.0107	0.0259	0.0540	0.0998	0.1658
	10	0.2517	0.3532	0.4631	0.5730	0.6751	0.7636	0.8355	0.8905	0.9302	0.9573
	20	0.9750	0.9859	0.9924	0.9960	0.9980	0.9990	0.9995	0.9998	0.9999	1.0000
13.50	0	0.0000	0.0000	0.0001	0.0007	0.0026	0.0077	0.0193	0.0415	0.0790	0.1353
	10	0.2112	0.3045	0.4093	0.5182	0.6233	0.7178	0.7975	0.8609	0.9084	0.9421
	20	0.9649	0.9796	0.9885	0.9938	0.9968	0.9984	0.9992	0.9996	0.9998	0.9999
	30	1.0000									

λ	x	0	1	2	3	4	5	6	7	8	9
14.00	0	0.0000	0.0000	0.0001	0.0005	0.0018	0.0055	0.0142	0.0316	0.0621	0.1094
	10	0.1757	0.2600	0.3585	0.4644	0.5704	0.6694	0.7559	0.8272	0.8826	0.9235
	20	0.9521	0.9712	0.9833	0.9907	0.9950	0.9974	0.9987	0.9994	0.9997	0.9999
	30	0.9999	1.0000								
14.50	0	0.0000	0.0000	0.0001	0.0003	0.0012	0.0039	0.0105	0.0239	0.0484	0.0878
	10	0.1449	0.2201	0.3111	0.4125	0.5176	0.6192	0.7112	0.7897	0.8530	0.9012
	20	0.9362	0.9604	0.9763	0.9863	0.9924	0.9959	0.9979	0.9989	0.9995	0.9998
	30	0.9999	1.0000								
15.00	0	0.0000	0.0000	0.0000	0.0002	0.0009	0.0028	0.0076	0.0180	0.0374	0.0699
	10	0.1185	0.1848	0.2676	0.3632	0.4657	0.5681	0.6641	0.7489	0.8195	0.8752
	20	0.9170	0.9469	0.9673	0.9805	0.9888	0.9938	0.9967	0.9983	0.9991	0.9996
	30	0.9998	0.9999	1.0000							
16.00	0	0.0000	0.0000	0.0000	0.0001	0.0004	0.0014	0.0040	0.0100	0.0220	0.0433
	10	0.0774	0.1270	0.1931	0.2745	0.3675	0.4667	0.5660	0.6593	0.7423	0.8122
	20	0.8682	0.9108	0.9418	0.9633	0.9777	0.9869	0.9925	0.9959	0.9978	0.9989
	30	0.9994	0.9997	0.9999	0.9999	1.0000					
17.00	0	0.0000	0.0000	0.0000	0.0000	0.0002	0.0007	0.0021	0.0054	0.0126	0.0261
	10	0.0491	0.0847	0.1350	0.2009	0.2808	0.3715	0.4677	0.5640	0.6550	0.7363
	20	0.8055	0.8615	0.9047	0.9367	0.9594	0.9748	0.9848	0.9912	0.9950	0.9973
	30	0.9986	0.9993	0.9996	0.9998	0.9999	1.0000				
18.00	0	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0010	0.0029	0.0071	0.0154
	10	0.0304	0.0549	0.0917	0.1426	0.2081	0.2867	0.3751	0.4686	0.5622	0.6509
	20	0.7307	0.7991	0.8551	0.8989	0.9317	0.9554	0.9718	0.9827	0.9897	0.9941
	30	0.9967	0.9982	0.9990	0.9995	0.9998	0.9999	0.9999	1.0000		
19.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0005	0.0015	0.0039	0.0089
	10	0.0183	0.0347	0.0606	0.0984	0.1497	0.2148	0.2920	0.3784	0.4695	0.5606
	20	0.6472	0.7255	0.7931	0.8490	0.8933	0.9269	0.9514	0.9687	0.9805	0.9882
	30	0.9930	0.9960	0.9978	0.9988	0.9994	0.9997	0.9998	0.9999	1.0000	
20.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0008	0.0021	0.0050
	10	0.0108	0.0214	0.0390	0.0661	0.1049	0.1565	0.2211	0.2970	0.3814	0.4703
	20	0.5591	0.6437	0.7206	0.7875	0.8432	0.8878	0.9221	0.9475	0.9657	0.9782
	30	0.9865	0.9919	0.9953	0.9973	0.9985	0.9992	0.9996	0.9998	0.9999	0.9999
	40	1.0000									
21.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0004	0.0011	0.0028
	10	0.0063	0.0129	0.0245	0.0434	0.0716	0.1111	0.1629	0.2270	0.3017	0.3843
	20	0.4710	0.5577	0.6405	0.7160	0.7822	0.8377	0.8826	0.9175	0.9436	0.9626
	30	0.9758	0.9848	0.9907	0.9945	0.9968	0.9982	0.9990	0.9995	0.9997	0.9999
	40	0.9999	1.0000								
22.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0006	0.0015
	10	0.0035	0.0076	0.0151	0.0278	0.0477	0.0769	0.1170	0.1690	0.2325	0.3060
	20	0.3869	0.4716	0.5564	0.6374	0.7117	0.7771	0.8324	0.8775	0.9129	0.9398
	30	0.9595	0.9735	0.9831	0.9895	0.9936	0.9962	0.9978	0.9988	0.9993	0.9996
	40	0.9998	0.9999	1.0000							
23.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0008
	10	0.0020	0.0044	0.0091	0.0174	0.0311	0.0520	0.0821	0.1228	0.1748	0.2377
	20	0.3101	0.3894	0.4723	0.5551	0.6346	0.7077	0.7723	0.8274	0.8726	0.9085
	30	0.9360	0.9564	0.9711	0.9813	0.9882	0.9927	0.9956	0.9974	0.9985	0.9992
	40	0.9996	0.9998	0.9999	0.9999	1.0000					
24.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0004
	10	0.0011	0.0025	0.0054	0.0107	0.0198	0.0344	0.0563	0.0871	0.1283	0.1803
	20	0.2426	0.3139	0.3917	0.4728	0.5540	0.6319	0.7038	0.7677	0.8225	0.8679
	30	0.9042	0.9322	0.9533	0.9686	0.9794	0.9868	0.9918	0.9950	0.9970	0.9983
	40	0.9990	0.9995	0.9997	0.9998	0.9999	1.0000				
25.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002
	10	0.0006	0.0014	0.0031	0.0065	0.0124	0.0223	0.0377	0.0605	0.0920	0.1336
	20	0.1855	0.2473	0.3175	0.3939	0.4734	0.5529	0.6294	0.7002	0.7634	0.8179
	30	0.8633	0.8999	0.9285	0.9502	0.9662	0.9775	0.9854	0.9908	0.9943	0.9966
	40	0.9980	0.9988	0.9993	0.9996	0.9998	0.9999	0.9999	1.0000		
30.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	10	0.0000	0.0001	0.0002	0.0004	0.0009	0.0019	0.0039	0.0073	0.0129	0.0219
	20	0.0353	0.0544	0.0806	0.1146	0.1572	0.2084	0.2673	0.3329	0.4031	0.4757
	30	0.5484	0.6186	0.6845	0.7444	0.7973	0.8426	0.8804	0.9110	0.9352	0.9537
	40	0.9677	0.9779	0.9852	0.9903	0.9937	0.9960	0.9975	0.9985	0.9991	0.9995
	50	0.9997	0.9998	0.9999	0.9999	1.0000					
35.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0006	0.0012	0.0023
	20	0.0043	0.0076	0.0128	0.0208	0.0324	0.0486	0.0705	0.0988	0.1343	0.1770
	30	0.2269	0.2833	0.3449	0.4102	0.4775	0.5448	0.6102	0.6721	0.7291	0.7802
	40	0.8249	0.8631	0.8950	0.9209	0.9415	0.9575	0.9697	0.9788	0.9854	0.9902
	50	0.9935	0.9957	0.9973	0.9983	0.9989	0.9993	0.9996	0.9998	0.9999	0.9999
	60	1.0000									
40.00	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002
	20	0.0004	0.0007	0.0014	0.0026	0.0045	0.0076	0.0123	0.0193	0.0294	0.0432
	30	0.0617	0.0855	0.1153	0.1514	0.1939	0.2424	0.2963	0.3547	0.4160	0.4790
	40	0.5419	0.6033	0.6618	0.7162	0.7657	0.8097	0.8479	0.8804	0.9075	0.9297
	50	0.9474	0.9613	0.9719	0.9800	0.9860	0.9903	0.9934	0.9956	0.9971	0.9981
	60	0.9988	0.9992	0.9995	0.9997	0.9998	0.9999	0.9999	1.0000		

2.3 Distribuição Normal Centrada e Reduzida

Se $Z \sim \mathcal{N}(0,1)$ então $F_Z(z) = \int_{-\infty}^{z} \frac{1}{\sqrt{2\pi}}\, e^{-\frac{1}{2}t^2}\, dt$



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	0.998650	0.998694	0.998736	0.998777	0.998817	0.998856	0.998893	0.998930	0.998965	0.998999
3.1	0.999032	0.999064	0.999096	0.999126	0.999155	0.999184	0.999211	0.999238	0.999264	0.999289
3.2	0.999313	0.999336	0.999359	0.999381	0.999402	0.999423	0.999443	0.999462	0.999481	0.999499
3.3	0.999517	0.999533	0.999550	0.999566	0.999581	0.999596	0.999610	0.999624	0.999638	0.999650
3.4	0.999663	0.999675	0.999687	0.999698	0.999709	0.999720	0.999730	0.999740	0.999749	0.999758
3.5	0.999767	0.999776	0.999784	0.999792	0.999800	0.999807	0.999815	0.999821	0.999828	0.999835
3.6	0.999841	0.999847	0.999853	0.999858	0.999864	0.999869	0.999874	0.999879	0.999883	0.999888
3.7	0.999892	0.999896	0.999900	0.999904	0.999908	0.999912	0.999915	0.999918	0.999922	0.999925
3.8	0.999928	0.999930	0.999933	0.999936	0.999938	0.999941	0.999943	0.999946	0.999948	0.999950
3.9	0.999952	0.999954	0.999956	0.999958	0.999959	0.999961	0.999963	0.999964	0.999966	0.999967
4.0	0.999968	0.999970	0.999971	0.999972	0.999973	0.999974	0.999975	0.999976	0.999977	0.999978

2.4 Distribuição Qui-quadrado

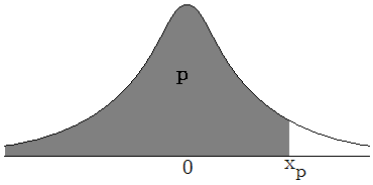
Quantis da função de distribuição Qui-quadrado

Se $X \sim \chi^2_n$ então $x_p = F_X^{-1}(p)$

$n \backslash p$	0.0005	0.001	0.005	0.01	0.025	0.05	0.075	0.10	0.15	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.85	0.90	0.925	0.950	0.975	0.990	0.995	0.999	0.9995
1	3.9E-07	1.6E-06	3.9E-05	0.0002	0.0010	0.0039	0.0089	0.0158	0.0358	0.0642	0.148	0.275	0.455	0.708	1.074	1.642	2.072	2.706	3.170	3.841	5.024	6.635	7.879	10.83	12.12
2	0.0010	0.0020	0.0100	0.0201	0.0506	0.103	0.156	0.211	0.325	0.446	0.713	1.022	1.386	1.833	2.408	3.219	3.794	4.605	5.181	5.991	7.378	9.210	10.60	13.82	15.20
3	0.0153	0.0243	0.0717	0.115	0.216	0.352	0.472	0.584	0.798	1.005	1.424	1.869	2.366	2.946	3.665	4.642	5.317	6.251	6.905	7.815	9.348	11.34	12.84	16.27	17.73
4	0.0639	0.0908	0.207	0.297	0.484	0.711	0.897	1.064	1.366	1.649	2.195	2.753	3.357	4.045	4.878	5.989	6.745	7.779	8.496	9.488	11.14	13.28	14.86	18.47	20.00
5	0.158	0.210	0.412	0.554	0.831	1.145	1.394	1.610	1.994	2.343	3.000	3.656	4.351	5.132	6.064	7.289	8.115	9.236	10.01	11.07	12.83	15.09	16.75	20.51	22.11
6	0.299	0.381	0.676	0.872	1.237	1.635	1.941	2.204	2.661	3.070	3.828	4.570	5.348	6.211	7.231	8.558	9.446	10.64	11.47	12.59	14.45	16.81	18.55	22.46	24.10
7	0.485	0.599	0.989	1.239	1.690	2.167	2.528	2.833	3.358	3.822	4.671	5.493	6.346	7.283	8.383	9.803	10.75	12.02	12.88	14.07	16.01	18.48	20.28	24.32	26.02
8	0.710	0.857	1.344	1.647	2.180	2.733	3.144	3.490	4.078	4.594	5.527	6.423	7.344	8.351	9.524	11.03	12.03	13.36	14.27	15.51	17.53	20.09	21.95	26.12	27.87
9	0.972	1.152	1.735	2.088	2.700	3.325	3.785	4.168	4.817	5.380	6.393	7.357	8.343	9.414	10.66	12.24	13.29	14.68	15.63	16.92	19.02	21.67	23.59	27.88	29.67
10	1.265	1.479	2.156	2.558	3.247	3.940	4.446	4.865	5.570	6.179	7.267	8.295	9.342	10.47	11.78	13.44	14.53	15.99	16.97	18.31	20.48	23.21	25.19	29.59	31.42
11	1.587	1.834	2.603	3.053	3.816	4.575	5.124	5.578	6.336	6.989	8.148	9.237	10.34	11.53	12.90	14.63	15.77	17.28	18.29	19.68	21.92	24.73	26.76	31.26	33.14
12	1.935	2.214	3.074	3.571	4.404	5.226	5.818	6.304	7.114	7.807	9.034	10.18	11.34	12.58	14.01	15.81	16.99	18.55	19.60	21.03	23.34	26.22	28.30	32.91	34.82
13	2.305	2.617	3.565	4.107	5.009	5.892	6.524	7.041	7.901	8.634	9.926	11.13	12.34	13.64	15.12	16.98	18.20	19.81	20.90	22.36	24.74	27.69	29.82	34.53	36.48
14	2.697	3.041	4.075	4.660	5.629	6.571	7.242	7.790	8.696	9.467	10.82	12.08	13.34	14.69	16.22	18.15	19.41	21.06	22.18	23.68	26.12	29.14	31.32	36.12	38.11
15	3.107	3.483	4.601	5.229	6.262	7.261	7.969	8.547	9.499	10.31	11.72	13.03	14.34	15.73	17.32	19.31	20.60	22.31	23.45	25.00	27.49	30.58	32.80	37.70	39.72
16	3.536	3.942	5.142	5.812	6.908	7.962	8.707	9.312	10.31	11.15	12.62	13.98	15.34	16.78	18.42	20.47	21.79	23.54	24.72	26.30	28.85	32.00	34.27	39.25	41.31
17	3.980	4.416	5.697	6.408	7.564	8.672	9.452	10.09	11.12	12.00	13.53	14.94	16.34	17.82	19.51	21.61	22.98	24.77	25.97	27.59	30.19	33.41	35.72	40.79	42.88
18	4.439	4.905	6.265	7.015	8.231	9.390	10.21	10.86	11.95	12.86	14.44	15.89	17.34	18.87	20.60	22.76	24.16	25.99	27.22	28.87	31.53	34.81	37.16	42.31	44.43
19	4.913	5.407	6.844	7.633	8.907	10.12	10.97	11.65	12.77	13.72	15.35	16.85	18.34	19.91	21.69	23.90	25.33	27.20	28.46	30.14	32.85	36.19	38.58	43.82	45.97
20	5.398	5.921	7.434	8.260	9.591	10.85	11.73	12.44	13.60	14.58	16.27	17.81	19.34	20.95	22.77	25.04	26.50	28.41	29.69	31.41	34.17	37.57	40.00	45.31	47.50
21	5.895	6.447	8.034	8.897	10.28	11.59	12.50	13.24	14.44	15.44	17.18	18.77	20.34	21.99	23.86	26.17	27.66	29.62	30.92	32.67	35.48	38.93	41.40	46.80	49.01
22	6.404	6.983	8.643	9.542	10.98	12.34	13.28	14.04	15.28	16.31	18.10	19.73	21.34	23.03	24.94	27.30	28.82	30.81	32.14	33.92	36.78	40.29	42.80	48.27	50.51
23	6.924	7.529	9.260	10.20	11.69	13.09	14.06	14.85	16.12	17.19	19.02	20.69	22.34	24.07	26.02	28.43	29.98	32.01	33.36	35.17	38.08	41.64	44.18	49.73	52.00
24	7.453	8.085	9.886	10.86	12.40	13.85	14.85	15.66	16.97	18.06	19.94	21.65	23.34	25.11	27.10	29.55	31.13	33.20	34.57	36.42	39.36	42.98	45.56	51.18	53.48
25	7.991	8.649	10.52	11.52	13.12	14.61	15.64	16.47	17.82	18.94	20.87	22.62	24.34	26.14	28.17	30.68	32.28	34.38	35.78	37.65	40.65	44.31	46.93	52.62	54.95
26	8.537	9.222	11.16	12.20	13.84	15.38	16.44	17.29	18.67	19.82	21.79	23.58	25.34	27.18	29.25	31.79	33.43	35.56	36.98	38.89	41.92	45.64	48.29	54.05	56.41
27	9.093	9.803	11.81	12.88	14.57	16.15	17.24	18.11	19.53	20.70	22.72	24.54	26.34	28.21	30.32	32.91	34.57	36.74	38.18	40.11	43.19	46.96	49.65	55.48	57.86
28	9.656	10.39	12.46	13.56	15.31	16.93	18.05	18.94	20.39	21.59	23.65	25.51	27.34	29.25	31.39	34.03	35.71	37.92	39.38	41.34	44.46	48.28	50.99	56.89	59.30
29	10.23	10.99	13.12	14.26	16.05	17.71	18.85	19.77	21.25	22.48	24.58	26.48	28.34	30.28	32.46	35.14	36.85	39.09	40.57	42.56	45.72	49.59	52.34	58.30	60.73
30	10.80	11.59	13.79	14.95	16.79	18.49	19.66	20.60	22.11	23.36	25.51	27.44	29.34	31.32	33.53	36.25	37.99	40.26	41.76	43.77	46.98	50.89	53.67	59.70	62.16
31	11.39	12.20	14.46	15.66	17.54	19.28	20.48	21.43	22.98	24.26	26.44	28.41	30.34	32.35	34.60	37.36	39.12	41.42	42.95	44.99	48.23	52.19	55.00	61.10	63.58
32	11.98	12.81	15.13	16.36	18.29	20.07	21.30	22.27	23.84	25.15	27.37	29.38	31.34	33.38	35.66	38.47	40.26	42.58	44.13	46.19	49.48	53.49	56.33	62.49	64.99
33	12.58	13.43	15.82	17.07	19.05	20.87	22.12	23.11	24.71	26.04	28.31	30.34	32.34	34.41	36.73	39.57	41.39	43.75	45.31	47.40	50.73	54.78	57.65	63.87	66.40
34	13.18	14.06	16.50	17.79	19.81	21.66	22.94	23.95	25.59	26.94	29.24	31.31	33.34	35.44	37.80	40.68	42.51	44.90	46.49	48.60	51.97	56.06	58.96	65.25	67.80
35	13.79	14.69	17.19	18.51	20.57	22.47	23.76	24.80	26.46	27.84	30.18	32.28	34.34	36.47	38.86	41.78	43.64	46.06	47.66	49.80	53.20	57.34	60.27	66.62	69.20
36	14.40	15.32	17.89	19.23	21.34	23.27	24.59	25.64	27.34	28.73	31.12	33.25	35.34	37.50	39.92	42.88	44.76	47.21	48.84	51.00	54.44	58.62	61.58	67.98	70.59
37	15.02	15.97	18.59	19.96	22.11	24.07	25.42	26.49	28.21	29.64	32.05	34.22	36.34	38.53	40.98	43.98	45.89	48.36	50.01	52.19	55.67	59.89	62.88	69.35	71.97
38	15.64	16.61	19.29	20.69	22.88	24.88	26.25	27.34	29.09	30.54	32.99	35.19	37.34	39.56	42.05	45.08	47.01	49.51	51.17	53.38	56.90	61.16	64.18	70.70	73.35
39	16.27	17.26	20.00	21.43	23.65	25.70	27.09	28.20	29.97	31.44	33.93	36.16	38.34	40.59	43.11	46.17	48.13	50.66	52.34	54.57	58.12	62.43	65.48	72.06	74.72
40	16.91	17.92	20.71	22.16	24.43	26.51	27.93	29.05	30.86	32.34	34.87	37.13	39.34	41.62	44.16	47.27	49.24	51.81	53.50	55.76	59.34	63.69	66.77	73.40	76.10
50	23.46	24.67	27.99	29.71	32.36	34.76	36.40	37.69	39.75	41.45	44.31	46.86	49.33	51.89	54.72	58.16	60.35	63.17	65.03	67.50	71.42	76.15	79.49	86.66	89.56
60	30.34	31.74	35.53	37.48	40.48	43.19	45.02	46.46	48.76	50.64	53.81	56.62	59.33	62.13	65.23	68.97	71.34	74.40	76.41	79.08	83.30	88.38	91.95	99.61	102.7
70	37.47	39.04	43.28	45.44	48.76	51.74	53.75	55.33	57.84	59.90	63.35	66.40	69.33	72.36	75.69	79.71	82.26	85.53	87.68	90.53	95.02	100.4	104.2	112.3	115.6
80	44.79	46.52	51.17	53.54	57.15	60.39	62.57	64.28	66.99	69.21	72.92	76.19	79.33	82.57	86.12	90.41	93.11	96.58	98.86	101.9	106.6	112.3	116.3	124.8	128.3
90	52.28	54.16	59.20	61.75	65.65	69.13	71.46	73.29	76.20	78.56	82.51	85.99	89.33	92.76	96.52	101.1	103.9	107.6	110.0	113.1	118.1	124.1	128.3	137.2	140.8
100	59.89	61.92	67.33	70.06	74.22	77.93	80.41	82.36	85.44	87.95	92.13	95.81	99.33	102.9	106.9	111.7	114.7	118.5	121.0	124.3	129.6	135.8	140.2	149.4	153.2
120	75.47	77.76	83.85	86.92	91.57	95.70	98.46	100.6	104.0	106.8	111.4	115.5	119.3	123.3	127.6	132.8	136.1	140.2	143.0	146.6	152.2	159.0	163.6	173.6	177.6
150	99.46	102.1	109.1	112.7	118.0	122.7	125.8	128.3	132.1	135.3	140.5	145.0	149.3	153.8	158.6	164.3	168.0	172.6	175.6	179.6	185.8	193.2	198.4	209.3	213.6
200	140.7	143.8	152.2	156.4	162.7	168.3	172.0	174.8	179.4	183.0	189.0	194.3	199.3	204.4	210.0	216.6	220.7	226.0	229.5	234.0	241.1	249.4	255.3	267.5	272.4

2.5 Distribuição t-Student

Se $X \sim t_n$ então $x_p = F_X^{-1}(p)$



$n\backslash p$	0.6	0.7	0.75	0.8	0.85	0.9	0.925	0.95	0.975	0.99	0.995	0.999	0.9995
1	0.325	0.727	1.000	1.376	1.963	3.078	4.165	6.314	12.706	31.821	63.656	318.289	636.578
2	0.289	0.617	0.816	1.061	1.386	1.886	2.282	2.920	4.303	6.965	9.925	22.328	31.600
3	0.277	0.584	0.765	0.978	1.250	1.638	1.924	2.353	3.182	4.541	5.841	10.214	12.924
4	0.271	0.569	0.741	0.941	1.190	1.533	1.778	2.132	2.776	3.747	4.604	7.173	8.610
5	0.267	0.559	0.727	0.920	1.156	1.476	1.699	2.015	2.571	3.365	4.032	5.894	6.869
6	0.265	0.553	0.718	0.906	1.134	1.440	1.650	1.943	2.447	3.143	3.707	5.208	5.959
7	0.263	0.549	0.711	0.896	1.119	1.415	1.617	1.895	2.365	2.998	3.499	4.785	5.408
8	0.262	0.546	0.706	0.889	1.108	1.397	1.592	1.860	2.306	2.896	3.355	4.501	5.041
9	0.261	0.543	0.703	0.883	1.100	1.383	1.574	1.833	2.262	2.821	3.250	4.297	4.781
10	0.260	0.542	0.700	0.879	1.093	1.372	1.559	1.812	2.228	2.764	3.169	4.144	4.587
11	0.260	0.540	0.697	0.876	1.088	1.363	1.548	1.796	2.201	2.718	3.106	4.025	4.437
12	0.259	0.539	0.695	0.873	1.083	1.356	1.538	1.782	2.179	2.681	3.055	3.930	4.318
13	0.259	0.538	0.694	0.870	1.079	1.350	1.530	1.771	2.160	2.650	3.012	3.852	4.221
14	0.258	0.537	0.692	0.868	1.076	1.345	1.523	1.761	2.145	2.624	2.977	3.787	4.140
15	0.258	0.536	0.691	0.866	1.074	1.341	1.517	1.753	2.131	2.602	2.947	3.733	4.073
16	0.258	0.535	0.690	0.865	1.071	1.337	1.512	1.746	2.120	2.583	2.921	3.686	4.015
17	0.257	0.534	0.689	0.863	1.069	1.333	1.508	1.740	2.110	2.567	2.898	3.646	3.965
18	0.257	0.534	0.688	0.862	1.067	1.330	1.504	1.734	2.101	2.552	2.878	3.610	3.922
19	0.257	0.533	0.688	0.861	1.066	1.328	1.500	1.729	2.093	2.539	2.861	3.579	3.883
20	0.257	0.533	0.687	0.860	1.064	1.325	1.497	1.725	2.086	2.528	2.845	3.552	3.850
21	0.257	0.532	0.686	0.859	1.063	1.323	1.494	1.721	2.080	2.518	2.831	3.527	3.819
22	0.256	0.532	0.686	0.858	1.061	1.321	1.492	1.717	2.074	2.508	2.819	3.505	3.792
23	0.256	0.532	0.685	0.858	1.060	1.319	1.489	1.714	2.069	2.500	2.807	3.485	3.768
24	0.256	0.531	0.685	0.857	1.059	1.318	1.487	1.711	2.064	2.492	2.797	3.467	3.745
25	0.256	0.531	0.684	0.856	1.058	1.316	1.485	1.708	2.060	2.485	2.787	3.450	3.725
26	0.256	0.531	0.684	0.856	1.058	1.315	1.483	1.706	2.056	2.479	2.779	3.435	3.707
27	0.256	0.531	0.684	0.855	1.057	1.314	1.482	1.703	2.052	2.473	2.771	3.421	3.689
28	0.256	0.530	0.683	0.855	1.056	1.313	1.480	1.701	2.048	2.467	2.763	3.408	3.674
29	0.256	0.530	0.683	0.854	1.055	1.311	1.479	1.699	2.045	2.462	2.756	3.396	3.660
30	0.256	0.530	0.683	0.854	1.055	1.310	1.477	1.697	2.042	2.457	2.750	3.385	3.646
40	0.255	0.529	0.681	0.851	1.050	1.303	1.468	1.684	2.021	2.423	2.704	3.307	3.551
45	0.255	0.528	0.680	0.850	1.049	1.301	1.465	1.679	2.014	2.412	2.690	3.281	3.520
50	0.255	0.528	0.679	0.849	1.047	1.299	1.462	1.676	2.009	2.403	2.678	3.261	3.496
60	0.254	0.527	0.679	0.848	1.045	1.296	1.458	1.671	2.000	2.390	2.660	3.232	3.460
70	0.254	0.527	0.678	0.847	1.044	1.294	1.456	1.667	1.994	2.381	2.648	3.211	3.435
80	0.254	0.526	0.678	0.846	1.043	1.292	1.453	1.664	1.990	2.374	2.639	3.195	3.416
90	0.254	0.526	0.677	0.846	1.042	1.291	1.452	1.662	1.987	2.368	2.632	3.183	3.402
100	0.254	0.526	0.677	0.845	1.042	1.290	1.451	1.660	1.984	2.364	2.626	3.174	3.390
120	0.254	0.526	0.677	0.845	1.041	1.289	1.449	1.658	1.980	2.358	2.617	3.160	3.373
150	0.254	0.526	0.676	0.844	1.040	1.287	1.447	1.655	1.976	2.351	2.609	3.145	3.357
∞	0.253	0.524	0.675	0.842	1.036	1.282	1.440	1.645	1.960	2.327	2.576	3.091	3.291

2.6 Distribuição F-Snedcor

Valores críticos da função de distribuição F-Snedcor

Se $X \sim \mathrm{F}_{m,n,\alpha}$ então $x : \ F_X(x) = 1 - \alpha$

$\alpha = 0.1$

n-graus de liberdade do denominador	*m-graus de liberdade do numerador*																	
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	39.86346	49.50000	53.59324	55.83296	57.24008	58.20442	58.90595	59.43898	59.85759	60.19498	60.70521	61.22034	61.74029	62.00205	62.26497	62.52905	62.79428	63.06064	63.32812
2	8.52632	9.00000	9.16179	9.24342	9.29263	9.32553	9.34908	9.36677	9.38054	9.39157	9.40813	9.42471	9.44131	9.44962	9.45793	9.46624	9.47456	9.48289	9.49122
3	5.53832	5.46238	5.39077	5.34264	5.30916	5.28473	5.26619	5.25167	5.24000	5.23041	5.21562	5.20031	5.18448	5.17636	5.16811	5.15972	5.15119	5.14251	5.13370
4	4.54477	4.32456	4.19086	4.10725	4.05058	4.00975	3.97897	3.95494	3.93567	3.91988	3.89553	3.87036	3.84434	3.83099	3.81742	3.80361	3.78957	3.77527	3.76073
5	4.06042	3.77972	3.61948	3.52020	3.45298	3.40451	3.36790	3.33928	3.31628	3.29740	3.26824	3.23801	3.20665	3.19052	3.17408	3.15732	3.14023	3.12279	3.10500
6	3.77595	3.46330	3.28876	3.18076	3.10751	3.05455	3.01446	2.98304	2.95774	2.93693	2.90472	2.87122	2.83634	2.81834	2.79996	2.78117	2.76195	2.74229	2.72216
7	3.58943	3.25744	3.07407	2.96053	2.88334	2.82739	2.78493	2.75158	2.72468	2.70251	2.66811	2.63223	2.59473	2.57533	2.55546	2.53510	2.51422	2.49279	2.47079
8	3.45792	3.11312	2.92380	2.80643	2.72645	2.66833	2.62413	2.58935	2.56124	2.53804	2.50196	2.46422	2.42464	2.40410	2.38302	2.36136	2.33910	2.31618	2.29257
9	3.36030	3.00645	2.81286	2.69268	2.61061	2.55086	2.50531	2.46941	2.44034	2.41632	2.37888	2.33962	2.29832	2.27683	2.25472	2.23196	2.20849	2.18427	2.15923
10	3.28502	2.92447	2.72767	2.60534	2.52164	2.46058	2.41397	2.37715	2.34731	2.32260	2.28405	2.24351	2.20074	2.17843	2.15543	2.13169	2.10716	2.08176	2.05542
11	3.22520	2.85951	2.66023	2.53619	2.45118	2.38907	2.34157	2.30400	2.27350	2.24823	2.20873	2.16709	2.12305	2.10001	2.07621	2.05161	2.02612	1.99965	1.97211
12	3.17655	2.80680	2.60552	2.48010	2.39402	2.33102	2.28278	2.24457	2.21352	2.18776	2.14744	2.10485	2.05968	2.03599	2.01149	1.98610	1.95973	1.93228	1.90361
13	3.13621	2.76317	2.56027	2.43371	2.34672	2.28298	2.23410	2.19535	2.16382	2.13763	2.09659	2.05316	2.00698	1.98272	1.95757	1.93147	1.90429	1.87591	1.84620
14	3.10221	2.72647	2.52222	2.39469	2.30694	2.24256	2.19313	2.15390	2.12195	2.09540	2.05371	2.00953	1.96245	1.93766	1.91193	1.88516	1.85723	1.82800	1.79728
15	3.07319	2.69517	2.48979	2.36143	2.27302	2.20808	2.15818	2.11853	2.08621	2.05932	2.01707	1.97222	1.92431	1.89904	1.87277	1.84539	1.81676	1.78672	1.75505
16	3.04811	2.66817	2.46181	2.33274	2.24376	2.17833	2.12800	2.08798	2.05533	2.02815	1.98539	1.93992	1.89127	1.86556	1.83879	1.81084	1.78156	1.75075	1.71817
17	3.02623	2.64464	2.43743	2.30775	2.21825	2.15239	2.10169	2.06134	2.02839	2.00094	1.95772	1.91169	1.86236	1.83624	1.80901	1.78053	1.75063	1.71909	1.68564
18	3.00698	2.62395	2.41601	2.28577	2.19583	2.12958	2.07854	2.03789	2.00467	1.97698	1.93334	1.88681	1.83685	1.81035	1.78269	1.75371	1.72322	1.69099	1.65671
19	2.98990	2.60561	2.39702	2.26630	2.17596	2.10936	2.05802	2.01710	1.98364	1.95573	1.91170	1.86471	1.81416	1.78731	1.75924	1.72979	1.69876	1.66587	1.63077
20	2.97465	2.58925	2.38009	2.24893	2.15823	2.09132	2.03970	1.99853	1.96485	1.93674	1.89236	1.84494	1.79384	1.76667	1.73822	1.70833	1.67678	1.64326	1.60738
21	2.96096	2.57457	2.36489	2.23334	2.14231	2.07512	2.02325	1.98186	1.94797	1.91967	1.87497	1.82715	1.77555	1.74807	1.71927	1.68896	1.65691	1.62278	1.58615
22	2.94858	2.56131	2.35117	2.21927	2.12794	2.06050	2.00840	1.96680	1.93273	1.90425	1.85925	1.81106	1.75899	1.73122	1.70208	1.67138	1.63885	1.60415	1.56678
23	2.93736	2.54929	2.33873	2.20651	2.11491	2.04723	1.99492	1.95312	1.91888	1.89025	1.84497	1.79643	1.74392	1.71588	1.68643	1.65535	1.62237	1.58711	1.54903
24	2.92712	2.53833	2.32739	2.19488	2.10303	2.03513	1.98263	1.94066	1.90625	1.87748	1.83194	1.78308	1.73015	1.70185	1.67210	1.64067	1.60726	1.57146	1.53270
25	2.91774	2.52831	2.31702	2.18424	2.09216	2.02406	1.97138	1.92925	1.89469	1.86578	1.82000	1.77083	1.71752	1.68898	1.65895	1.62718	1.59335	1.55703	1.51760
26	2.90913	2.51910	2.30749	2.17447	2.08218	2.01389	1.96104	1.91876	1.88407	1.85503	1.80902	1.75957	1.70589	1.67712	1.64682	1.61472	1.58050	1.54368	1.50360
27	2.90119	2.51061	2.29871	2.16546	2.07298	2.00452	1.95151	1.90909	1.87427	1.84511	1.79889	1.74917	1.69514	1.66616	1.63560	1.60320	1.56859	1.53129	1.49057
28	2.89385	2.50276	2.29060	2.15714	2.06447	1.99585	1.94270	1.90014	1.86520	1.83593	1.78951	1.73954	1.68519	1.65600	1.62519	1.59250	1.55753	1.51976	1.47841
29	2.88703	2.49548	2.28307	2.14941	2.05658	1.98781	1.93452	1.89184	1.85679	1.82741	1.78081	1.73060	1.67593	1.64655	1.61551	1.58253	1.54721	1.50899	1.46704
30	2.88069	2.48872	2.27607	2.14223	2.04925	1.98033	1.92692	1.88412	1.84896	1.81949	1.77270	1.72227	1.66731	1.63774	1.60648	1.57323	1.53757	1.49891	1.45636
40	2.83535	2.44037	2.22609	2.09095	1.99682	1.92688	1.87252	1.82886	1.79290	1.76269	1.71456	1.66241	1.60515	1.57411	1.54108	1.50562	1.46716	1.42476	1.37691
60	2.79107	2.39325	2.17741	2.04099	1.94571	1.87472	1.81939	1.77483	1.73802	1.70701	1.65743	1.60337	1.54349	1.51072	1.47554	1.43734	1.39520	1.34757	1.29146
120	2.74781	2.34734	2.12999	1.99230	1.89587	1.82381	1.76748	1.72196	1.68425	1.65238	1.60120	1.54500	1.48207	1.44723	1.40938	1.36760	1.32034	1.26457	1.19256
∞	2.70554	2.30259	2.08380	1.94486	1.84727	1.77411	1.71672	1.67020	1.63152	1.59872	1.54578	1.48714	1.42060	1.38318	1.34187	1.29513	1.23995	1.16860	1.00000

$\alpha = 0.05$

n-graus de liberdade do denominador	*m-graus de liberdade do numerador*																
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	16.4476	199.5000	215.7073	224.5832	230.1619	233.9860	236.7684	238.8827	240.5433	241.8817	243.9060	245.9499	248.0131	249.0518	250.0951	251.1432	252.1957	253.2529	254.3144
2	18.5128	19.0000	19.1643	19.2468	19.2964	19.3295	19.3532	19.3710	19.3848	19.3959	19.4125	19.4291	19.4458	19.4541	19.4624	19.4707	19.4791	19.4874	19.4957
3	10.1280	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123	8.7855	8.7446	8.7029	8.6602	8.6385	8.6166	8.5944	8.5720	8.5494	8.5264
4	7.7086	6.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	5.9988	5.9644	5.9117	5.8578	5.8025	5.7744	5.7459	5.7170	5.6877	5.6581	5.6281
5	6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725	4.7351	4.6777	4.6188	4.5581	4.5272	4.4957	4.4638	4.4314	4.3985	4.3650
6	5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990	4.0600	3.9999	3.9381	3.8742	3.8415	3.8082	3.7743	3.7398	3.7047	3.6689
7	5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767	3.6365	3.5747	3.5107	3.4445	3.4105	3.3758	3.3404	3.3043	3.2674	3.2298
8	5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881	3.3472	3.2839	3.2184	3.1503	3.1152	3.0794	3.0428	3.0053	2.9669	2.9276
9	5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789	3.1373	3.0729	3.0061	2.9365	2.9005	2.8637	2.8259	2.7872	2.7475	2.7067
10	4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204	2.9782	2.9130	2.8450	2.7740	2.7372	2.6996	2.6609	2.6211	2.5801	2.5379
11	4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962	2.8536	2.7876	2.7186	2.6464	2.6090	2.5705	2.5309	2.4901	2.4480	2.4045
12	4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964	2.7534	2.6866	2.6169	2.5436	2.5055	2.4663	2.4259	2.3842	2.3410	2.2962
13	4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144	2.6710	2.6037	2.5331	2.4589	2.4202	2.3803	2.3392	2.2966	2.2524	2.2064
14	4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458	2.6022	2.5342	2.4630	2.3879	2.3487	2.3082	2.2664	2.2229	2.1778	2.1307
15	4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876	2.5437	2.4753	2.4034	2.3275	2.2878	2.2468	2.2043	2.1601	2.1141	2.0658
16	4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377	2.4935	2.4247	2.3522	2.2756	2.2354	2.1938	2.1507	2.1058	2.0589	2.0096
17	4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943	2.4499	2.3807	2.3077	2.2304	2.1898	2.1477	2.1040	2.0584	2.0107	1.9604
18	4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563	2.4117	2.3421	2.2686	2.1906	2.1497	2.1071	2.0629	2.0166	1.9681	1.9168
19	4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227	2.3779	2.3080	2.2341	2.1555	2.1141	2.0712	2.0264	1.9795	1.9302	1.8780
20	4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928	2.3479	2.2776	2.2033	2.1242	2.0825	2.0391	1.9938	1.9464	1.8963	1.8432
21	4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3660	2.3210	2.2504	2.1757	2.0960	2.0540	2.0102	1.9645	1.9165	1.8657	1.8117
22	4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419	2.2967	2.2258	2.1508	2.0707	2.0283	1.9842	1.9380	1.8894	1.8380	1.7831
23	4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201	2.2747	2.2036	2.1282	2.0476	2.0050	1.9605	1.9139	1.8648	1.8128	1.7570
24	4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002	2.2547	2.1834	2.1077	2.0267	1.9838	1.9390	1.8920	1.8424	1.7896	1.7330
25	4.2417	3.3852	2.9912	2.7587	2.6030	2.4904	2.4047	2.3371	2.2821	2.2365	2.1649	2.0889	2.0075	1.9643	1.9192	1.8718	1.8217	1.7684	1.7110
26	4.2252	3.3690	2.9752	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655	2.2197	2.1479	2.0716	1.9898	1.9464	1.9010	1.8533	1.8027	1.7488	1.6906
27	4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501	2.2043	2.1323	2.0558	1.9736	1.9299	1.8842	1.8361	1.7851	1.7306	1.6717
28	4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360	2.1900	2.1179	2.0411	1.9586	1.9147	1.8687	1.8203	1.7689	1.7138	1.6541
29	4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2783	2.2229	2.1768	2.1045	2.0275	1.9446	1.9005	1.8543	1.8055	1.7537	1.6981	1.6376
30	4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107	2.1646	2.0921	2.0148	1.9317	1.8874	1.8409	1.7918	1.7396	1.6835	1.6223
40	4.0847	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240	2.0772	2.0035	1.9245	1.8389	1.7929	1.7444	1.6928	1.6373	1.5766	1.5089
60	4.0012	3.1504	2.7581	2.5252	2.3683	2.2541	2.1665	2.0970	2.0401	1.9926	1.9174	1.8364	1.7480	1.7001	1.6491	1.5943	1.5343	1.4673	1.3893
120	3.9201	3.0718	2.6802	2.4472	2.2899	2.1750	2.0868	2.0164	1.9588	1.9105	1.8337	1.7505	1.6587	1.6084	1.5543	1.4952	1.4290	1.3519	1.2539
∞	3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799	1.8307	1.7522	1.6664	1.5705	1.5173	1.4591	1.3940	1.3180	1.2214	1.0000

$\alpha = 0.025$

n-graus de liberdade do denominador	*m-graus de liberdade do numerador*															
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	647.7890	799.5000	864.1630	899.5833	921.8479	937.1111	948.2169	956.6562	963.2846	968.6274	976.7079	984.8668	993.1028	997.2492	1001.414	1005.598	1009.800	1014.020	1018.258
2	38.5063	39.0000	39.1655	39.2484	39.2982	39.3315	39.3552	39.3730	39.3869	39.3980	39.4146	39.4313	39.4479	39.4562	39.465	39.473	39.481	39.490	39.498
3	17.4434	16.0441	15.4392	15.1010	14.8848	14.7347	14.6244	14.5399	14.4731	14.4189	14.3366	14.2527	14.1674	14.1241	14.081	14.037	13.992	13.947	13.902
4	12.2179	10.6491	9.9792	9.6045	9.3645	9.1973	9.0741	8.9796	8.9047	8.8439	8.7512	8.6565	8.5599	8.5109	8.461	8.411	8.360	8.309	8.257
5	10.0070	8.4336	7.7636	7.3879	7.1464	6.9777	6.8531	6.7572	6.6811	6.6192	6.5245	6.4277	6.3286	6.2780	6.227	6.175	6.123	6.069	6.015
6	8.8131	7.2599	6.5988	6.2272	5.9876	5.8198	5.6955	5.5996	5.5234	5.4613	5.3662	5.2687	5.1684	5.1172	5.065	5.012	4.959	4.904	4.849
7	8.0727	6.5415	5.8898	5.5226	5.2852	5.1186	4.9949	4.8993	4.8232	4.7611	4.6658	4.5678	4.4667	4.4150	4.362	4.309	4.254	4.199	4.142
8	7.5709	6.0595	5.4160	5.0526	4.8173	4.6517	4.5286	4.4333	4.3572	4.2951	4.1997	4.1012	3.9995	3.9472	3.894	3.840	3.784	3.728	3.670
9	7.2093	5.7147	5.0781	4.7181	4.4844	4.3197	4.1970	4.1020	4.0260	3.9639	3.8682	3.7694	3.6669	3.6142	3.560	3.505	3.449	3.392	3.333
10	6.9367	5.4564	4.8256	4.4683	4.2361	4.0721	3.9498	3.8549	3.7790	3.7168	3.6209	3.5217	3.4185	3.3654	3.311	3.255	3.198	3.140	3.080
11	6.7241	5.2559	4.6300	4.2751	4.0440	3.8807	3.7586	3.6638	3.5879	3.5257	3.4296	3.3299	3.2261	3.1725	3.118	3.061	3.004	2.944	2.883
12	6.5538	5.0959	4.4742	4.1212	3.8911	3.7283	3.6065	3.5118	3.4358	3.3736	3.2773	3.1772	3.0728	3.0187	2.963	2.906	2.848	2.787	2.725
13	6.4143	4.9653	4.3472	3.9959	3.7667	3.6043	3.4827	3.3880	3.3120	3.2497	3.1532	3.0527	2.9477	2.8932	2.837	2.780	2.720	2.659	2.595
14	6.2979	4.8567	4.2417	3.8919	3.6634	3.5014	3.3799	3.2853	3.2093	3.1469	3.0502	2.9493	2.8437	2.7888	2.732	2.674	2.614	2.552	2.487
15	6.1995	4.7650	4.1528	3.8043	3.5764	3.4147	3.2934	3.1987	3.1227	3.0602	2.9633	2.8621	2.7559	2.7006	2.644	2.585	2.524	2.461	2.395
16	6.1151	4.6867	4.0768	3.7294	3.5021	3.3406	3.2194	3.1248	3.0488	2.9862	2.8890	2.7875	2.6808	2.6252	2.568	2.509	2.447	2.383	2.316
17	6.0420	4.6189	4.0112	3.6648	3.4379	3.2767	3.1556	3.0610	2.9849	2.9222	2.8249	2.7230	2.6158	2.5598	2.502	2.442	2.380	2.315	2.247
18	5.9781	4.5597	3.9539	3.6083	3.3820	3.2209	3.0999	3.0053	2.9291	2.8664	2.7689	2.6667	2.5590	2.5027	2.445	2.384	2.321	2.256	2.187
19	5.9216	4.5075	3.9034	3.5587	3.3327	3.1718	3.0509	2.9563	2.8801	2.8172	2.7196	2.6171	2.5089	2.4523	2.394	2.333	2.270	2.203	2.133
20	5.8715	4.4613	3.8587	3.5147	3.2891	3.1283	3.0074	2.9128	2.8365	2.7737	2.6758	2.5731	2.4645	2.4076	2.349	2.287	2.223	2.156	2.085
21	5.8266	4.4199	3.8188	3.4754	3.2501	3.0895	2.9686	2.8740	2.7977	2.7348	2.6368	2.5338	2.4247	2.3675	2.308	2.246	2.182	2.114	2.042
22	5.7863	4.3828	3.7829	3.4401	3.2151	3.0546	2.9338	2.8392	2.7628	2.6998	2.6017	2.4984	2.3890	2.3315	2.272	2.210	2.145	2.076	2.003
23	5.7498	4.3492	3.7505	3.4083	3.1835	3.0232	2.9023	2.8077	2.7313	2.6682	2.5699	2.4665	2.3567	2.2989	2.239	2.176	2.111	2.041	1.968
24	5.7166	4.3187	3.7211	3.3794	3.1548	2.9946	2.8738	2.7791	2.7027	2.6396	2.5411	2.4374	2.3273	2.2693	2.209	2.146	2.080	2.010	1.935
25	5.6864	4.2909	3.6943	3.3530	3.1287	2.9685	2.8478	2.7531	2.6766	2.6135	2.5149	2.4110	2.3005	2.2422	2.182	2.118	2.052	1.981	1.906
26	5.6586	4.2655	3.6697	3.3289	3.1048	2.9447	2.8240	2.7293	2.6528	2.5896	2.4908	2.3867	2.2759	2.2174	2.157	2.093	2.026	1.954	1.878
27	5.6331	4.2421	3.6472	3.3067	3.0828	2.9228	2.8021	2.7074	2.6309	2.5676	2.4688	2.3644	2.2533	2.1946	2.133	2.069	2.002	1.930	1.853
28	5.6096	4.2205	3.6264	3.2863	3.0626	2.9027	2.7820	2.6872	2.6106	2.5473	2.4484	2.3438	2.2324	2.1735	2.112	2.048	1.980	1.907	1.829
29	5.5878	4.2006	3.6072	3.2674	3.0438	2.8840	2.7633	2.6686	2.5919	2.5286	2.4295	2.3248	2.2131	2.1540	2.092	2.028	1.959	1.886	1.807
30	5.5675	4.1821	3.5894	3.2499	3.0265	2.8667	2.7460	2.6513	2.5746	2.5112	2.4120	2.3072	2.1952	2.1359	2.074	2.009	1.940	1.866	1.787
40	5.4239	4.0510	3.4633	3.1261	2.9037	2.7444	2.6238	2.5289	2.4519	2.3882	2.2882	2.1819	2.0677	2.0069	1.943	1.875	1.803	1.724	1.637
60	5.2856	3.9253	3.3425	3.0077	2.7863	2.6274	2.5068	2.4117	2.3344	2.2702	2.1692	2.0613	1.9445	1.8817	1.815	1.744	1.667	1.581	1.482
120	5.1523	3.8046	3.2269	2.8943	2.6740	2.5154	2.3948	2.2994	2.2217	2.1570	2.0548	1.9450	1.8249	1.7597	1.690	1.614	1.530	1.433	1.310
∞	5.0239	3.6889	3.1161	2.7858	2.5665	2.4082	2.2875	2.1918	2.1136	2.0483	1.9447	1.8326	1.7085	1.6402	1.566	1.484	1.388	1.268	1.000

$\alpha = 0.01$

n-graus de liberdade do denominador	*m-graus de liberdade do numerador*																
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	4052.181	4999.500	5403.352	5624.583	5763.650	5858.986	5928.356	5981.070	6022.473	6055.847	6106.321	6157.285	6208.730	6234.631	6260.649	6286.782	6313.030	6339.391	6365.864
2	98.503	99.000	99.166	99.249	99.299	99.333	99.356	99.374	99.388	99.399	99.416	99.433	99.449	99.458	99.466	99.474	99.482	99.491	99.499
3	34.116	30.817	29.457	28.710	28.237	27.911	27.672	27.489	27.345	27.229	27.052	26.872	26.690	26.598	26.505	26.411	26.316	26.221	26.125
4	21.198	18.000	16.694	15.977	15.522	15.207	14.976	14.799	14.659	14.546	14.374	14.198	14.020	13.929	13.838	13.745	13.652	13.558	13.463
5	16.258	13.274	12.060	11.392	10.967	10.672	10.456	10.289	10.158	10.051	9.888	9.722	9.553	9.466	9.379	9.291	9.202	9.112	9.020
6	13.745	10.925	9.780	9.148	8.746	8.466	8.260	8.102	7.976	7.874	7.718	7.559	7.396	7.313	7.229	7.143	7.057	6.969	6.880
7	12.246	9.547	8.451	7.847	7.460	7.191	6.993	6.840	6.719	6.620	6.469	6.314	6.155	6.074	5.992	5.908	5.824	5.737	5.650
8	11.259	8.649	7.591	7.006	6.632	6.371	6.178	6.029	5.911	5.814	5.667	5.515	5.359	5.279	5.198	5.116	5.032	4.946	4.859
9	10.561	8.022	6.992	6.422	6.057	5.802	5.613	5.467	5.351	5.257	5.111	4.962	4.808	4.729	4.649	4.567	4.483	4.398	4.311
10	10.044	7.559	6.552	5.994	5.636	5.386	5.200	5.057	4.942	4.849	4.706	4.558	4.405	4.327	4.247	4.165	4.082	3.996	3.909
11	9.646	7.206	6.217	5.668	5.316	5.069	4.886	4.744	4.632	4.539	4.397	4.251	4.099	4.021	3.941	3.860	3.776	3.690	3.602
12	9.330	6.927	5.953	5.412	5.064	4.821	4.640	4.499	4.388	4.296	4.155	4.010	3.858	3.780	3.701	3.619	3.535	3.449	3.361
13	9.074	6.701	5.739	5.205	4.862	4.620	4.441	4.302	4.191	4.100	3.960	3.815	3.665	3.587	3.507	3.425	3.341	3.255	3.165
14	8.862	6.515	5.564	5.035	4.695	4.456	4.278	4.140	4.030	3.939	3.800	3.656	3.505	3.427	3.348	3.266	3.181	3.094	3.004
15	8.683	6.359	5.417	4.893	4.556	4.318	4.142	4.004	3.895	3.805	3.666	3.522	3.372	3.294	3.214	3.132	3.047	2.959	2.868
16	8.531	6.226	5.292	4.773	4.437	4.202	4.026	3.890	3.780	3.691	3.553	3.409	3.259	3.181	3.101	3.018	2.933	2.845	2.753
17	8.400	6.112	5.185	4.669	4.336	4.102	3.927	3.791	3.682	3.593	3.455	3.312	3.162	3.084	3.003	2.920	2.835	2.746	2.653
18	8.285	6.013	5.092	4.579	4.248	4.015	3.841	3.705	3.597	3.508	3.371	3.227	3.077	2.999	2.919	2.835	2.749	2.660	2.566
19	8.185	5.926	5.010	4.500	4.171	3.939	3.765	3.631	3.523	3.434	3.297	3.153	3.003	2.925	2.844	2.761	2.674	2.584	2.489
20	8.096	5.849	4.938	4.431	4.103	3.871	3.699	3.564	3.457	3.368	3.231	3.088	2.938	2.859	2.778	2.695	2.608	2.517	2.421
21	8.017	5.780	4.874	4.369	4.042	3.812	3.640	3.506	3.398	3.310	3.173	3.030	2.880	2.801	2.720	2.636	2.548	2.457	2.360
22	7.945	5.719	4.817	4.313	3.988	3.758	3.587	3.453	3.346	3.258	3.121	2.978	2.827	2.749	2.667	2.583	2.495	2.403	2.305
23	7.881	5.664	4.765	4.264	3.939	3.710	3.539	3.406	3.299	3.211	3.074	2.931	2.781	2.702	2.620	2.535	2.447	2.354	2.256
24	7.823	5.614	4.718	4.218	3.895	3.667	3.496	3.363	3.256	3.168	3.032	2.889	2.738	2.659	2.577	2.492	2.403	2.310	2.211
25	7.770	5.568	4.675	4.177	3.855	3.627	3.457	3.324	3.217	3.129	2.993	2.850	2.699	2.620	2.538	2.453	2.364	2.270	2.169
26	7.721	5.526	4.637	4.140	3.818	3.591	3.421	3.288	3.182	3.094	2.958	2.815	2.664	2.585	2.503	2.417	2.327	2.233	2.131
27	7.677	5.488	4.601	4.106	3.785	3.558	3.388	3.256	3.149	3.062	2.926	2.783	2.632	2.552	2.470	2.384	2.294	2.198	2.097
28	7.636	5.453	4.568	4.074	3.754	3.528	3.358	3.226	3.120	3.032	2.896	2.753	2.602	2.522	2.440	2.354	2.263	2.167	2.064
29	7.598	5.420	4.538	4.045	3.725	3.499	3.330	3.198	3.092	3.005	2.868	2.726	2.574	2.495	2.412	2.325	2.234	2.138	2.034
30	7.562	5.390	4.510	4.018	3.699	3.473	3.304	3.173	3.067	2.979	2.843	2.700	2.549	2.469	2.386	2.299	2.208	2.111	2.006
40	7.314	5.179	4.313	3.828	3.514	3.291	3.124	2.993	2.888	2.801	2.665	2.522	2.369	2.288	2.203	2.114	2.019	1.917	1.805
60	7.077	4.977	4.126	3.649	3.339	3.119	2.953	2.823	2.718	2.632	2.496	2.352	2.198	2.115	2.028	1.936	1.836	1.726	1.601
120	6.851	4.787	3.949	3.480	3.174	2.956	2.792	2.663	2.559	2.472	2.336	2.192	2.035	1.950	1.860	1.763	1.656	1.533	1.381
∞	6.635	4.605	3.782	3.319	3.017	2.802	2.639	2.511	2.407	2.321	2.185	2.039	1.878	1.791	1.696	1.592	1.473	1.325	1.000