Công thức tính xác suất – hàm mật độ

$X \sim A(p); x = 0,1$	$X \sim B(n,p); x = 0,1,\dots,n$	$X \sim P(\lambda); x = 0,1,\dots,$	$X \sim N(\mu,\sigma^2), x \in \mathbb{R}$
$P(X=x) = p^x(1-p)^{1-x}$	$P(X=x) = C_n^x p^x (1-p)^{n-x}$	$P(X=x) = \dfrac{e^{-\lambda}\lambda^x}{x!}$	$f(x) = \dfrac{1}{\sigma\sqrt{2\pi}}\exp\left(-\dfrac{(x-\mu)^2}{2\sigma^2}\right)$

Trung bình và phương sai mẫu

	Trung bình mẫu: $\bar{x}$	Phương sai mẫu s^2	
Mẫu liệt kê $(x_1, x_2, \dots, x_n)$	$\dfrac{\sum x_i}{n}$	$\dfrac{\sum(x_i - \bar{x})^2}{n-1}$	$\dfrac{n}{n-1}\left(\dfrac{\sum x_i^2}{n} - (\bar{x})^2\right)$
Mẫu k nhóm Tần số $(n_1, n_2, \dots, n_k)$	$\dfrac{\sum n_i x_i}{\sum n_i} = \dfrac{\sum n_i x_i}{n}$	$\dfrac{\sum n_i(x_i - \bar{x})^2}{n-1}$	$\dfrac{n}{n-1}\left(\dfrac{\sum n_i x_i^2}{n} - (\bar{x})^2\right)$

QUY LUẬT CỦA THỐNG KÊ – ƯỚC LƯỢNG THAM SỐ

Phân phối của thống kê: mẫu kích thước n	Ước lượng khoảng hai phía: độ tin cậy $(1-\alpha)$
$X \sim N(\mu,\sigma^2)$: $\bar{X} \sim N\left(\mu, \dfrac{\sigma^2}{n}\right)$	$\bar{X} - \dfrac{S}{\sqrt{n}} t_{\frac{\alpha}{2}}^{(n-1)} < \mu < \bar{X} + \dfrac{S}{\sqrt{n}} t_{\alpha/2}^{(n-1)}$
$X \sim N(\mu,\sigma^2)$: $\dfrac{(n-1)S^2}{\sigma^2} \sim \chi^2(n-1)$	$\dfrac{(n-1)S^2}{\chi_{\alpha/2}^{2(n-1)}} < \sigma^2 < \dfrac{(n-1)S^2}{\chi_{1-\alpha/2}^{2(n-1)}}$
$X \sim A(p), n \geq 100$: $\hat{p} \sim N\left(p, \dfrac{p(1-p)}{n}\right)$	$\hat{p} - z_{\alpha/2}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}} < p < \hat{p} + z_{\alpha/2}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$

KIỂM ĐỊNH THAM SỐ (mức ý nghĩa α)

Kiểm định một tham số			Kiểm định hai tham số		
H_0 – Tiêu chuẩn	H_1	Miền bác bỏ W_α	H_0 – Tiêu chuẩn	H_1	Miền bác bỏ W_α
$H_0: \mu = \mu_0$ $T = \dfrac{\bar{X} - \mu_0}{S/\sqrt{n}}$	$\mu \neq \mu_0$	$\left\{T: \lvert T\rvert > t_{\alpha/2}^{(n-1)}\right\}$	$H_0: \mu_1 = \mu_2 (n_1, n_2 > 30)$ $T = \dfrac{\bar{X}_1 - \bar{X}_2}{\sqrt{\dfrac{S_1^2}{n_1} + \dfrac{S_2^2}{n_2}}}$	$\mu_1 \neq \mu_2$	$\left\{T: \lvert T\rvert > z_{\alpha/2}\right\}$
	$\mu > \mu_0$	$\left\{T: T > t_\alpha^{(n-1)}\right\}$		$\mu_1 > \mu_2$	$\{T: T > z_\alpha\}$
	$\mu < \mu_0$	$\left\{T: < -t_\alpha^{(n-1)}\right\}$		$\mu_1 < \mu_2$	$\{T: T < -z_\alpha\}$
$H_0: \sigma^2 = \sigma_0^2$ $\chi^2 = \dfrac{(n-1)S^2}{\sigma_0^2}$	$\sigma^2 \neq \sigma_0^2$	$\left\{\chi^2: \begin{matrix}\chi^2 > \chi_{\alpha/2}^{2(n-1)}\\ \chi^2 < \chi_{1-\alpha/2}^{2(n-1)}\end{matrix}\right\}$	$H_0: \sigma_1^2 = \sigma_2^2$ $F = \dfrac{S_1^2}{S_2^2}$	$\sigma_1^2 \neq \sigma_2^2$	$\left\{F: \begin{matrix}F > f_{\alpha/2}^{(n_1-1,n_2-1)}\\ F < f_{1-\alpha/2}^{(n_1-1,n_2-1)}\end{matrix}\right\}$
	$\sigma^2 > \sigma_0^2$	$\left\{\chi^2: \chi^2 > \chi_\alpha^{2(n-1)}\right\}$		$\sigma_1^2 > \sigma_2^2$	$\left\{F: F > f_\alpha^{(n_1-1,n_2-1)}\right\}$
	$\sigma^2 < \sigma_0^2$	$\left\{\chi^2: \chi^2 < \chi_{1-\alpha}^{2(n-1)}\right\}$		$\sigma_1^2 < \sigma_2^2$	$\left\{F: F < f_{1-\alpha}^{(n_1-1,n_2-1)}\right\}$
$H_0: p = p_0$ $Z = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}}$	$p \neq p_0$	$\{Z: \lvert Z\rvert > z_{\alpha/2}\}$	$H_0: p_1 = p_2$ $Z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}(1-\bar{p})\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$	$p_1 \neq p_2$	$\{Z: \lvert Z\rvert > z_{\alpha/2}\}$
	$p > p_0$	$\{Z: Z > z_\alpha\}$		$p_1 > p_2$	$\{Z: Z > z_\alpha\}$
	$p < p_0$	$\{Z: Z < -z_\alpha\}$		$p_1 < p_2$	$\{Z: Z < -z_\alpha\}$

KIỂM ĐỊNH PHI THAM SỐ (mức ý nghĩa α)

	Phân phối chuẩn	Tính độc lập
Tiêu chuẩn	$JB = n\left(\dfrac{a_3^2}{6} + \dfrac{(a_4-3)^2}{24}\right)$	$\chi^2 = n\left(\sum\sum \dfrac{n_{ij}^2}{n_i m_j} - 1\right)$
Miền bác bỏ	$\left\{JB: JB > \chi_\alpha^{2(2)}\right\}$	$\left\{\chi^2: \chi^2 > \chi_\alpha^{2((h-1)\times(k-1))}\right\}$

GIÁ TRỊ TỚI HẠN MỨC α

Phân phối Student: $t_\alpha^{(n)}$

α \ n	0.1	0.05	0.025	0.01
6	1.440	1.943	2.447	3.143
7	1.415	1.895	2.365	2.998
8	1.397	1.860	2.306	2.896
9	1.383	1.833	2.262	2.821
10	1.372	1.812	2.228	2.764
11	1.363	1.796	2.201	2.718
12	1.356	1.782	2.179	2.681
13	1.350	1.771	2.160	2.650
14	1.345	1.761	2.145	2.624
15	1.341	1.753	2.131	2.602
16	1.337	1.746	2.120	2.583
17	1.333	1.740	2.110	2.567
18	1.330	1.734	2.101	2.552
19	1.328	1.729	2.093	2.539
20	1.325	1.725	2.086	2.528
21	1.323	1.721	2.080	2.518
22	1.321	1.717	2.074	2.508
23	1.319	1.714	2.069	2.500
24	1.318	1.711	2.064	2.492
25	1.316	1.708	2.060	2.485
26	1.315	1.706	2.056	2.479
27	1.314	1.703	2.052	2.473
28	1.313	1.701	2.048	2.467
29	1.311	1.699	2.045	2.462
30	1.310	1.697	2.042	2.457
∞	1.282	1.645	1.960	2.326

Phân phối Khi-bình phương: $\chi_\alpha^{2(n)}$

α \ n	0.975	0.95	0.9	0.1	0.05	0.025
1	0.001	0.004	0.016	2.706	3.841	5.024
2	0.051	0.103	0.211	4.605	5.991	7.378
3	0.216	0.352	0.584	6.251	7.815	9.348
4	0.484	0.711	1.064	7.779	9.488	11.14
5	0.831	1.145	1.610	9.236	11.07	12.83
6	1.237	1.635	2.204	10.64	12.59	14.45
7	1.690	2.167	2.833	12.02	14.07	16.01
8	2.180	2.733	3.490	13.36	15.51	17.53
9	2.700	3.325	4.168	14.68	16.92	19.02
10	3.247	3.940	4.865	15.99	18.31	20.48
11	3.816	4.575	5.578	17.28	19.68	21.92
12	4.404	5.226	6.304	18.55	21.03	23.34
13	5.009	5.892	7.042	19.81	22.36	24.74
14	5.629	6.571	7.790	21.06	23.68	26.12
15	6.262	7.261	8.547	22.31	25.00	27.49
19	8.907	10.12	11.65	27.20	30.14	32.85
24	12.40	13.85	15.66	33.20	36.42	39.36
29	16.05	17.71	19.77	39.09	42.56	45.72
39	23.65	25.70	28.20	50.66	54.57	58.12
49	31.55	33.93	36.82	62.04	66.34	70.22
59	39.66	42.34	45.58	73.28	77.93	82.12
79	56.31	59.52	63.38	95.48	100.8	105.5
99	73.36	77.05	81.45	117.4	123.2	128.4
120	91.57	95.70	100.6	140.2	146.6	152.2
150	118.0	122.7	128.3	172.6	179.6	185.8
200	162.7	168.3	174.8	226.0	234.0	241.1

Phân phối Fisher: $f_\alpha^{(n_1,n_2)}$

n_2	α \ n_1	15	19	24	29	39	59	99	120
19	0.025	2.773	2.526	2.345	2.231	2.096	1.968	1.870	1.845
	0.05	2.340	2.168	2.040	1.958	1.860	1.766	1.693	1.674
	0.1	1.932	1.822	1.739	1.685	1.619	1.555	1.505	1.493
24	0.025	2.701	2.452	2.269	2.154	2.017	1.886	1.785	1.760
	0.05	2.288	2.114	1.984	1.901	1.800	1.703	1.628	1.608
	0.1	1.899	1.787	1.702	1.647	1.579	1.513	1.461	1.447
29	0.025	2.652	2.402	2.217	2.101	1.962	1.829	1.726	1.700
	0.05	2.253	2.077	1.945	1.861	1.759	1.660	1.582	1.562
	0.1	1.876	1.763	1.676	1.620	1.551	1.483	1.429	1.415
39	0.025	2.590	2.338	2.151	2.033	1.891	1.754	1.648	1.620
	0.05	2.208	2.030	1.896	1.809	1.704	1.602	1.521	1.500
	0.1	1.848	1.732	1.643	1.585	1.514	1.443	1.386	1.371
59	0.025	2.526	2.272	2.082	1.962	1.816	1.674	1.562	1.533
	0.05	2.162	1.981	1.844	1.756	1.647	1.540	1.454	1.431
	0.1	1.818	1.700	1.608	1.548	1.474	1.399	1.338	1.322
99	0.025	2.475	2.218	2.025	1.902	1.752	1.605	1.486	1.455
	0.05	2.124	1.941	1.801	1.710	1.598	1.486	1.394	1.369
	0.1	1.793	1.673	1.579	1.517	1.440	1.361	1.295	1.277
120	0.025	2.461	2.203	2.010	1.886	1.735	1.586	1.465	1.433
	0.05	2.114	1.930	1.790	1.698	1.585	1.471	1.377	1.352
	0.1	1.787	1.666	1.571	1.509	1.431	1.350	1.283	1.265

Giá trị hàm: $\Phi(z) = P(Z < z); Z \sim N(0,1)$
Với $z > 0$

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

Giá trị hàm: $\Phi(z) = P(Z < z); Z \sim N(0,1)$
Với $z < 0$

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	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.5	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
-3.6	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
-3.7	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
-3.8	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001