DISTRIBUCION JI CUADRADO

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Función de densidad:

$$f(x) \; = \; \frac{1}{2^{k/2}\Gamma(k/2)}x^{k/2-1}e^{-x/2} \qquad si \quad x > 0$$

Espacio paramétrico: $Grados\ de\ libertad \quad k \in \{1, 2, 3, ...\}$

Valor esperado: k

**Varianza:** $2k$

Función generadora de momentos: $\left(\frac{1}{1-2t}\right)^{k/2}$ $para \quad t < 1/2$

TABLA DE DISTRIBUCION JI CUADRADO

La tabla entrega valores de la cuantila z para valores dados de probabilidad acumulada $F(x) = \int_0^x f(y)dy$.

Los valores de probabilidad acumulada son 0.0005; 0.001; 0.0025; 0.005; 0.010; 0.025; desde 0.050 hasta 0.950, variando en 0.050; 0.975; 0.990; 0.995; 0.998; 0.999; 0.9995.

Los valores de los grados de libertad son: De 1 a 30; de 35 a 100 variando en 5; 110; 120; 200.
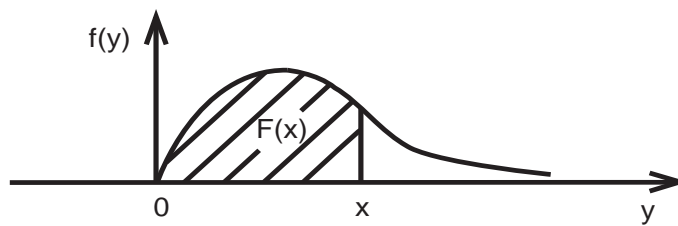
APROXIMACION NORMAL DE LA JI-CUADRADO.

Si una variable aleatoria X tiene distribución **ji-cuadrado** con k grados de libertad, entonces si k es grande la variable aleatoria $Z = \frac{X-k}{\sqrt{(2k)}}$ tiene distribución aproximada **normal standard**.

En la práctica, si k es grande, si se requiere la probabilidad acumulada $F(x)$ con F distribución **ji-cuadrado**, se puede obtener su valor aproximado buscando en la tabla **normal**

$$F_N\left(\frac{x-k}{\sqrt{(2k)}}\right)$$

en que F_N es la distribución **normal estándar**. Se puede utilizar, como criterio, la condición $k > 200$.

TABLA DE DISTRIBUCION JI - CUADRADO

Grados de
Libertad   Probabilidad acumulada

	0.0005	0.001	0.0025	0.005	0.010	0.025	0.050	0.100	0.150	0.200	0.250
1	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.016	0.036	0.064	0.102
2	0.001	0.002	0.005	0.010	0.020	0.051	0.103	0.211	0.325	0.446	0.575
3	0.015	0.024	0.045	0.072	0.115	0.216	0.352	0.584	0.798	1.005	1.213
4	0.064	0.091	0.145	0.207	0.297	0.484	0.711	1.064	1.366	1.649	1.923
5	0.158	0.210	0.307	0.412	0.554	0.831	1.145	1.610	1.994	2.343	2.675
6	0.299	0.381	0.527	0.676	0.872	1.237	1.635	2.204	2.661	3.070	3.455
7	0.485	0.598	0.794	0.989	1.239	1.690	2.167	2.833	3.358	3.822	4.255
8	0.710	0.857	1.104	1.344	1.646	2.180	2.733	3.490	4.078	4.594	5.071
9	0.972	1.152	1.450	1.735	2.088	2.700	3.325	4.168	4.817	5.380	5.899
10	1.265	1.479	1.827	2.156	2.558	3.247	3.940	4.865	5.570	6.179	6.737
11	1.587	1.834	2.232	2.603	3.053	3.816	4.575	5.578	6.336	6.989	7.584
12	1.934	2.214	2.661	3.074	3.571	4.404	5.226	6.304	7.114	7.807	8.438
13	2.305	2.617	3.112	3.565	4.107	5.009	5.892	7.042	7.901	8.634	9.299
14	2.697	3.041	3.582	4.075	4.660	5.629	6.571	7.790	8.696	9.467	10.17
15	3.108	3.483	4.070	4.601	5.229	6.262	7.261	8.547	9.499	10.31	11.04
16	3.536	3.942	4.573	5.142	5.812	6.908	7.962	9.312	10.31	11.15	11.91
17	3.980	4.416	5.092	5.697	6.408	7.564	8.672	10.09	11.12	12.00	12.79
18	4.439	4.905	5.623	6.265	7.015	8.231	9.390	10.86	11.95	12.86	13.68
19	4.912	5.407	6.167	6.844	7.633	8.907	10.12	11.65	12.77	13.72	14.56
20	5.398	5.921	6.723	7.434	8.260	9.591	10.85	12.44	13.60	14.58	15.45
21	5.896	6.447	7.289	8.034	8.897	10.28	11.59	13.24	14.44	15.44	16.34
22	6.404	6.983	7.865	8.643	9.542	10.98	12.34	14.04	15.28	16.31	17.24
23	6.924	7.529	8.450	9.260	10.20	11.69	13.09	14.85	16.12	17.19	18.14
24	7.453	8.085	9.044	9.886	10.86	12.40	13.85	15.66	16.97	18.06	19.04
25	7.991	8.649	9.646	10.52	11.52	13.12	14.61	16.47	17.82	18.94	19.94
26	8.538	9.222	10.26	11.16	12.20	13.84	15.38	17.29	18.67	19.82	20.84
27	9.093	9.803	10.87	11.81	12.88	14.57	16.15	18.11	19.53	20.70	21.75
28	9.656	10.39	11.50	12.46	13.56	15.31	16.93	18.94	20.39	21.59	22.66
29	10.23	10.99	12.13	13.12	14.26	16.05	17.71	19.77	21.25	22.48	23.57
30	10.80	11.59	12.76	13.79	14.95	16.79	18.49	20.60	22.11	23.36	24.48
35	13.79	14.69	16.03	17.19	18.51	20.57	22.47	24.80	26.46	27.84	29.05
40	16.91	17.92	19.42	20.71	22.16	24.43	26.51	29.05	30.86	32.34	33.66
45	20.14	21.25	22.90	24.31	25.90	28.37	30.61	33.35	35.29	36.88	38.29
50	23.46	24.67	26.46	27.99	29.71	32.36	34.76	37.69	39.75	41.45	42.94
55	26.87	28.17	30.10	31.73	33.57	36.40	38.96	42.06	44.24	46.04	47.61
60	30.34	31.74	33.79	35.53	37.48	40.48	43.19	46.46	48.76	50.64	52.29
65	33.88	35.36	37.54	39.38	41.44	44.60	47.45	50.88	53.29	55.26	56.99
70	37.47	39.04	41.33	43.28	45.44	48.76	51.74	55.33	57.84	59.90	61.70
75	41.11	42.76	45.17	47.21	49.48	52.94	56.05	59.79	62.41	64.55	66.42
80	44.79	46.52	49.04	51.17	53.54	57.15	60.39	64.28	66.99	69.21	71.14
85	48.52	50.32	52.95	55.17	57.63	61.39	64.75	68.78	71.59	73.88	75.88
90	52.28	54.16	56.89	59.20	61.75	65.65	69.13	73.29	76.20	78.56	80.62
95	56.07	58.02	60.86	63.25	65.90	69.92	73.52	77.82	80.81	83.25	85.38
100	59.90	61.92	64.86	67.33	70.06	74.22	77.93	82.36	85.44	87.95	90.13
110	67.63	69.79	72.92	75.55	78.46	82.87	86.79	91.47	94.72	97.36	99.67
120	75.47	77.76	81.07	83.85	86.92	91.57	95.70	100.6	104.0	106.8	109.2
200	140.7	143.8	148.4	152.2	156.4	162.7	168.3	174.8	179.4	183.0	186.2

DISTRIBUCION JI - CUADRADO (2)

Grados de
Libertad   Probabilidad acumulada

	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750
1	0.148	0.206	0.275	0.357	0.455	0.571	0.708	0.873	1.074	1.323
2	0.713	0.862	1.022	1.196	1.386	1.597	1.833	2.100	2.408	2.773
3	1.424	1.642	1.869	2.109	2.366	2.643	2.946	3.283	3.665	4.108
4	2.195	2.470	2.753	3.047	3.357	3.687	4.045	4.438	4.878	5.385
5	3.000	3.325	3.655	3.996	4.351	4.728	5.132	5.573	6.064	6.626
6	3.828	4.197	4.570	4.952	5.348	5.765	6.211	6.695	7.231	7.841
7	4.671	5.082	5.493	5.913	6.346	6.800	7.283	7.806	8.383	9.037
8	5.527	5.975	6.423	6.877	7.344	7.833	8.351	8.909	9.524	10.22
9	6.393	6.876	7.357	7.843	8.343	8.863	9.414	10.01	10.66	11.39
10	7.267	7.783	8.295	8.812	9.342	9.892	10.47	11.10	11.78	12.55
11	8.148	8.695	9.237	9.783	10.34	10.92	11.53	12.18	12.90	13.70
12	9.034	9.612	10.18	10.76	11.34	11.95	12.58	13.27	14.01	14.85
13	9.926	10.53	11.13	11.73	12.34	12.97	13.64	14.35	15.12	15.98
14	10.82	11.45	12.08	12.70	13.34	14.00	14.69	15.42	16.22	17.12
15	11.72	12.38	13.03	13.68	14.34	15.02	15.73	16.49	17.32	18.25
16	12.62	13.31	13.98	14.66	15.34	16.04	16.78	17.56	18.42	19.37
17	13.53	14.24	14.94	15.63	16.34	17.06	17.82	18.63	19.51	20.49
18	14.44	15.17	15.89	16.61	17.34	18.09	18.87	19.70	20.60	21.60
19	15.35	16.11	16.85	17.59	18.34	19.11	19.91	20.76	21.69	22.72
20	16.27	17.05	17.81	18.57	19.34	20.13	20.95	21.83	22.77	23.83
21	17.18	17.98	18.77	19.55	20.34	21.15	21.99	22.89	23.86	24.93
22	18.10	18.92	19.73	20.53	21.34	22.17	23.03	23.95	24.94	26.04
23	19.02	19.87	20.69	21.51	22.34	23.19	24.07	25.01	26.02	27.14
24	19.94	20.81	21.65	22.49	23.34	24.20	25.11	26.06	27.10	28.24
25	20.87	21.75	22.62	23.47	24.34	25.22	26.14	27.12	28.17	29.34
26	21.79	22.70	23.58	24.45	25.34	26.24	27.18	28.17	29.25	30.43
27	22.72	23.64	24.54	25.44	26.34	27.26	28.21	29.23	30.32	31.53
28	23.65	24.59	25.51	26.42	27.34	28.27	29.25	30.28	31.39	32.62
29	24.58	25.54	26.48	27.40	28.34	29.29	30.28	31.33	32.46	33.71
30	25.51	26.49	27.44	28.39	29.34	30.31	31.32	32.38	33.53	34.80
35	30.18	31.25	32.28	33.31	34.34	35.39	36.47	37.62	38.86	40.22
40	34.87	36.02	37.13	38.23	39.34	40.46	41.62	42.85	44.16	45.62
45	39.58	40.81	42.00	43.16	44.34	45.53	46.76	48.06	49.45	50.98
50	44.31	45.61	46.86	48.10	49.33	50.59	51.89	53.26	54.72	56.33
55	49.06	50.42	51.74	53.04	54.33	55.65	57.02	58.45	59.98	61.66
60	53.81	55.24	56.62	57.98	59.33	60.71	62.13	63.63	65.23	66.98
65	58.57	60.07	61.51	62.92	64.33	65.77	67.25	68.80	70.46	72.28
70	63.35	64.90	66.40	67.87	69.33	70.82	72.36	73.97	75.69	77.58
75	68.13	69.74	71.29	72.81	74.33	75.88	77.46	79.13	80.91	82.86
80	72.92	74.58	76.19	77.76	79.33	80.93	82.57	84.28	86.12	88.13
85	77.71	79.43	81.09	82.71	84.33	85.98	87.67	89.43	91.32	93.39
90	82.51	84.29	85.99	87.67	89.33	91.02	92.76	94.58	96.52	98.65
95	87.32	89.14	90.90	92.62	94.33	96.07	97.85	99.72	101.7	103.9
100	92.13	94.00	95.81	97.57	99.33	101.1	102.9	104.9	106.9	109.1
110	101.8	103.7	105.6	107.5	109.3	111.2	113.1	115.1	117.3	119.6
120	111.4	113.5	115.5	117.4	119.3	121.3	123.3	125.4	127.6	130.1
200	189.0	191.7	194.3	196.8	199.3	201.9	204.4	207.1	210.0	213.1

DISTRIBUCION JI - CUADRADO (3)

Grados de
Libertad   Probabilidad acumulada

	0.800	0.850	0.900	0.950	0.975	0.990	0.995	0.998	0.999	0.9995
1	1.642	2.072	2.706	3.841	5.024	6.635	7.879	9.141	10.83	12.12
2	3.219	3.794	4.606	5.992	7.379	9.214	10.60	12.00	13.85	15.27
3	4.642	5.317	6.251	7.815	9.348	11.34	12.84	14.32	16.27	17.73
4	5.989	6.745	7.779	9.488	11.14	13.28	14.86	16.42	18.47	20.00
5	7.289	8.115	9.236	11.07	12.83	15.09	16.75	18.39	20.52	22.11
6	8.558	9.446	10.64	12.59	14.45	16.81	18.55	20.25	22.46	24.10
7	9.803	10.75	12.02	14.07	16.01	18.48	20.28	22.04	24.32	26.02
8	11.03	12.03	13.36	15.51	17.53	20.09	21.95	23.77	26.12	27.87
9	12.24	13.29	14.68	16.92	19.02	21.67	23.59	25.46	27.88	29.67
10	13.44	14.53	15.99	18.31	20.48	23.21	25.19	27.11	29.59	31.42
11	14.63	15.77	17.28	19.68	21.92	24.72	26.76	28.73	31.26	33.14
12	15.81	16.99	18.55	21.03	23.34	26.22	28.30	30.32	32.91	34.82
13	16.98	18.20	19.81	22.36	24.74	27.69	29.82	31.88	34.53	36.48
14	18.15	19.41	21.06	23.68	26.12	29.14	31.32	33.43	36.12	38.11
15	19.31	20.60	22.31	25.00	27.49	30.58	32.80	34.95	37.70	39.72
16	20.47	21.79	23.54	26.30	28.85	32.00	34.27	36.46	39.25	41.31
17	21.61	22.98	24.77	27.59	30.19	33.41	35.72	37.95	40.79	42.88
18	22.76	24.16	25.99	28.87	31.53	34.81	37.16	39.42	42.31	44.43
19	23.90	25.33	27.20	30.14	32.85	36.19	38.58	40.88	43.82	45.97
20	25.04	26.50	28.41	31.41	34.17	37.57	40.00	42.34	45.31	47.50
21	26.17	27.66	29.62	32.67	35.48	38.93	41.40	43.78	46.80	49.01
22	27.30	28.82	30.81	33.92	36.78	40.29	42.80	45.20	48.27	50.51
23	28.43	29.98	32.01	35.17	38.08	41.64	44.18	46.62	49.73	52.00
24	29.55	31.13	33.20	36.42	39.36	42.98	45.56	48.03	51.18	53.48
25	30.68	32.28	34.38	37.65	40.65	44.31	46.93	49.44	52.62	54.95
26	31.79	33.43	35.56	38.89	41.92	45.64	48.29	50.83	54.05	56.41
27	32.91	34.57	36.74	40.11	43.19	46.96	49.64	52.22	55.48	57.86
28	34.03	35.71	37.92	41.34	44.46	48.28	50.99	53.59	56.89	59.30
29	35.14	36.85	39.09	42.56	45.72	49.59	52.34	54.97	58.30	60.73
30	36.25	37.99	40.26	43.77	46.98	50.89	53.67	56.33	59.70	62.16
35	41.78	43.64	46.06	49.80	53.20	57.34	60.27	63.08	66.62	69.20
40	47.27	49.24	51.81	55.76	59.34	63.69	66.77	69.70	73.40	76.09
45	52.73	54.81	57.51	61.66	65.41	69.96	73.17	76.22	80.08	82.88
50	58.16	60.35	63.17	67.50	71.42	76.15	79.49	82.66	86.66	89.56
55	63.58	65.86	68.80	73.31	77.38	82.29	85.75	89.03	93.17	96.16
60	68.97	71.34	74.40	79.08	83.30	88.38	91.95	95.34	99.61	102.7
65	74.35	76.81	79.97	84.82	89.18	94.42	98.11	101.6	106.0	109.2
70	79.71	82.26	85.53	90.53	95.02	100.4	104.2	107.8	112.3	115.6
75	85.07	87.69	91.06	96.22	100.8	106.4	110.3	114.0	118.6	121.9
80	90.41	93.11	96.58	101.9	106.6	112.3	116.3	120.1	124.8	128.3
85	95.73	98.51	102.1	107.5	112.4	118.2	122.3	126.2	131.0	134.5
90	101.1	103.9	107.6	113.1	118.1	124.1	128.3	132.3	137.2	140.8
95	106.4	109.3	113.0	118.8	123.9	130.0	134.2	138.3	143.3	147.0
100	111.7	114.7	118.5	124.3	129.6	135.8	140.2	144.3	149.4	153.2
110	122.2	125.4	129.4	135.5	140.9	147.4	151.9	156.2	161.6	165.4
120	132.8	136.1	140.2	146.6	152.2	159.0	163.6	168.1	173.6	177.6
200	216.6	220.7	226.0	234.0	241.1	249.4	255.3	260.7	267.5	272.4