

Tabla I.- Puntos críticos $t_{v,\gamma}$ para la distribución t con v grados de libertad y z_γ para la distribución normal estándar.

$\gamma = P\{T_v \leq t_{v,\gamma}\}$, donde T_v es una variable aleatoria con distribución t con v grados de libertad.

La última fila, $v=\infty$, corresponde a los puntos críticos normales $\gamma = P\{Z \leq z_\gamma\}$, donde Z es una variable aleatoria normal estándar.

	γ															
ν	0.6000	0.7000	0.8000	0.9000	0.9333	0.9500	0.9600	0.9667	0.9750	0.9800	0.9833	0.9875	0.9900	0.9917	0.9938	0.9950
1	0.325	0.727	1.376	3.078	4.702	6.314	7.916	9.524	12.706	15.895	19.043	25.452	31.821	38.342	51.334	63.657
2	0.289	0.617	1.061	1.886	2.456	2.920	3.320	3.679	4.303	4.849	5.334	6.205	6.965	7.665	8.897	9.925
3	0.277	0.584	0.978	1.638	2.045	2.353	2.605	2.823	3.182	3.482	3.738	4.177	4.541	4.864	5.408	5.841
4	0.271	0.569	0.941	1.533	1.879	2.132	2.333	2.502	2.776	2.999	3.184	3.495	3.747	3.966	4.325	4.604
5	0.267	0.559	0.920	1.476	1.790	2.015	2.191	2.337	2.571	2.757	2.910	3.163	3.365	3.538	3.818	4.032
6	0.265	0.553	0.906	1.440	1.735	1.943	2.104	2.237	2.447	2.612	2.748	2.969	3.143	3.291	3.528	3.707
7	0.263	0.549	0.896	1.415	1.698	1.895	2.046	2.170	2.365	2.517	2.640	2.841	2.998	3.130	3.341	3.499
8	0.262	0.546	0.889	1.397	1.670	1.860	2.004	2.122	2.306	2.449	2.565	2.752	2.896	3.018	3.211	3.355
9	0.261	0.543	0.883	1.383	1.650	1.833	1.973	2.086	2.262	2.398	2.508	2.685	2.821	2.936	3.116	3.250
10	0.260	0.542	0.879	1.372	1.634	1.812	1.948	2.058	2.228	2.359	2.465	2.634	2.764	2.872	3.043	3.169
11	0.260	0.540	0.876	1.363	1.621	1.796	1.928	2.036	2.201	2.328	2.430	2.593	2.718	2.822	2.985	3.106
12	0.259	0.539	0.873	1.356	1.610	1.782	1.912	2.017	2.179	2.303	2.402	2.560	2.681	2.782	2.939	3.055
13	0.259	0.538	0.870	1.350	1.601	1.771	1.899	2.002	2.160	2.282	2.379	2.533	2.650	2.748	2.900	3.012
14	0.258	0.537	0.868	1.345	1.593	1.761	1.887	1.989	2.145	2.264	2.359	2.510	2.624	2.720	2.868	2.977
15	0.258	0.536	0.866	1.341	1.587	1.753	1.878	1.978	2.131	2.249	2.342	2.490	2.602	2.696	2.841	2.947
16	0.258	0.535	0.865	1.337	1.581	1.746	1.869	1.968	2.120	2.235	2.327	2.473	2.583	2.675	2.817	2.921
17	0.257	0.534	0.863	1.333	1.576	1.740	1.862	1.960	2.110	2.224	2.315	2.458	2.567	2.657	2.796	2.898
18	0.257	0.534	0.862	1.330	1.572	1.734	1.855	1.953	2.101	2.214	2.303	2.445	2.552	2.641	2.778	2.878
19	0.257	0.533	0.861	1.328	1.568	1.729	1.850	1.946	2.093	2.205	2.293	2.433	2.539	2.627	2.762	2.861
20	0.257	0.533	0.860	1.325	1.564	1.725	1.844	1.940	2.086	2.197	2.285	2.423	2.528	2.614	2.748	2.845
21	0.257	0.532	0.859	1.323	1.561	1.721	1.840	1.935	2.080	2.189	2.277	2.414	2.518	2.603	2.735	2.831
22	0.256	0.532	0.858	1.321	1.558	1.717	1.835	1.930	2.074	2.183	2.269	2.405	2.508	2.593	2.724	2.819
23	0.256	0.532	0.858	1.319	1.556	1.714	1.832	1.926	2.069	2.177	2.263	2.398	2.500	2.584	2.713	2.807
24	0.256	0.531	0.857	1.318	1.553	1.711	1.828	1.922	2.064	2.172	2.257	2.391	2.492	2.575	2.704	2.797
25	0.256	0.531	0.856	1.316	1.551	1.708	1.825	1.918	2.060	2.167	2.251	2.385	2.485	2.568	2.695	2.787
26	0.256	0.531	0.856	1.315	1.549	1.706	1.822	1.915	2.056	2.162	2.246	2.379	2.479	2.561	2.687	2.779
27	0.256	0.531	0.855	1.314	1.547	1.703	1.819	1.912	2.052	2.158	2.242	2.373	2.473	2.554	2.680	2.771
28	0.256	0.530	0.855	1.313	1.546	1.701	1.817	1.909	2.048	2.154	2.237	2.368	2.467	2.548	2.673	2.763
29	0.256	0.530	0.854	1.311	1.544	1.699	1.814	1.906	2.045	2.150	2.233	2.364	2.462	2.543	2.667	2.756
30	0.256	0.530	0.854	1.310	1.543	1.697	1.812	1.904	2.042	2.147	2.230	2.360	2.457	2.537	2.661	2.750
40	0.255	0.529	0.851	1.303	1.532	1.684	1.796	1.886	2.021	2.123	2.203	2.329	2.423	2.501	2.619	2.704
50	0.255	0.528	0.849	1.299	1.526	1.676	1.787	1.875	2.009	2.109	2.188	2.311	2.403	2.479	2.594	2.678
75	0.254	0.527	0.846	1.293	1.517	1.665	1.775	1.861	1.992	2.090	2.167	2.287	2.377	2.450	2.562	2.643
100	0.254	0.526	0.845	1.290	1.513	1.660	1.769	1.855	1.984	2.081	2.157	2.276	2.364	2.436	2.547	2.626
∞	0.253	0.524	0.842	1.282	1.501	1.645	1.751	1.834	1.960	2.054	2.127	2.241	2.326	2.395	2.501	2.576

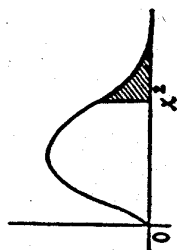


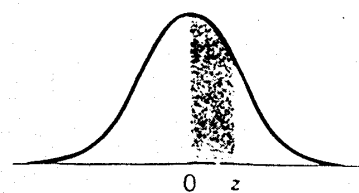
Tabla II. — Distribución χ^2

Grados de libertad	$p = 0,99$	0,98	0,95	0,90	0,80	0,70	0,50	0,30	0,20	0,10	0,05	0,02	0,01
1	0,000157	0,000628	0,00393	0,0158	0,0642	0,148	0,455	1,074	1,642	2,706	3,841	5,412	6,635
2	0,0201	0,0404	0,103	0,211	0,446	0,713	1,386	2,408	3,219	4,605	5,991	7,879	9,210
3	0,115	0,185	0,352	0,584	1,005	1,424	2,366	3,665	4,642	6,251	7,815	9,837	11,341
4	0,297	0,429	0,711	1,064	1,649	2,195	3,357	4,878	5,989	7,779	9,488	11,668	13,277
5	0,554	0,752	1,145	1,610	2,343	3,000	4,351	6,064	7,289	9,236	11,070	13,388	15,086
6	0,872	1,134	1,635	2,204	3,070	3,828	5,348	7,231	8,558	10,645	12,592	15,033	16,812
7	1,239	1,564	2,167	2,833	3,822	4,671	6,346	8,383	9,803	12,017	14,067	16,622	18,475
8	1,646	2,032	2,733	3,490	4,594	5,527	7,344	9,524	11,030	13,362	15,507	18,168	20,090
9	2,088	2,532	3,325	4,168	5,380	6,393	8,343	10,656	12,242	14,684	16,919	19,679	21,666
10	2,558	3,059	3,940	4,865	6,179	7,267	9,342	11,781	13,442	15,987	18,307	21,161	23,209
11	3,053	3,609	4,575	5,578	6,989	8,148	10,341	12,899	14,631	17,275	19,675	22,618	24,725
12	3,571	4,178	5,226	6,304	7,807	9,034	11,340	14,011	15,812	18,549	21,026	24,054	26,217
13	4,107	4,765	5,892	7,042	8,634	9,926	12,340	15,119	16,985	19,812	22,362	25,472	27,688
14	4,660	5,368	6,571	7,790	9,467	10,821	13,339	16,222	18,151	21,064	23,685	26,873	29,141
15	5,229	5,985	7,261	8,547	10,307	11,721	14,339	17,322	19,311	22,307	24,996	28,259	30,578
16	5,812	6,614	7,962	9,312	11,152	12,624	15,338	18,418	20,465	23,542	26,296	29,633	32,000
17	6,408	7,255	8,672	10,085	12,002	13,531	16,338	19,511	21,615	24,769	27,587	30,995	33,409
18	7,015	7,906	9,390	10,865	12,857	14,440	17,338	20,601	22,760	25,989	28,869	32,346	34,805
19	7,633	8,567	10,117	11,651	13,716	15,352	18,338	21,689	23,900	27,204	30,144	33,687	36,191
20	8,260	9,237	10,851	12,443	14,578	16,266	19,337	22,775	25,038	28,412	31,410	35,020	37,566
21	8,897	9,915	11,591	13,240	15,445	17,182	20,337	23,858	26,171	29,615	32,671	36,343	38,932
22	9,542	10,600	12,338	14,041	16,314	18,101	21,337	24,939	27,301	30,813	33,924	37,659	40,289
23	10,196	11,293	13,091	14,848	17,187	19,021	22,337	26,018	28,429	32,007	35,172	38,968	41,638
24	10,856	11,992	13,848	15,659	18,062	19,943	23,337	27,096	29,553	33,196	36,415	40,270	42,980
25	11,524	12,697	14,611	16,473	18,940	20,867	24,337	28,172	30,675	34,382	37,652	41,566	44,314
26	12,198	13,409	15,379	17,292	19,820	21,792	25,336	29,246	31,795	35,563	38,885	42,056	45,642
27	12,879	14,125	16,151	18,114	20,703	22,719	26,336	30,319	32,912	36,741	40,113	44,140	46,963
28	13,565	14,847	16,928	18,939	21,588	23,647	27,336	31,391	34,027	37,916	41,337	45,419	48,278
29	14,256	15,574	17,708	19,768	22,475	24,577	28,336	32,461	35,139	39,087	42,557	46,693	49,588
30	14,953	16,306	18,493	20,599	23,364	25,508	29,336	33,530	36,250	40,256	43,773	47,962	50,892

Para grados de libertad mayores de 30, se puede utilizar la expresión $\sqrt{2\chi^2} - \sqrt{2n'} - 1$ como desviación aleatoria normal con variancia unidad, en donde n' es el número de grados de libertad.

Tabla III. -- Áreas de una distribución normal tipificada.

Una entrada en la tabla es la proporción que, del área total bajo la curva, está comprendida entre $z = 0$ y un valor positivo de z . Las áreas para valores negativos de z se obtienen por simetría.



z	0,00	0,01	0,02	0,03	0,04	0,05	0,06	0,07	0,08	0,09
0,0	0,0000	0,0040	0,0080	0,0120	0,0160	0,0199	0,0239	0,0279	0,0319	0,0359
0,1	0,0398	0,0438	0,0478	0,0517	0,0557	0,0596	0,0636	0,0675	0,0714	0,0753
0,2	0,0793	0,0832	0,0871	0,0910	0,0948	0,0987	0,1026	0,1064	0,1103	0,1141
0,3	0,1179	0,1217	0,1255	0,1293	0,1331	0,1368	0,1406	0,1443	0,1480	0,1517
0,4	0,1554	0,1591	0,1628	0,1664	0,1700	0,1736	0,1772	0,1808	0,1844	0,1879
0,5	0,1915	0,1950	0,1985	0,2019	0,2054	0,2088	0,2123	0,2157	0,2190	0,2224
0,6	0,2257	0,2291	0,2324	0,2357	0,2389	0,2422	0,2454	0,2486	0,2517	0,2549
0,7	0,2580	0,2611	0,2642	0,2673	0,2703	0,2734	0,2764	0,2794	0,2823	0,2852
0,8	0,2881	0,2910	0,2939	0,2967	0,2995	0,3023	0,3051	0,3078	0,3106	0,3133
0,9	0,3159	0,3186	0,3212	0,3238	0,3264	0,3289	0,3315	0,3340	0,3365	0,3389
1,0	0,3413	0,3438	0,3461	0,3485	0,3508	0,3531	0,3554	0,3577	0,3599	0,3621
1,1	0,3643	0,3665	0,3686	0,3708	0,3729	0,3749	0,3770	0,3790	0,3810	0,3830
1,2	0,3849	0,3869	0,3888	0,3907	0,3925	0,3944	0,3962	0,3980	0,3997	0,4015
1,3	0,4032	0,4049	0,4066	0,4082	0,4099	0,4115	0,4131	0,4147	0,4162	0,4177
1,4	0,4192	0,4207	0,4222	0,4236	0,4251	0,4265	0,4279	0,4292	0,4306	0,4319
1,5	0,4332	0,4345	0,4357	0,4370	0,4382	0,4394	0,4406	0,4418	0,4429	0,4441
1,6	0,4452	0,4463	0,4474	0,4484	0,4495	0,4505	0,4515	0,4525	0,4535	0,4545
1,7	0,4554	0,4564	0,4573	0,4582	0,4591	0,4599	0,4608	0,4616	0,4625	0,4633
1,8	0,4641	0,4649	0,4656	0,4664	0,4671	0,4678	0,4686	0,4693	0,4699	0,4706
1,9	0,4713	0,4719	0,4726	0,4732	0,4738	0,4744	0,4750	0,4756	0,4761	0,4767
2,0	0,4772	0,4778	0,4783	0,4788	0,4793	0,4798	0,4803	0,4808	0,4812	0,4817
2,1	0,4821	0,4826	0,4830	0,4834	0,4838	0,4842	0,4846	0,4850	0,4854	0,4857
2,2	0,4861	0,4864	0,4868	0,4871	0,4875	0,4878	0,4881	0,4884	0,4887	0,4890
2,3	0,4893	0,4896	0,4898	0,4901	0,4904	0,4906	0,4909	0,4911	0,4913	0,4916
2,4	0,4918	0,4920	0,4922	0,4925	0,4927	0,4929	0,4931	0,4932	0,4934	0,4936
2,5	0,4938	0,4940	0,4941	0,4943	0,4945	0,4946	0,4948	0,4949	0,4951	0,4952
2,6	0,4953	0,4955	0,4956	0,4957	0,4959	0,4960	0,4961	0,4962	0,4963	0,4964
2,7	0,4965	0,4966	0,4967	0,4968	0,4969	0,4970	0,4971	0,4972	0,4973	0,4974
2,8	0,4974	0,4975	0,4976	0,4977	0,4977	0,4978	0,4979	0,4979	0,4980	0,4981
2,9	0,4981	0,4982	0,4982	0,4983	0,4984	0,4984	0,4985	0,4985	0,4986	0,4986
3,0	0,4987	0,4987	0,4987	0,4988	0,4988	0,4989	0,4989	0,4989	0,4990	0,4990

Tabla IV.- Puntos críticos $\chi^2_{v,\gamma}$ para la distribución chi-cuadrado con v grados de libertad.

$\gamma = P\{Y_v \leq \chi^2_{v,\gamma}\}$, donde Y_v tiene una distribución chi-cuadrado con v grados de libertad.

ν	γ						
	0.250	0.500	0.750	0.900	0.950	0.975	0.990
1	0.102	0.455	1.323	2.706	3.841	5.024	6.635
2	0.575	1.386	2.773	4.605	5.991	7.378	9.210
3	1.213	2.366	4.108	6.251	7.815	9.348	11.345
4	1.923	3.357	5.385	7.779	9.488	11.143	13.277
5	2.675	4.351	6.626	9.236	11.070	12.833	15.086
6	3.455	5.348	7.841	10.645	12.592	14.449	16.812
7	4.255	6.346	9.037	12.017	14.067	16.013	18.475
8	5.071	7.344	10.219	13.362	15.507	17.535	20.090
9	5.899	8.343	11.389	14.684	16.919	19.023	21.666
10	6.737	9.342	12.549	15.987	18.307	20.483	23.209
11	7.584	10.341	13.701	17.275	19.675	21.920	24.725
12	8.438	11.340	14.845	18.549	21.026	23.337	26.217
13	9.299	12.340	15.984	19.812	22.362	24.736	27.688
14	10.165	13.339	17.117	21.064	23.685	26.119	29.141
15	11.037	14.339	18.245	22.307	24.996	27.488	30.578
16	11.912	15.338	19.369	23.542	26.296	28.845	32.000
17	12.792	16.338	20.489	24.769	27.587	30.191	33.409
18	13.675	17.338	21.605	25.989	28.869	31.526	34.805
19	14.562	18.338	22.718	27.204	30.144	32.852	36.191
20	15.452	19.337	23.828	28.412	31.410	34.170	37.566
21	16.344	20.337	24.935	29.615	32.671	35.479	38.932
22	17.240	21.337	26.039	30.813	33.924	36.781	40.289
23	18.137	22.337	27.141	32.007	35.172	38.076	41.638
24	19.037	23.337	28.241	33.196	36.415	39.364	42.980
25	19.939	24.337	29.339	34.382	37.652	40.646	44.314
26	20.843	25.336	30.435	35.563	38.885	41.923	45.642
27	21.749	26.336	31.528	36.741	40.113	43.195	46.963
28	22.657	27.336	32.620	37.916	41.337	44.461	48.278
29	23.567	28.336	33.711	39.087	42.557	45.722	49.588
30	24.478	29.336	34.800	40.256	43.773	46.979	50.892
40	33.660	39.335	45.616	51.805	55.758	59.342	63.691
50	42.942	49.335	56.334	63.167	67.505	71.420	76.154
75	66.417	74.334	82.858	91.061	96.217	100.839	106.393
100	90.133	99.334	109.141	118.498	124.342	129.561	135.807

Para $n \geq 50$: $\chi^2_{v,\gamma} \approx \frac{1}{2}(z_\gamma + \sqrt{2v-1})^2$

APÉNDICE: La función gamma

$$\Gamma(x) = \int_0^{\infty} t^{x-1} e^{-t} dt \quad \text{para } 1 \leq x \leq 2$$

Para poder obtener valores adicionales, empléese la fórmula: $[\Gamma(x+1) = x\Gamma(x)]$

x	$\Gamma(x)$
1,00	1,00000
1,01	0,99433
1,02	0,98884
1,03	0,98355
1,04	0,97844
1,05	0,97350
1,06	0,96874
1,07	0,96415
1,08	0,95973
1,09	0,95546
1,10	0,95135
1,11	0,94740
1,12	0,94359
1,13	0,93993
1,14	0,93642
1,15	0,93304
1,16	0,92980
1,17	0,92670
1,18	0,92373
1,19	0,92089
1,20	0,91817
1,21	0,91558
1,22	0,91311
1,23	0,91075
1,24	0,90852
1,25	0,90640
1,26	0,90440
1,27	0,90250
1,28	0,90072
1,29	0,89904
1,30	0,89747
1,31	0,89600
1,32	0,89464
1,33	0,89338
1,34	0,89222
1,35	0,89115
1,36	0,89018
1,37	0,88931
1,38	0,88854
1,39	0,88785
1,40	0,88726
1,41	0,88676
1,42	0,88636
1,43	0,88604
1,44	0,88581
1,45	0,88566
1,46	0,88560
1,47	0,88563
1,48	0,88575
1,49	0,88595
1,50	0,88623

x	$\Gamma(x)$
1,50	0,88623
1,51	0,88659
1,52	0,88704
1,53	0,88757
1,54	0,88818
1,55	0,88887
1,56	0,88964
1,57	0,89049
1,58	0,89142
1,59	0,89243
1,60	0,89352
1,61	0,89468
1,62	0,89592
1,63	0,89724
1,64	0,89864
1,65	0,90012
1,66	0,90167
1,67	0,90330
1,68	0,90500
1,69	0,90678
1,70	0,90864
1,71	0,91057
1,72	0,91258
1,73	0,91467
1,74	0,91683
1,75	0,91906
1,76	0,92137
1,77	0,92376
1,78	0,92623
1,79	0,92877
1,80	0,93138
1,81	0,93408
1,82	0,93685
1,83	0,93969
1,84	0,94261
1,85	0,94561
1,86	0,94869
1,87	0,95184
1,88	0,95507
1,89	0,95838
1,90	0,96177
1,91	0,96523
1,92	0,96877
1,93	0,97240
1,94	0,97610
1,95	0,97988
1,96	0,98374
1,97	0,98768
1,98	0,99171
1,99	0,99581
2,00	1,00000

DEFINICIÓN DE LA FUNCIÓN GAMMA

$$\Gamma(n) = \int_0^{\infty} t^{n-1} e^{-t} dt \quad n > 0$$

FÓRMULA DE RECURRENCIA

$$\Gamma(n+1) = n\Gamma(n)$$

$$\Gamma(n+1) = n! \quad \text{si } n = 0, 1, 2, \dots \quad \text{donde } 0! = 1$$

FUNCIÓN GAMMA PARA $n < 0$

Cuando $n < 0$, la función gamma se puede definir a partir de la fórmula de recurrencia como:

$$\Gamma(n) = \frac{\Gamma(n+1)}{n}$$

