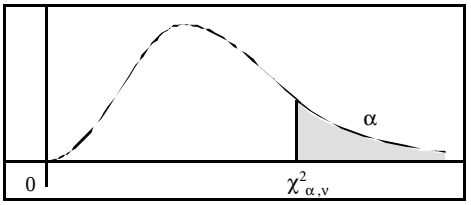
Universidad de Sevilla

Escuela Universitaria Politécnica

Departamento de Matemática Aplicada II

15	20	24	30	40	60	120	∞
9.49	9.58	9.63	9.67	9.71	9.76	9.80	9.85
3.41	3.43	3.43	3.44	3.45	3.46	3.47	3.48
2.46	2.46	2.46	2.47	2.47	2.47	2.47	2.47
2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08
1.89	1.88	1.88	1.88	1.88	1.87	1.87	1.87
1.76	1.76	1.75	1.75	1.75	1.74	1.74	1.74
1.68	1.67	1.67	1.66	1.66	1.65	1.65	1.65
1.62	1.61	1.60	1.60	1.59	1.59	1.58	1.58

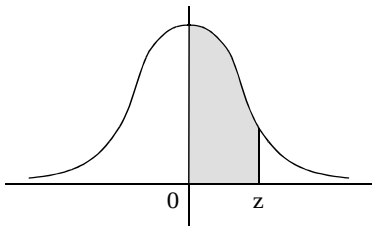
Asignatura Métodos Estadísticos de la Ingeniería



$$(\bar{x}_1 - \bar{x}_2) - t_{a/2,\mu}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} < m_1 - m_2 < (\bar{x}_1 - \bar{x}_2) + t_{a/2,\mu}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

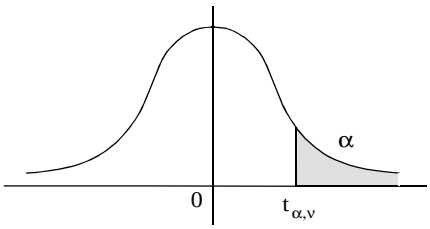
Formulario y tablas estadísticas

Áreas bajo la curva normal
tipificada desde **0** hasta **z**



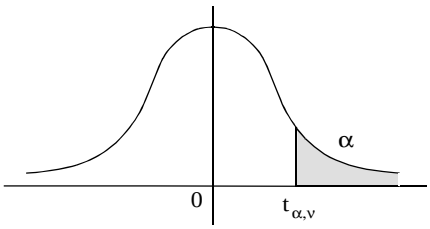
z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	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	0.2704	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
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.9	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

Valores críticos $t_{\alpha,v}$ de la distribución t de Student



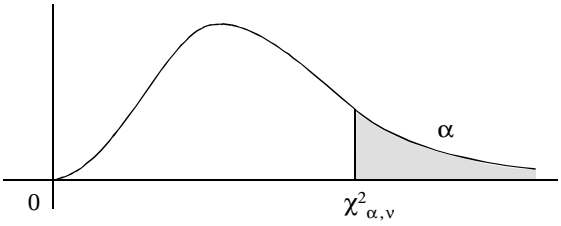
Número de grados de libertad (v)	Área de la cola (α)							
	0.4500	0.4000	0.3500	0.3000	0.2500	0.2000	0.1500	0.1000
1	0.1584	0.3249	0.5095	0.7265	1.0000	1.3764	1.9626	3.0777
2	0.1421	0.2887	0.4447	0.6172	0.8165	1.0607	1.3862	1.8856
3	0.1366	0.2767	0.4242	0.5844	0.7649	0.9785	1.2498	1.6377
4	0.1338	0.2707	0.4142	0.5686	0.7407	0.9410	1.1896	1.5332
5	0.1322	0.2672	0.4082	0.5594	0.7267	0.9195	1.1558	1.4759
6	0.1311	0.2648	0.4043	0.5534	0.7176	0.9057	1.1342	1.4398
7	0.1303	0.2632	0.4015	0.5491	0.7111	0.8960	1.1192	1.4149
8	0.1297	0.2619	0.3995	0.5459	0.7064	0.8889	1.1081	1.3968
9	0.1293	0.2610	0.3979	0.5435	0.7027	0.8834	1.0997	1.3830
10	0.1289	0.2602	0.3966	0.5415	0.6998	0.8791	1.0931	1.3722
11	0.1286	0.2596	0.3956	0.5399	0.6974	0.8755	1.0877	1.3634
12	0.1283	0.2590	0.3947	0.5386	0.6955	0.8726	1.0832	1.3562
13	0.1281	0.2586	0.3940	0.5375	0.6938	0.8702	1.0795	1.3502
14	0.1280	0.2582	0.3933	0.5366	0.6924	0.8681	1.0763	1.3450
15	0.1278	0.2579	0.3928	0.5357	0.6912	0.8662	1.0735	1.3406
16	0.1277	0.2576	0.3923	0.5350	0.6901	0.8647	1.0711	1.3368
17	0.1276	0.2573	0.3919	0.5344	0.6892	0.8633	1.0690	1.3334
18	0.1274	0.2571	0.3915	0.5338	0.6884	0.8620	1.0672	1.3304
19	0.1274	0.2569	0.3912	0.5333	0.6876	0.8610	1.0655	1.3277
20	0.1273	0.2567	0.3909	0.5329	0.6870	0.8600	1.0640	1.3253
21	0.1272	0.2566	0.3906	0.5325	0.6864	0.8591	1.0627	1.3232
22	0.1271	0.2564	0.3904	0.5321	0.6858	0.8583	1.0614	1.3212
23	0.1271	0.2563	0.3902	0.5317	0.6853	0.8575	1.0603	1.3195
24	0.1270	0.2562	0.3900	0.5314	0.6848	0.8569	1.0593	1.3178
25	0.1269	0.2561	0.3898	0.5312	0.6844	0.8562	1.0584	1.3163
26	0.1269	0.2560	0.3896	0.5309	0.6840	0.8557	1.0575	1.3150
27	0.1268	0.2559	0.3894	0.5306	0.6837	0.8551	1.0567	1.3137
28	0.1268	0.2558	0.3893	0.5304	0.6834	0.8546	1.0560	1.3125
29	0.1268	0.2557	0.3892	0.5302	0.6830	0.8542	1.0553	1.3114
30	0.1267	0.2556	0.3890	0.5300	0.6828	0.8538	1.0547	1.3104
32	0.1267	0.2555	0.3888	0.5297	0.6822	0.8530	1.0535	1.3086
34	0.1266	0.2553	0.3886	0.5294	0.6818	0.8523	1.0525	1.3070
36	0.1266	0.2552	0.3884	0.5291	0.6814	0.8517	1.0516	1.3055
38	0.1265	0.2551	0.3882	0.5288	0.6810	0.8512	1.0508	1.3042
40	0.1265	0.2550	0.3881	0.5286	0.6807	0.8507	1.0500	1.3031
45	0.1264	0.2549	0.3878	0.5281	0.6800	0.8497	1.0485	1.3007
50	0.1263	0.2547	0.3875	0.5278	0.6794	0.8489	1.0473	1.2987
60	0.1262	0.2545	0.3872	0.5272	0.6786	0.8477	1.0455	1.2958
90	0.1260	0.2541	0.3866	0.5263	0.6772	0.8456	1.0424	1.2910
120	0.1259	0.2539	0.3862	0.5258	0.6765	0.8446	1.0409	1.2886
∞	0.1257	0.2533	0.3853	0.5244	0.6745	0.8416	1.0364	1.2816

Valores críticos $t_{\alpha,\nu}$ de la distribución t de Student



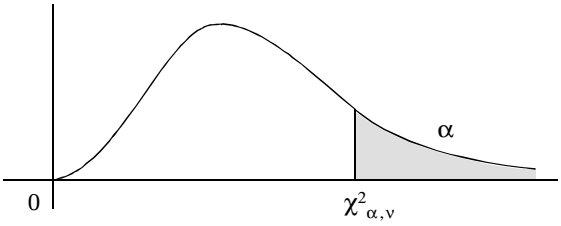
Número de grados de libertad (ν)	Área de la cola (α)							
	0.0500	0.0250	0.0125	0.0100	0.0050	0.0025	0.0010	0.0005
1	6.3137	12.7062	25.4519	31.8210	63.6559	127.3211	318.2888	636.5776
2	2.9200	4.3027	6.2054	6.9645	9.9250	14.0892	22.3285	31.5998
3	2.3534	3.1824	4.1765	4.5407	5.8408	7.4532	10.2143	12.9244
4	2.1318	2.7765	3.4954	3.7469	4.6041	5.5975	7.1729	8.6101
5	2.0150	2.5706	3.1634	3.3649	4.0321	4.7733	5.8935	6.8685
6	1.9432	2.4469	2.9687	3.1427	3.7074	4.3168	5.2075	5.9587
7	1.8946	2.3646	2.8412	2.9979	3.4995	4.0294	4.7853	5.4081
8	1.8595	2.3060	2.7515	2.8965	3.3554	3.8325	4.5008	5.0414
9	1.8331	2.2622	2.6850	2.8214	3.2498	3.6896	4.2969	4.7809
10	1.8125	2.2281	2.6338	2.7638	3.1693	3.5814	4.1437	4.5868
11	1.7959	2.2010	2.5931	2.7181	3.1058	3.4966	4.0248	4.4369
12	1.7823	2.1788	2.5600	2.6810	3.0545	3.4284	3.9296	4.3178
13	1.7709	2.1604	2.5326	2.6503	3.0123	3.3725	3.8520	4.2209
14	1.7613	2.1448	2.5096	2.6245	2.9768	3.3257	3.7874	4.1403
15	1.7531	2.1315	2.4899	2.6025	2.9467	3.2860	3.7329	4.0728
16	1.7459	2.1199	2.4729	2.5835	2.9208	3.2520	3.6861	4.0149
17	1.7396	2.1098	2.4581	2.5669	2.8982	3.2224	3.6458	3.9651
18	1.7341	2.1009	2.4450	2.5524	2.8784	3.1966	3.6105	3.9217
19	1.7291	2.0930	2.4334	2.5395	2.8609	3.1737	3.5793	3.8833
20	1.7247	2.0860	2.4231	2.5280	2.8453	3.1534	3.5518	3.8496
21	1.7207	2.0796	2.4138	2.5176	2.8314	3.1352	3.5271	3.8193
22	1.7171	2.0739	2.4055	2.5083	2.8188	3.1188	3.5050	3.7922
23	1.7139	2.0687	2.3979	2.4999	2.8073	3.1040	3.4850	3.7676
24	1.7109	2.0639	2.3910	2.4922	2.7970	3.0905	3.4668	3.7454
25	1.7081	2.0595	2.3846	2.4851	2.7874	3.0782	3.4502	3.7251
26	1.7056	2.0555	2.3788	2.4786	2.7787	3.0669	3.4350	3.7067
27	1.7033	2.0518	2.3734	2.4727	2.7707	3.0565	3.4210	3.6895
28	1.7011	2.0484	2.3685	2.4671	2.7633	3.0470	3.4082	3.6739
29	1.6991	2.0452	2.3638	2.4620	2.7564	3.0380	3.3963	3.6595
30	1.6973	2.0423	2.3596	2.4573	2.7500	3.0298	3.3852	3.6460
32	1.6939	2.0369	2.3518	2.4487	2.7385	3.0149	3.3653	3.6218
34	1.6909	2.0322	2.3451	2.4411	2.7284	3.0020	3.3480	3.6007
36	1.6883	2.0281	2.3391	2.4345	2.7195	2.9905	3.3326	3.5821
38	1.6860	2.0244	2.3337	2.4286	2.7116	2.9803	3.3190	3.5657
40	1.6839	2.0211	2.3289	2.4233	2.7045	2.9712	3.3069	3.5510
45	1.6794	2.0141	2.3189	2.4121	2.6896	2.9521	3.2815	3.5203
50	1.6759	2.0086	2.3109	2.4033	2.6778	2.9370	3.2614	3.4960
60	1.6706	2.0003	2.2990	2.3901	2.6603	2.9146	3.2317	3.4602
90	1.6620	1.9867	2.2795	2.3685	2.6316	2.8779	3.1832	3.4019
120	1.6576	1.9799	2.2699	2.3578	2.6174	2.8599	3.1595	3.3734
∞	1.6449	1.9600	2.2414	2.3264	2.5758	2.8070	3.0902	3.2905

Valores críticos $\chi^2_{\alpha,\nu}$
de la distribución ji-cuadrado



Número de grados de libertad (ν)	Área de la cola (α)							
	0.995	0.990	0.975	0.950	0.900	0.800	0.700	0.500
1	0.00	0.00	0.00	0.00	0.02	0.06	0.15	0.45
2	0.01	0.02	0.05	0.10	0.21	0.45	0.71	1.39
3	0.07	0.11	0.22	0.35	0.58	1.01	1.42	2.37
4	0.21	0.30	0.48	0.71	1.06	1.65	2.19	3.36
5	0.41	0.55	0.83	1.15	1.61	2.34	3.00	4.35
6	0.68	0.87	1.24	1.64	2.20	3.07	3.83	5.35
7	0.99	1.24	1.69	2.17	2.83	3.82	4.67	6.35
8	1.34	1.65	2.18	2.73	3.49	4.59	5.53	7.34
9	1.73	2.09	2.70	3.33	4.17	5.38	6.39	8.34
10	2.16	2.56	3.25	3.94	4.87	6.18	7.27	9.34
11	2.60	3.05	3.82	4.57	5.58	6.99	8.15	10.34
12	3.07	3.57	4.40	5.23	6.30	7.81	9.03	11.34
13	3.57	4.11	5.01	5.89	7.04	8.63	9.93	12.34
14	4.07	4.66	5.63	6.57	7.79	9.47	10.82	13.34
15	4.60	5.23	6.26	7.26	8.55	10.31	11.72	14.34
16	5.14	5.81	6.91	7.96	9.31	11.15	12.62	15.34
17	5.70	6.41	7.56	8.67	10.09	12.00	13.53	16.34
18	6.26	7.01	8.23	9.39	10.86	12.86	14.44	17.34
19	6.84	7.63	8.91	10.12	11.65	13.72	15.35	18.34
20	7.43	8.26	9.59	10.85	12.44	14.58	16.27	19.34
21	8.03	8.90	10.28	11.59	13.24	15.44	17.18	20.34
22	8.64	9.54	10.98	12.34	14.04	16.31	18.10	21.34
23	9.26	10.20	11.69	13.09	14.85	17.19	19.02	22.34
24	9.89	10.86	12.40	13.85	15.66	18.06	19.94	23.34
25	10.52	11.52	13.12	14.61	16.47	18.94	20.87	24.34
26	11.16	12.20	13.84	15.38	17.29	19.82	21.79	25.34
27	11.81	12.88	14.57	16.15	18.11	20.70	22.72	26.34
28	12.46	13.56	15.31	16.93	18.94	21.59	23.65	27.34
29	13.12	14.26	16.05	17.71	19.77	22.48	24.58	28.34
30	13.79	14.95	16.79	18.49	20.60	23.36	25.51	29.34
40	20.71	22.16	24.43	26.51	29.05	32.34	34.87	39.34
50	27.99	29.71	32.36	34.76	37.69	41.45	44.31	49.33
60	35.53	37.48	40.48	43.19	46.46	50.64	53.81	59.33
70	43.28	45.44	48.76	51.74	55.33	59.90	63.35	69.33
80	51.17	53.54	57.15	60.39	64.28	69.21	72.92	79.33
90	59.20	61.75	65.65	69.13	73.29	78.56	82.51	89.33
100	67.33	70.06	74.22	77.93	82.36	87.95	92.13	99.33

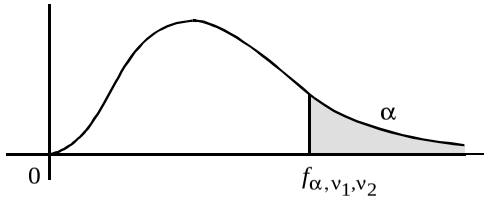
Valores críticos $\chi^2_{\alpha,\nu}$
de la distribución ji-cuadrado



Número de grados de libertad (ν)	Área de la cola (α)							
	0.300	0.200	0.100	0.050	0.025	0.010	0.005	0.001
1	1.07	1.64	2.71	3.84	5.02	6.63	7.88	10.83
2	2.41	3.22	4.61	5.99	7.38	9.21	10.60	13.82
3	3.66	4.64	6.25	7.81	9.35	11.34	12.84	16.27
4	4.88	5.99	7.78	9.49	11.14	13.28	14.86	18.47
5	6.06	7.29	9.24	11.07	12.83	15.09	16.75	20.51
6	7.23	8.56	10.64	12.59	14.45	16.81	18.55	22.46
7	8.38	9.80	12.02	14.07	16.01	18.48	20.28	24.32
8	9.52	11.03	13.36	15.51	17.53	20.09	21.95	26.12
9	10.66	12.24	14.68	16.92	19.02	21.67	23.59	27.88
10	11.78	13.44	15.99	18.31	20.48	23.21	25.19	29.59
11	12.90	14.63	17.28	19.68	21.92	24.73	26.76	31.26
12	14.01	15.81	18.55	21.03	23.34	26.22	28.30	32.91
13	15.12	16.98	19.81	22.36	24.74	27.69	29.82	34.53
14	16.22	18.15	21.06	23.68	26.12	29.14	31.32	36.12
15	17.32	19.31	22.31	25.00	27.49	30.58	32.80	37.70
16	18.42	20.47	23.54	26.30	28.85	32.00	34.27	39.25
17	19.51	21.61	24.77	27.59	30.19	33.41	35.72	40.79
18	20.60	22.76	25.99	28.87	31.53	34.81	37.16	42.31
19	21.69	23.90	27.20	30.14	32.85	36.19	38.58	43.82
20	22.77	25.04	28.41	31.41	34.17	37.57	40.00	45.31
21	23.86	26.17	29.62	32.67	35.48	38.93	41.40	46.80
22	24.94	27.30	30.81	33.92	36.78	40.29	42.80	48.27
23	26.02	28.43	32.01	35.17	38.08	41.64	44.18	49.73
24	27.10	29.55	33.20	36.42	39.36	42.98	45.56	51.18
25	28.17	30.68	34.38	37.65	40.65	44.31	46.93	52.62
26	29.25	31.79	35.56	38.89	41.92	45.64	48.29	54.05
27	30.32	32.91	36.74	40.11	43.19	46.96	49.65	55.48
28	31.39	34.03	37.92	41.34	44.46	48.28	50.99	56.89
29	32.46	35.14	39.09	42.56	45.72	49.59	52.34	58.30
30	33.53	36.25	40.26	43.77	46.98	50.89	53.67	59.70
40	44.16	47.27	51.81	55.76	59.34	63.69	66.77	73.40
50	54.72	58.16	63.17	67.50	71.42	76.15	79.49	86.66
60	65.23	68.97	74.40	79.08	83.30	88.38	91.95	99.61
70	75.69	79.71	85.53	90.53	95.02	100.43	104.21	112.32
80	86.12	90.41	96.58	101.88	106.63	112.33	116.32	124.84
90	96.52	101.05	107.57	113.15	118.14	124.12	128.30	137.21
100	106.91	111.67	118.50	124.34	129.56	135.81	140.17	149.45

Valores críticos $f_{\alpha,\nu1,\nu2}$ de la distribución F

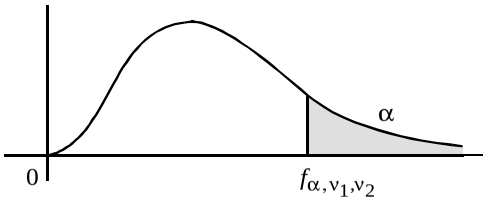
α= 0.25



Número de grados de libertad del denominador (ν_2)	Número de grados de libertad del numerador (ν_1)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	5.83	7.50	8.20	8.58	8.82	8.98	9.10	9.19	9.26	9.32	9.41	9.49	9.58	9.63	9.67	9.71	9.76	9.80	9.85
2	2.57	3.00	3.15	3.23	3.28	3.31	3.34	3.35	3.37	3.38	3.39	3.41	3.43	3.43	3.44	3.45	3.46	3.47	3.48
3	2.02	2.28	2.36	2.39	2.41	2.42	2.43	2.44	2.44	2.44	2.45	2.46	2.46	2.46	2.47	2.47	2.47	2.47	2.47
4	1.81	2.00	2.05	2.06	2.07	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08
5	1.69	1.85	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.88	1.88	1.88	1.88	1.87	1.87	1.87
6	1.62	1.76	1.78	1.79	1.79	1.78	1.78	1.78	1.77	1.77	1.77	1.76	1.76	1.75	1.75	1.75	1.74	1.74	1.74
7	1.57	1.70	1.72	1.72	1.71	1.71	1.70	1.70	1.69	1.69	1.68	1.68	1.67	1.67	1.66	1.66	1.65	1.65	1.65
8	1.54	1.66	1.67	1.66	1.66	1.65	1.64	1.64	1.63	1.63	1.62	1.62	1.61	1.60	1.60	1.59	1.59	1.58	1.58
9	1.51	1.62	1.63	1.63	1.62	1.61	1.60	1.60	1.59	1.59	1.58	1.57	1.56	1.56	1.55	1.54	1.54	1.53	1.53
10	1.49	1.60	1.60	1.59	1.59	1.58	1.57	1.56	1.56	1.55	1.54	1.53	1.52	1.52	1.51	1.51	1.50	1.49	1.48
11	1.47	1.58	1.58	1.57	1.56	1.55	1.54	1.53	1.53	1.52	1.51	1.50	1.49	1.49	1.48	1.47	1.47	1.46	1.45
12	1.46	1.56	1.56	1.55	1.54	1.53	1.52	1.51	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.45	1.44	1.43	1.42
13	1.45	1.55	1.55	1.53	1.52	1.51	1.50	1.49	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.42	1.41	1.40
14	1.44	1.53	1.53	1.52	1.51	1.50	1.49	1.48	1.47	1.46	1.45	1.44	1.43	1.42	1.41	1.41	1.40	1.39	1.38
15	1.43	1.52	1.52	1.51	1.49	1.48	1.47	1.46	1.46	1.45	1.44	1.43	1.41	1.41	1.40	1.39	1.38	1.37	1.36
16	1.42	1.51	1.51	1.50	1.48	1.47	1.46	1.45	1.44	1.44	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34
17	1.42	1.51	1.50	1.49	1.47	1.46	1.45	1.44	1.43	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33
18	1.41	1.50	1.49	1.48	1.46	1.45	1.44	1.43	1.42	1.42	1.40	1.39	1.38	1.37	1.36	1.35	1.34	1.33	1.32
19	1.41	1.49	1.49	1.47	1.46	1.44	1.43	1.42	1.41	1.41	1.40	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.30
20	1.40	1.49	1.48	1.47	1.45	1.44	1.43	1.42	1.41	1.40	1.39	1.37	1.36	1.35	1.34	1.33	1.32	1.31	1.29
21	1.40	1.48	1.48	1.46	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.35	1.34	1.33	1.32	1.31	1.30	1.28
22	1.40	1.48	1.47	1.45	1.44	1.42	1.41	1.40	1.39	1.39	1.37	1.36	1.34	1.33	1.32	1.31	1.30	1.29	1.28
23	1.39	1.47	1.47	1.45	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.35	1.34	1.33	1.32	1.31	1.30	1.28	1.27
24	1.39	1.47	1.46	1.44	1.43	1.41	1.40	1.39	1.38	1.38	1.36	1.35	1.33	1.32	1.31	1.30	1.29	1.28	1.26
25	1.39	1.47	1.46	1.44	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.34	1.33	1.32	1.31	1.29	1.28	1.27	1.25
26	1.38	1.46	1.45	1.44	1.42	1.41	1.39	1.38	1.37	1.37	1.35	1.34	1.32	1.31	1.30	1.29	1.28	1.26	1.25
27	1.38	1.46	1.45	1.43	1.42	1.40	1.39	1.38	1.37	1.36	1.35	1.33	1.32	1.31	1.30	1.28	1.27	1.26	1.24
28	1.38	1.46	1.45	1.43	1.41	1.40	1.39	1.38	1.37	1.36	1.34	1.33	1.31	1.30	1.29	1.28	1.27	1.25	1.24
29	1.38	1.45	1.45	1.43	1.41	1.40	1.38	1.37	1.36	1.35	1.34	1.32	1.31	1.30	1.29	1.27	1.26	1.25	1.23
30	1.38	1.45	1.44	1.42	1.41	1.39	1.38	1.37	1.36	1.35	1.34	1.32	1.30	1.29	1.28	1.27	1.26	1.24	1.23
40	1.36	1.44	1.42	1.40	1.39	1.37	1.36	1.35	1.34	1.33	1.31	1.30	1.28	1.26	1.25	1.24	1.22	1.21	1.19
60	1.35	1.42	1.41	1.38	1.37	1.35	1.33	1.32	1.31	1.30	1.29	1.27	1.25	1.24	1.22	1.21	1.19	1.17	1.15
120	1.34	1.40	1.39	1.37	1.35	1.33	1.31	1.30	1.29	1.28	1.26	1.24	1.22	1.21	1.19	1.18	1.16	1.13	1.10
∞	1.32	1.39	1.37	1.35	1.33	1.31	1.29	1.28	1.27	1.25	1.24	1.22	1.19	1.18	1.16	1.14	1.12	1.08	1.00

Valores críticos $f_{\alpha,\nu1,\nu2}$ de la distribución F

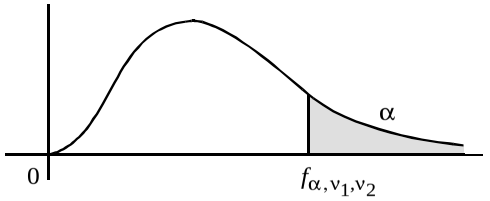
α= 0.1



Número de grados de libertad del denominador (ν_2)	Número de grados de libertad del numerador (ν_1)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	39.86	49.50	53.59	55.83	57.24	58.20	58.91	59.44	59.86	60.19	60.71	61.22	61.74	62.00	62.26	62.53	62.79	63.06	63.33
2	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38	9.39	9.41	9.42	9.44	9.45	9.46	9.47	9.47	9.48	9.49
3	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24	5.23	5.22	5.20	5.18	5.18	5.17	5.16	5.15	5.14	5.13
4	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94	3.92	3.90	3.87	3.84	3.83	3.82	3.80	3.79	3.78	3.76
5	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32	3.30	3.27	3.24	3.21	3.19	3.17	3.16	3.14	3.12	3.11
6	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96	2.94	2.90	2.87	2.84	2.82	2.80	2.78	2.76	2.74	2.72
7	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72	2.70	2.67	2.63	2.59	2.58	2.56	2.54	2.51	2.49	2.47
8	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56	2.54	2.50	2.46	2.42	2.40	2.38	2.36	2.34	2.32	2.29
9	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44	2.42	2.38	2.34	2.30	2.28	2.25	2.23	2.21	2.18	2.16
10	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35	2.32	2.28	2.24	2.20	2.18	2.16	2.13	2.11	2.08	2.06
11	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27	2.25	2.21	2.17	2.12	2.10	2.08	2.05	2.03	2.00	1.97
12	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21	2.19	2.15	2.10	2.06	2.04	2.01	1.99	1.96	1.93	1.90
13	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16	2.14	2.10	2.05	2.01	1.98	1.96	1.93	1.90	1.88	1.85
14	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12	2.10	2.05	2.01	1.96	1.94	1.91	1.89	1.86	1.83	1.80
15	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09	2.06	2.02	1.97	1.92	1.90	1.87	1.85	1.82	1.79	1.76
16	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06	2.03	1.99	1.94	1.89	1.87	1.84	1.81	1.78	1.75	1.72
17	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03	2.00	1.96	1.91	1.86	1.84	1.81	1.78	1.75	1.72	1.69
18	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00	1.98	1.93	1.89	1.84	1.81	1.78	1.75	1.72	1.69	1.66
19	2.99	2.61	2.40	2.27	2.18	2.11	2.06	2.02	1.98	1.96	1.91	1.86	1.81	1.79	1.76	1.73	1.70	1.67	1.63
20	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96	1.94	1.89	1.84	1.79	1.77	1.74	1.71	1.68	1.64	1.61
21	2.96	2.57	2.36	2.23	2.14	2.08	2.02	1.98	1.95	1.92	1.87	1.83	1.78	1.75	1.72	1.69	1.66	1.62	1.59
22	2.95	2.56	2.35	2.22	2.13	2.06	2.01	1.97	1.93	1.90	1.86	1.81	1.76	1.73	1.70	1.67	1.64	1.60	1.57
23	2.94	2.55	2.34	2.21	2.11	2.05	1.99	1.95	1.92	1.89	1.84	1.80	1.74	1.72	1.69	1.66	1.62	1.59	1.55
24	2.93	2.54	2.33	2.19	2.10	2.04	1.98	1.94	1.91	1.88	1.83	1.78	1.73	1.70	1.67	1.64	1.61	1.57	1.53
25	2.92	2.53	2.32	2.18	2.09	2.02	1.97	1.93	1.89	1.87	1.82	1.77	1.72	1.69	1.66	1.63	1.59	1.56	1.52
26	2.91	2.52	2.31	2.17	2.08	2.01	1.96	1.92	1.88	1.86	1.81	1.76	1.71	1.68	1.65	1.61	1.58	1.54	1.50
27	2.90	2.51	2.30	2.17	2.07	2.00	1.95	1.91	1.87	1.85	1.80	1.75	1.70	1.67	1.64	1.60	1.57	1.53	1.49
28	2.89	2.50	2.29	2.16	2.06	2.00	1.94	1.90	1.87	1.84	1.79	1.74	1.69	1.66	1.63	1.59	1.56	1.52	1.48
29	2.89	2.50	2.28	2.15	2.06	1.99	1.93	1.89	1.86	1.83	1.78	1.73	1.68	1.65	1.62	1.58	1.55	1.51	1.47
30	2.88	2.49	2.28	2.14	2.05	1.98	1.93	1.88	1.85	1.82	1.77	1.72	1.67	1.64	1.61	1.57	1.54	1.50	1.46
40	2.84	2.44	2.23	2.09	2.00	1.93	1.87	1.83	1.79	1.76	1.71	1.66	1.61	1.57	1.54	1.51	1.47	1.42	1.38
60	2.79	2.39	2.18	2.04	1.95	1.87	1.82	1.77	1.74	1.71	1.66	1.60	1.54	1.51	1.48	1.44	1.40	1.35	1.29
120	2.75	2.35	2.13	1.99	1.90	1.82	1.77	1.72	1.68	1.65	1.60	1.55	1.48	1.45	1.41	1.37	1.32	1.26	1.19
∞	2.71	2.30	2.08	1.94	1.85	1.77	1.72	1.67	1.63	1.60	1.55	1.49	1.42	1.38	1.34	1.30	1.24	1.17	1.00

Valores críticos $f_{\alpha,\nu1,\nu2}$ de la distribución F

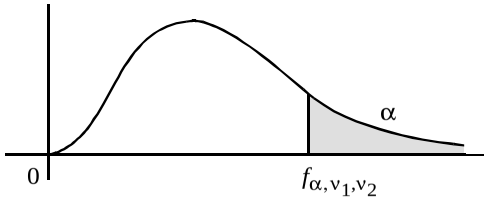
α= 0.05



Número de grados de libertad del denominador (ν_2)	Número de grados de libertad del numerador (ν_1)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.90	245.95	248.02	249.05	250.10	251.14	252.20	253.25	254.32
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.37
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00

Valores críticos $f_{\alpha,v1,v2}$ de la distribución F

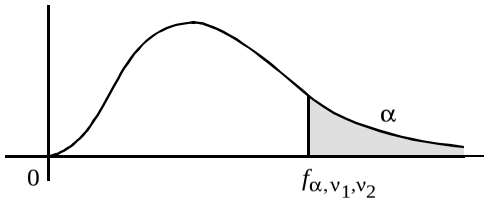
α= 0.025



Número de grados de libertad del denominador (ν_2)	Número de grados de libertad del numerador (ν_1)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	647.79	799.48	864.15	899.60	921.83	937.11	948.20	956.64	963.28	968.63	976.72	984.87	993.08	997.27	1001.40	1005.60	1009.79	1014.04	1018.26
2	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39	39.40	39.41	39.43	39.45	39.46	39.46	39.47	39.48	39.49	39.50
3	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47	14.42	14.34	14.25	14.17	14.12	14.08	14.04	13.99	13.95	13.90
4	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.75	8.66	8.56	8.51	8.46	8.41	8.36	8.31	8.26
5	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68	6.62	6.52	6.43	6.33	6.28	6.23	6.18	6.12	6.07	6.02
6	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.37	5.27	5.17	5.12	5.07	5.01	4.96	4.90	4.85
7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.67	4.57	4.47	4.41	4.36	4.31	4.25	4.20	4.14
8	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.20	4.10	4.00	3.95	3.89	3.84	3.78	3.73	3.67
9	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.87	3.77	3.67	3.61	3.56	3.51	3.45	3.39	3.33
10	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.62	3.52	3.42	3.37	3.31	3.26	3.20	3.14	3.08
11	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.43	3.33	3.23	3.17	3.12	3.06	3.00	2.94	2.88
12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.28	3.18	3.07	3.02	2.96	2.91	2.85	2.79	2.72
13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.15	3.05	2.95	2.89	2.84	2.78	2.72	2.66	2.60
14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.05	2.95	2.84	2.79	2.73	2.67	2.61	2.55	2.49
15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	2.96	2.86	2.76	2.70	2.64	2.59	2.52	2.46	2.40
16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.89	2.79	2.68	2.63	2.57	2.51	2.45	2.38	2.32
17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.82	2.72	2.62	2.56	2.50	2.44	2.38	2.32	2.25
18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.77	2.67	2.56	2.50	2.44	2.38	2.32	2.26	2.19
19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.72	2.62	2.51	2.45	2.39	2.33	2.27	2.20	2.13
20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.68	2.57	2.46	2.41	2.35	2.29	2.22	2.16	2.09
21	5.83	4.42	3.82	3.48	3.25	3.09	2.97	2.87	2.80	2.73	2.64	2.53	2.42	2.37	2.31	2.25	2.18	2.11	2.04
22	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76	2.70	2.60	2.50	2.39	2.33	2.27	2.21	2.14	2.08	2.00
23	5.75	4.35	3.75	3.41	3.18	3.02	2.90	2.81	2.73	2.67	2.57	2.47	2.36	2.30	2.24	2.18	2.11	2.04	1.97
24	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70	2.64	2.54	2.44	2.33	2.27	2.21	2.15	2.08	2.01	1.94
25	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68	2.61	2.51	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91
26	5.66	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65	2.59	2.49	2.39	2.28	2.22	2.16	2.09	2.03	1.95	1.88
27	5.63	4.24	3.65	3.31	3.08	2.92	2.80	2.71	2.63	2.57	2.47	2.36	2.25	2.19	2.13	2.07	2.00	1.93	1.85
28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	2.69	2.61	2.55	2.45	2.34	2.23	2.17	2.11	2.05	1.98	1.91	1.83
29	5.59	4.20	3.61	3.27	3.04	2.88	2.76	2.67	2.59	2.53	2.43	2.32	2.21	2.15	2.09	2.03	1.96	1.89	1.81
30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.41	2.31	2.20	2.14	2.07	2.01	1.94	1.87	1.79
40	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.29	2.18	2.07	2.01	1.94	1.88	1.80	1.72	1.64
60	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.17	2.06	1.94	1.88	1.82	1.74	1.67	1.58	1.48
120	5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22	2.16	2.05	1.94	1.82	1.76	1.69	1.61	1.53	1.43	1.31
∞	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.94	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00

Valores críticos $f_{\alpha,\nu1,\nu2}$ de la distribución F

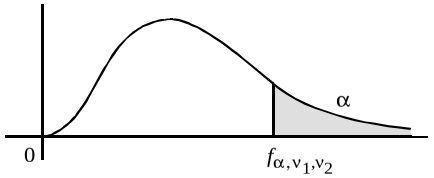
$\alpha = 0.01$



Número de grados de libertad del denominador (ν_2)	Número de grados de libertad del numerador (ν_1)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	4052.18	4999.34	5403.53	5624.26	5763.96	5858.95	5928.33	5980.95	6022.40	6055.93	6106.68	6156.97	6208.66	6234.27	6260.35	6286.43	6312.97	6339.51	6365.59
2	98.50	99.00	99.16	99.25	99.30	99.33	99.36	99.38	99.39	99.40	99.42	99.43	99.45	99.46	99.47	99.48	99.48	99.49	99.50
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.34	27.23	27.05	26.87	26.69	26.60	26.50	26.41	26.32	26.22	26.13
4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55	14.37	14.20	14.02	13.93	13.84	13.75	13.65	13.56	13.46
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	9.89	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.02
6	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88
7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.47	6.31	6.16	6.07	5.99	5.91	5.82	5.74	5.65
8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86
9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.96	3.82	3.66	3.59	3.51	3.43	3.34	3.25	3.17
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.67	3.52	3.37	3.29	3.21	3.13	3.05	2.96	2.87
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.84	2.75
17	8.40	6.11	5.19	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.23	3.09	2.94	2.86	2.78	2.69	2.61	2.52	2.42
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35	3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18	3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13
27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15	3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12	3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09	3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.03
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.50	2.35	2.20	2.12	2.03	1.94	1.84	1.73	1.60
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38
∞	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00

Valores críticos $f_{\alpha,v1,v2}$ de la distribución F

α= 0.005



Número de grados de libertad del denominador (v_2)	Número de grados de libertad del numerador (v_1)																		
	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	∞
1	16212.46	19997.36	21614.13	22500.75	23055.82	23439.53	23715.20	23923.81	24091.45	24221.84	24426.73	24631.62	24836.51	24937.09	25041.40	25145.71	25253.74	25358.05	25466.08
2	198.50	199.01	199.16	199.24	199.30	199.33	199.36	199.38	199.39	199.39	199.42	199.43	199.45	199.45	199.48	199.48	199.48	199.49	199.51
3	55.55	49.80	47.47	46.20	45.39	44.84	44.43	44.13	43.88	43.68	43.39	43.08	42.78	42.62	42.47	42.31	42.15	41.99	41.83
4	31.33	26.28	24.26	23.15	22.46	21.98	21.62	21.35	21.14	20.97	20.70	20.44	20.17	20.03	19.89	19.75	19.61	19.47	19.32
5	22.78	18.31	16.53	15.56	14.94	14.51	14.20	13.96	13.77	13.62	13.38	13.15	12.90	12.78	12.66	12.53	12.40	12.27	12.14
6	18.63	14.54	12.92	12.03	11.46	11.07	10.79	10.57	10.39	10.25	10.03	9.81	9.59	9.47	9.36	9.24	9.12	9.00	8.88
7	16.24	12.40	10.88	10.05	9.52	9.16	8.89	8.68	8.51	8.38	8.18	7.97	7.75	7.64	7.53	7.42	7.31	7.19	7.08
8	14.69	11.04	9.60	8.81	8.30	7.95	7.69	7.50	7.34	7.21	7.01	6.81	6.61	6.50	6.40	6.29	6.18	6.06	5.95
9	13.61	10.11	8.72	7.96	7.47	7.13	6.88	6.69	6.54	6.42	6.23	6.03	5.83	5.73	5.62	5.52	5.41	5.30	5.19
10	12.83	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97	5.85	5.66	5.47	5.27	5.17	5.07	4.97	4.86	4.75	4.64
11	12.23	8.91	7.60	6.88	6.42	6.10	5.86	5.68	5.54	5.42	5.24	5.05	4.86	4.76	4.65	4.55	4.45	4.34	4.23
12	11.75	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20	5.09	4.91	4.72	4.53	4.43	4.33	4.23	4.12	4.01	3.90
13	11.37	8.19	6.93	6.23	5.79	5.48	5.25	5.08	4.94	4.82	4.64	4.46	4.27	4.17	4.07	3.97	3.87	3.76	3.65
14	11.06	7.92	6.68	6.00	5.56	5.26	5.03	4.86	4.72	4.60	4.43	4.25	4.06	3.96	3.86	3.76	3.66	3.55	3.44
15	10.80	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54	4.42	4.25	4.07	3.88	3.79	3.69	3.59	3.48	3.37	3.26
16	10.58	7.51	6.30	5.64	5.21	4.91	4.69	4.52	4.38	4.27	4.10	3.92	3.73	3.64	3.54	3.44	3.33	3.22	3.11
17	10.38	7.35	6.16	5.50	5.07	4.78	4.56	4.39	4.25	4.14	3.97	3.79	3.61	3.51	3.41	3.31	3.21	3.10	2.98
18	10.22	7.21	6.03	5.37	4.96	4.66	4.44	4.28	4.14	4.03	3.86	3.68	3.50	3.40	3.30	3.20	3.10	2.99	2.87
19	10.07	7.09	5.92	5.27	4.85	4.56	4.34	4.18	4.04	3.93	3.76	3.59	3.40	3.31	3.21	3.11	3.00	2.89	2.78
20	9.94	6.99	5.82	5.17	4.76	4.47	4.26	4.09	3.96	3.85	3.68	3.50	3.32	3.22	3.12	3.02	2.92	2.81	2.69
21	9.83	6.89	5.73	5.09	4.68	4.39	4.18	4.01	3.88	3.77	3.60	3.43	3.24	3.15	3.05	2.95	2.84	2.73	2.61
22	9.73	6.81	5.65	5.02	4.61	4.32	4.11	3.94	3.81	3.70	3.54	3.36	3.18	3.08	2.98	2.88	2.77	2.66	2.55
23	9.63	6.73	5.58	4.95	4.54	4.26	4.05	3.88	3.75	3.64	3.47	3.30	3.12	3.02	2.92	2.82	2.71	2.60	2.48
24	9.55	6.66	5.52	4.89	4.49	4.20	3.99	3.83	3.69	3.59	3.42	3.25	3.06	2.97	2.87	2.77	2.66	2.55	2.43
25	9.48	6.60	5.46	4.84	4.43	4.15	3.94	3.78	3.64	3.54	3.37	3.20	3.01	2.92	2.82	2.72	2.61	2.50	2.38
26	9.41	6.54	5.41	4.79	4.38	4.10	3.89	3.73	3.60	3.49	3.33	3.15	2.97	2.87	2.77	2.67	2.56	2.45	2.33
27	9.34	6.49	5.36	4.74	4.34	4.06	3.85	3.69	3.56	3.45	3.28	3.11	2.93	2.83	2.73	2.63	2.52	2.41	2.29
28	9.28	6.44	5.32	4.70	4.30	4.02	3.81	3.65	3.52	3.41	3.25	3.07	2.89	2.79	2.69	2.59	2.48	2.37	2.25
29	9.23	6.40	5.28	4.66	4.26	3.98	3.77	3.61	3.48	3.38	3.21	3.04	2.86	2.76	2.66	2.56	2.45	2.33	2.21
30	9.18	6.35	5.24	4.62	4.23	3.95	3.74	3.58	3.45	3.34	3.18	3.01	2.82	2.73	2.63	2.52	2.42	2.30	2.18
40	8.83	6.07	4.98	4.37	3.99	3.71	3.51	3.35	3.22	3.12	2.95	2.78	2.60	2.50	2.40	2.30	2.18	2.06	1.93
60	8.49	5.79	4.73	4.14	3.76	3.49	3.29	3.13	3.01	2.90	2.74	2.57	2.39	2.29	2.19	2.08	1.96	1.83	1.69
120	8.18	5.54	4.50	3.92	3.55	3.28	3.09	2.93	2.81	2.71	2.54	2.37	2.19	2.09	1.98	1.87	1.75	1.61	1.43
∞	7.88	5.30	4.28	3.72	3.35	3.09	2.90	2.74	2.62	2.52	2.36	2.19	2.00	1.90	1.79	1.67	1.53	1.36	1.01

Intervalos de confianza al 100(1-α) %

Distribución	Parámetro	Casos	Intervalo
$\mathcal{N}(\mu,\sigma)$	μ	σ conocida	$\bar{X} \pm z_{\frac{\alpha}{2}} \dfrac{\sigma}{\sqrt{n}}$
		σ desconocida	$n<30 \quad \bar{X} \pm t_{\frac{\alpha}{2},n-1} \dfrac{S_c}{\sqrt{n}}$ | $n \geqslant 30 \quad \bar{X} \pm z_{\frac{\alpha}{2}} \dfrac{S_c}{\sqrt{n}}$
General ($n \geqslant 30$)	μ	σ conocida	$\bar{X} \pm z_{\frac{\alpha}{2}} \dfrac{\sigma}{\sqrt{n}}$
		σ desconocida	$\bar{X} \pm z_{\frac{\alpha}{2}} \dfrac{S_c}{\sqrt{n}}$
$\mathcal{B}(p)$	p	$n \geqslant 30$, $np,\ nq \geqslant 5$	$\hat{p} \pm z_{\frac{\alpha}{2}} \sqrt{\dfrac{\hat{p}\hat{q}}{n}} \qquad \hat{p}=\bar{X}, \quad \hat{q}=1-\bar{X}$
$\mathcal{N}(\mu,\sigma)$	σ^2	μ conocida	$\left[\dfrac{nS_\mu^2}{\chi^2_{\frac{\alpha}{2},n}}\ ,\ \dfrac{nS_\mu^2}{\chi^2_{1-\frac{\alpha}{2},n}}\right] \qquad S_\mu^2=\dfrac{1}{n}\sum_{i=1}^{n}(X_i-\mu)^2$
		μ desconocida	$\left[\dfrac{(n-1)S_c^2}{\chi^2_{\frac{\alpha}{2},n-1}}\ ,\ \dfrac{(n-1)S_c^2}{\chi^2_{1-\frac{\alpha}{2},n-1}}\right] \qquad S_c^2=\dfrac{1}{n-1}\sum_{i=1}^{n}\left(X_i-\bar{X}\right)^2$
$\mathcal{P}(\lambda)$	λ	$n \geqslant 30$	$\bar{X} \pm z_{\frac{\alpha}{2}} \sqrt{\dfrac{\bar{X}}{n}}$
$\mathcal{N}(\mu_1,\sigma_1)$ $\mathcal{N}(\mu_2,\sigma_2)$ Indep.	$\mu_1-\mu_2$	σ_1,σ_2 conocidas	$\bar{X}_1-\bar{X}_2 \pm z_{\frac{\alpha}{2}} \sqrt{\dfrac{\sigma_1^2}{n_1}+\dfrac{\sigma_2^2}{n_2}}$
		$\sigma_1=\sigma_2$ desconocidas	$\bar{X}_1-\bar{X}_2 \pm t_{\frac{\alpha}{2},n_1+n_2-2} S_p \sqrt{\dfrac{1}{n_1}+\dfrac{1}{n_2}} \qquad S_p^2=\dfrac{(n_1-1)S_{c_1}^2+(n_2-1)S_{c_2}^2}{n_1+n_2-2}$
		$\sigma_1 \neq \sigma_2$ desconocidas	$\bar{X}_1-\bar{X}_2 \pm t_{\frac{\alpha}{2},\nu} \sqrt{\dfrac{S_{c_1}^2}{n_1}+\dfrac{S_{c_2}^2}{n_2}} \qquad \nu=\dfrac{\left(\frac{S_{c_1}^2}{n_1}+\frac{S_{c_2}^2}{n_2}\right)^2}{\left(\frac{S_{c_1}^2}{n_1}\right)^2\frac{1}{n_1-1}+\left(\frac{S_{c_2}^2}{n_2}\right)^2\frac{1}{n_2-1}}-2$
$\mathcal{N}(\mu_1,\sigma_1)$ $\mathcal{N}(\mu_2,\sigma_2)$ Depen.	$\mu_D=$ $\mu_1-\mu_2$	σ_D conocida	$\bar{D} \pm z_{\frac{\alpha}{2}} \dfrac{\sigma_D}{\sqrt{n}}$
		σ_D desconocida	$n<30 \quad \bar{D} \pm t_{\frac{\alpha}{2},n-1} \dfrac{S_{c_D}}{\sqrt{n}}$ | $n \geqslant 30 \quad \bar{D} \pm z_{\frac{\alpha}{2}} \dfrac{S_{c_D}}{\sqrt{n}}$
$\mathcal{N}(\mu_1,\sigma_1)$ $\mathcal{N}(\mu_2,\sigma_2)$	$\dfrac{\sigma_1^2}{\sigma_2^2}$	μ_1,μ_2 conocidas	$\left[\dfrac{S_{\mu_1}^2}{S_{\mu_2}^2}\dfrac{1}{f_{1-\frac{\alpha}{2},n_1,n_2}}, \dfrac{S_{\mu_1}^2}{S_{\mu_2}^2}\dfrac{1}{f_{\frac{\alpha}{2},n_1,n_2}}\right]$
		μ_1,μ_2 desconocidas	$\left[\dfrac{S_{c_1}^2}{S_{c_2}^2}\dfrac{1}{f_{1-\frac{\alpha}{2},n_1-1,n_2-1}}, \dfrac{S_{c_1}^2}{S_{c_2}^2}\dfrac{1}{f_{\frac{\alpha}{2},n_1-1,n_2-1}}\right]$
$\mathcal{B}(p_1)$ $\mathcal{B}(p_2)$	p_1-p_2	$n_1,n_2 \geqslant 30$ $n_1p_1, n_1q_1 \geqslant 5$ $n_2p_2, n_2q_2 \geqslant 5$	$\hat{p}_1-\hat{p}_2 \pm z_{\frac{\alpha}{2}} \sqrt{\dfrac{\hat{p}_1\hat{q}_1}{n_1}+\dfrac{\hat{p}_2\hat{q}_2}{n_2}}$ $\hat{p}_1=\bar{X}_1, \quad \hat{q}_1=1-\bar{X}_1$ $\hat{p}_2=\bar{X}_2, \quad \hat{q}_2=1-\bar{X}_2$

Contrastes de hipótesis sobre poblaciones normales

1. Contrastes sobre una población

(a)

Contrastes sobre μ con σ conocida		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu \neq \mu_0 \end{cases}$	$Z = \dfrac{\bar{X} - \mu_0}{\sigma}\sqrt{n} \sim \mathcal{N}(0,1)$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu < \mu_0 \end{cases}$		$Z \leqslant -z_{\alpha}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu > \mu_0 \end{cases}$		$Z \geqslant z_{\alpha}$

(b)

Contrastes sobre μ con σ desconocida		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu \neq \mu_0 \end{cases}$	$T = \dfrac{\bar{X} - \mu_0}{S_c}\sqrt{n} \sim t_{n-1}$	$T \leqslant -t_{\frac{\alpha}{2},n-1} \quad$ ó $\quad T \geqslant t_{\frac{\alpha}{2},n-1}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu < \mu_0 \end{cases}$		$T \leqslant -t_{\alpha,n-1}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu > \mu_0 \end{cases}$		$T \geqslant t_{\alpha,n-1}$

(c)

Contrastes sobre σ^2 con μ conocida		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 \neq \sigma_0^2 \end{cases}$	$\chi^2 = \dfrac{nS_\mu^2}{\sigma_0^2} \sim \chi_n^2$	$\chi^2 \leqslant \chi^2_{1-\frac{\alpha}{2},n} \quad$ ó $\quad \chi^2 \geqslant \chi^2_{\frac{\alpha}{2},n}$
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 < \sigma_0^2 \end{cases}$		$\chi^2 \leqslant \chi^2_{1-\alpha,n}$
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 > \sigma_0^2 \end{cases}$		$\chi^2 \geqslant \chi^2_{\alpha,n}$

(d)

Contrastes sobre σ^2 con μ desconocida		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 \neq \sigma_0^2 \end{cases}$	$\chi^2 = \dfrac{(n-1)S_c^2}{\sigma_0^2} \sim \chi_{n-1}^2$	$\chi^2 \leqslant \chi^2_{1-\frac{\alpha}{2},n-1} \quad$ ó $\quad \chi^2 \geqslant \chi^2_{\frac{\alpha}{2},n-1}$
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 < \sigma_0^2 \end{cases}$		$\chi^2 \leqslant \chi^2_{1-\alpha,n-1}$
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 > \sigma_0^2 \end{cases}$		$\chi^2 \geqslant \chi^2_{\alpha,n-1}$

2. Contrastes sobre dos muestras pareadas

- Se considera la muestra de las diferencias y se aplican los contrastes para una población.

3. Contrastes sobre dos muestras independientes

(a)

Contrastes sobre diferencias de medias con varianzas conocidas		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 \neq \mu_0 \end{cases}$	$Z = \dfrac{\bar{X}_1 - \bar{X}_2 - \mu_0}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}} \sim \mathcal{N}(0,1)$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 < \mu_0 \end{cases}$		$Z \leqslant -z_{\alpha}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 > \mu_0 \end{cases}$		$Z \geqslant z_{\alpha}$

(b)

Contrastes sobre diferencias de medias con varianzas desconocidas e iguales		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 \neq \mu_0 \end{cases}$	$T = \dfrac{\bar{X}_1 - \bar{X}_2 - \mu_0}{\sqrt{\dfrac{(n_1-1)S_{c_1}^2 + (n_2-1)S_{c_2}^2}{n_1+n_2-2}\left(\dfrac{1}{n_1}+\dfrac{1}{n_2}\right)}} \sim t_{n_1+n_2-2}$	$T \leqslant -t_{\frac{\alpha}{2},n_1+n_2-2}$ ó $T \geqslant t_{\frac{\alpha}{2},n_1+n_2-2}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 < \mu_0 \end{cases}$		$T \leqslant -t_{\alpha,n_1+n_2-2}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 > \mu_0 \end{cases}$		$T \geqslant t_{\alpha,n_1+n_2-2}$

(c)

Contrastes sobre diferencias de medias con varianzas desconocidas y distintas		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 \neq \mu_0 \end{cases}$	$T = \dfrac{\bar{X}_1 - \bar{X}_2 - \mu_0}{\sqrt{\dfrac{S_{c_1}^2}{n_1} + \dfrac{S_{c_2}^2}{n_2}}} \sim t_{\nu}$	$T \leqslant -t_{\frac{\alpha}{2},\nu} \quad$ ó $\quad T \geqslant t_{\frac{\alpha}{2},\nu}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 < \mu_0 \end{cases}$		$T \leqslant -t_{\alpha,\nu}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 > \mu_0 \end{cases}$	$\nu = \dfrac{\left(\dfrac{S_{c_1}^2}{n_1}+\dfrac{S_{c_2}^2}{n_2}\right)^2}{\left(\dfrac{S_{c_1}^2}{n_1}\right)^2 \dfrac{1}{n_1-1} + \left(\dfrac{S_{c_2}^2}{n_2}\right)^2 \dfrac{1}{n_2-1}} - 2$	$T \geqslant t_{\alpha,\nu}$

(d)

Contrastes sobre igualdad de varianzas con medias desconocidas		
Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \sigma_1^2 = \sigma_2^2 \\ H_1 : \sigma_1^2 \neq \sigma_2^2 \end{cases}$	$\mathcal{F} = \dfrac{S_{c_1}^2}{S_{c_2}^2} \sim \mathcal{F}_{n_1-1,n_2-1}$	$\mathcal{F} \leqslant \mathcal{F}_{1-\frac{\alpha}{2},n_1-1,n_2-1} \quad$ ó $\quad \mathcal{F} \geqslant \mathcal{F}_{\frac{\alpha}{2},n_1-1,n_2-1}$
$\begin{cases} H_0 : \sigma_1^2 = \sigma_2^2 \\ H_1 : \sigma_1^2 < \sigma_2^2 \end{cases}$		$\mathcal{F} \leqslant \mathcal{F}_{1-\alpha,n_1-1,n_2-1}$
$\begin{cases} H_0 : \sigma_1^2 = \sigma_2^2 \\ H_1 : \sigma_1^2 > \sigma_2^2 \end{cases}$		$\mathcal{F} \geqslant \mathcal{F}_{\alpha,n_1-1,n_2-1}$

Contrastes de hipótesis sobre los parámetros de una población

1. Contrastes sobre la media con varianza conocida:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu \neq \mu_0 \end{cases}$	$Z = \dfrac{\bar{X} - \mu_0}{\sigma}\sqrt{n}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu < \mu_0 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_{\alpha}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu > \mu_0 \end{cases}$	$(n \geqslant 30)$	$Z \geqslant z_{\alpha}$

2. Contrastes sobre la media con varianza desconocida:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu \neq \mu_0 \end{cases}$	$Z = \dfrac{\bar{X} - \mu_0}{S_c}\sqrt{n}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu < \mu_0 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_{\alpha}$
$\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu > \mu_0 \end{cases}$	$(n \geqslant 30)$	$Z \geqslant z_{\alpha}$

3. Contrastes sobre la varianza:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 \neq \sigma_0^2 \end{cases}$	$Z = \dfrac{S_c - \sigma_0}{\sigma_0}\sqrt{2n}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 < \sigma_0^2 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_{\alpha}$
$\begin{cases} H_0 : \sigma^2 = \sigma_0^2 \\ H_1 : \sigma^2 > \sigma_0^2 \end{cases}$	$(n \geqslant 30)$	$Z \geqslant z_{\alpha}$

4. Contrastes sobre la proporción:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : p = p_0 \\ H_1 : p \neq p_0 \end{cases}$	$Z = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : p = p_0 \\ H_1 : p < p_0 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_{\alpha}$
$\begin{cases} H_0 : p = p_0 \\ H_1 : p > p_0 \end{cases}$	$(np_0 \geqslant 5 \quad \text{y} \quad n(1-p_0) \geqslant 5)$ $(n \geqslant 30)$	$Z \geqslant z_{\alpha}$

Contrastes de hipótesis sobre los parámetros de dos poblaciones

1. Contrastes sobre diferencia de medias con varianzas conocidas:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 \neq \mu_0 \end{cases}$	$Z = \dfrac{\bar{X}_1 - \bar{X}_2 - \mu_0}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 < \mu_0 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_\alpha$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 > \mu_0 \end{cases}$	$(n_1,\, n_2 \geqslant 30)$	$Z \geqslant z_\alpha$

2. Contrastes sobre diferencia de medias con varianzas desconocidas:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 \neq \mu_0 \end{cases}$	$Z = \dfrac{\bar{X}_1 - \bar{X}_2 - \mu_0}{\sqrt{\dfrac{S_{c_1}^2}{n_1} + \dfrac{S_{c_2}^2}{n_2}}}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 < \mu_0 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_\alpha$
$\begin{cases} H_0 : \mu_1 - \mu_2 = \mu_0 \\ H_1 : \mu_1 - \mu_2 > \mu_0 \end{cases}$	$(n_1,\, n_2 \geqslant 30)$	$Z \geqslant z_\alpha$

3. Contrastes sobre igualdad de varianzas:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : \sigma_1^2 = \sigma_2^2 \\ H_1 : \sigma_1^2 \neq \sigma_2^2 \end{cases}$	$Z = \dfrac{S_{c_1} - S_{c_2}}{S_p\sqrt{\dfrac{1}{2n_1} + \dfrac{1}{2n_2}}}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : \sigma_1^2 = \sigma_2^2 \\ H_1 : \sigma_1^2 < \sigma_2^2 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_\alpha$
$\begin{cases} H_0 : \sigma_1^2 = \sigma_2^2 \\ H_1 : \sigma_1^2 > \sigma_2^2 \end{cases}$	$(n_1,\, n_2 \geqslant 30)$	$Z \geqslant z_\alpha$

4. Contrastes sobre diferencia de proporciones:

Hipótesis	Estadístico	Región crítica
$\begin{cases} H_0 : p_1 - p_2 = p_0 \\ H_1 : p_1 - p_2 \neq p_0 \end{cases}$	$Z = \dfrac{\hat{p}_1 - \hat{p}_2 - p_0}{\sqrt{\dfrac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \dfrac{\hat{p}_2(1-\hat{p}_2)}{n_2}}}$	$Z \leqslant -z_{\frac{\alpha}{2}} \quad$ ó $\quad Z \geqslant z_{\frac{\alpha}{2}}$
$\begin{cases} H_0 : p_1 - p_2 = p_0 \\ H_1 : p_1 - p_2 < p_0 \end{cases}$	Distribución $\mathcal{N}(0,1)$	$Z \leqslant -z_\alpha$
$\begin{cases} H_0 : p_1 - p_2 = p_0 \\ H_1 : p_1 - p_2 > p_0 \end{cases}$	$(n_1\hat{p}_1 \geqslant 5 \quad \text{y} \quad n_1(1-\hat{p}_1) \geqslant 5)$ $(n_2\hat{p}_2 \geqslant 5 \quad \text{y} \quad n_2(1-\hat{p}_2) \geqslant 5)$ $(n_1, n_2 \geqslant 30)$	$Z \geqslant z_\alpha$

Cartas de control. Formulario

Carta $\overline{X}$

$$\begin{aligned} \text{LSC} &= \hat{\mu} + A_2\overline{R} \\ \text{LC} &= \hat{\mu} \\ \text{LIC} &= \hat{\mu} - A_2\overline{R} \end{aligned} \qquad \hat{\mu} = \frac{1}{m}\sum_{i=1}^{m}\overline{X}_i \qquad \overline{R} = \frac{1}{m}\sum_{i=1}^{m} R_i \qquad A_2 = \frac{3}{d_2\sqrt{n}}$$

Carta R

$$\begin{aligned} \text{LSC} &= D_4\overline{R} \\ \text{LC} &= \overline{R} \\ \text{LIC} &= D_3\overline{R} \end{aligned} \qquad D_4 = \left(1 + \frac{3\sigma_W}{d_2}\right) \qquad D_3 = \left(1 - \frac{3\sigma_W}{d_2}\right)$$

Carta p

$$\begin{aligned} \text{LSC} &= \overline{p} + 3\sqrt{\frac{\overline{p}(1-\overline{p})}{n}} \\ \text{LC} &= \overline{p} \\ \text{LIC} &= \overline{p} - 3\sqrt{\frac{\overline{p}(1-\overline{p})}{n}} \end{aligned} \qquad \overline{p} = \frac{1}{m}\sum_{i=1}^{m}\hat{p}_i = \frac{1}{m\cdot n}\sum_{i=1}^{m} D_i \qquad \hat{p}_i = \frac{D_i}{n}$$

Carta C

$$\begin{aligned} \text{LSC} &= \overline{C} + 3\sqrt{\overline{C}} \\ \text{LC} &= \overline{C} \\ \text{LIC} &= \overline{C} - 3\sqrt{\overline{C}} \end{aligned} \qquad \overline{C} = \frac{1}{m}\sum_{i=1}^{m} C_i$$

Carta U

$$\begin{aligned} \text{LSC} &= \overline{U} + 3\sqrt{\frac{\overline{U}}{n}} \\ \text{LC} &= \overline{U} \\ \text{LIC} &= \overline{U} - 3\sqrt{\frac{\overline{U}}{n}} \end{aligned} \qquad \overline{U} = \frac{1}{m}\sum_{i=1}^{m} U_i \qquad U_i = \frac{C_i}{n}$$