A

Statistical Tables

A.1 Critical Values of the F distribution

		Numerator degrees of freedom, df_{num}										
df_{den}	α	1	2	3	4	5	6	8	9	10	12	15
2	.100	8.53	9.00	9.16	9.24	9.29	9.33	9.37	9.38	9.39	9.41	9.42
	.050	18.51	19.00	19.16	19.25	19.30	19.33	19.37	19.38	19.40	19.41	19.43
	.025	38.51	39.00	39.17	39.25	39.30	39.33	39.37	39.39	39.40	39.41	39.43
	.010	98.50	99.00	99.17	99.25	99.30	99.33	99.37	99.39	99.40	99.42	99.43
	.001	998.5	999.0	999.2	999.2	999.3	999.3	999.4	999.4	999.4	999.4	999.4
3	.100	5.54	5.46	5.39	5.34	5.31	5.28	5.25	5.24	5.23	5.22	5.20
	.050	10.13	9.55	9.28	9.12	9.01	8.94	8.85	8.81	8.79	8.74	8.70
	.025	17.44	16.04	15.44	15.10	14.88	14.73	14.54	14.47	14.42	14.34	14.25
	.010	34.12	30.82	29.46	28.71	28.24	27.91	27.49	27.35	27.23	27.05	26.87
	.001	167.0	148.5	141.1	137.1	134.6	132.8	130.6	129.9	129.2	128.3	127.4
4	.100	4.54	4.32	4.19	4.11	4.05	4.01	3.95	3.94	3.92	3.90	3.87
	.050	7.71	6.94	6.59	6.39	6.26	6.16	6.04	6.00	5.96	5.91	5.86
	.025	12.22	10.65	9.98	9.60	9.36	9.20	8.98	8.90	8.84	8.75	8.66
	.010	21.20	18.00	16.69	15.98	15.52	15.21	14.80	14.66	14.55	14.37	14.20
	.001	74.14	61.25	56.18	53.44	51.71	50.53	49.00	48.47	48.05	47.41	46.76
5	.100	4.06	3.78	3.62	3.52	3.45	3.40	3.34	3.32	3.30	3.27	3.24
	.050	6.61	5.79	5.41	5.19	5.05	4.95	4.82	4.77	4.74	4.68	4.62
	.025	10.01	8.43	7.76	7.39	7.15	6.98	6.76	6.68	6.62	6.52	6.43
	.010	16.26	13.27	12.06	11.39	10.97	10.67	10.29	10.16	10.05	9.89	9.72
	.001	47.18	37.12	33.20	31.09	29.75	28.83	27.65	27.24	26.92	26.42	25.91
6	.100	3.78	3.46	3.29	3.18	3.11	3.05	2.98	2.96	2.94	2.90	2.87
	.050	5.99	5.14	4.76	4.53	4.39	4.28	4.15	4.10	4.06	4.00	3.94
	.025	8.81	7.26	6.60	6.23	5.99	5.82	5.60	5.52	5.46	5.37	5.27
	.010	13.75	10.92	9.78	9.15	8.75	8.47	8.10	7.98	7.87	7.72	7.56
	.001	35.51	27.00	23.70	21.92	20.80	20.03	19.03	18.69	18.41	17.99	17.56

		Numerator degrees of freedom, df_{num}										
df_{den}	α	1	2	3	4	5	6	8	9	10	12	15
7	.100	3.59	3.26	3.07	2.96	2.88	2.83	2.75	2.72	2.70	2.67	2.63
	.050	5.59	4.74	4.35	4.12	3.97	3.87	3.73	3.68	3.64	3.57	3.51
	.025	8.07	6.54	5.89	5.52	5.29	5.12	4.90	4.82	4.76	4.67	4.57
	.010	12.25	9.55	8.45	7.85	7.46	7.19	6.84	6.72	6.62	6.47	6.31
	.001	29.25	21.69	18.77	17.20	16.21	15.52	14.63	14.33	14.08	13.71	13.32
8	.100	3.46	3.11	2.92	2.81	2.73	2.67	2.59	2.56	2.54	2.50	2.46
	.050	5.32	4.46	4.07	3.84	3.69	3.58	3.44	3.39	3.35	3.28	3.22
	.025	7.57	6.06	5.42	5.05	4.82	4.65	4.43	4.36	4.30	4.20	4.10
	.010	11.26	8.65	7.59	7.01	6.63	6.37	6.03	5.91	5.81	5.67	5.52
	.001	25.41	18.49	15.83	14.39	13.48	12.86	12.05	11.77	11.54	11.19	10.84
9	.100	3.36	3.01	2.81	2.69	2.61	2.55	2.47	2.44	2.42	2.38	2.34
	.050	5.12	4.26	3.86	3.63	3.48	3.37	3.23	3.18	3.14	3.07	3.01
	.025	7.21	5.71	5.08	4.72	4.48	4.32	4.10	4.03	3.96	3.87	3.77
	.010	10.56	8.02	6.99	6.42	6.06	5.80	5.47	5.35	5.26	5.11	4.96
	.001	22.86	16.39	13.90	12.56	11.71	11.13	10.37	10.11	9.89	9.57	9.24
10	.100	3.29	2.92	2.73	2.61	2.52	2.46	2.38	2.35	2.32	2.28	2.24
	.050	4.96	4.10	3.71	3.48	3.33	3.22	3.07	3.02	2.98	2.91	2.85
	.025	6.94	5.46	4.83	4.47	4.24	4.07	3.85	3.78	3.72	3.62	3.52
	.010	10.04	7.56	6.55	5.99	5.64	5.39	5.06	4.94	4.85	4.71	4.56
	.001	21.04	14.91	12.55	11.28	10.48	9.93	9.20	8.96	8.75	8.45	8.13
11	.100	3.23	2.86	2.66	2.54	2.45	2.39	2.30	2.27	2.25	2.21	2.17
	.050	4.84	3.98	3.59	3.36	3.20	3.09	2.95	2.90	2.85	2.79	2.72
	.025	6.72	5.26	4.63	4.28	4.04	3.88	3.66	3.59	3.53	3.43	3.33
	.010	9.65	7.21	6.22	5.67	5.32	5.07	4.74	4.63	4.54	4.40	4.25
	.001	19.69	13.81	11.56	10.35	9.58	9.05	8.35	8.12	7.92	7.63	7.32
12	.100	3.18	2.81	2.61	2.48	2.39	2.33	2.24	2.21	2.19	2.15	2.10
	.050	4.75	3.89	3.49	3.26	3.11	3.00	2.85	2.80	2.75	2.69	2.62
	.025	6.55	5.10	4.47	4.12	3.89	3.73	3.51	3.44	3.37	3.28	3.18
	.010	9.33	6.93	5.95	5.41	5.06	4.82	4.50	4.39	4.30	4.16	4.01
	.001	18.64	12.97	10.80	9.63	8.89	8.38	7.71	7.48	7.29	7.00	6.71
13	.100	3.14	2.76	2.56	2.43	2.35	2.28	2.20	2.16	2.14	2.10	2.05
	.050	4.67	3.81	3.41	3.18	3.03	2.92	2.77	2.71	2.67	2.60	2.53
	.025	6.41	4.97	4.35	4.00	3.77	3.60	3.39	3.31	3.25	3.15	3.05
	.010	9.07	6.70	5.74	5.21	4.86	4.62	4.30	4.19	4.10	3.96	3.82
	.001	17.82	12.31	10.21	9.07	8.35	7.86	7.21	6.98	6.80	6.52	6.23
14	.100	3.10	2.73	2.52	2.39	2.31	2.24	2.15	2.12	2.10	2.05	2.01
	.050	4.60	3.74	3.34	3.11	2.96	2.85	2.70	2.65	2.60	2.53	2.46
	.025	6.30	4.86	4.24	3.89	3.66	3.50	3.29	3.21	3.15	3.05	2.95
	.010	8.86	6.51	5.56	5.04	4.69	4.46	4.14	4.03	3.94	3.80	3.66
	.001	17.14	11.78	9.73	8.62	7.92	7.44	6.80	6.58	6.40	6.13	5.85

		Numerator degrees of freedom, df_{num}										
df_{den}	α	1	2	3	4	5	6	8	9	10	12	15
15	.100	3.07	2.70	2.49	2.36	2.27	2.21	2.12	2.09	2.06	2.02	1.97
	.050	4.54	3.68	3.29	3.06	2.90	2.79	2.64	2.59	2.54	2.48	2.40
	.025	6.20	4.77	4.15	3.80	3.58	3.41	3.20	3.12	3.06	2.96	2.86
	.010	8.68	6.36	5.42	4.89	4.56	4.32	4.00	3.89	3.80	3.67	3.52
	.001	16.59	11.34	9.34	8.25	7.57	7.09	6.47	6.26	6.08	5.81	5.54
16	.100	3.05	2.67	2.46	2.33	2.24	2.18	2.09	2.06	2.03	1.99	1.94
	.050	4.49	3.63	3.24	3.01	2.85	2.74	2.59	2.54	2.49	2.42	2.35
	.025	6.12	4.69	4.08	3.73	3.50	3.34	3.12	3.05	2.99	2.89	2.79
	.010	8.53	6.23	5.29	4.77	4.44	4.20	3.89	3.78	3.69	3.55	3.41
	.001	16.12	10.97	9.01	7.94	7.27	6.80	6.19	5.98	5.81	5.55	5.27
17	.100	3.03	2.64	2.44	2.31	2.22	2.15	2.06	2.03	2.00	1.96	1.91
	.050	4.45	3.59	3.20	2.96	2.81	2.70	2.55	2.49	2.45	2.38	2.31
	.025	6.04	4.62	4.01	3.66	3.44	3.28	3.06	2.98	2.92	2.82	2.72
	.010	8.40	6.11	5.18	4.67	4.34	4.10	3.79	3.68	3.59	3.46	3.31
	.001	15.72	10.66	8.73	7.68	7.02	6.56	5.96	5.75	5.58	5.32	5.05
18	.100	3.01	2.62	2.42	2.29	2.20	2.13	2.04	2.00	1.98	1.93	1.89
	.050	4.41	3.55	3.16	2.93	2.77	2.66	2.51	2.46	2.41	2.34	2.27
	.025	5.98	4.56	3.95	3.61	3.38	3.22	3.01	2.93	2.87	2.77	2.67
	.010	8.29	6.01	5.09	4.58	4.25	4.01	3.71	3.60	3.51	3.37	3.23
	.001	15.38	10.39	8.49	7.46	6.81	6.35	5.76	5.56	5.39	5.13	4.87
19	.100	2.99	2.61	2.40	2.27	2.18	2.11	2.02	1.98	1.96	1.91	1.86
	.050	4.38	3.52	3.13	2.90	2.74	2.63	2.48	2.42	2.38	2.31	2.23
	.025	5.92	4.51	3.90	3.56	3.33	3.17	2.96	2.88	2.82	2.72	2.62
	.010	8.18	5.93	5.01	4.50	4.17	3.94	3.63	3.52	3.43	3.30	3.15
	.001	15.08	10.16	8.28	7.27	6.62	6.18	5.59	5.39	5.22	4.97	4.70
20	.100	2.97	2.59	2.38	2.25	2.16	2.09	2.00	1.96	1.94	1.89	1.84
	.050	4.35	3.49	3.10	2.87	2.71	2.60	2.45	2.39	2.35	2.28	2.20
	.025	5.87	4.46	3.86	3.51	3.29	3.13	2.91	2.84	2.77	2.68	2.57
	.010	8.10	5.85	4.94	4.43	4.10	3.87	3.56	3.46	3.37	3.23	3.09
	.001	14.82	9.95	8.10	7.10	6.46	6.02	5.44	5.24	5.08	4.82	4.56
22	.100	2.95	2.56	2.35	2.22	2.13	2.06	1.97	1.93	1.90	1.86	1.81
	.050	4.30	3.44	3.05	2.82	2.66	2.55	2.40	2.34	2.30	2.23	2.15
	.025	5.79	4.38	3.78	3.44	3.22	3.05	2.84	2.76	2.70	2.60	2.50
	.010	7.95	5.72	4.82	4.31	3.99	3.76	3.45	3.35	3.26	3.12	2.98
	.001	14.38	9.61	7.80	6.81	6.19	5.76	5.19	4.99	4.83	4.58	4.33
24	.100	2.93	2.54	2.33	2.19	2.10	2.04	1.94	1.91	1.88	1.83	1.78
	.050	4.26	3.40	3.01	2.78	2.62	2.51	2.36	2.30	2.25	2.18	2.11
	.025	5.72	4.32	3.72	3.38	3.15	2.99	2.78	2.70	2.64	2.54	2.44
	.010	7.82	5.61	4.72	4.22	3.90	3.67	3.36	3.26	3.17	3.03	2.89
	.001	14.03	9.34	7.55	6.59	5.98	5.55	4.99	4.80	4.64	4.39	4.14

df_{den}	α	Numerator degrees of freedom, df_{num} 1	2	3	4	5	6	8	9	10	12	15
26	.100	2.91	2.52	2.31	2.17	2.08	2.01	1.92	1.88	1.86	1.81	1.76
	.050	4.23	3.37	2.98	2.74	2.59	2.47	2.32	2.27	2.22	2.15	2.07
	.025	5.66	4.27	3.67	3.33	3.10	2.94	2.73	2.65	2.59	2.49	2.39
	.010	7.72	5.53	4.64	4.14	3.82	3.59	3.29	3.18	3.09	2.96	2.81
	.001	13.74	9.12	7.36	6.41	5.80	5.38	4.83	4.64	4.48	4.24	3.99
28	.100	2.89	2.50	2.29	2.16	2.06	2.00	1.90	1.87	1.84	1.79	1.74
	.050	4.20	3.34	2.95	2.71	2.56	2.45	2.29	2.24	2.19	2.12	2.04
	.025	5.61	4.22	3.63	3.29	3.06	2.90	2.69	2.61	2.55	2.45	2.34
	.010	7.64	5.45	4.57	4.07	3.75	3.53	3.23	3.12	3.03	2.90	2.75
	.001	13.50	8.93	7.19	6.25	5.66	5.24	4.69	4.50	4.35	4.11	3.86
30	.100	2.88	2.49	2.28	2.14	2.05	1.98	1.88	1.85	1.82	1.77	1.72
	.050	4.17	3.32	2.92	2.69	2.53	2.42	2.27	2.21	2.16	2.09	2.01
	.025	5.57	4.18	3.59	3.25	3.03	2.87	2.65	2.57	2.51	2.41	2.31
	.010	7.56	5.39	4.51	4.02	3.70	3.47	3.17	3.07	2.98	2.84	2.70
	.001	13.29	8.77	7.05	6.12	5.53	5.12	4.58	4.39	4.24	4.00	3.75
35	.100	2.85	2.46	2.25	2.11	2.02	1.95	1.85	1.82	1.79	1.74	1.69
	.050	4.12	3.27	2.87	2.64	2.49	2.37	2.22	2.16	2.11	2.04	1.96
	.025	5.48	4.11	3.52	3.18	2.96	2.80	2.58	2.50	2.44	2.34	2.23
	.010	7.42	5.27	4.40	3.91	3.59	3.37	3.07	2.96	2.88	2.74	2.60
	.001	12.90	8.47	6.79	5.88	5.30	4.89	4.36	4.18	4.03	3.79	3.55
40	.100	2.84	2.44	2.23	2.09	2.00	1.93	1.83	1.79	1.76	1.71	1.66
	.050	4.08	3.23	2.84	2.61	2.45	2.34	2.18	2.12	2.08	2.00	1.92
	.025	5.42	4.05	3.46	3.13	2.90	2.74	2.53	2.45	2.39	2.29	2.18
	.010	7.31	5.18	4.31	3.83	3.51	3.29	2.99	2.89	2.80	2.66	2.52
	.001	12.61	8.25	6.59	5.70	5.13	4.73	4.21	4.02	3.87	3.64	3.40
45	.100	2.82	2.42	2.21	2.07	1.98	1.91	1.81	1.77	1.74	1.70	1.64
	.050	4.06	3.20	2.81	2.58	2.42	2.31	2.15	2.10	2.05	1.97	1.89
	.025	5.38	4.01	3.42	3.09	2.86	2.70	2.49	2.41	2.35	2.25	2.14
	.010	7.23	5.11	4.25	3.77	3.45	3.23	2.94	2.83	2.74	2.61	2.46
	.001	12.39	8.09	6.45	5.56	5.00	4.61	4.09	3.91	3.76	3.53	3.29
50	.100	2.81	2.41	2.20	2.06	1.97	1.90	1.80	1.76	1.73	1.68	1.63
	.050	4.03	3.18	2.79	2.56	2.40	2.29	2.13	2.07	2.03	1.95	1.87
	.025	5.34	3.97	3.39	3.05	2.83	2.67	2.46	2.38	2.32	2.22	2.11
	.010	7.17	5.06	4.20	3.72	3.41	3.19	2.89	2.78	2.70	2.56	2.42
	.001	12.22	7.96	6.34	5.46	4.90	4.51	4.00	3.82	3.67	3.44	3.20
60	.100	2.79	2.39	2.18	2.04	1.95	1.87	1.77	1.74	1.71	1.66	1.60
	.050	4.00	3.15	2.76	2.53	2.37	2.25	2.10	2.04	1.99	1.92	1.84
	.025	5.29	3.93	3.34	3.01	2.79	2.63	2.41	2.33	2.27	2.17	2.06
	.010	7.08	4.98	4.13	3.65	3.34	3.12	2.82	2.72	2.63	2.50	2.35
	.001	11.97	7.77	6.17	5.31	4.76	4.37	3.86	3.69	3.54	3.32	3.08

		Numerator degrees of freedom, df_{num}										
df_{den}	α	1	2	3	4	5	6	8	9	10	12	15
70	.100	2.78	2.38	2.16	2.03	1.93	1.86	1.76	1.72	1.69	1.64	1.59
	.050	3.98	3.13	2.74	2.50	2.35	2.23	2.07	2.02	1.97	1.89	1.81
	.025	5.25	3.89	3.31	2.97	2.75	2.59	2.38	2.30	2.24	2.14	2.03
	.010	7.01	4.92	4.07	3.60	3.29	3.07	2.78	2.67	2.59	2.45	2.31
	.001	11.80	7.64	6.06	5.20	4.66	4.28	3.77	3.60	3.45	3.23	2.99
80	.100	2.77	2.37	2.15	2.02	1.92	1.85	1.75	1.71	1.68	1.63	1.57
	.050	3.96	3.11	2.72	2.49	2.33	2.21	2.06	2.00	1.95	1.88	1.79
	.025	5.22	3.86	3.28	2.95	2.73	2.57	2.35	2.28	2.21	2.11	2.00
	.010	6.96	4.88	4.04	3.56	3.26	3.04	2.74	2.64	2.55	2.42	2.27
	.001	11.67	7.54	5.97	5.12	4.58	4.20	3.70	3.53	3.39	3.16	2.93
90	.100	2.76	2.36	2.15	2.01	1.91	1.84	1.74	1.70	1.67	1.62	1.56
	.050	3.95	3.10	2.71	2.47	2.32	2.20	2.04	1.99	1.94	1.86	1.78
	.025	5.20	3.84	3.26	2.93	2.71	2.55	2.34	2.26	2.19	2.09	1.98
	.010	6.93	4.85	4.01	3.53	3.23	3.01	2.72	2.61	2.52	2.39	2.24
	.001	11.57	7.47	5.91	5.06	4.53	4.15	3.65	3.48	3.34	3.11	2.88
100	.100	2.76	2.36	2.14	2.00	1.91	1.83	1.73	1.69	1.66	1.61	1.56
	.050	3.94	3.09	2.70	2.46	2.31	2.19	2.03	1.97	1.93	1.85	1.77
	.025	5.18	3.83	3.25	2.92	2.70	2.54	2.32	2.24	2.18	2.08	1.97
	.010	6.90	4.82	3.98	3.51	3.21	2.99	2.69	2.59	2.50	2.37	2.22
	.001	11.50	7.41	5.86	5.02	4.48	4.11	3.61	3.44	3.30	3.07	2.84
110	.100	2.75	2.35	2.13	2.00	1.90	1.83	1.73	1.69	1.66	1.61	1.55
	.050	3.93	3.08	2.69	2.45	2.30	2.18	2.02	1.97	1.92	1.84	1.76
	.025	5.16	3.82	3.24	2.90	2.68	2.53	2.31	2.23	2.17	2.07	1.96
	.010	6.87	4.80	3.96	3.49	3.19	2.97	2.68	2.57	2.49	2.35	2.21
	.001	11.43	7.36	5.82	4.98	4.45	4.07	3.58	3.41	3.26	3.04	2.81
120	.100	2.75	2.35	2.13	1.99	1.90	1.82	1.72	1.68	1.65	1.60	1.55
	.050	3.92	3.07	2.68	2.45	2.29	2.18	2.02	1.96	1.91	1.83	1.75
	.025	5.15	3.80	3.23	2.89	2.67	2.52	2.30	2.22	2.16	2.05	1.94
	.010	6.85	4.79	3.95	3.48	3.17	2.96	2.66	2.56	2.47	2.34	2.19
	.001	11.38	7.32	5.78	4.95	4.42	4.04	3.55	3.38	3.24	3.02	2.78
∞	.100	2.71	2.30	2.08	1.95	1.85	1.77	1.67	1.63	1.60	1.55	1.49
	.050	3.84	3.00	2.61	2.37	2.21	2.10	1.94	1.88	1.83	1.75	1.67
	.025	5.03	3.69	3.12	2.79	2.57	2.41	2.19	2.11	2.05	1.95	1.83
	.010	6.64	4.61	3.78	3.32	3.02	2.80	2.51	2.41	2.32	2.19	2.04
	.001	10.83	6.91	5.43	4.62	4.11	3.75	3.27	3.10	2.96	2.75	2.52

Note: These tables were computed using an adaptation of the algorithm for the integral of the beta function given in Press, Flannery, Teukolsky, and Vetterling (1986).

A.2 Critical Values of the t Distribution

	Two-sided α level							
df	.200	.100	.050	.020	.010	.005	.002	.001
2	1.89	2.92	4.30	6.96	9.92	14.09	22.33	31.60
3	1.64	2.35	3.18	4.54	5.84	7.45	10.21	12.92
4	1.53	2.13	2.78	3.75	4.60	5.60	7.17	8.61
5	1.48	2.02	2.57	3.36	4.03	4.77	5.89	6.87
6	1.44	1.94	2.45	3.14	3.71	4.32	5.21	5.96
7	1.41	1.89	2.36	3.00	3.50	4.03	4.79	5.41
8	1.40	1.86	2.31	2.90	3.36	3.83	4.50	5.04
9	1.38	1.83	2.26	2.82	3.25	3.69	4.30	4.78
10	1.37	1.81	2.23	2.76	3.17	3.58	4.14	4.59
12	1.36	1.78	2.18	2.68	3.05	3.43	3.93	4.32
14	1.35	1.76	2.14	2.62	2.98	3.33	3.79	4.14
16	1.34	1.75	2.12	2.58	2.92	3.25	3.69	4.01
18	1.33	1.73	2.10	2.55	2.88	3.20	3.61	3.92
20	1.33	1.72	2.09	2.53	2.85	3.15	3.55	3.85
22	1.32	1.72	2.07	2.51	2.82	3.12	3.50	3.79
24	1.32	1.71	2.06	2.49	2.80	3.09	3.47	3.75
26	1.31	1.71	2.06	2.48	2.78	3.07	3.43	3.71
28	1.31	1.70	2.05	2.47	2.76	3.05	3.41	3.67
30	1.31	1.70	2.04	2.46	2.75	3.03	3.39	3.65
35	1.31	1.69	2.03	2.44	2.72	3.00	3.34	3.59
40	1.30	1.68	2.02	2.42	2.70	2.97	3.31	3.55
45	1.30	1.68	2.01	2.41	2.69	2.95	3.28	3.52
50	1.30	1.68	2.01	2.40	2.68	2.94	3.26	3.50
60	1.30	1.67	2.00	2.39	2.66	2.91	3.23	3.46
70	1.29	1.67	1.99	2.38	2.65	2.90	3.21	3.44
80	1.29	1.66	1.99	2.37	2.64	2.89	3.20	3.42
90	1.29	1.66	1.99	2.37	2.63	2.88	3.18	3.40
100	1.29	1.66	1.98	2.36	2.63	2.87	3.17	3.39
110	1.29	1.66	1.98	2.36	2.62	2.86	3.17	3.38
120	1.29	1.66	1.98	2.36	2.62	2.86	3.16	3.37
∞	1.28	1.65	1.96	2.33	2.58	2.81	3.09	3.29

Note: These tables were computed using an adaptation of the algorithm for the integral of the beta function given in Press et al. (1986).

A.3 Coefficients of Orthogonal Polynomials

Coefficients for the orthogonal polynomials for designs with equally spaced intervals.

a	Degree	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8	c_9	c_{10}	$\sum c_j^2$
3	Linear	−1	0	1								2
	Quadratic	1	−2	1								6
4	Linear	−3	−1	1	3							20
	Quadratic	1	−1	−1	1							4
	Cubic	−1	3	−3	1							20
5	Linear	−2	−1	0	1	2						10
	Quadratic	2	−1	−2	−1	2						14
	Cubic	−1	2	0	−2	1						10
	Quartic	1	−4	6	−4	1						70
6	Linear	−5	−3	−1	1	3	5					70
	Quadratic	5	−1	−4	−4	−1	5					84
	Cubic	−5	7	4	−4	−7	5					180
	Quartic	1	−3	2	2	−3	1					28
7	Linear	−3	−2	−1	0	1	2	3				28
	Quadratic	5	0	−3	−4	−3	0	5				84
	Cubic	−1	1	1	0	−1	−1	1				6
	Quartic	3	−7	1	6	1	−7	3				154
8	Linear	−7	−5	−3	−1	1	3	5	7			168
	Quadratic	7	1	−3	−5	−5	−3	1	7			168
	Cubic	−7	5	7	3	−3	−7	−5	7			264
	Quartic	7	−13	−3	9	9	−3	−13	7			616
9	Linear	−4	−3	−2	−1	0	1	2	3	4		60
	Quadratic	28	7	−8	−17	−20	−17	−8	7	28		2,772
	Cubic	−14	7	13	9	0	−9	−13	−7	14		990
	Quartic	14	−21	−11	9	18	18	9	−11	−21	14	2,002
10	Linear	−9	−7	−5	−3	−1	1	3	5	7	9	330
	Quadratic	6	2	−1	−3	−4	−4	−3	−1	2	6	132
	Cubic	−42	14	35	31	12	−12	−31	−35	−14	42	8,580
	Quartic	18	−22	−17	3	18	18	3	−17	−22	18	2,860

A.4 Critical Values of the Šidák-Bonferroni t Statistic

Critical values of the Šidák-Bonferroni t at $\alpha_{FW} = .20$

Note: The line of numbers immediately above the table gives the percentages for the tests.

	Number of tests										
	2	3	4	5	6	7	8	9	10	11	12
df	10.557	7.168	5.426	4.365	3.651	3.137	2.751	2.449	2.207	2.008	1.842
2	2.83	3.53	4.12	4.63	5.09	5.51	5.90	6.27	6.62	6.95	7.27
3	2.29	2.73	3.08	3.36	3.61	3.83	4.03	4.21	4.38	4.53	4.68
4	2.08	2.43	2.70	2.91	3.09	3.25	3.39	3.52	3.63	3.74	3.84
5	1.97	2.28	2.50	2.68	2.83	2.96	3.08	3.18	3.28	3.36	3.44
6	1.90	2.18	2.39	2.55	2.68	2.79	2.90	2.98	3.07	3.14	3.21
7	1.86	2.12	2.31	2.46	2.58	2.68	2.77	2.86	2.93	3.00	3.06
8	1.82	2.07	2.25	2.39	2.51	2.60	2.69	2.76	2.83	2.89	2.95
9	1.80	2.04	2.21	2.35	2.45	2.55	2.63	2.70	2.76	2.82	2.87
10	1.78	2.01	2.18	2.31	2.41	2.50	2.58	2.65	2.71	2.76	2.81
12	1.75	1.98	2.13	2.25	2.35	2.44	2.51	2.57	2.63	2.68	2.73
14	1.73	1.95	2.10	2.22	2.31	2.39	2.46	2.52	2.57	2.62	2.67
16	1.72	1.93	2.08	2.19	2.28	2.36	2.43	2.48	2.53	2.58	2.62
18	1.70	1.91	2.06	2.17	2.26	2.33	2.40	2.46	2.51	2.55	2.59
20	1.70	1.90	2.04	2.15	2.24	2.31	2.38	2.43	2.48	2.53	2.57
22	1.69	1.89	2.03	2.14	2.23	2.30	2.36	2.42	2.46	2.51	2.55
24	1.68	1.88	2.02	2.13	2.21	2.29	2.35	2.40	2.45	2.49	2.53
26	1.68	1.88	2.02	2.12	2.20	2.28	2.34	2.39	2.43	2.48	2.51
28	1.67	1.87	2.01	2.11	2.20	2.27	2.33	2.38	2.42	2.47	2.50
30	1.67	1.87	2.00	2.11	2.19	2.26	2.32	2.37	2.41	2.46	2.49
35	1.66	1.86	1.99	2.09	2.17	2.24	2.30	2.35	2.40	2.44	2.47
40	1.66	1.85	1.98	2.08	2.16	2.23	2.29	2.34	2.38	2.42	2.46
45	1.65	1.84	1.98	2.08	2.16	2.22	2.28	2.33	2.37	2.41	2.45
50	1.65	1.84	1.97	2.07	2.15	2.21	2.27	2.32	2.36	2.40	2.44
60	1.64	1.83	1.96	2.06	2.14	2.20	2.26	2.31	2.35	2.39	2.42
70	1.64	1.83	1.96	2.05	2.13	2.20	2.25	2.30	2.34	2.38	2.41
80	1.64	1.83	1.95	2.05	2.13	2.19	2.25	2.29	2.33	2.37	2.41
90	1.63	1.82	1.95	2.05	2.12	2.19	2.24	2.29	2.33	2.37	2.40
100	1.63	1.82	1.95	2.04	2.12	2.18	2.24	2.28	2.33	2.36	2.40
110	1.63	1.82	1.95	2.04	2.12	2.18	2.23	2.28	2.32	2.36	2.39
120	1.63	1.82	1.94	2.04	2.11	2.18	2.23	2.28	2.32	2.36	2.39
∞	1.62	1.80	1.92	2.02	2.09	2.15	2.20	2.25	2.29	2.33	2.36

Critical values of the Šidák-Bonferroni t at $\alpha_{FW} = .10$

Note: The line of numbers immediately above the table gives the percentages for the tests.

	Number of tests										
	2	3	4	5	6	7	8	9	10	11	12
df	5.132	3.451	2.600	2.085	1.741	1.494	1.308	1.164	1.048	0.953	0.874
2	4.24	5.24	6.08	6.82	7.48	8.09	8.66	9.19	9.69	10.17	10.63
3	3.15	3.69	4.12	4.47	4.78	5.05	5.30	5.53	5.74	5.94	6.13
4	2.75	3.15	3.45	3.70	3.91	4.09	4.26	4.41	4.54	4.67	4.79
5	2.55	2.88	3.13	3.33	3.49	3.64	3.77	3.88	3.98	4.08	4.17
6	2.43	2.72	2.94	3.11	3.25	3.38	3.48	3.58	3.67	3.75	3.82
7	2.35	2.62	2.81	2.97	3.10	3.21	3.30	3.39	3.46	3.54	3.60
8	2.29	2.54	2.73	2.87	2.99	3.09	3.18	3.25	3.32	3.39	3.45
9	2.25	2.49	2.66	2.80	2.91	3.00	3.08	3.16	3.22	3.28	3.33
10	2.21	2.45	2.61	2.74	2.84	2.93	3.01	3.08	3.14	3.20	3.25
12	2.16	2.38	2.54	2.66	2.76	2.84	2.91	2.97	3.03	3.08	3.13
14	2.13	2.34	2.49	2.60	2.70	2.77	2.84	2.90	2.95	3.00	3.04
16	2.11	2.31	2.45	2.56	2.65	2.73	2.79	2.85	2.90	2.94	2.99
18	2.09	2.29	2.43	2.53	2.62	2.69	2.75	2.81	2.86	2.90	2.94
20	2.07	2.27	2.40	2.51	2.59	2.66	2.72	2.78	2.82	2.87	2.91
22	2.06	2.25	2.39	2.49	2.57	2.64	2.70	2.75	2.80	2.84	2.88
24	2.05	2.24	2.37	2.47	2.55	2.62	2.68	2.73	2.78	2.82	2.85
26	2.04	2.23	2.36	2.46	2.54	2.61	2.66	2.71	2.76	2.80	2.84
28	2.04	2.22	2.35	2.45	2.53	2.59	2.65	2.70	2.74	2.78	2.82
30	2.03	2.21	2.34	2.44	2.52	2.58	2.64	2.69	2.73	2.77	2.81
35	2.02	2.20	2.32	2.42	2.50	2.56	2.61	2.66	2.70	2.74	2.78
40	2.01	2.19	2.31	2.41	2.48	2.54	2.60	2.64	2.69	2.72	2.76
45	2.00	2.18	2.30	2.39	2.47	2.53	2.58	2.63	2.67	2.71	2.74
50	2.00	2.17	2.29	2.39	2.46	2.52	2.57	2.62	2.66	2.70	2.73
60	1.99	2.16	2.28	2.37	2.45	2.51	2.56	2.60	2.64	2.68	2.71
70	1.98	2.16	2.27	2.36	2.44	2.50	2.55	2.59	2.63	2.67	2.70
80	1.98	2.15	2.27	2.36	2.43	2.49	2.54	2.58	2.62	2.66	2.69
90	1.98	2.15	2.26	2.35	2.42	2.48	2.53	2.58	2.61	2.65	2.68
100	1.97	2.14	2.26	2.35	2.42	2.48	2.53	2.57	2.61	2.64	2.67
110	1.97	2.14	2.26	2.34	2.41	2.47	2.52	2.57	2.60	2.64	2.67
120	1.97	2.14	2.25	2.34	2.41	2.47	2.52	2.56	2.60	2.63	2.67
∞	1.95	2.11	2.23	2.31	2.38	2.43	2.48	2.52	2.56	2.59	2.62

Critical values of the Šidák-Bonferroni t at $\alpha_{FW} = .05$

Note: The line of numbers immediately above the table gives the percentages for the tests.

	Number of tests										
	2	3	4	5	6	7	8	9	10	11	12
df	2.532	1.695	1.274	1.021	0.851	0.730	0.639	0.568	0.512	0.465	0.427
2	6.16	7.58	8.77	9.82	10.77	11.64	12.45	13.21	13.93	14.61	15.26
3	4.16	4.83	5.35	5.80	6.18	6.53	6.84	7.13	7.39	7.64	7.88
4	3.48	3.94	4.29	4.58	4.82	5.04	5.23	5.40	5.56	5.71	5.85
5	3.15	3.52	3.79	4.01	4.20	4.36	4.50	4.63	4.75	4.86	4.96
6	2.96	3.27	3.51	3.69	3.84	3.98	4.10	4.20	4.30	4.38	4.46
7	2.83	3.12	3.32	3.48	3.62	3.74	3.84	3.93	4.01	4.09	4.16
8	2.74	3.00	3.19	3.34	3.46	3.57	3.66	3.74	3.82	3.88	3.95
9	2.68	2.92	3.10	3.24	3.35	3.45	3.53	3.61	3.67	3.74	3.79
10	2.63	2.86	3.03	3.16	3.26	3.36	3.43	3.50	3.57	3.62	3.68
12	2.55	2.77	2.92	3.04	3.14	3.22	3.30	3.36	3.42	3.47	3.51
14	2.50	2.71	2.85	2.97	3.06	3.14	3.20	3.26	3.31	3.36	3.41
16	2.47	2.66	2.80	2.91	3.00	3.07	3.14	3.19	3.24	3.29	3.33
18	2.44	2.63	2.77	2.87	2.95	3.02	3.08	3.14	3.19	3.23	3.27
20	2.42	2.60	2.74	2.84	2.92	2.99	3.05	3.10	3.14	3.19	3.22
22	2.40	2.58	2.71	2.81	2.89	2.96	3.01	3.06	3.11	3.15	3.19
24	2.39	2.57	2.69	2.79	2.87	2.93	2.99	3.04	3.08	3.12	3.16
26	2.37	2.55	2.68	2.77	2.85	2.91	2.97	3.01	3.06	3.10	3.13
28	2.36	2.54	2.66	2.75	2.83	2.89	2.95	3.00	3.04	3.08	3.11
30	2.35	2.53	2.65	2.74	2.82	2.88	2.93	2.98	3.02	3.06	3.09
35	2.34	2.51	2.63	2.72	2.79	2.85	2.90	2.95	2.99	3.02	3.06
40	2.32	2.49	2.61	2.70	2.77	2.83	2.88	2.92	2.96	3.00	3.03
45	2.31	2.48	2.59	2.68	2.75	2.81	2.86	2.90	2.94	2.98	3.01
50	2.31	2.47	2.58	2.67	2.74	2.80	2.85	2.89	2.93	2.96	2.99
60	2.29	2.46	2.57	2.65	2.72	2.78	2.83	2.87	2.91	2.94	2.97
70	2.29	2.45	2.56	2.64	2.71	2.76	2.81	2.85	2.89	2.92	2.95
80	2.28	2.44	2.55	2.63	2.70	2.75	2.80	2.84	2.88	2.91	2.94
90	2.27	2.43	2.54	2.62	2.69	2.75	2.79	2.83	2.87	2.90	2.93
100	2.27	2.43	2.54	2.62	2.68	2.74	2.79	2.83	2.86	2.90	2.92
110	2.27	2.42	2.53	2.61	2.68	2.73	2.78	2.82	2.86	2.89	2.92
120	2.26	2.42	2.53	2.61	2.68	2.73	2.78	2.82	2.85	2.88	2.91
∞	2.24	2.39	2.49	2.57	2.63	2.68	2.73	2.77	2.80	2.83	2.86

Critical values of the Šidák-Bonferroni t at $\alpha_{FW} = .01$

Note: The line of numbers immediately above the table gives the percentages for the tests.

	Number of tests										
	2	3	4	5	6	7	8	9	10	11	12
df	0.501	0.334	0.251	0.201	0.167	0.143	0.126	0.112	0.100	0.091	0.084
2	14.07	17.25	19.92	22.28	24.41	26.37	28.20	29.91	31.53	33.07	34.54
3	7.45	8.57	9.45	10.20	10.85	11.44	11.97	12.45	12.90	13.33	13.72
4	5.59	6.25	6.75	7.17	7.52	7.83	8.11	8.37	8.60	8.82	9.02
5	4.77	5.24	5.60	5.89	6.13	6.35	6.54	6.71	6.86	7.01	7.14
6	4.31	4.69	4.98	5.20	5.39	5.56	5.70	5.83	5.95	6.06	6.16
7	4.03	4.35	4.59	4.78	4.94	5.08	5.20	5.31	5.40	5.49	5.58
8	3.83	4.12	4.33	4.50	4.64	4.76	4.86	4.95	5.04	5.11	5.19
9	3.69	3.95	4.14	4.29	4.42	4.53	4.62	4.70	4.78	4.85	4.91
10	3.58	3.83	4.00	4.14	4.26	4.35	4.44	4.52	4.58	4.65	4.70
12	3.43	3.65	3.80	3.93	4.03	4.11	4.19	4.26	4.32	4.37	4.42
14	3.32	3.53	3.67	3.79	3.88	3.96	4.02	4.08	4.14	4.19	4.23
16	3.25	3.44	3.58	3.68	3.77	3.84	3.91	3.96	4.01	4.06	4.10
18	3.20	3.38	3.51	3.61	3.69	3.76	3.82	3.87	3.92	3.96	4.00
20	3.15	3.33	3.45	3.55	3.63	3.69	3.75	3.80	3.85	3.89	3.93
22	3.12	3.29	3.41	3.50	3.58	3.64	3.70	3.75	3.79	3.83	3.87
24	3.09	3.26	3.37	3.47	3.54	3.60	3.65	3.70	3.74	3.78	3.82
26	3.07	3.23	3.34	3.43	3.51	3.57	3.62	3.66	3.70	3.74	3.78
28	3.05	3.21	3.32	3.41	3.48	3.54	3.59	3.63	3.67	3.71	3.74
30	3.03	3.19	3.30	3.38	3.45	3.51	3.56	3.61	3.64	3.68	3.71
35	3.00	3.15	3.26	3.34	3.41	3.46	3.51	3.55	3.59	3.62	3.65
40	2.97	3.12	3.23	3.31	3.37	3.42	3.47	3.51	3.55	3.58	3.61
45	2.95	3.10	3.20	3.28	3.34	3.40	3.44	3.48	3.52	3.55	3.58
50	2.94	3.08	3.18	3.26	3.32	3.37	3.42	3.46	3.49	3.53	3.55
60	2.91	3.06	3.15	3.23	3.29	3.34	3.39	3.42	3.46	3.49	3.52
70	2.90	3.04	3.14	3.21	3.27	3.32	3.36	3.40	3.43	3.46	3.49
80	2.89	3.02	3.12	3.19	3.25	3.30	3.34	3.38	3.41	3.44	3.47
90	2.88	3.01	3.11	3.18	3.24	3.29	3.33	3.37	3.40	3.43	3.46
100	2.87	3.01	3.10	3.17	3.23	3.28	3.32	3.36	3.39	3.42	3.44
110	2.86	3.00	3.09	3.16	3.22	3.27	3.31	3.35	3.38	3.41	3.43
120	2.86	2.99	3.09	3.16	3.22	3.26	3.30	3.34	3.37	3.40	3.43
∞	2.81	2.93	3.02	3.09	3.14	3.19	3.23	3.26	3.29	3.32	3.34

Note: These tables were computed using an adaptation of the algorithm for the integral of the beta function given in Press et al. (1986).

A.5 Critical Values for Dunnett's Test

Critical values for Dunnett's test at $\alpha_{FW} = .20$

	Number of groups *including control*									
df	3	4	5	6	7	8	9	10	11	12
2	2.47	2.80	3.03	3.20	3.33	3.44	3.54	3.62	3.70	3.76
3	2.10	2.36	2.54	2.68	2.78	2.87	2.95	3.01	3.07	3.12
4	1.95	2.18	2.34	2.45	2.55	2.63	2.69	2.75	2.80	2.85
5	1.86	2.08	2.22	2.33	2.42	2.49	2.56	2.61	2.66	2.70
6	1.81	2.01	2.15	2.26	2.34	2.41	2.47	2.52	2.56	2.60
7	1.77	1.97	2.10	2.20	2.28	2.35	2.41	2.46	2.50	2.54
8	1.75	1.94	2.07	2.16	2.24	2.31	2.36	2.41	2.45	2.49
9	1.73	1.91	2.04	2.14	2.21	2.27	2.33	2.37	2.41	2.45
10	1.71	1.89	2.02	2.11	2.19	2.25	2.30	2.35	2.39	2.42
12	1.69	1.87	1.99	2.08	2.15	2.21	2.26	2.30	2.34	2.38
14	1.67	1.85	1.96	2.05	2.12	2.18	2.23	2.28	2.31	2.35
16	1.66	1.83	1.95	2.04	2.11	2.16	2.21	2.25	2.29	2.32
18	1.65	1.82	1.94	2.02	2.09	2.15	2.20	2.24	2.27	2.31
20	1.64	1.81	1.93	2.01	2.08	2.13	2.18	2.22	2.26	2.29
22	1.63	1.80	1.92	2.00	2.07	2.13	2.17	2.21	2.25	2.28
24	1.63	1.80	1.91	1.99	2.06	2.12	2.16	2.20	2.24	2.27
26	1.63	1.79	1.90	1.99	2.05	2.11	2.16	2.20	2.23	2.26
28	1.62	1.79	1.90	1.98	2.05	2.10	2.15	2.19	2.23	2.26
30	1.62	1.78	1.90	1.98	2.04	2.10	2.15	2.19	2.22	2.25
35	1.61	1.78	1.89	1.97	2.03	2.09	2.13	2.17	2.21	2.24
40	1.61	1.77	1.88	1.96	2.03	2.08	2.13	2.17	2.20	2.23
45	1.60	1.77	1.88	1.96	2.02	2.08	2.12	2.16	2.19	2.22
50	1.60	1.76	1.87	1.95	2.02	2.07	2.12	2.15	2.19	2.22
60	1.60	1.76	1.87	1.95	2.01	2.06	2.11	2.15	2.18	2.21
70	1.59	1.75	1.86	1.94	2.01	2.06	2.10	2.14	2.18	2.21
80	1.59	1.75	1.86	1.94	2.00	2.05	2.10	2.14	2.17	2.20
90	1.59	1.75	1.86	1.94	2.00	2.05	2.10	2.13	2.17	2.20
100	1.59	1.75	1.85	1.93	2.00	2.05	2.09	2.13	2.17	2.20
110	1.59	1.75	1.85	1.93	2.00	2.05	2.09	2.13	2.16	2.19
120	1.59	1.75	1.85	1.93	1.99	2.05	2.09	2.13	2.16	2.19
∞	1.58	1.73	1.84	1.92	1.98	2.03	2.07	2.11	2.14	2.17

Critical values for Dunnett's test at $\alpha_{FW} = .10$

Number of groups *including control*

df	3	4	5	6	7	8	9	10	11	12
2	3.72	4.18	4.50	4.74	4.93	5.09	5.23	5.34	5.45	5.54
3	2.91	3.23	3.45	3.62	3.75	3.87	3.96	4.04	4.12	4.18
4	2.60	2.86	3.05	3.18	3.30	3.39	3.47	3.54	3.60	3.65
5	2.43	2.67	2.83	2.96	3.05	3.14	3.21	3.27	3.32	3.37
6	2.33	2.55	2.70	2.81	2.91	2.98	3.05	3.10	3.15	3.20
7	2.26	2.47	2.61	2.72	2.81	2.88	2.94	2.99	3.04	3.08
8	2.22	2.41	2.55	2.65	2.73	2.80	2.86	2.91	2.96	3.00
9	2.18	2.37	2.50	2.60	2.68	2.74	2.80	2.85	2.89	2.93
10	2.15	2.34	2.46	2.56	2.64	2.70	2.75	2.80	2.84	2.88
12	2.11	2.29	2.41	2.50	2.57	2.63	2.69	2.73	2.77	2.81
14	2.08	2.25	2.37	2.46	2.53	2.59	2.64	2.68	2.72	2.76
16	2.06	2.23	2.34	2.43	2.50	2.56	2.61	2.65	2.69	2.72
18	2.04	2.21	2.32	2.41	2.47	2.53	2.58	2.62	2.66	2.69
20	2.03	2.19	2.30	2.39	2.46	2.51	2.56	2.60	2.64	2.67
22	2.02	2.18	2.29	2.37	2.44	2.63	2.54	2.58	2.62	2.65
24	2.01	2.17	2.28	2.36	2.43	2.48	2.53	2.57	2.60	2.64
26	2.00	2.16	2.27	2.35	2.42	2.47	2.52	2.56	2.59	2.62
28	1.99	2.15	2.26	2.34	2.41	2.46	2.51	2.55	2.58	2.61
30	1.99	2.15	2.25	2.33	2.40	2.45	2.50	2.54	2.57	2.60
35	1.98	2.13	2.24	2.32	2.38	2.44	2.48	2.52	2.55	2.58
40	1.97	2.13	2.23	2.31	2.37	2.42	2.47	2.51	2.54	2.57
45	1.96	2.12	2.22	2.30	2.36	2.41	2.46	2.50	2.53	2.56
50	1.96	2.11	2.22	2.29	2.36	2.41	2.45	2.49	2.52	2.55
60	1.95	2.10	2.21	2.28	2.34	2.40	2.44	2.48	2.51	2.54
70	1.95	2.10	2.20	2.28	2.34	2.39	2.43	2.47	2.50	2.53
80	1.94	2.09	2.19	2.27	2.33	2.38	2.42	2.46	2.49	2.52
90	1.94	2.09	2.19	2.27	2.33	2.38	2.42	2.46	2.49	2.52
100	1.94	2.09	2.19	2.26	2.32	2.37	2.42	2.45	2.48	2.51
110	1.94	2.08	2.19	2.26	2.32	2.37	2.41	2.45	2.48	2.51
120	1.93	2.08	2.18	2.26	2.32	2.37	2.41	2.45	2.48	2.51
∞	1.92	2.06	2.16	2.23	2.29	2.34	2.38	2.42	2.45	2.48

Critical values for Dunnett's test at $\alpha_{FW} = .05$

	Number of groups *including control*									
df	3	4	5	6	7	8	9	10	11	12
2	5.42	6.07	6.51	6.85	7.12	7.35	7.54	7.71	7.85	7.99
3	3.87	4.26	4.54	4.75	4.92	5.06	5.18	5.28	5.37	5.45
4	3.31	3.62	3.83	3.99	4.13	4.24	4.33	4.41	4.48	4.55
5	3.03	3.29	3.48	3.62	3.73	3.82	3.90	3.97	4.03	4.09
6	2.86	3.10	3.26	3.39	3.49	3.57	3.64	3.71	3.76	3.81
7	2.75	2.97	3.12	3.24	3.33	3.41	3.47	3.53	3.58	3.63
8	2.67	2.88	3.02	3.13	3.22	3.29	3.35	3.41	3.46	3.50
9	2.61	2.81	2.95	3.05	3.14	3.20	3.26	3.32	3.36	3.40
10	2.57	2.76	2.89	2.99	3.07	3.14	3.19	3.24	3.29	3.33
12	2.50	2.68	2.81	2.90	2.98	3.04	3.09	3.14	3.18	3.22
14	2.46	2.63	2.75	2.84	2.91	2.97	3.02	3.07	3.11	3.14
16	2.42	2.59	2.71	2.80	2.87	2.92	2.97	3.02	3.06	3.09
18	2.40	2.56	2.68	2.76	2.83	2.89	2.94	2.98	3.02	3.05
20	2.38	2.54	2.65	2.73	2.80	2.86	2.90	2.95	2.98	3.02
22	2.36	2.52	2.63	2.71	2.78	2.83	2.88	2.92	2.96	2.99
24	2.35	2.51	2.61	2.70	2.76	2.81	2.86	2.90	2.94	3.38
26	2.34	2.49	2.60	2.68	2.74	2.80	2.84	2.88	2.92	2.95
28	2.33	2.48	2.59	2.67	2.73	2.78	2.83	2.87	2.90	2.93
30	2.32	2.47	2.58	2.66	2.72	2.77	2.82	2.86	2.89	2.92
35	2.30	2.46	2.56	2.64	2.70	2.75	2.79	2.83	2.86	2.89
40	2.29	2.44	2.54	2.62	2.68	2.73	2.77	2.81	2.84	2.87
45	2.28	2.43	2.53	2.61	2.67	2.72	2.76	2.80	2.83	2.86
50	2.28	2.42	2.52	2.60	2.66	2.71	2.75	2.79	2.82	2.85
60	2.27	2.41	2.51	2.58	2.64	2.69	2.73	2.77	2.80	2.83
70	2.26	2.40	2.50	2.57	2.63	2.68	2.72	2.76	2.79	2.82
80	2.25	2.39	2.49	2.56	2.62	2.67	2.71	2.75	2.78	2.81
90	2.25	2.39	2.49	2.56	2.62	2.66	2.71	2.74	2.77	2.80
100	2.24	2.39	2.48	2.55	2.61	2.66	2.70	2.74	2.77	2.79
110	2.24	2.38	2.48	2.55	2.61	2.65	2.70	2.73	2.76	2.79
120	2.24	2.38	2.47	2.55	2.60	2.65	2.69	2.73	2.76	2.79
∞	2.21	2.35	2.44	2.51	2.57	2.61	2.65	2.69	2.72	2.74

Critical values for Dunnett's test at $\alpha_{FW} = .01$

	Number of groups *including control*									
df	3	4	5	6	7	8	9	10	11	12
2	12.39	13.83	14.83	15.59	16.20	16.70	17.13	17.50	17.83	18.13
3	6.97	7.64	8.10	8.46	8.75	8.98	9.19	9.37	9.52	9.67
4	5.37	5.81	6.12	6.36	6.56	6.72	6.86	6.98	7.08	7.18
5	4.63	4.98	5.22	5.41	5.56	5.68	5.79	5.89	5.97	6.05
6	4.21	4.51	4.71	4.87	5.00	5.10	5.20	5.28	5.35	5.41
7	3.95	4.21	4.39	4.53	4.64	4.74	4.82	4.89	4.95	5.01
8	3.77	4.00	4.17	4.30	4.40	4.48	4.56	4.62	4.68	4.73
9	3.63	3.85	4.01	4.12	4.22	4.30	4.37	4.43	4.48	4.53
10	3.53	3.74	3.88	3.99	4.08	4.16	4.22	4.28	4.33	4.37
12	3.39	3.58	3.71	3.81	3.89	3.96	4.02	4.07	4.12	4.16
14	3.29	3.47	3.59	3.69	3.76	3.83	3.88	3.93	3.97	4.01
16	3.22	3.39	3.51	3.60	3.67	3.73	3.78	3.83	3.87	3.91
18	3.17	3.33	3.45	3.53	3.60	3.66	3.71	3.75	3.79	3.83
20	3.13	3.29	3.40	3.48	3.55	3.60	3.65	3.69	3.73	3.77
22	3.09	3.25	3.36	3.44	3.50	3.56	3.61	3.65	3.68	3.72
24	3.07	3.22	3.32	3.40	3.47	3.52	3.57	3.61	3.64	3.67
26	3.04	3.19	3.30	3.38	3.44	3.49	3.54	3.58	3.61	3.64
28	3.03	3.17	3.27	3.35	3.41	3.47	3.51	3.55	3.58	3.61
30	3.01	3.15	3.25	3.33	3.39	3.44	3.49	3.52	3.56	3.59
35	2.98	3.12	3.22	3.29	3.35	3.40	3.44	3.48	3.51	3.54
40	2.95	3.09	3.19	3.26	3.32	3.37	3.41	3.44	3.48	3.51
45	2.93	3.07	3.16	3.24	3.29	3.34	3.38	3.42	3.45	3.48
50	2.92	3.05	3.15	3.22	3.27	3.32	3.36	3.40	3.43	3.46
60	2.90	3.03	3.12	3.19	3.25	3.29	3.33	3.37	3.40	3.42
70	2.88	3.01	3.10	3.17	3.23	3.27	3.31	3.34	3.37	3.40
80	2.87	3.00	3.09	3.16	3.21	3.26	3.30	3.33	3.36	3.39
90	2.86	2.99	3.08	3.15	3.20	3.24	3.28	3.32	3.35	3.37
100	2.86	2.98	3.07	3.14	3.19	3.24	3.27	3.31	3.34	3.36
110	2.85	2.98	3.06	3.13	3.18	3.23	3.27	3.30	3.33	3.35
120	2.85	2.97	3.06	3.12	3.18	3.22	3.26	3.29	3.32	3.35
∞	2.80	2.92	3.00	3.06	3.11	3.15	3.19	3.22	3.25	3.27

Note: These tables were calculated using the algorithm in Dunnett (1989), with additions and corrections posted in statlib (lib.stat.cmu.edu).

A.6 Critical Values of the Studentized Range Statistic

Critical values of the Studentized range statistic at $\alpha_{FW} = .20$

	Number of means										
df	2	3	4	5	6	7	8	9	10	12	15
2	2.67	3.82	4.56	5.10	5.52	5.87	6.16	6.41	6.63	7.00	7.44
3	2.32	3.25	3.83	4.26	4.60	4.87	5.10	5.30	5.48	5.78	6.13
4	2.17	3.00	3.53	3.91	4.21	4.45	4.66	4.83	4.99	5.25	5.57
5	2.09	2.87	3.36	3.71	3.99	4.21	4.41	4.57	4.72	4.96	5.25
6	2.04	2.79	3.25	3.59	3.85	4.07	4.25	4.40	4.54	4.77	5.05
7	2.00	2.73	3.18	3.50	3.76	3.96	4.14	4.29	4.42	4.64	4.91
8	1.98	2.69	3.13	3.44	3.69	3.89	4.06	4.20	4.33	4.55	4.80
9	1.96	2.66	3.09	3.39	3.63	3.83	3.99	4.14	4.26	4.47	4.72
10	1.94	2.63	3.05	3.36	3.59	3.78	3.94	4.08	4.21	4.41	4.66
12	1.92	2.60	3.01	3.30	3.53	3.72	3.87	4.01	4.13	4.33	4.57
14	1.90	2.57	2.97	3.26	3.48	3.67	3.82	3.95	4.07	4.26	4.50
16	1.89	2.55	2.95	3.23	3.45	3.63	3.78	3.91	4.03	4.22	4.45
18	1.88	2.54	2.93	3.21	3.43	3.60	3.75	3.88	3.99	4.18	4.41
20	1.87	2.52	2.91	3.19	3.41	3.58	3.73	3.86	3.97	4.15	4.38
22	1.87	2.52	2.90	3.18	3.39	3.56	3.71	3.84	3.95	4.13	4.35
24	1.86	2.51	2.89	3.17	3.38	3.55	3.69	3.82	3.93	4.11	4.33
26	1.86	2.50	2.88	3.16	3.37	3.54	3.68	3.80	3.91	4.09	4.31
28	1.86	2.50	2.88	3.15	3.36	3.53	3.67	3.79	3.90	4.08	4.30
30	1.85	2.49	2.87	3.14	3.35	3.52	3.66	3.78	3.89	4.07	4.28
35	1.85	2.48	2.86	3.13	3.33	3.50	3.64	3.76	3.87	4.04	4.25
40	1.84	2.47	2.85	3.11	3.32	3.48	3.62	3.74	3.85	4.02	4.23
45	1.84	2.47	2.84	3.11	3.31	3.47	3.61	3.73	3.84	4.01	4.22
50	1.84	2.46	2.84	3.10	3.30	3.47	3.60	3.72	3.82	4.00	4.21
60	1.83	2.46	2.83	3.09	3.29	3.45	3.59	3.71	3.81	3.98	4.19
70	1.83	2.45	2.82	3.08	3.28	3.44	3.58	3.70	3.80	3.97	4.17
80	1.83	2.45	2.82	3.08	3.28	3.44	3.57	3.69	3.79	3.96	4.16
90	1.83	2.45	2.81	3.07	3.27	3.43	3.57	3.68	3.78	3.95	4.15
100	1.82	2.44	2.81	3.07	3.27	3.43	3.56	3.68	3.78	3.95	4.15
110	1.82	2.44	2.81	3.07	3.26	3.42	3.56	3.67	3.77	3.94	4.14
120	1.82	2.44	2.81	3.06	3.26	3.42	3.55	3.67	3.77	3.94	4.14
∞	1.81	2.42	2.78	3.04	3.23	3.39	3.52	3.63	3.73	3.90	4.09

Critical values of the Studentized range statistic at $\alpha_{FW} = .10$

	Number of means										
df	2	3	4	5	6	7	8	9	10	12	15
2	4.14	5.74	6.78	7.54	8.14	8.63	9.05	9.41	9.73	10.26	10.89
3	3.33	4.47	5.20	5.74	6.16	6.51	6.81	7.06	7.29	7.67	8.12
4	3.02	3.98	4.59	5.04	5.39	5.68	5.93	6.14	6.33	6.65	7.03
5	2.85	3.72	4.26	4.67	4.98	5.24	5.46	5.65	5.82	6.10	6.44
6	2.75	3.56	4.07	4.44	4.73	4.97	5.17	5.34	5.50	5.76	6.08
7	2.68	3.45	3.93	4.28	4.56	4.78	4.97	5.14	5.28	5.53	5.83
8	2.63	3.38	3.83	4.17	4.43	4.65	4.83	4.99	5.13	5.36	5.64
9	2.59	3.32	3.76	4.08	4.34	4.55	4.72	4.87	5.01	5.24	5.51
10	2.56	3.27	3.70	4.02	4.26	4.47	4.64	4.78	4.91	5.13	5.40
12	2.52	3.20	3.62	3.92	4.16	4.35	4.51	4.65	4.78	4.99	5.24
14	2.49	3.16	3.56	3.85	4.08	4.27	4.42	4.56	4.68	4.88	5.12
16	2.47	3.12	3.52	3.81	4.03	4.21	4.36	4.49	4.61	4.81	5.04
18	2.45	3.10	3.49	3.77	3.98	4.16	4.31	4.44	4.55	4.75	4.98
20	2.44	3.08	3.46	3.74	3.95	4.12	4.27	4.40	4.51	4.70	4.92
22	2.43	3.06	3.44	3.71	3.92	4.10	4.24	4.36	4.47	4.66	4.88
24	2.42	3.05	3.42	3.69	3.90	4.07	4.21	4.34	4.45	4.63	4.85
26	2.41	3.04	3.41	3.68	3.88	4.05	4.19	4.31	4.42	4.60	4.82
28	2.41	3.03	3.40	3.66	3.87	4.03	4.17	4.29	4.40	4.58	4.79
30	2.40	3.02	3.39	3.65	3.85	4.02	4.16	4.28	4.38	4.56	4.77
35	2.39	3.00	3.36	3.62	3.82	3.99	4.12	4.24	4.34	4.52	4.73
40	2.38	2.99	3.35	3.61	3.80	3.96	4.10	4.22	4.32	4.49	4.69
45	2.38	2.98	3.34	3.59	3.79	3.95	4.08	4.20	4.30	4.47	4.67
50	2.37	2.97	3.33	3.58	3.77	3.93	4.07	4.18	4.28	4.45	4.65
60	2.36	2.96	3.31	3.56	3.76	3.91	4.04	4.16	4.25	4.42	4.62
70	2.36	2.95	3.30	3.55	3.74	3.90	4.03	4.14	4.24	4.40	4.60
80	2.35	2.95	3.29	3.54	3.73	3.89	4.01	4.13	4.22	4.39	4.58
90	2.35	2.94	3.29	3.53	3.72	3.88	4.01	4.12	4.21	4.38	4.57
100	2.35	2.94	3.28	3.53	3.72	3.87	4.00	4.11	4.20	4.37	4.56
110	2.35	2.93	3.28	3.52	3.71	3.86	3.99	4.10	4.20	4.36	4.55
120	2.35	2.93	3.28	3.52	3.71	3.86	3.99	4.10	4.19	4.35	4.54
∞	2.33	2.90	3.24	3.48	3.66	3.81	3.93	4.04	4.13	4.28	4.47

Critical values of the Studentized range statistic at $\alpha_{FW} = .05$

	Number of means										
df	2	3	4	5	6	7	8	9	10	12	15
2	6.10	8.34	9.81	10.89	11.74	12.44	13.04	13.55	14.00	14.76	15.66
3	4.51	5.91	6.83	7.50	8.04	8.48	8.86	9.18	9.47	9.95	10.52
4	3.93	5.04	5.76	6.29	6.71	7.05	7.35	7.60	7.83	8.21	8.67
5	3.64	4.61	5.22	5.68	6.04	6.33	6.58	6.80	7.00	7.33	7.72
6	3.46	4.34	4.90	5.31	5.63	5.90	6.12	6.32	6.50	6.79	7.14
7	3.35	4.17	4.68	5.06	5.36	5.61	5.82	6.00	6.16	6.43	6.76
8	3.26	4.04	4.53	4.89	5.17	5.40	5.60	5.77	5.92	6.18	6.48
9	3.20	3.95	4.42	4.76	5.03	5.25	5.43	5.60	5.74	5.98	6.28
10	3.15	3.88	4.33	4.66	4.91	5.13	5.31	5.46	5.60	5.83	6.12
12	3.08	3.77	4.20	4.51	4.75	4.95	5.12	5.27	5.40	5.62	5.88
14	3.04	3.70	4.11	4.41	4.64	4.83	4.99	5.13	5.25	5.46	5.72
16	3.00	3.65	4.05	4.33	4.56	4.74	4.90	5.03	5.15	5.35	5.59
18	2.97	3.61	4.00	4.28	4.50	4.67	4.83	4.96	5.07	5.27	5.50
20	2.95	3.58	3.96	4.23	4.45	4.62	4.77	4.90	5.01	5.20	5.43
22	2.93	3.55	3.93	4.20	4.41	4.58	4.72	4.85	4.96	5.15	5.37
24	2.92	3.53	3.90	4.17	4.37	4.54	4.69	4.81	4.92	5.10	5.32
26	2.91	3.52	3.88	4.14	4.35	4.51	4.65	4.77	4.88	5.06	5.28
28	2.90	3.50	3.86	4.12	4.32	4.49	4.63	4.75	4.85	5.03	5.24
30	2.89	3.49	3.85	4.10	4.30	4.47	4.60	4.72	4.83	5.00	5.21
35	2.87	3.46	3.82	4.07	4.26	4.42	4.56	4.67	4.77	4.95	5.15
40	2.86	3.44	3.79	4.04	4.23	4.39	4.52	4.64	4.74	4.90	5.11
45	2.85	3.43	3.77	4.02	4.21	4.36	4.49	4.61	4.71	4.87	5.07
50	2.84	3.42	3.76	4.00	4.19	4.34	4.47	4.58	4.68	4.85	5.04
60	2.83	3.40	3.74	3.98	4.16	4.31	4.44	4.55	4.65	4.81	5.00
70	2.82	3.39	3.72	3.96	4.14	4.29	4.42	4.53	4.62	4.78	4.97
80	2.82	3.38	3.71	3.95	4.13	4.28	4.40	4.51	4.60	4.76	4.95
90	2.81	3.37	3.70	3.94	4.12	4.27	4.39	4.50	4.59	4.75	4.93
100	2.81	3.37	3.70	3.93	4.11	4.26	4.38	4.48	4.58	4.73	4.92
110	2.80	3.36	3.69	3.92	4.10	4.25	4.37	4.48	4.57	4.72	4.91
120	2.80	3.36	3.69	3.92	4.10	4.24	4.36	4.47	4.56	4.72	4.90
∞	2.77	3.31	3.63	3.86	4.03	4.17	4.29	4.39	4.47	4.62	4.80

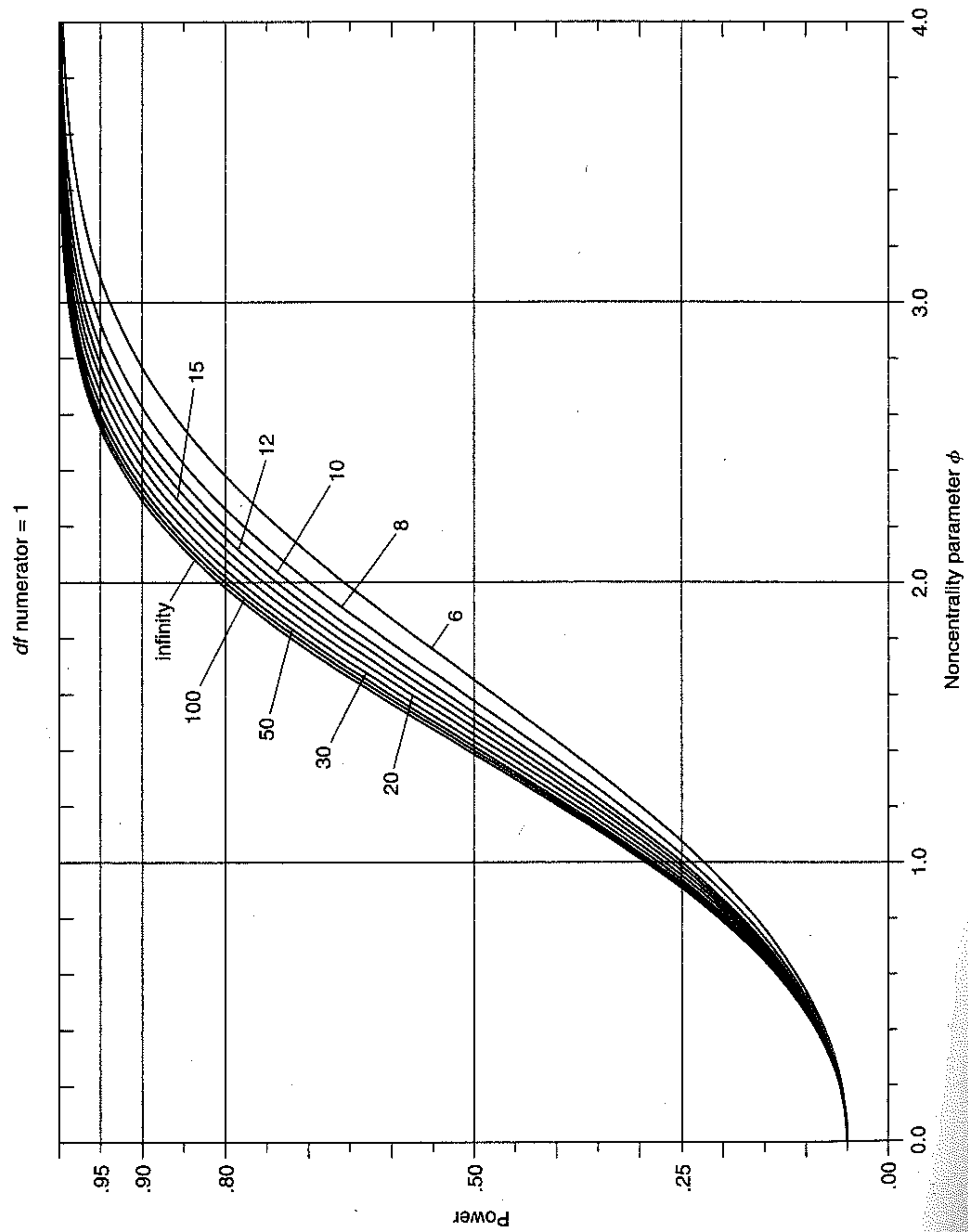
Critical values of the Studentized range statistic at $\alpha_{FW} = .01$

	Number of means										
df	2	3	4	5	6	7	8	9	10	12	15
2	14.25	19.21	22.52	24.90	26.81	28.38	29.75	30.92	31.93	33.64	35.69
3	8.31	10.66	12.22	13.36	14.28	15.03	15.69	16.25	16.75	17.57	18.57
4	6.54	8.15	9.21	9.99	10.61	11.13	11.57	11.96	12.30	12.87	13.56
5	5.73	7.00	7.83	8.44	8.93	9.34	9.69	10.00	10.27	10.72	11.27
6	5.27	6.35	7.05	7.57	7.99	8.34	8.63	8.89	9.12	9.50	9.97
7	4.97	5.93	6.56	7.02	7.39	7.69	7.95	8.18	8.38	8.72	9.14
8	4.76	5.65	6.22	6.64	6.97	7.25	7.49	7.69	7.88	8.19	8.56
9	4.61	5.44	5.97	6.36	6.67	6.92	7.14	7.34	7.51	7.79	8.14
10	4.49	5.28	5.78	6.15	6.44	6.68	6.88	7.06	7.22	7.49	7.82
12	4.33	5.06	5.51	5.84	6.11	6.33	6.51	6.68	6.82	7.07	7.36
14	4.22	4.90	5.33	5.64	5.89	6.09	6.27	6.42	6.55	6.78	7.05
16	4.14	4.79	5.20	5.50	5.73	5.92	6.09	6.23	6.36	6.57	6.83
18	4.08	4.71	5.10	5.39	5.61	5.79	5.95	6.09	6.21	6.41	6.66
20	4.03	4.65	5.02	5.30	5.52	5.69	5.84	5.98	6.09	6.29	6.53
22	4.00	4.59	4.96	5.23	5.44	5.61	5.76	5.89	6.00	6.19	6.42
24	3.96	4.55	4.91	5.18	5.38	5.55	5.69	5.81	5.92	6.11	6.33
26	3.94	4.52	4.87	5.13	5.33	5.49	5.63	5.75	5.86	6.04	6.26
28	3.92	4.49	4.83	5.09	5.28	5.45	5.58	5.70	5.81	5.99	6.20
30	3.90	4.46	4.80	5.05	5.25	5.41	5.54	5.66	5.76	5.94	6.15
35	3.86	4.41	4.74	4.99	5.17	5.33	5.46	5.57	5.67	5.84	6.04
40	3.83	4.37	4.70	4.94	5.12	5.27	5.40	5.51	5.60	5.77	5.97
45	3.81	4.34	4.67	4.90	5.08	5.22	5.35	5.46	5.55	5.71	5.91
50	3.79	4.32	4.64	4.87	5.05	5.19	5.31	5.42	5.51	5.67	5.86
60	3.77	4.29	4.60	4.82	5.00	5.14	5.26	5.36	5.45	5.60	5.79
70	3.75	4.26	4.57	4.79	4.96	5.10	5.22	5.32	5.41	5.56	5.74
80	3.74	4.25	4.55	4.77	4.94	5.07	5.19	5.29	5.38	5.52	5.70
90	3.73	4.23	4.53	4.75	4.92	5.05	5.17	5.26	5.35	5.50	5.67
100	3.72	4.22	4.52	4.73	4.90	5.04	5.15	5.25	5.33	5.48	5.65
110	3.71	4.21	4.51	4.72	4.89	5.02	5.13	5.23	5.32	5.46	5.63
120	3.71	4.20	4.50	4.71	4.88	5.01	5.12	5.22	5.30	5.45	5.62
∞	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.29	5.45

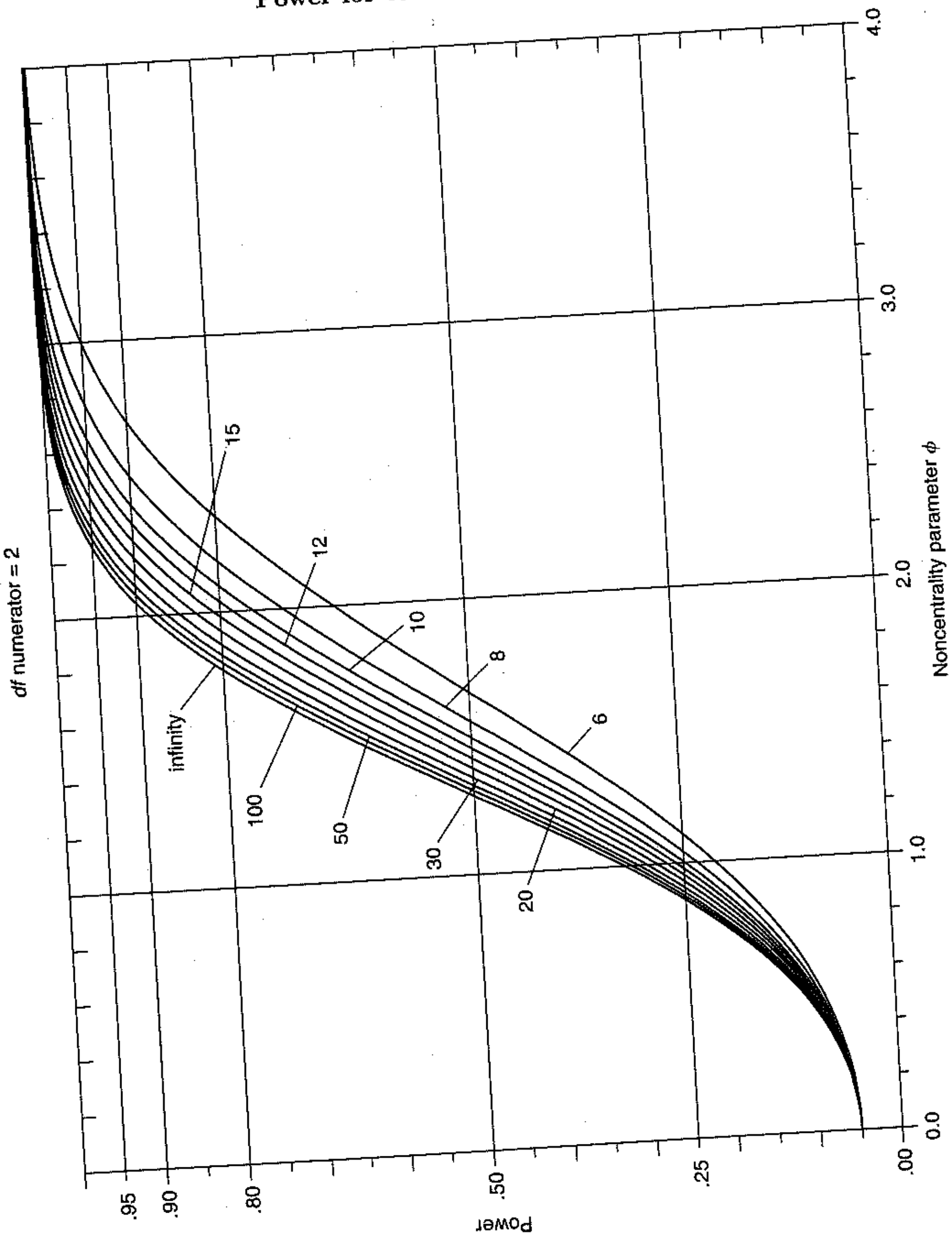
Note: These tables were calculated using the algorithm in Lund and Lund (1983).

A.7 Power Functions

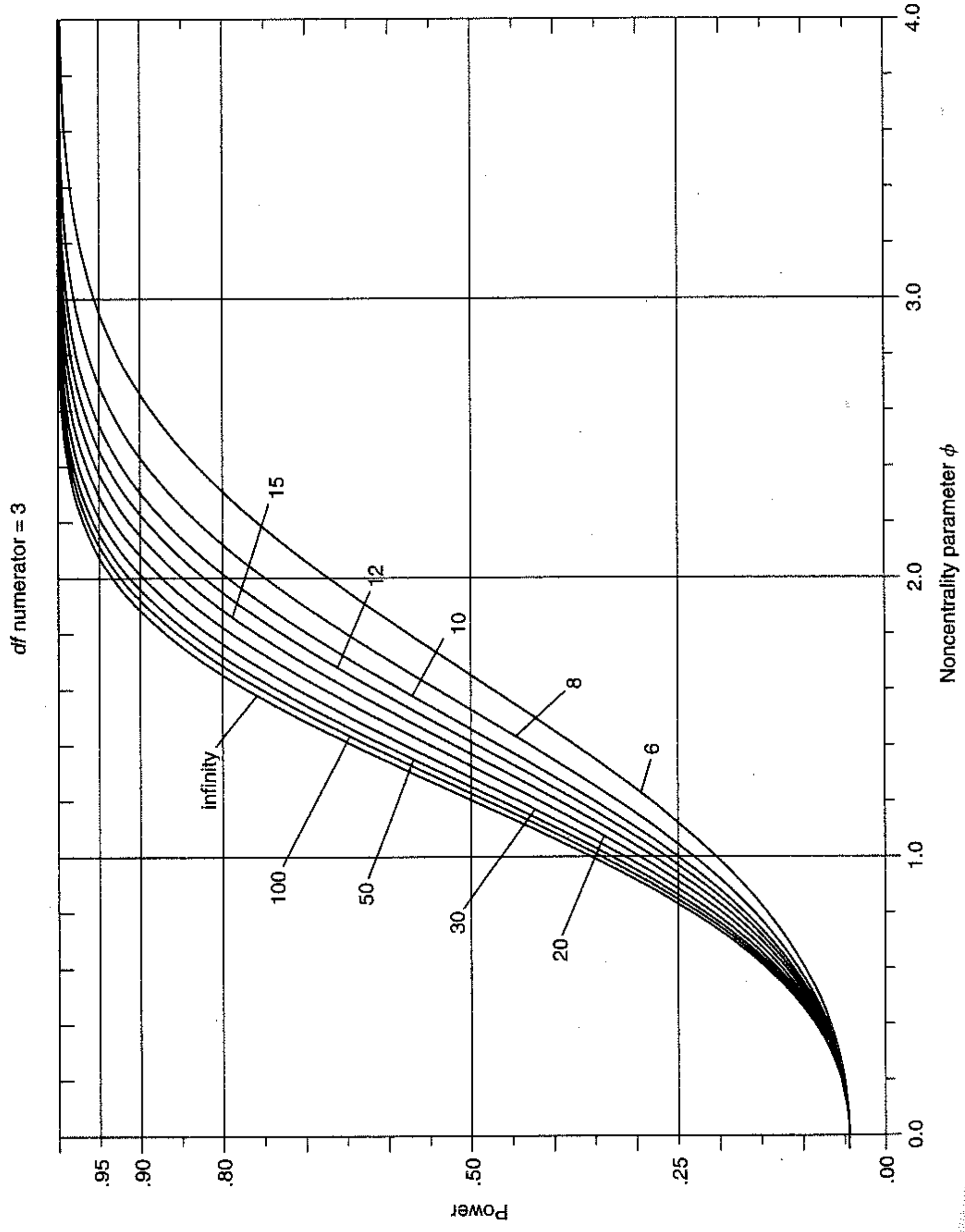
Power for tests with $df_{\text{num}} = 1$



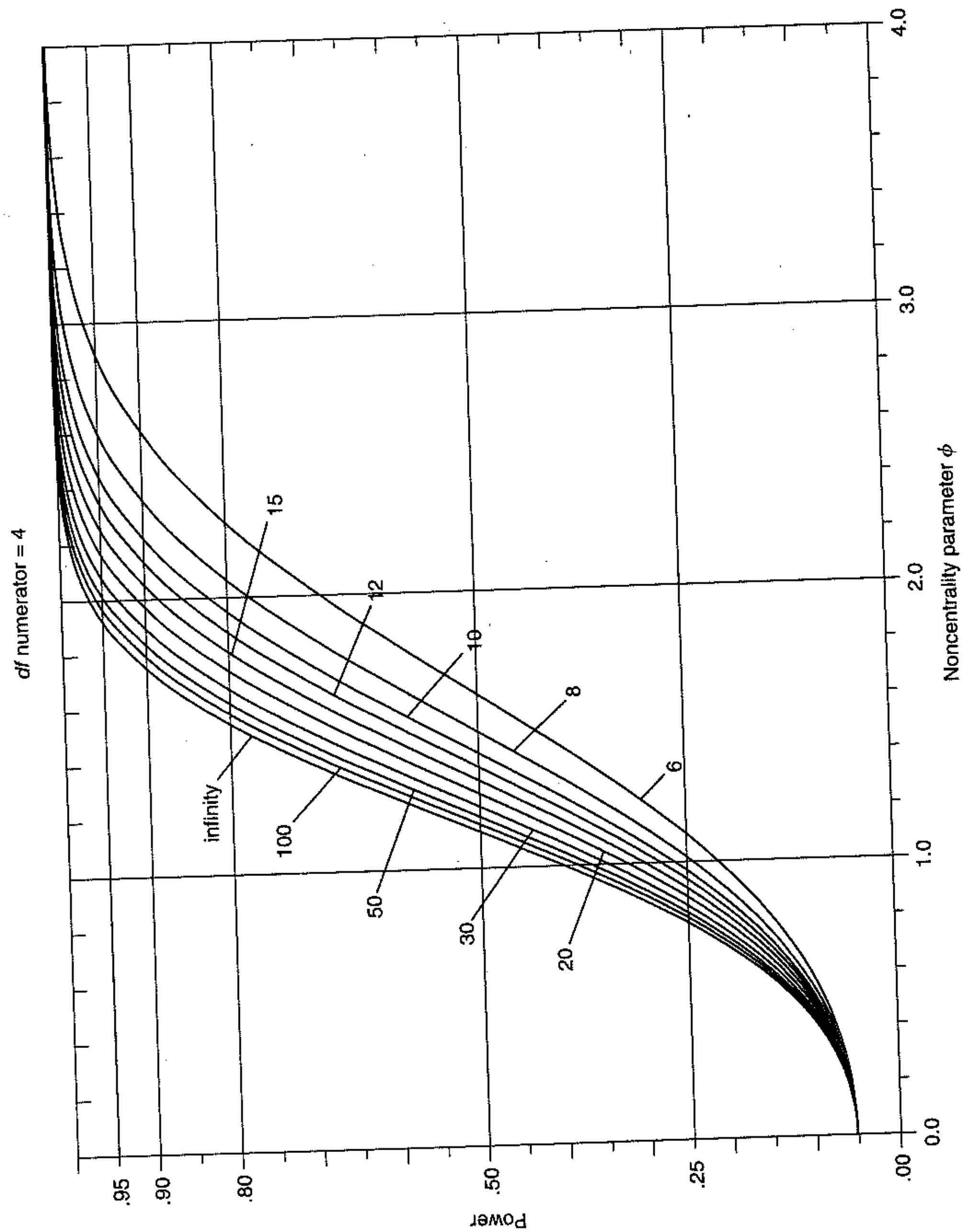
Power for tests with $df_{\text{num}} = 2$



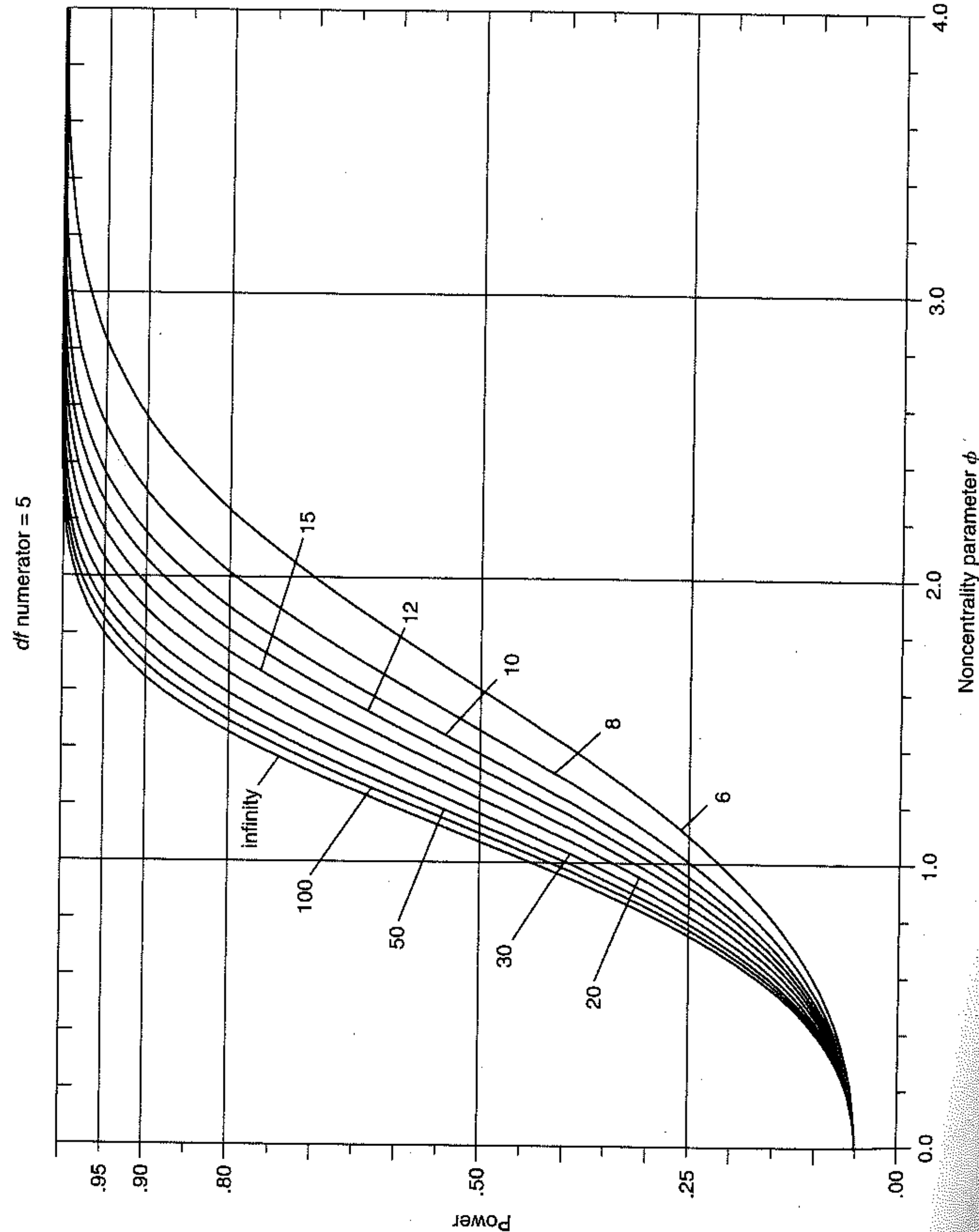
Power for tests with $df_{\text{num}} = 3$



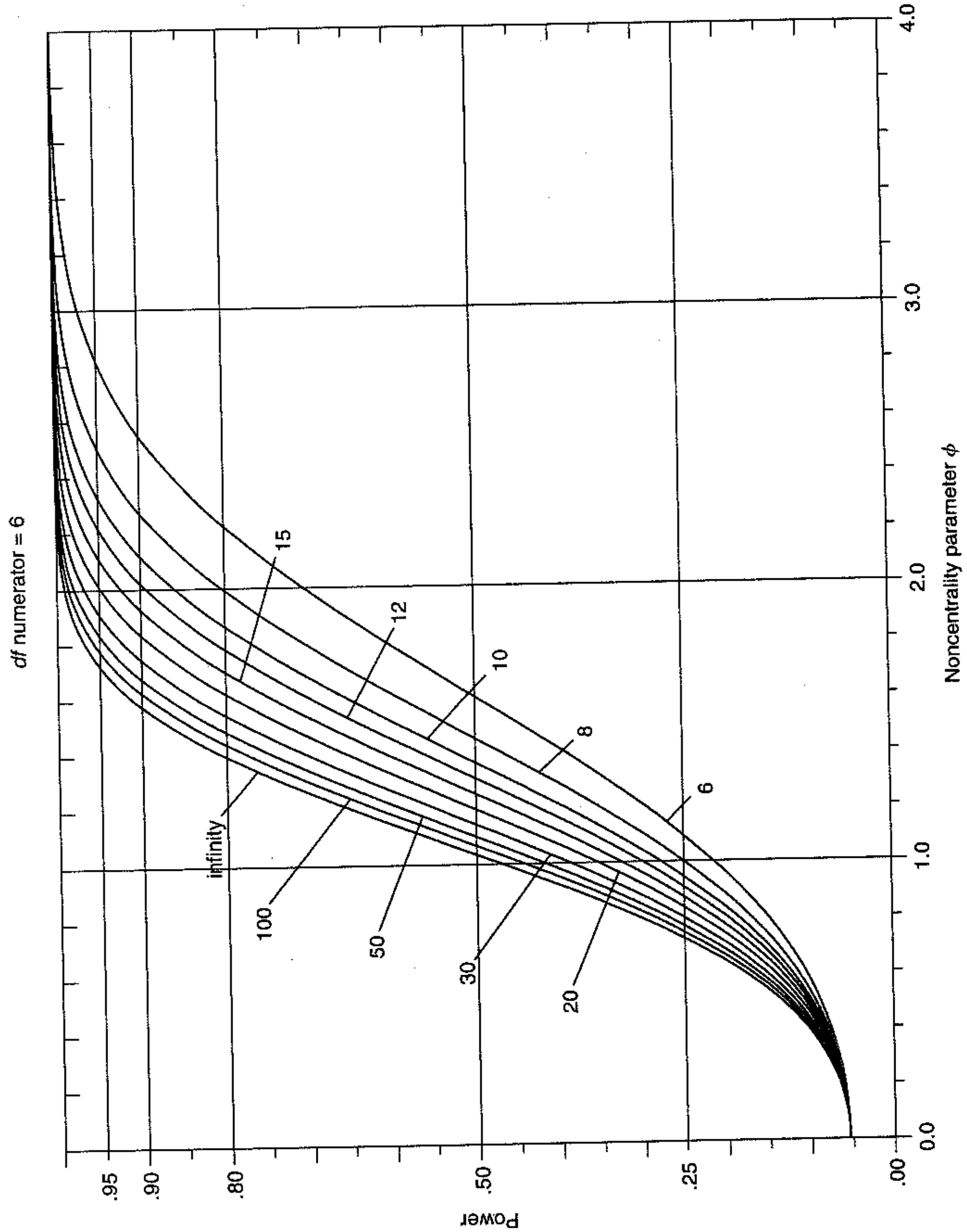
Power for tests with $df_{\text{num}} = 4$



Power for tests with $df_{\text{num}} = 5$



Power for tests with $df_{\text{num}} = 6$



Note: These charts were drawn using the noncentral F approximation given as Equation 26.6.20 in Zelen and Severo (1964) and the incomplete beta algorithm given in Press et al. (1986).