Figure 13.13l. 99.99*th* PERCENTILES FOR THE *F* DISTRIBUTION [F_{ν_1,ν_2}]

[calculated with *qf* in **R** version 3.3.2 using 17-digit arithmetic; the accuracy of all digits in the table entries has *not* been verified]

Each table entry is the value (y) of the random variable $Y \sim F_{\nu_1,\nu_2}$ such that $\Pr(Y \le y) = 0.9999$ (ν_1 is the numerator, ν_2 the denominator, degrees of freedom)

F_{ν_1,ν_2} .9999

Df→ ν_2 / ν_1	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000	
1	40528473	50000000	54037964	56250000	57640495	58593750	59287367	59814453	60228436	60562133	61066818	61576401	62090802	62401717	62609930	62871237	63028572	63133689	63238988	63344467	63480346	63571096	63630154	1
2	9998.5	9999.0	9999.2	9999.2	9999.3	9999.3	9999.4	9999.4	9999.4	9999.4	9999.4	9999.4	9999.4	9999.5	9999.5	9999.5	9999.5	9999.5	9999.5	9999.5	9999.5	9999.5	9999.5	
3	784.01	694.74	659.34	640.19	628.17	619.91	613.88	609.29	605.67	602.75	598.33	593.84	589.30	586.54	584.69	582.36	580.96	580.02	579.08	578.13	576.91	576.10	575.57	
4	241.62	198.00	181.02	171.87	166.13	162.19	159.31	157.11	155.38	153.98	151.86	149.71	147.52	146.19	145.30	144.18	143.50	143.05	142.59	142.13	141.54	141.15	140.89	
5	124.491	97.027	86.292	80.527	76.911	74.426	72.611	71.226	70.133	69.250	67.908	66.544	65.157	64.313	63.746	63.031	62.598	62.309	62.018	61.726	61.349	61.097	60.933	5
6	82.489	61.633	53.680	49.419	46.747	44.909	43.566	42.541	41.732	41.077	40.081	39.068	38.036	37.407	36.984	36.450	36.127	35.910	35.693	35.474	35.192	35.002	34.879	
7	62.167	45.132	38.676	35.222	33.056	31.567	30.477	29.644	28.987	28.455	27.644	26.819	25.977	25.464	25.118	24.680	24.416	24.238	24.059	23.880	23.648	23.492	23.391	
8	50.694	36.000	30.456	27.493	25.635	24.357	23.421	22.706	22.141	21.683	20.985	20.274	19.547	19.103	18.803	18.425	18.195	18.041	17.886	17.730	17.528	17.393	17.304	
9	43.477	30.342	25.404	22.766	21.112	19.974	19.140	18.503	17.999	17.590	16.967	16.331	15.680	15.282	15.013	14.672	14.466	14.327	14.187	14.047	13.865	13.743	13.663	
10	38.577	26.548	22.038	19.630	18.120	17.081	16.319	15.736	15.275	14.901	14.330	13.747	13.150	12.784	12.536	12.222	12.032	11.904	11.775	11.645	11.477	11.363	11.290	10
11	35.0605	23.8518	19.6585	17.4211	16.0178	15.0511	14.3425	13.7999	13.3706	13.0221	12.4901	11.9458	11.3877	11.0452	10.8134	10.5194	10.3406	10.2203	10.0991	9.9769	9.8185	9.7119	9.6422	
12	32.4269	21.8495	17.8995	15.7926	14.4710	13.5602	12.8924	12.3807	11.9757	11.6467	11.1443	10.6298	10.1015	9.7769	9.5570	9.2778	9.1078	8.9933	8.8780	8.7616	8.6106	8.5089	8.4423	
13	30.3878	20.3101	16.5523	14.5485	13.2913	12.4247	11.7889	11.3017	10.9158	10.6022	10.1231	9.6319	9.1270	8.8164	8.6058	8.3381	8.1750	8.0651	7.9542	7.8423	7.6969	7.5989	7.5348	
14	28.7662	19.0932	15.4908	13.5703	12.3653	11.5343	10.9245	10.4569	10.0865	9.7853	9.3249	8.8526	8.3664	8.0670	7.8638	7.6053	7.4476	7.3412	7.2339	7.1255	6.9845	6.8895	6.8272	
15	27.4480	18.1091	14.6350	12.7832	11.6211	10.8194	10.2310	9.7796	9.4218	9.1309	8.6859	8.2290	7.7582	7.4679	7.2707	7.0197	6.8663	6.7628	6.6583	6.5527	6.4153	6.3225	6.2617	15
16	26.3569	17.2982	13.9315	12.1372	11.0111	10.2340	9.6634	9.2256	8.8784	8.5961	8.1639	7.7198	7.2618	6.9791	6.7869	6.5419	6.3922	6.2911	6.1889	6.0855	5.9509	5.8599	5.8003	
17	25.4396	16.6193	13.3439	11.5984	10.5028	9.7466	9.1911	8.7648	8.4267	8.1515	7.7302	7.2970	6.8498	6.5735	6.3854	6.1455	5.9987	5.8996	5.7993	5.6978	5.5655	5.4760	5.4172	
18	24.6582	16.0430	12.8461	11.1426	10.0732	9.3349	8.7925	8.3760	8.0456	7.7767	7.3647	6.9408	6.5028	6.2318	6.0473	5.8117	5.6674	5.5699	5.4712	5.3712	5.2408	5.1525	5.0945	
19	23.9851	15.5482	12.4194	10.7524	9.7057	8.9830	8.4519	8.0440	7.7202	7.4567	7.0528	6.6369	6.2068	5.9405	5.7590	5.5271	5.3849	5.2887	5.1913	5.0927	4.9637	4.8764	4.8190	
20	23.3995	15.1189	12.0498	10.4147	9.3880	8.6789	8.1577	7.7573	7.4394	7.1805	6.7837	6.3748	5.9516	5.6894	5.5105	5.2817	5.1413	5.0463	4.9500	4.8524	4.7248	4.6382	4.5813	20
22	22.4309	14.4114	11.4421	9.8603	8.8668	8.1804	7.6757	7.2878	6.9797	6.7286	6.3435	5.9463	5.5345	5.2788	5.1042	4.8805	4.7430	4.6498	4.5553	4.4594	4.3337	4.2483	4.1921	
24	21.6633	13.8532	10.9637	9.4246	8.4578	7.7896	7.2980	6.9201	6.6197	6.3750	5.9992	5.6112	5.2084	4.9580	4.7867	4.5669	4.4316	4.3397	4.2465	4.1517	4.0274	3.9428	3.8870	
26	21.0404	13.4019	10.5778	9.0736	8.1286	7.4752	6.9945	6.6247	6.3307	6.0910	5.7228	5.3424	4.9468	4.7006	4.5319	4.3152	4.1816	4.0908	3.9985	3.9046	3.7812	3.6970	3.6414	
28	20.5252	13.0298	10.2601	8.7850	7.8581	7.2172	6.7454	6.3824	6.0937	5.8582	5.4964	5.1221	4.7326	4.4897	4.3232	4.1090	3.9767	3.8867	3.7951	3.7018	3.5789	3.4951	3.4396	
30	20.0921	12.7177	9.9942	8.5437	7.6322	7.0017	6.5375	6.1802	5.8960	5.6641	5.3075	4.9385	4.5540	4.3140	4.1492	3.9370	3.8057	3.7163	3.6253	3.5324	3.4099	3.3261	3.2706	30
35	19.2615	12.1217	9.4873	8.0844	7.2025	6.5923	6.1427	5.7964	5.5209	5.2959	4.9495	4.5906	4.2156	3.9808	3.8193	3.6106	3.4812	3.3928	3.3025	3.2102	3.0880	3.0040	2.9482	
40	18.6684	11.6979	9.1278	7.7592	6.8987	6.3031	5.8640	5.5257	5.2564	5.0363	4.6973	4.3455	3.9772	3.7461	3.5868	3.3804	3.2520	3.1642	3.0742	2.9820	2.8594	2.7749	2.7185	
45	18.2240	11.3813	8.8598	7.5172	6.6728	6.0881	5.6571	5.3248	5.0601	4.8437	4.5102	4.1637	3.8004	3.5720	3.4142	3.2094	3.0817	2.9940	2.9042	2.8118	2.6886	2.6033	2.5462	
50	17.8786	11.1360	8.6524	7.3301	6.4983	5.9222	5.4974	5.1698	4.9087	4.6952	4.3660	4.0237	3.6642	3.4378	3.2811	3.0774	2.9500	2.8625	2.7726	2.6799	2.5559	2.4697	2.4118	50
60	17.3769	10.7807	8.3526	7.0599	6.2465	5.6830	5.2672	4.9465	4.6907	4.4815	4.1585	3.8221	3.4681	3.2445	3.0894	2.8870	2.7599	2.6723	2.5820	2.4886	2.3628	2.2746	2.2150	
70	17.0302	10.5859	8.1465	6.8743	6.0738	5.5190	5.1095	4.7935	4.5414	4.3351	4.0164	3.6841	3.3338	3.1121	2.9579	2.7563	2.6292	2.5414	2.4506	2.3563	2.2287	2.1385	2.0772	
80	16.7764	10.3570	7.9960	6.7390	5.9479	5.3996	4.9947	4.6822	4.4328	4.2286	3.9131	3.5838	3.2361	3.0157	2.8622	2.6609	2.5338	2.4457	2.3544	2.2593	2.1298	2.0378	1.9748	
90	16.5825	10.2206	7.8814	6.6360	5.8521	5.3087	4.9074	4.5976	4.3502	4.1477	3.8346	3.5076	3.1619	2.9424	2.7894	2.5884	2.4611	2.3727	2.2809	2.1849	2.0538	1.9600	1.8954	
100	16.4295	10.1132	7.7912	6.5550	5.7768	5.2373	4.8388	4.5311	4.2854	4.0841	3.7729	3.4477	3.1037	2.8849	2.7322	2.5313	2.4038	2.3151	2.2228	2.1261	1.9934	1.8979	1.8318	100
125	16.1591	9.9236	7.6322	6.4122	5.6442	5.1116	4.7181	4.4141	4.1713	3.9723	3.6645	3.3424	3.0011	2.7836	2.6314	2.4305	2.3026	2.2132	2.1199	2.0216	1.8855	1.7862	1.7166	
150	15.9822	9.7998	7.5284	6.3192	5.5578	5.0298	4.6395	4.3379	4.0970	3.8996	3.5939	3.2739	2.9344	2.7176	2.5657	2.3648	2.2364	2.1465	2.0524	1.9528	1.8138	1.7113	1.6385	
175	15.8575	9.7126	7.4554	6.2537	5.4971	4.9722	4.5843	4.2844	4.0449	3.8485	3.5444	3.2258	2.8875	2.6712	2.5195	2.3185	2.1897	2.0994	2.0046	1.9039	1.7626	1.6574	1.5818	
200	15.7648	9.6478	7.4012	6.2052	5.4521	4.9296	4.5433	4.2448	4.0062	3.8106	3.5077	3.1902	2.8527	2.6369	2.4853	2.2841	2.1551	2.0644	1.9690	1.8674	1.7241	1.6165	1.5384	
250	15.6364	9.5582	7.3262	6.1380	5.3898	4.8706	4.4867	4.1900	3.9528	3.7583	3.4569	3.1409	2.8047	2.5893	2.4379	2.2365	2.1070	2.0157	1.9194	1.8165	1.6700	1.5585	1.4760	250
300	15.5515	9.4990	7.2768	6.0937	5.3487	4.8317	4.4495	4.1539	3.9176	3.7238	3.4235	3.1085	2.7730	2.5580	2.4066	2.2051	2.0752	1.9835	1.8866	1.7826	1.6338	1.5191	1.4330	
350	15.4913	9.4570	7.2417	6.0623	5.3196	4.8042	4.4230	4.1283	3.8927	3.6994	3.3998	3.0855	2.7506	2.5358	2.3845	2.1828	2.0526	1.9607	1.8632	1.7584	1.6077	1.4906	1.4014	
400	15.4464	9.4257	7.2156	6.0389	5.2979	4.7836	4.4033	4.1092	3.8741	3.6812	3.3822	3.0683	2.7339	2.5192	2.3679	2.1661	2.0358	1.9435	1.8457	1.7403	1.5881	1.4689	1.3770	
450	15.4115	9.4015	7.1953	6.0208	5.2811	4.7677	4.3881	4.0945	3.8597	3.6671	3.3685	3.0551	2.7210	2.5064	2.3551	2.1533	2.0227	1.9303	1.8321	1.7262	1.5728	1.4518	1.3576	
500	15.3837	9.3821	7.1792	6.0064	5.2677	4.7550	4.3759	4.0827	3.8482	3.6559	3.3576	3.0445	2.7107	2.4962	2.3449	2.1430	2.0123	1.9197	1.8212	1.7149	1.5605	1.4380	1.3418	500
600	15.3422	9.3532	7.1550	5.9848	5.2477	4.7361	4.3578	4.0651	3.8311	3.6391	3.3414	3.0287	2.6953	2.4809	2.3297	2.1276	1.9967	1.9038	1.8050	1.6980	1.5419	1.4171	1.3174	
700	15.3126	9.3326	7.1378	5.9694	5.2334	4.7226	4.3448	4.0526	3.8189	3.6272	3.3298	3.0175	2.6843	2.4701	2.3188	2.1166	1.9856	1.8925	1.7934	1.6859	1.5286	1.4019	1.2994	
800	15.2904	9.3172	7.1250	5.9579	5.2228	4.7126	4.3352	4.0433	3.8098	3.6182	3.3211	3.0091	2.6761	2.4619	2.3107	2.1084	1.9772	1.8840	1.7847	1.6768	1.5186	1.3904	1.2856	
900	15.2733	9.3052	7.1150	5.9490	5.2145	4.7047	4.3277	4.0360	3.8027	3.6113	3.3144	3.0026	2.6697	2.4556	2.3044	2.1021	1.9708	1.8775	1.7779	1.6698	1.5108	1.3814	1.2746	
1,000	15.2595	9.2957	7.1070	5.9418	5.2079	4.6985	4.3217	4.0302	3.7971	3.6058	3.3091	2.9973	2.6647	2.4506	2.2994	2.0970	1.9656	1.8722	1.7725	1.6641	1.5045	1.3741	1.2656	1,000
2,000	15.1979	9.2529	7.0713	5.9099	5.1783	4.6705	4.2949	4.0042	3.7718	3.5810	3.2850	2.9740	2.6419	2.4280	2.2768	2.0742	1.9424	1.8486	1.7482	1.6387	1.4760	1.3406	1.2230	
3,000	15.1775	9.2387	7.0595	5.8993	5.1685	4.6612	4.2860	3.9956	3.7634	3.5728	3.2771	2.9663	2.6343	2.4205	2.2693	2.0667	1.9347	1.8407	1.7401	1.6302	1.4665	1.3292	1.2077	
4,000	15.1673	9.2316	7.0536	5.8940	5.1636	4.6566	4.2815	3.9913	3.7592	3.5687	3.2731	2.9624	2.6306	2.4168	2.2656	2.0629	1.9309	1.8368	1.7360	1.6259	1.4617	1.3234	1.1998	
5,000	15.1612	9.2273	7.0500	5.8908	5.1607	4.6538	4.2788	3.9887	3.7567	3.5662	3.2707	2.9601	2.6283	2.4146	2.2634	2.0606	1.9286	1.8345	1.7336	1.6234	1.4588	1.3200	1.1950	
7,500	15.1530	9.2217	7.0453	5.8866	5.1568	4.6501	4.2753	3.9853	3.7533	3.5629	3.2675	2.9570	2.6253	2.4116	2.2604	2.0576	1.9255	1.8313	1.7304	1.6200	1.4550	1.3153	1.1885	
10,000	15.1489	9.2188	7.0429	5.8845	5.1548	4.6483	4.2735	3.9836	3.7517	3.5613	3.2660	2.9555	2.6238	2.4101	2.2589	2.0561	1.9240	1.8298	1.7288	1.6183	1.4530	1.3129	1.1851	10,000
	1	2	3	4	5	6	7	8	9	10	12	15	20	25	30	40	50	60	75	100	175	350	1,000	

F_{ν_1,ν_2} .9999