

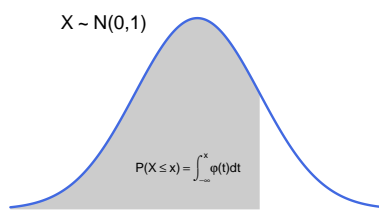
# Tabele Statistice

În acest document ne propunem să prezentăm mai multe tabele statistice utile pentru rezolvarea problemelor de probabilități și statistică.

## 1 Tabele pentru repartiția normală standard

### 1.1 Valorile funcției de repartiție

În tabelul următor descriem valorile **funcției de repartiție**,  $\Phi(x) = \mathbb{P}(X \leq x)$  cu  $x = x_1 + x_2$ , pentru o variabilă aleatoare  $X$  repartizată normal de medie 0 și varianță 1. Pentru valori negative putem folosi relația  $\Phi(x) = 1 - \Phi(-x)$ .



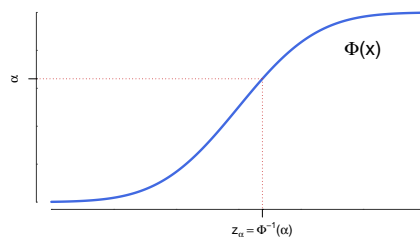
$x_1/x_2$	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986

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$x_1/x_2$	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
<b>3.0</b>	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990

## 1.2 Cuantilele pentru $\mathcal{N}(0, 1)$

În tabelul următor descriem **cuantilele** de ordin  $\alpha$  pentru repartiția normală standard, i.e.  $z_\alpha = \Phi^{-1}(\alpha)$  cu  $\alpha = \alpha_1 + \alpha_2$ . În cazul în care  $\alpha < 0.5$  vom folosi relația  $z_\alpha = -z_{1-\alpha}$ .



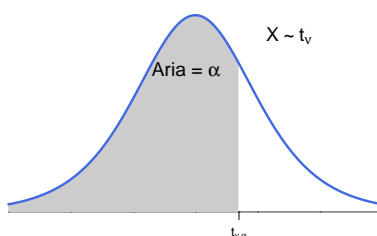
$\alpha_1/\alpha_2$	0	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
<b>0.50</b>	0.0000	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0175	0.0201	0.0226
<b>0.51</b>	0.0251	0.0276	0.0301	0.0326	0.0351	0.0376	0.0401	0.0426	0.0451	0.0476
<b>0.52</b>	0.0502	0.0527	0.0552	0.0577	0.0602	0.0627	0.0652	0.0677	0.0702	0.0728
<b>0.53</b>	0.0753	0.0778	0.0803	0.0828	0.0853	0.0878	0.0904	0.0929	0.0954	0.0979
<b>0.54</b>	0.1004	0.1030	0.1055	0.1080	0.1105	0.1130	0.1156	0.1181	0.1206	0.1231
<b>0.55</b>	0.1257	0.1282	0.1307	0.1332	0.1358	0.1383	0.1408	0.1434	0.1459	0.1484
<b>0.56</b>	0.1510	0.1535	0.1560	0.1586	0.1611	0.1637	0.1662	0.1687	0.1713	0.1738
<b>0.57</b>	0.1764	0.1789	0.1815	0.1840	0.1866	0.1891	0.1917	0.1942	0.1968	0.1993
<b>0.58</b>	0.2019	0.2045	0.2070	0.2096	0.2121	0.2147	0.2173	0.2198	0.2224	0.2250
<b>0.59</b>	0.2275	0.2301	0.2327	0.2353	0.2378	0.2404	0.2430	0.2456	0.2482	0.2508
<b>0.60</b>	0.2533	0.2559	0.2585	0.2611	0.2637	0.2663	0.2689	0.2715	0.2741	0.2767
<b>0.61</b>	0.2793	0.2819	0.2845	0.2871	0.2898	0.2924	0.2950	0.2976	0.3002	0.3029
<b>0.62</b>	0.3055	0.3081	0.3107	0.3134	0.3160	0.3186	0.3213	0.3239	0.3266	0.3292
<b>0.63</b>	0.3319	0.3345	0.3372	0.3398	0.3425	0.3451	0.3478	0.3505	0.3531	0.3558
<b>0.64</b>	0.3585	0.3611	0.3638	0.3665	0.3692	0.3719	0.3745	0.3772	0.3799	0.3826
<b>0.65</b>	0.3853	0.3880	0.3907	0.3934	0.3961	0.3989	0.4016	0.4043	0.4070	0.4097
<b>0.66</b>	0.4125	0.4152	0.4179	0.4207	0.4234	0.4261	0.4289	0.4316	0.4344	0.4372
<b>0.67</b>	0.4399	0.4427	0.4454	0.4482	0.4510	0.4538	0.4565	0.4593	0.4621	0.4649
<b>0.68</b>	0.4677	0.4705	0.4733	0.4761	0.4789	0.4817	0.4845	0.4874	0.4902	0.4930
<b>0.69</b>	0.4959	0.4987	0.5015	0.5044	0.5072	0.5101	0.5129	0.5158	0.5187	0.5215
<b>0.70</b>	0.5244	0.5273	0.5302	0.5330	0.5359	0.5388	0.5417	0.5446	0.5476	0.5505
<b>0.71</b>	0.5534	0.5563	0.5592	0.5622	0.5651	0.5681	0.5710	0.5740	0.5769	0.5799
<b>0.72</b>	0.5828	0.5858	0.5888	0.5918	0.5948	0.5978	0.6008	0.6038	0.6068	0.6098
<b>0.73</b>	0.6128	0.6158	0.6189	0.6219	0.6250	0.6280	0.6311	0.6341	0.6372	0.6403
<b>0.74</b>	0.6433	0.6464	0.6495	0.6526	0.6557	0.6588	0.6620	0.6651	0.6682	0.6713
<b>0.75</b>	0.6745	0.6776	0.6808	0.6840	0.6871	0.6903	0.6935	0.6967	0.6999	0.7031
<b>0.76</b>	0.7063	0.7095	0.7128	0.7160	0.7192	0.7225	0.7257	0.7290	0.7323	0.7356
<b>0.77</b>	0.7388	0.7421	0.7454	0.7488	0.7521	0.7554	0.7588	0.7621	0.7655	0.7688
<b>0.78</b>	0.7722	0.7756	0.7790	0.7824	0.7858	0.7892	0.7926	0.7961	0.7995	0.8030
<b>0.79</b>	0.8064	0.8099	0.8134	0.8169	0.8204	0.8239	0.8274	0.8310	0.8345	0.8381
<b>0.80</b>	0.8416	0.8452	0.8488	0.8524	0.8560	0.8596	0.8633	0.8669	0.8705	0.8742
<b>0.81</b>	0.8779	0.8816	0.8853	0.8890	0.8927	0.8965	0.9002	0.9040	0.9078	0.9116
<b>0.82</b>	0.9154	0.9192	0.9230	0.9269	0.9307	0.9346	0.9385	0.9424	0.9463	0.9502
<b>0.83</b>	0.9542	0.9581	0.9621	0.9661	0.9701	0.9741	0.9782	0.9822	0.9863	0.9904
<b>0.84</b>	0.9945	0.9986	1.0027	1.0069	1.0110	1.0152	1.0194	1.0237	1.0279	1.0322
<b>0.85</b>	1.0364	1.0407	1.0450	1.0494	1.0537	1.0581	1.0625	1.0669	1.0714	1.0758
<b>0.86</b>	1.0803	1.0848	1.0893	1.0939	1.0985	1.1031	1.1077	1.1123	1.1170	1.1217

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$\alpha_1/\alpha_2$	0	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
<b>0.87</b>	1.1264	1.1311	1.1359	1.1407	1.1455	1.1503	1.1552	1.1601	1.1650	1.1700
<b>0.88</b>	1.1750	1.1800	1.1850	1.1901	1.1952	1.2004	1.2055	1.2107	1.2160	1.2212
<b>0.89</b>	1.2265	1.2319	1.2372	1.2426	1.2481	1.2536	1.2591	1.2646	1.2702	1.2759
<b>0.90</b>	1.2816	1.2873	1.2930	1.2988	1.3047	1.3106	1.3165	1.3225	1.3285	1.3346
<b>0.91</b>	1.3408	1.3469	1.3532	1.3595	1.3658	1.3722	1.3787	1.3852	1.3917	1.3984
<b>0.92</b>	1.4051	1.4118	1.4187	1.4255	1.4325	1.4395	1.4466	1.4538	1.4611	1.4684
<b>0.93</b>	1.4758	1.4833	1.4909	1.4985	1.5063	1.5141	1.5220	1.5301	1.5382	1.5464
<b>0.94</b>	1.5548	1.5632	1.5718	1.5805	1.5893	1.5982	1.6072	1.6164	1.6258	1.6352
<b>0.95</b>	1.6449	1.6546	1.6646	1.6747	1.6849	1.6954	1.7060	1.7169	1.7279	1.7392
<b>0.96</b>	1.7507	1.7624	1.7744	1.7866	1.7991	1.8119	1.8250	1.8384	1.8522	1.8663
<b>0.97</b>	1.8808	1.8957	1.9110	1.9268	1.9431	1.9600	1.9774	1.9954	2.0141	2.0335
<b>0.98</b>	2.0537	2.0749	2.0969	2.1201	2.1444	2.1701	2.1973	2.2262	2.2571	2.2904
<b>0.99</b>	2.3263	2.3656	2.4089	2.4573	2.5121	2.5758	2.6521	2.7478	2.8782	3.0902

## 2 Tabel pentru repartiția t-Student

Tabelul următor prezintă cuantilele de ordin  $\alpha$  pentru repartiția t-Student cu  $\nu$  grade de libertate. Pentru valori ale lui  $\alpha \leq 0.5$  se poate folosi relația următoare  $t_{\nu, \alpha} = -t_{\nu, 1-\alpha}$ .



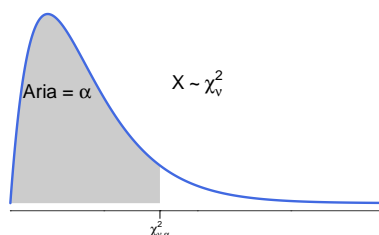
$\nu/\alpha$	0.6	0.75	0.9	0.95	0.975	0.99	0.995	0.9995
<b>1</b>	0.3249	1.0000	3.078	6.314	12.706	31.820	63.657	636.619
<b>2</b>	0.2887	0.8165	1.886	2.920	4.303	6.965	9.925	31.599
<b>3</b>	0.2767	0.7649	1.638	2.353	3.182	4.541	5.841	12.924
<b>4</b>	0.2707	0.7407	1.533	2.132	2.776	3.747	4.604	8.610
<b>5</b>	0.2672	0.7267	1.476	2.015	2.571	3.365	4.032	6.869
<b>6</b>	0.2648	0.7176	1.440	1.943	2.447	3.143	3.707	5.959
<b>7</b>	0.2632	0.7111	1.415	1.895	2.365	2.998	3.499	5.408
<b>8</b>	0.2619	0.7064	1.397	1.859	2.306	2.897	3.355	5.041
<b>9</b>	0.2610	0.7027	1.383	1.833	2.262	2.821	3.250	4.781
<b>10</b>	0.2602	0.6998	1.372	1.812	2.228	2.764	3.169	4.587
<b>11</b>	0.2596	0.6974	1.363	1.796	2.201	2.718	3.106	4.437
<b>12</b>	0.2590	0.6955	1.356	1.782	2.179	2.681	3.054	4.318
<b>13</b>	0.2586	0.6938	1.350	1.771	2.160	2.650	3.012	4.221
<b>14</b>	0.2582	0.6924	1.345	1.761	2.145	2.624	2.977	4.141
<b>15</b>	0.2579	0.6912	1.341	1.753	2.131	2.603	2.947	4.073
<b>16</b>	0.2576	0.6901	1.337	1.746	2.120	2.583	2.921	4.015
<b>17</b>	0.2573	0.6892	1.333	1.740	2.110	2.567	2.898	3.965
<b>18</b>	0.2571	0.6884	1.330	1.734	2.101	2.552	2.878	3.922
<b>19</b>	0.2569	0.6876	1.328	1.729	2.093	2.539	2.861	3.883
<b>20</b>	0.2567	0.6870	1.325	1.725	2.086	2.528	2.845	3.849
<b>21</b>	0.2566	0.6864	1.323	1.721	2.080	2.518	2.831	3.819
<b>22</b>	0.2564	0.6858	1.321	1.717	2.074	2.508	2.819	3.792
<b>23</b>	0.2563	0.6853	1.319	1.714	2.069	2.500	2.807	3.768
<b>24</b>	0.2562	0.6848	1.318	1.711	2.064	2.492	2.797	3.745

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$\nu/\alpha$	0.6	0.75	0.9	0.95	0.975	0.99	0.995	0.9995
<b>25</b>	0.2561	0.6844	1.316	1.708	2.059	2.485	2.787	3.725
<b>26</b>	0.2560	0.6840	1.315	1.706	2.055	2.479	2.779	3.707
<b>27</b>	0.2559	0.6837	1.314	1.703	2.052	2.473	2.771	3.690
<b>28</b>	0.2558	0.6834	1.312	1.701	2.048	2.467	2.763	3.674
<b>29</b>	0.2557	0.6830	1.311	1.699	2.045	2.462	2.756	3.659
<b>30</b>	0.2556	0.6828	1.310	1.697	2.042	2.457	2.750	3.646
<b>40</b>	0.2550	0.6807	1.303	1.684	2.021	2.423	2.704	3.551
<b>60</b>	0.2545	0.6786	1.296	1.671	2.000	2.390	2.660	3.460
<b>120</b>	0.2539	0.6765	1.289	1.658	1.980	2.358	2.617	3.373
<b>1000</b>	0.2534	0.6747	1.282	1.646	1.962	2.330	2.581	3.300

### 3 Tabel pentru repartiția $\chi^2$

Tabelul de mai jos prezintă cuantilele de ordin  $\alpha$  ale repartiției  $\chi^2_\nu$ . Dacă  $X \sim \chi^2_\nu$  atunci  $\mathbb{E}[X] = \nu$  și  $Var(X) = 2\nu$ . Pentru valori  $\nu > 50$  vom folosi formula  $\chi^2_{\nu,\alpha} \approx \frac{(z_\alpha + \sqrt{2\nu-1})^2}{2}$  pentru a aproxima cuantilele repartiției  $\chi^2_\nu$ , unde  $z_\alpha$  este cuantila de ordin  $\alpha$  a repartiției normale standard.



$\nu/\alpha$	0.005	0.01	0.025	0.05	0.1	0.25	0.5	0.75	0.9	0.95	0.975	0.99	0.995
<b>1</b>	0.0000	0.0002	0.0010	0.0039	0.0158	0.1015	0.4549	1.323	2.705	3.841	5.024	6.635	7.879
<b>2</b>	0.0100	0.0201	0.0506	0.1026	0.2107	0.5754	1.3863	2.773	4.605	5.992	7.378	9.210	10.597
<b>3</b>	0.0717	0.1148	0.2158	0.3518	0.5844	1.2125	2.3660	4.108	6.251	7.815	9.348	11.345	12.838
<b>4</b>	0.2070	0.2971	0.4844	0.7107	1.0636	1.9226	3.3567	5.385	7.779	9.488	11.143	13.277	14.860
<b>5</b>	0.4117	0.5543	0.8312	1.1455	1.6103	2.6746	4.3515	6.626	9.236	11.070	12.832	15.086	16.750
<b>6</b>	0.6757	0.8721	1.2373	1.6354	2.2041	3.4546	5.3481	7.841	10.645	12.592	14.449	16.812	18.548
<b>7</b>	0.9893	1.2390	1.6899	2.1673	2.8331	4.2549	6.3458	9.037	12.017	14.067	16.013	18.475	20.278
<b>8</b>	1.3444	1.6465	2.1797	2.7326	3.4895	5.0706	7.3441	10.219	13.362	15.507	17.535	20.090	21.955
<b>9</b>	1.7349	2.0879	2.7004	3.3251	4.1682	5.8988	8.3428	11.389	14.684	16.919	19.023	21.666	23.589
<b>10</b>	2.1559	2.5582	3.2470	3.9403	4.8652	6.7372	9.3418	12.549	15.987	18.307	20.483	23.209	25.188
<b>11</b>	2.6032	3.0535	3.8157	4.5748	5.5778	7.5841	10.3410	13.701	17.275	19.675	21.920	24.725	26.757
<b>12</b>	3.0738	3.5706	4.4038	5.2260	6.3038	8.4384	11.3403	14.845	18.549	21.026	23.337	26.217	28.299
<b>13</b>	3.5650	4.1069	5.0088	5.8919	7.0415	9.2991	12.3398	15.984	19.812	22.362	24.736	27.688	29.820
<b>14</b>	4.0747	4.6604	5.6287	6.5706	7.7895	10.1653	13.3393	17.117	21.064	23.685	26.119	29.141	31.319
<b>15</b>	4.6009	5.2293	6.2621	7.2609	8.5468	11.0365	14.3389	18.245	22.307	24.996	27.488	30.578	32.801
<b>16</b>	5.1422	5.8122	6.9077	7.9616	9.3122	11.9122	15.3385	19.369	23.542	26.296	28.845	32.000	34.267
<b>17</b>	5.6972	6.4078	7.5642	8.6718	10.0852	12.7919	16.3382	20.489	24.769	27.587	30.191	33.409	35.718
<b>18</b>	6.2648	7.0149	8.2307	9.3905	10.8649	13.6753	17.3379	21.605	25.989	28.869	31.526	34.805	37.157
<b>19</b>	6.8440	7.6327	8.9065	10.1170	11.6509	14.5620	18.3377	22.718	27.204	30.143	32.852	36.191	38.582
<b>20</b>	7.4338	8.2604	9.5908	10.8508	12.4426	15.4518	19.3374	23.828	28.412	31.410	34.170	37.566	39.997
<b>21</b>	8.0337	8.8972	10.2829	11.5913	13.2396	16.3444	20.3372	24.935	29.615	32.671	35.479	38.932	41.401
<b>22</b>	8.6427	9.5425	10.9823	12.3380	14.0415	17.2396	21.3370	26.039	30.813	33.924	36.781	40.289	42.796
<b>23</b>	9.2604	10.1957	11.6886	13.0905	14.8480	18.1373	22.3369	27.141	32.007	35.172	38.076	41.638	44.181
<b>24</b>	9.8862	10.8564	12.4012	13.8484	15.6587	19.0373	23.3367	28.241	33.196	36.415	39.364	42.980	45.559
<b>25</b>	10.5197	11.5240	13.1197	14.6114	16.4734	19.9393	24.3366	29.339	34.382	37.653	40.647	44.314	46.928
<b>26</b>	11.1602	12.1981	13.8439	15.3792	17.2919	20.8434	25.3365	30.435	35.563	38.885	41.923	45.642	48.290
<b>27</b>	11.8076	12.8785	14.5734	16.1514	18.1139	21.7494	26.3363	31.528	36.741	40.113	43.194	46.963	49.645
<b>28</b>	12.4613	13.5647	15.3079	16.9279	18.9392	22.6572	27.3362	32.620	37.916	41.337	44.461	48.278	50.993
<b>29</b>	13.1211	14.2565	16.0471	17.7084	19.7677	23.5666	28.3361	33.711	39.087	42.557	45.722	49.588	52.336

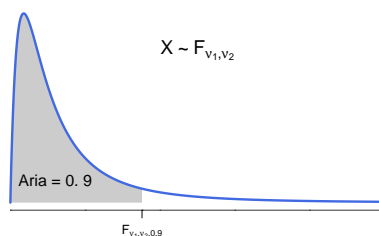
(continued)

$\nu/\alpha$	0.005	0.01	0.025	0.05	0.1	0.25	0.5	0.75	0.9	0.95	0.975	0.99	0.995
30	13.7867	14.9535	16.7908	18.4927	20.5992	24.4776	29.3360	34.800	40.256	43.773	46.979	50.892	53.672
31	14.4578	15.6555	17.5387	19.2806	21.4336	25.3901	30.3359	35.887	41.422	44.985	48.232	52.191	55.003
32	15.1340	16.3622	18.2908	20.0719	22.2706	26.3041	31.3359	36.973	42.585	46.194	49.480	53.486	56.328
33	15.8153	17.0735	19.0467	20.8665	23.1102	27.2194	32.3358	38.057	43.745	47.400	50.725	54.776	57.648
34	16.5013	17.7891	19.8063	21.6643	23.9523	28.1361	33.3357	39.141	44.903	48.602	51.966	56.061	58.964
35	17.1918	18.5089	20.5694	22.4650	24.7967	29.0540	34.3356	40.223	46.059	49.802	53.203	57.342	60.275
36	17.8867	19.2327	21.3359	23.2686	25.6433	29.9730	35.3356	41.304	47.212	50.998	54.437	58.619	61.581
37	18.5858	19.9602	22.1056	24.0749	26.4921	30.8933	36.3355	42.383	48.363	52.192	55.668	59.892	62.883
38	19.2889	20.6914	22.8785	24.8839	27.3430	31.8146	37.3355	43.462	49.513	53.383	56.895	61.162	64.181
39	19.9959	21.4262	23.6543	25.6954	28.1958	32.7369	38.3354	44.539	50.660	54.572	58.120	62.428	65.476
40	20.7065	22.1643	24.4330	26.5093	29.0505	33.6603	39.3353	45.616	51.805	55.758	59.342	63.691	66.766
41	21.4208	22.9056	25.2145	27.3256	29.9071	34.5846	40.3353	46.692	52.949	56.942	60.561	64.950	68.053
42	22.1385	23.6501	25.9987	28.1440	30.7654	35.5099	41.3352	47.766	54.090	58.124	61.777	66.206	69.336
43	22.8595	24.3976	26.7854	28.9647	31.6255	36.4361	42.3352	48.840	55.230	59.303	62.990	67.459	70.616
44	23.5837	25.1480	27.5746	29.7875	32.4871	37.3631	43.3352	49.913	56.368	60.481	64.201	68.710	71.893
45	24.3110	25.9013	28.3662	30.6123	33.3504	38.2910	44.3351	50.985	57.505	61.656	65.410	69.957	73.166
46	25.0413	26.6572	29.1601	31.4390	34.2152	39.2197	45.3351	52.056	58.641	62.830	66.617	71.201	74.436
47	25.7746	27.4158	29.9562	32.2676	35.0814	40.1492	46.3350	53.127	59.774	64.001	67.821	72.443	75.704
48	26.5106	28.1770	30.7545	33.0981	35.9491	41.0794	47.3350	54.196	60.907	65.171	69.023	73.683	76.969
49	27.2493	28.9406	31.5549	33.9303	36.8182	42.0104	48.3350	55.265	62.038	66.339	70.222	74.919	78.231
50	27.9907	29.7067	32.3574	34.7643	37.6886	42.9421	49.3349	56.334	63.167	67.505	71.420	76.154	79.490

## 4 Tabel pentru repartiția Fischer-Snedecor

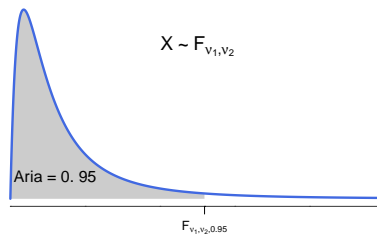
Tabelele care urmează prezintă cuantilele de ordin  $\alpha \in \{0.9, 0.95, 0.975\}$  pentru repartiția Fischer-Snedecor cu  $\nu_1$  grade de libertate la numărător și  $\nu_2$  grade de libertate la numitor. Pentru valori ale lui  $\alpha \leq 0.5$  se poate folosi relația  $F_{\nu_1, \nu_2, \alpha} = \frac{1}{F_{\nu_2, \nu_1, 1-\alpha}}$ .

### 4.1 Cuntatile pentru $F_{\nu_1, \nu_2, 0.9}$



$\nu_2/\nu_1$	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	39.864	49.500	53.593	55.833	57.240	58.204	58.906	59.439	59.858	60.195	60.705	61.220	61.740	62.002	62.265	62.529	62.794	63.061	63.328
2	8.526	9.000	9.162	9.243	9.293	9.325	9.349	9.367	9.380	9.392	9.408	9.425	9.441	9.450	9.458	9.466	9.475	9.483	9.491
3	5.538	5.462	5.391	5.343	5.309	5.285	5.266	5.252	5.240	5.230	5.216	5.200	5.184	5.176	5.168	5.160	5.151	5.143	5.134
4	4.545	4.325	4.191	4.107	4.051	4.010	3.979	3.955	3.936	3.920	3.896	3.870	3.844	3.831	3.817	3.804	3.790	3.775	3.761
5	4.060	3.780	3.619	3.520	3.453	3.405	3.368	3.339	3.316	3.297	3.268	3.238	3.207	3.191	3.174	3.157	3.140	3.123	3.105
6	3.776	3.463	3.289	3.181	3.107	3.055	3.014	2.983	2.958	2.937	2.905	2.871	2.836	2.818	2.800	2.781	2.762	2.742	2.722
7	3.589	3.257	3.074	2.961	2.883	2.827	2.785	2.752	2.725	2.703	2.668	2.632	2.595	2.575	2.555	2.535	2.514	2.493	2.471
8	3.458	3.113	2.924	2.806	2.726	2.668	2.624	2.589	2.561	2.538	2.502	2.464	2.425	2.404	2.383	2.361	2.339	2.316	2.293
9	3.360	3.006	2.813	2.693	2.611	2.551	2.505	2.469	2.440	2.416	2.379	2.340	2.298	2.277	2.255	2.232	2.208	2.184	2.159
10	3.285	2.925	2.728	2.605	2.522	2.461	2.414	2.377	2.347	2.323	2.284	2.244	2.201	2.178	2.155	2.132	2.107	2.082	2.055
11	3.225	2.860	2.660	2.536	2.451	2.389	2.342	2.304	2.273	2.248	2.209	2.167	2.123	2.100	2.076	2.052	2.026	2.000	1.972
12	3.176	2.807	2.606	2.480	2.394	2.331	2.283	2.245	2.213	2.188	2.147	2.105	2.060	2.036	2.011	1.986	1.960	1.932	1.904
13	3.136	2.763	2.560	2.434	2.347	2.283	2.234	2.195	2.164	2.138	2.097	2.053	2.007	1.983	1.958	1.931	1.904	1.876	1.846
14	3.102	2.727	2.522	2.395	2.307	2.243	2.193	2.154	2.122	2.095	2.054	2.010	1.962	1.938	1.912	1.885	1.857	1.828	1.797
15	3.073	2.695	2.490	2.361	2.273	2.208	2.158	2.119	2.086	2.059	2.017	1.972	1.924	1.899	1.873	1.845	1.817	1.787	1.755
16	3.048	2.668	2.462	2.333	2.244	2.178	2.128	2.088	2.055	2.028	1.985	1.940	1.891	1.866	1.839	1.811	1.782	1.751	1.718
17	3.026	2.645	2.437	2.308	2.218	2.152	2.102	2.061	2.028	2.001	1.958	1.912	1.862	1.836	1.809	1.780	1.751	1.719	1.686
18	3.007	2.624	2.416	2.286	2.196	2.130	2.079	2.038	2.005	1.977	1.933	1.887	1.837	1.810	1.783	1.754	1.723	1.691	1.657
19	2.990	2.606	2.397	2.266	2.176	2.109	2.058	2.017	1.984	1.956	1.912	1.865	1.814	1.787	1.759	1.730	1.699	1.666	1.631
20	2.975	2.589	2.380	2.249	2.158	2.091	2.040	1.998	1.965	1.937	1.892	1.845	1.794	1.767	1.738	1.708	1.677	1.643	1.607
21	2.961	2.575	2.365	2.233	2.142	2.075	2.023	1.982	1.948	1.920	1.875	1.827	1.776	1.748	1.719	1.689	1.657	1.623	1.586
22	2.949	2.561	2.351	2.219	2.128	2.061	2.008	1.967	1.933	1.904	1.859	1.811	1.759	1.731	1.702	1.671	1.639	1.604	1.567
23	2.937	2.549	2.339	2.207	2.115	2.047	1.995	1.953	1.919	1.890	1.845	1.796	1.744	1.716	1.686	1.655	1.622	1.587	1.549
24	2.927	2.538	2.327	2.195	2.103	2.035	1.983	1.941	1.906	1.877	1.832	1.783	1.730	1.702	1.672	1.641	1.607	1.571	1.533
25	2.918	2.528	2.317	2.184	2.092	2.024	1.971	1.929	1.895	1.866	1.820	1.771	1.718	1.689	1.659	1.627	1.593	1.557	1.518
26	2.909	2.519	2.308	2.175	2.082	2.014	1.961	1.919	1.884	1.855	1.809	1.760	1.706	1.677	1.647	1.615	1.581	1.544	1.504
27	2.901	2.511	2.299	2.166	2.073	2.005	1.952	1.909	1.874	1.845	1.799	1.749	1.695	1.666	1.636	1.603	1.569	1.531	1.491
28	2.894	2.503	2.291	2.157	2.064	1.996	1.943	1.900	1.865	1.836	1.790	1.740	1.685	1.656	1.625	1.593	1.558	1.520	1.478
29	2.887	2.495	2.283	2.149	2.057	1.988	1.935	1.892	1.857	1.827	1.781	1.731	1.676	1.647	1.615	1.583	1.547	1.509	1.467
30	2.881	2.489	2.276	2.142	2.049	1.980	1.927	1.884	1.849	1.819	1.773	1.722	1.667	1.638	1.607	1.573	1.538	1.499	1.456
40	2.835	2.440	2.226	2.091	1.997	1.927	1.873	1.829	1.793	1.763	1.715	1.662	1.605	1.574	1.541	1.506	1.467	1.425	1.377
60	2.791	2.393	2.177	2.041	1.946	1.875	1.819	1.775	1.738	1.707	1.657	1.603	1.544	1.511	1.476	1.437	1.395	1.348	1.292
120	2.748	2.347	2.130	1.992	1.896	1.824	1.768	1.722	1.684	1.652	1.601	1.545	1.482	1.447	1.409	1.368	1.320	1.265	1.193
$\infty$	2.705	2.303	2.084	1.945	1.847	1.774	1.717	1.670	1.631	1.599	1.546	1.487	1.421	1.383	1.342	1.295	1.240	1.169	1.000

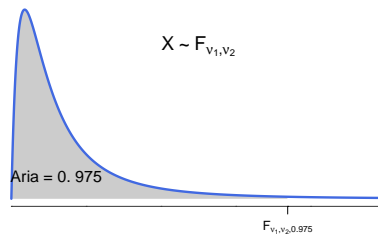
## 4.2 Cuntatile pentru $F_{\nu_1, \nu_2, 0.95}$



$\nu_2/\nu_1$	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
<b>1</b>	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.95	248.01	249.05	250.09	251.14	252.20	253.25	254.31
<b>2</b>	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.39	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50
<b>3</b>	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
<b>4</b>	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
<b>5</b>	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
<b>6</b>	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	3.71	3.67
<b>7</b>	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.58	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23
<b>8</b>	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	3.00	2.97	2.93
<b>9</b>	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
<b>10</b>	4.96	4.10	3.71	3.48	3.33	3.22	3.13	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54
<b>11</b>	4.84	3.98	3.59	3.36	3.20	3.10	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
<b>12</b>	4.75	3.88	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.50	2.47	2.43	2.38	2.34	2.30
<b>13</b>	4.67	3.81	3.41	3.18	3.02	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
<b>14</b>	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
<b>15</b>	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
<b>16</b>	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	2.23	2.19	2.15	2.11	2.06	2.01
<b>17</b>	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
<b>18</b>	4.41	3.56	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
<b>19</b>	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.15	2.11	2.07	2.03	1.98	1.93	1.88
<b>20</b>	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
<b>21</b>	4.33	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	1.97	1.92	1.87	1.81
<b>22</b>	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
<b>23</b>	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.38	2.32	2.27	2.20	2.13	2.05	2.00	1.96	1.91	1.86	1.81	1.76
<b>24</b>	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.35	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73
<b>25</b>	4.24	3.38	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
<b>26</b>	4.22	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
<b>27</b>	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	1.78	1.73	1.67
<b>28</b>	4.20	3.34	2.95	2.71	2.56	2.44	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.92	1.87	1.82	1.77	1.71	1.65
<b>29</b>	4.18	3.33	2.93	2.70	2.54	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.95	1.90	1.85	1.81	1.75	1.70	1.64
<b>30</b>	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.02	1.93	1.89	1.84	1.79	1.74	1.68	1.62
<b>40</b>	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
<b>60</b>	4.00	3.15	2.76	2.52	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
<b>120</b>	3.92	3.07	2.68	2.45	2.29	2.17	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
$\infty$	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



### 4.3 Cuntatile pentru $F_{\nu_1, \nu_2, 0.975}$



$\nu_2/\nu_1$	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	$\infty$
1	647.79	799.50	864.16	899.58	921.85	937.11	948.22	956.66	963.28	968.63	976.71	984.87	993.10	997.25	1001.41	1005.60	1009.80	1014.02	1018.26
2	38.51	39.00	39.16	39.25	39.30	39.33	39.35	39.37	39.39	39.40	39.41	39.43	39.45	39.46	39.47	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	9.61	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	6.53	6.43	6.33	6.28	6.23	6.17	6.12	6.07	6.01
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	5.00	4.90	4.82	4.76	4.67	4.57	4.47	4.42	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	4.29	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	3.50	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	3.25	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	2.73
13	6.41	4.96	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	4.76	4.15	3.80	3.58	3.42	3.29	3.20	3.12	3.06	2.96	2.86	2.76	2.70	2.64	2.58	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	2.62	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	2.83	2.72	2.62	2.56	2.50	2.44	2.38	2.31	2.25
18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.00	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	3.52	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	2.08
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	3.21	3.06	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	3.00	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	2.52	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91
26	5.66	4.26	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	2.33	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	2.58	2.51	2.41	2.31	2.19	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	3.92	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.17	2.06	1.94	1.88	1.81	1.74	1.67	1.58	1.48
120	5.15	3.81	3.23	2.89	2.67	2.52	2.40	2.30	2.22	2.16	2.06	1.95	1.82	1.76	1.69	1.61	1.53	1.43	1.31
$\infty$	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.95	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00