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**Working Paper**

## On group sequential tests based on robust location and scale estimators in the two-sample problem

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Simulated values of the test statistic based on (25A, Q) based on 10000 replications for  $F=G=N(0,1)$ . **FIXED** sample size situation, i.e.  $K=1$ .

	n=n1=n2 Test statistic			
	mean	lower bound of 95% CI	upper bound of 95% CI	standard deviation
10	-.015176	-.036351	.005999	1.080359
11	-.008177	-.029321	.012967	1.078775
12	-.003488	-.024103	.017127	1.051773
13	.007814	-.013147	.028775	1.069436
14	.010081	-.010588	.030751	1.054560
15	-.007736	-.028364	.012893	1.052483
16	.010388	-.010136	.030912	1.047133
17	.003245	-.017285	.023775	1.047471
18	-.005836	-.026348	.014676	1.046529
19	-.007344	-.027627	.012940	1.034868
20	.005570	-.014807	.025947	1.039636
21	-.004596	-.024529	.015337	1.016993
22	-.003886	-.024212	.016439	1.037000
23	-.013688	-.033828	.006452	1.027560
24	-.002057	-.022039	.017924	1.019464
25	-.003107	-.023319	.017106	1.031268
26	-.011061	-.031369	.009246	1.036095
27	-.023618	-.043495	-.003740	1.014178
28	.000300	-.019837	.020437	1.027398
29	-.000154	-.020387	.020078	1.032256
30	-.006337	-.026649	.013975	1.036333
31	.002228	-.017819	.022275	1.022818
32	-.003551	-.023650	.016549	1.025491
33	.013660	-.006455	.033776	1.026295
34	-.001115	-.021418	.019188	1.035864
35	.005913	-.014054	.025880	1.018721
36	.008941	-.010951	.028832	1.014851
37	-.006646	-.026992	.013700	1.038052
38	.018086	-.002026	.038199	1.026140
39	.017257	-.002454	.036968	1.005666
40	.007068	-.012893	.027029	1.018421
41	-.005189	-.025280	.014903	1.025088
42	-.014258	-.034259	.005744	1.020465
43	-.008149	-.027994	.011696	1.012521
44	.016349	-.003897	.036594	1.032935
45	.004776	-.015171	.024723	1.017704
46	.007148	-.012936	.027232	1.024706
47	.011293	-.008824	.031411	1.026402
48	.003360	-.016796	.023516	1.028374
49	-.000992	-.020892	.018908	1.015305
50	-.004607	-.024829	.015616	1.031745
51	-.011887	-.031856	.008081	1.018796
52	.017449	-.002536	.037434	1.019654
53	-.000180	-.019956	.019597	1.008999
54	-.003157	-.023048	.016733	1.014819
55	.004365	-.015762	.024491	1.026850
56	-.004139	-.024122	.015845	1.019555
57	.006884	-.013165	.026934	1.022927
58	.000511	-.019768	.020789	1.034614
59	.014439	-.005432	.034310	1.013807
60	.000600	-.019233	.020434	1.011929
61	.004346	-.015341	.024032	1.004394
62	-.000779	-.020907	.019350	1.026960
63	-.011979	-.031653	.007695	1.003761
64	.005410	-.014728	.025548	1.027468
65	-.013064	-.033091	.006963	1.021778
66	.001295	-.018510	.021100	1.010465
67	.006109	-.013712	.025929	1.011254
68	-.012168	-.031911	.007576	1.007310

n=n1=n2	Test statistic	mean	lower bound of 95% CI	upper bound of 95% CI	standard deviation
69	.006404	-.013369	.026177	1.008841	
70	.004690	-.015123	.024502	1.010833	
71	-.011611	-.031376	.008154	1.008397	
72	-.001074	-.020732	.018584	1.002959	
73	.003588	-.016014	.023191	1.000119	
74	-.000689	-.020603	.019226	1.016038	
75	-.012579	-.032390	.007231	1.010749	
76	.002142	-.017911	.022194	1.023080	
77	-.002079	-.021878	.017719	1.010131	
78	-.010475	-.030228	.009278	1.007809	
79	.012029	-.007463	.031520	.994463	
80	-.010468	-.030402	.009465	1.017030	
81	.005552	-.014481	.025585	1.022074	
82	.000564	-.019633	.020761	1.030476	
83	-.014901	-.034968	.005166	1.023815	
84	.006283	-.013721	.026287	1.020612	
85	-.001671	-.021342	.018000	1.003637	
86	.008414	-.011482	.028309	1.015066	
87	-.004108	-.024048	.015833	1.017369	
88	.002933	-.017371	.023236	1.035900	
89	.002128	-.017805	.022061	1.016979	
90	-.001710	-.021574	.018154	1.013483	
91	-.003603	-.023560	.016354	1.018197	
92	.011564	-.008203	.031330	1.008493	
93	-.003979	-.023972	.016015	1.020093	
94	-.010099	-.030182	.009984	1.024639	
95	-.002107	-.021995	.017781	1.014698	
96	-.007785	-.027662	.012093	1.014152	
97	.005751	-.014225	.025727	1.019199	
98	-.006829	-.026772	.013114	1.017500	
99	-.011611	-.031647	.008425	1.022229	
100	.011258	-.008580	.031095	1.012130	
105	.008516	-.011233	.028266	1.007615	
110	.008301	-.011727	.028330	1.021865	
115	.005410	-.014514	.025334	1.016533	
120	-.005701	-.025567	.014165	1.013556	
125	-.013605	-.033350	.006140	1.007404	
130	.011291	-.008677	.031259	1.018761	
135	-.003851	-.023831	.016130	1.019402	
140	-.001427	-.021565	.018712	1.027475	
145	.005762	-.013703	.025226	.993080	
150	-.006344	-.026145	.013457	1.010274	
155	-.008883	-.028396	.010630	.995550	
160	-.002044	-.021950	.017862	1.015618	
165	-.005468	-.025286	.014351	1.011167	
170	.008228	-.011853	.028310	1.024569	
175	-.006617	-.026374	.013140	1.008023	
180	-.018688	-.038528	.001152	1.012266	
185	.009026	-.010969	.029021	1.020154	
190	.002110	-.017840	.022061	1.017889	
195	.001583	-.018255	.021420	1.012115	
200	.007779	-.012140	.027698	1.016274	
225	.002084	-.017880	.022048	1.018594	
250	.002332	-.017541	.022206	1.013945	
275	-.013955	-.033730	.005820	1.008941	
300	-.005613	-.025373	.014148	1.008185	
325	.031303	.011131	.051476	1.029204	
350	.011654	-.008496	.031803	1.028032	
375	.004251	-.015689	.024191	1.017348	
400	-.008191	-.028106	.011724	1.016065	
425	.008384	-.011426	.028194	1.010710	
450	.009415	-.010404	.029234	1.011180	
475	.007693	-.012089	.027475	1.009277	
500	.016356	-.003565	.036276	1.016348	

Simulated values of the test statistic based on (25A, SH) based on 10000 replications for  $F=G=N(0,1)$ . **FIXED** sample size situation, i.e.  $K=1$

n=n1=n2	Test statistic mean	lower bound of 95% CI	upper bound of 95% CI	standard deviation
10	-0.022912	-0.053265	0.007441	1.548623
11	-0.007766	-0.043973	0.028441	1.847312
12	-0.004288	-0.033120	0.024544	1.471031
13	0.003727	-0.030002	0.037455	1.720836
14	0.014579	-0.013433	0.042590	1.429149
15	-0.010323	-0.042215	0.021569	1.627127
16	0.011339	-0.015883	0.038561	1.388883
17	0.005101	-0.025313	0.035516	1.551754
18	-0.011251	-0.037879	0.015376	1.358538
19	-0.008629	-0.037811	0.020553	1.488876
20	0.008630	-0.017614	0.034875	1.339023
21	-0.002076	-0.030199	0.026048	1.434853
22	-0.007102	-0.032804	0.018599	1.311302
23	-0.017589	-0.045039	0.009861	1.400514
24	0.000815	-0.024157	0.025787	1.274076
25	-0.003545	-0.030537	0.023447	1.377150
26	-0.011232	-0.036269	0.013805	1.277376
27	-0.032472	-0.058785	-0.006160	1.342465
28	-0.000969	-0.025566	0.023628	1.254930
29	0.000692	-0.025642	0.027027	1.343609
30	-0.005090	-0.029771	0.019592	1.259266
31	0.000686	-0.025187	0.026559	1.320066
32	-0.003985	-0.028240	0.020270	1.237513
33	0.016089	-0.009445	0.041622	1.302746
34	-0.000962	-0.025187	0.023263	1.235968
35	0.009932	-0.015185	0.035049	1.281466
36	0.011057	-0.012595	0.034709	1.206742
37	-0.007856	-0.033075	0.017362	1.286662
38	0.023231	-0.000651	0.047114	1.218497
39	0.019074	-0.005226	0.043373	1.239756
40	0.010819	-0.012691	0.034329	1.199484
41	-0.007319	-0.032021	0.017384	1.260314
42	-0.017767	-0.041201	0.005667	1.195608
43	-0.007825	-0.031898	0.016249	1.228245
44	0.018095	-0.005556	0.041745	1.206651
45	0.004543	-0.019652	0.028738	1.234425
46	0.009143	-0.014197	0.032484	1.190838
47	0.011730	-0.012564	0.036024	1.239480
48	0.003138	-0.020195	0.026471	1.190456
49	-0.002925	-0.026743	0.020894	1.215225
50	-0.005257	-0.028641	0.018127	1.193072
51	-0.015874	-0.039627	0.007879	1.211881
52	0.021692	-0.001268	0.044651	1.171404
53	-0.001270	-0.024717	0.022178	1.196301
54	-0.002965	-0.025826	0.019895	1.166354
55	0.004029	-0.019856	0.027915	1.218653
56	-0.003252	-0.026040	0.019535	1.162644
57	0.008308	-0.015305	0.031921	1.204744
58	-0.001463	-0.024558	0.021631	1.178292
59	0.017168	-0.006176	0.040511	1.190995
60	0.003053	-0.019513	0.025619	1.151321
61	0.003246	-0.019793	0.026285	1.175456
62	-0.001019	-0.023816	0.021778	1.163120
63	-0.013794	-0.036696	0.009109	1.168497
64	0.005042	-0.017802	0.027887	1.165550
65	-0.014083	-0.037331	0.009164	1.186106
66	0.001406	-0.020948	0.023761	1.140515
67	0.006529	-0.016454	0.029512	1.172592
68	-0.013855	-0.036118	0.008408	1.135849

n=n1=n2	Test statistic mean	lower bound of 95% CI	upper bound of 95% CI	standard deviation
69	0.006397	-0.016410	0.029203	1.163615
70	0.004644	-0.017634	0.026923	1.136664
71	-0.010899	-0.033649	0.011851	1.160707
72	-0.002436	-0.024466	0.019594	1.123983
73	0.004024	-0.018453	0.026501	1.146773
74	-0.002340	-0.024629	0.019949	1.137194
75	-0.013133	-0.035779	0.009514	1.155446
76	0.002512	-0.019844	0.024868	1.140605
77	-0.002031	-0.024574	0.020513	1.150190
78	-0.012711	-0.034758	0.009337	1.124858
79	0.013701	-0.008464	0.035866	1.130862
80	-0.010607	-0.032816	0.011603	1.133139
81	0.007504	-0.015254	0.030262	1.161120
82	0.005445	-0.016893	0.027783	1.139696
83	-0.005098	-0.027551	0.017355	1.145567
84	0.005740	-0.016803	0.028282	1.150132
85	-0.015769	-0.038470	0.006931	1.158195
86	-0.009562	-0.031955	0.012831	1.142477
87	0.019634	-0.002509	0.041777	1.129757
88	-0.015187	-0.037321	0.006947	1.129293
89	-0.010412	-0.032755	0.011931	1.139954
90	-0.018385	-0.040273	0.003503	1.116733
91	0.023543	0.001387	0.045698	1.130396
92	-0.000261	-0.022361	0.021839	1.127563
93	-0.010580	-0.032864	0.011705	1.136952
94	0.004825	-0.017476	0.027125	1.137778
95	0.015426	-0.006825	0.037677	1.135271
96	0.009797	-0.012007	0.031601	1.112462
97	0.020720	-0.001429	0.042869	1.130050
98	-0.002418	-0.024015	0.019179	1.101885
99	-0.015036	-0.037113	0.007040	1.126344
100	-0.001875	-0.023794	0.020043	1.118289
105	0.004357	-0.017735	0.026449	1.127134
110	0.028653	0.006940	0.050365	1.107796
115	-0.013737	-0.035825	0.008352	1.126960
120	0.001288	-0.020455	0.023030	1.109302
125	0.011532	-0.010092	0.033157	1.103304
130	0.027576	0.006100	0.049053	1.095754
135	0.011020	-0.010864	0.032905	1.116564
140	0.011179	-0.010383	0.032741	1.100110
145	0.008799	-0.013143	0.030741	1.119501
150	-0.007167	-0.028592	0.014258	1.093119
155	0.014994	-0.006590	0.036579	1.101244
160	0.024690	0.003383	0.045997	1.087100
165	-0.023481	-0.044994	-0.001968	1.097596
170	0.001255	-0.019977	0.022487	1.083274
175	0.004527	-0.016734	0.025788	1.084743
180	0.026603	0.005419	0.047787	1.080795
185	0.001920	-0.019317	0.023156	1.083489
190	0.005782	-0.015334	0.026897	1.077319
195	0.008813	-0.012766	0.030391	1.100931
200	0.004630	-0.016485	0.025745	1.077310
225	0.010311	-0.010759	0.031381	1.074993
250	0.005500	-0.015800	0.026800	1.086748
275	0.009046	-0.011860	0.029951	1.066612
300	0.011516	-0.009332	0.032365	1.063711
325	0.009751	-0.011360	0.030861	1.077061
350	-0.005013	-0.025650	0.015625	1.052927
375	-0.023580	-0.044169	-0.002992	1.050432
400	0.011795	-0.008817	0.032408	1.051666
425	0.004650	-0.016017	0.025317	1.054457
450	0.006244	-0.014602	0.027089	1.063535
475	0.010882	-0.009768	0.031532	1.053563
500	0.007944	-0.012745	0.028633	1.055559