

TABLE 7 Selected Tail Probabilities for the Null Distribution of Wilcoxon's Rank-Sum Statistic

$$P = P [W_s \geq x] = P [W_s \leq x^*]$$

Smaller Sample Size = 2											
Larger Sample Size											
3			4			5			6		
<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>
8	.200	4	10	.133	4	11	.190	5	13	.143	5
9	.100	3	11	.067	3	12	.095	4	14	.071	4
10	0	2	12	0	2	13	.048	3	15	.036	3
						14	0	2	16	0	2
7			8			9			10		
<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>
15	.111	5	16	.133	6	18	.109	6	19	.136	7
16	.056	4	17	.089	5	19	.073	5	20	.091	6
17	.028	3	18	.044	4	20	.036	4	21	.061	5
18	0	2	19	.022	3	21	.018	3	22	.030	4
			20	0	2	22	0	2	23	.015	3
Smaller Sample Size = 3											
Larger Sample Size											
3			4			5			6		
<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>
13	.200	8	16	.114	8	18	.125	9	20	.131	10
14	.100	7	17	.057	7	19	.071	8	21	.083	9
15	.050	6	18	.029	6	20	.036	7	22	.048	8
16	0	5	19	0	5	21	.018	6	23	.024	7
						22	0	5	24	.012	6
									25	0	5
7			8			9			10		
<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>	<i>x</i>	<i>P</i>	<i>x*</i>
22	.133	11	24	.139	12	27	.105	12	29	.108	13
23	.092	10	25	.097	11	28	.073	11	30	.080	12
24	.058	9	26	.067	10	29	.050	10	31	.056	11
25	.033	8	27	.042	9	30	.032	9	32	.038	10
26	.017	7	28	.024	8	31	.018	8	33	.024	9
27	.008	6	29	.012	7	32	.009	7	34	.014	8
28	0	5	30	.006	6				35	.007	7
			31	0	5						

TABLE 7 (Continued)

Smaller Sample Size = 4											
Larger Sample Size											
4			5			6			7		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
22	.171	14	25	.143	15	28	.129	16	31	.115	17
23	.100	13	26	.095	14	29	.086	15	32	.082	16
24	.057	12	27	.056	13	30	.057	14	33	.055	15
25	.029	11	28	.032	12	31	.033	13	34	.036	14
26	.014	10	29	.016	11	32	.019	12	35	.021	13
27	0	9	30	.008	10	33	.010	11	36	.012	12
			31	0	9				37	.006	11
8			9			10					
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
34	.107	18	36	.130	20	39	.120	21			
35	.077	17	37	.099	19	40	.094	20			
36	.055	16	38	.074	18	41	.071	19			
37	.036	15	39	.053	17	42	.053	18			
38	.024	14	40	.038	16	43	.038	17			
39	.014	13	41	.025	15	44	.027	16			
40	.008	12	42	.017	14	45	.018	15			
			43	.010	13	46	.012	14			
						47	.007	13			

Smaller Sample Size = 5											
Larger Sample Size											
5			6			7			8		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
34	.111	21	37	.123	23	41	.101	24	44	.111	26
35	.075	20	38	.089	22	42	.074	23	45	.085	25
36	.048	19	39	.063	21	43	.053	22	46	.064	24
37	.028	18	40	.041	20	44	.037	21	47	.047	23
38	.016	17	41	.026	19	45	.024	20	48	.033	22
39	.008	16	42	.015	18	46	.015	19	49	.023	21
			43	.009	17	47	.009	18	50	.015	20
									51	.009	19

TABLE 7 (Continued)

Larger Sample Size					
9			10		
x	P	x^*	x	P	x^*
47	.120	28	51	.103	29
48	.095	27	52	.082	28
49	.073	26	53	.065	27
50	.056	25	54	.050	26
51	.041	24	55	.038	25
52	.030	23	56	.028	24
53	.021	22	57	.020	23
54	.014	21	58	.014	22
55	.009	20	59	.010	21

Smaller Sample Size = 6											
6			Larger Sample Size						9		
x	P	x^*	7			8			x	P	x^*
x	P	x^*	x	P	x^*	x	P	x^*	x	P	x^*
47	.120	31	51	.117	33	55	.114	35	59	.112	37
48	.090	30	52	.090	32	56	.091	34	60	.091	36
49	.066	29	53	.069	31	57	.071	33	61	.072	35
50	.047	28	54	.051	30	58	.054	32	62	.057	34
51	.032	27	55	.037	29	59	.041	31	63	.044	33
52	.021	26	56	.026	28	60	.030	30	64	.033	32
53	.013	25	57	.017	27	61	.021	29	65	.025	31
54	.008	24	58	.011	26	62	.015	28	66	.018	30
			59	.007	25	63	.010	27	67	.013	29
									68	.009	28

10		
x	P	x^*
63	.110	39
64	.090	38
65	.074	37
66	.059	36
67	.047	35
68	.036	34
69	.028	33
70	.021	32
71	.016	31
72	.011	30
73	.008	29

TABLE 7 (Continued)

Smaller Sample Size = 7											
Larger Sample Size											
7			8			9			10		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
63	.104	42	67	.116	45	72	.105	47	76	.115	50
64	.082	41	68	.095	44	73	.087	46	77	.097	49
65	.064	40	69	.076	43	74	.071	45	78	.081	48
66	.049	39	70	.060	42	75	.057	44	79	.067	47
67	.036	38	71	.047	41	76	.045	43	80	.054	46
68	.027	37	72	.036	40	77	.036	42	81	.044	45
69	.019	36	73	.027	39	78	.027	41	82	.035	44
70	.013	35	74	.020	38	79	.021	40	83	.028	43
71	.009	34	75	.014	37	80	.016	39	84	.022	42
			76	.010	36	81	.011	38	85	.017	41
						82	.008	37	86	.012	40
									87	.009	39

Smaller Sample Size = 8								
Larger Sample Size								
8			9			10		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
80	.117	56	86	.100	58	91	.102	61
81	.097	55	87	.084	57	92	.086	60
82	.080	54	88	.069	56	93	.073	59
83	.065	53	89	.057	55	94	.061	58
84	.052	52	90	.046	54	95	.051	57
85	.041	51	91	.037	53	96	.042	56
86	.032	50	92	.030	52	97	.034	55
87	.025	49	93	.023	51	98	.027	54
88	.019	48	94	.018	50	99	.022	53
89	.014	47	95	.014	49	100	.017	52
90	.010	46	96	.010	48	101	.013	51
						102	.010	50

TABLE 7 (Continued)

Smaller Sample Size = 9						Smaller Sample Size = 10		
Larger Sample Size						Larger Sample Size		
9			10			10		
x	P	x^*	x	P	x^*	x	P	x^*
100	.111	71	106	.106	74	122	.109	88
101	.095	70	107	.091	73	123	.095	87
102	.081	69	108	.078	72	124	.083	86
103	.068	68	109	.067	71	125	.072	85
104	.057	67	110	.056	70	126	.062	84
105	.047	66	111	.047	69	127	.053	83
106	.039	65	112	.039	68	128	.045	82
107	.031	64	113	.033	67	129	.038	81
108	.025	63	114	.027	66	130	.032	80
109	.020	62	115	.022	65	131	.026	79
110	.016	61	116	.017	64	132	.022	78
111	.012	60	117	.014	63	133	.018	77
112	.009	59	118	.011	62	134	.014	76
			119	.009	61	135	.012	75
						136	.009	74

Source: Adapted from C. Kraft and C. van Eeden, *A Nonparametric Introduction to Statistics*, Macmillan, New York, 1968.

TABLE 8 Selected Tail Probabilities for the Null Distribution of Wilcoxon's Signed-Rank Statistic

$$P = P[T^+ \geq x] = P[T^+ \leq x^*]$$

<i>n</i> = 3			<i>n</i> = 4			<i>n</i> = 5			<i>n</i> = 6		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
5	.250	1	8	.188	2	12	.156	3	17	.109	4
6	.125	0	9	.125	1	13	.094	2	18	.078	3
7	0		10	.062	0	14	.062	1	19	.047	2
			11	0		15	.031	0	20	.031	1
						16	0		21	.016	0
									22	0	
<i>n</i> = 7			<i>n</i> = 8			<i>n</i> = 9			<i>n</i> = 10		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
22	.109	6	27	.125	9	34	.102	11	40	.116	15
23	.078	5	28	.098	8	35	.082	10	41	.097	14
24	.055	4	29	.074	7	36	.064	9	42	.080	13
25	.039	3	30	.055	6	37	.049	8	43	.065	12
26	.023	2	31	.039	5	38	.037	7	44	.053	11
27	.016	1	32	.027	4	39	.027	6	45	.042	10
28	.008	0	33	.020	3	40	.020	5	46	.032	9
			34	.012	2	41	.014	4	47	.024	8
			35	.008	1	42	.010	3	48	.019	7
									49	.014	6
									50	.010	5
<i>n</i> = 11			<i>n</i> = 12			<i>n</i> = 13			<i>n</i> = 14		
<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *	<i>x</i>	<i>P</i>	<i>x</i> *
48	.103	18	56	.102	22	64	.108	27	73	.108	32
49	.087	17	57	.088	21	65	.095	26	74	.097	31
50	.074	16	58	.076	20	66	.084	25	75	.086	30
51	.062	15	59	.065	19	67	.073	24	76	.077	29
52	.051	14	60	.055	18	68	.064	23	77	.068	28
53	.042	13	61	.046	17	69	.055	22	78	.059	27
54	.034	12	62	.039	16	70	.047	21	79	.052	26
55	.027	11	63	.032	15	71	.040	20	80	.045	25
56	.021	10	64	.026	14	72	.034	19	81	.039	24
57	.016	9	65	.021	13	73	.029	18	82	.034	23
58	.012	8	66	.017	12	74	.024	17	83	.029	22
59	.009	7	67	.013	11	75	.020	16	84	.025	21
			68	.010	10	76	.016	15	85	.021	20
						77	.013	14	86	.018	19
						78	.011	13	87	.015	18
						79	.009	12	88	.012	17
									89	.010	16

TABLE 8 (Continued)

$n = 15$		
x	P	x^*
83	.104	37
84	.094	36
85	.084	35
86	.076	34
87	.068	33
88	.060	32
89	.053	31
90	.047	30
91	.042	29
92	.036	28
93	.032	27
94	.028	26
95	.024	25
96	.021	24
97	.018	23
98	.015	22
99	.013	21
100	.011	20
101	.009	19

Source: Adapted from C. Kraft and C. van Eeden, *A Nonparametric Introduction to Statistics*, Macmillan, New York, 1968.