NAVY DEPARTMENT

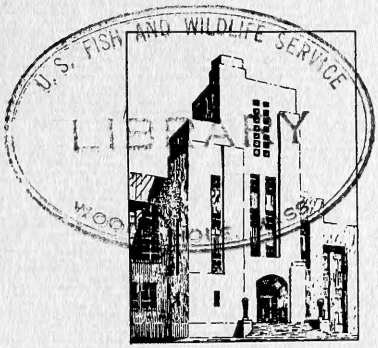
THE DAVID W. TAYLOR MODEL BASIN

WASHINGTON 7, D.C.

CABLE FUNCTION TABLES FOR SMALL CRITICAL ANGLES

by

Leonard Pode, Ph.D. and Louis Rosenthal



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NOTATION

F The drag per unit length of the cable when the cable is parallel to the stream

f The ratio F/R

P The component of the external forces acting upon an element of cable in the direction of the element

p The ratio P/R

Q The component of the external forces, acting upon an element of cable, that is in the direction 90° counterclockwise from the direction of the element

q The ratio Q/R

R The drag per unit length of the cable when the cable is normal to the stream

s The distance along the cable measured positively in the sense of positive progression along the cable; see Figure 1 on page 2.

T The tension in the cable at an arbitrarily chosen point

T_0 The tension in the cable at the point chosen as origin of the coordinate system

W The weight in water per unit length of the cable

w The ratio W/R

x, y The rectangular coordinates of an arbitrarily chosen point on the cable; see Figure 1.

ξ, η The nondimensional rectangular coordinates; $\xi = \frac{Rx}{T_0}$; $\eta = \frac{Ry}{T_0}$

σ The nondimensional length of cable, Rs/T_0

τ The nondimensional tension, T/T_0

ϕ The angle from the direction of motion to the direction of the tangent to the cable at an arbitrarily chosen point on the cable, the direction of the tangent being taken in the sense of increasing s; see Figure 1.

ϕ' The difference $\pi - \phi$

ϕ'' The difference $\phi - \pi$

ϕ_c The critical angle of the cable, i.e., the value of the angle ϕ obtained when the cable is freely trailed in the stream

ϕ_0 The value of ϕ at the point chosen as the origin of the coordinate system

ABSTRACT

Supplementary tables of the cable functions used for determining the shape and tension of a flexible cable immersed in a uniform stream are presented. The tables cover the range of critical angles from 0 to 10 degrees in increments of one degree. In the neighborhood of the critical angle, values of the functions are given at intervals of 0.5 degree.

INTRODUCTION

An extensive set of tables of functions which may be used to compute the configuration and tensions in a flexible heavy cable immersed in a uniform stream has been published in TMB Report 687. These tables give values of the functions for critical angles from 0 to 180 degrees in increments of 5 degrees. However, it has been found that problems involving critical angles in the range from 0 to 10 degrees occur most frequently and that tables covering this range in more detail would be desirable. Therefore, the present supplementary work was undertaken. It provides tables for critical angles in the range from 0 to 10 degrees in increments of one degree. More closely spaced intervals of the independent variable ϕ in the vicinity of the critical angle ϕ_c are also provided.

DEFINITION OF THE CABLE FUNCTIONS

The theory of flexible cables immersed in a uniform stream and the application of the cable functions is given in TMB Report 687 and will not be repeated here. The notation used in this supplement is identical to that used in Report 687 but is repeated for convenience as is Figure 1. Equations [16a, b, c, d] of Report 687, which define the cable functions τ, σ, ξ, and η are also repeated as follows:

$$ln\,\tau = \int_{\phi_0}^{\phi} \frac{f\dfrac{\cos\phi}{|\cos\phi|} + w\sin\phi}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [1a]$$

$$\sigma = \int_{\phi_0}^{\phi} \frac{\tau}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [1b]$$

$$\xi = \int_{\phi_0}^{\phi} \frac{\cos\phi}{-\sin\phi\,|\sin\phi| + w\cos\phi}\,d\phi \qquad [1c]$$

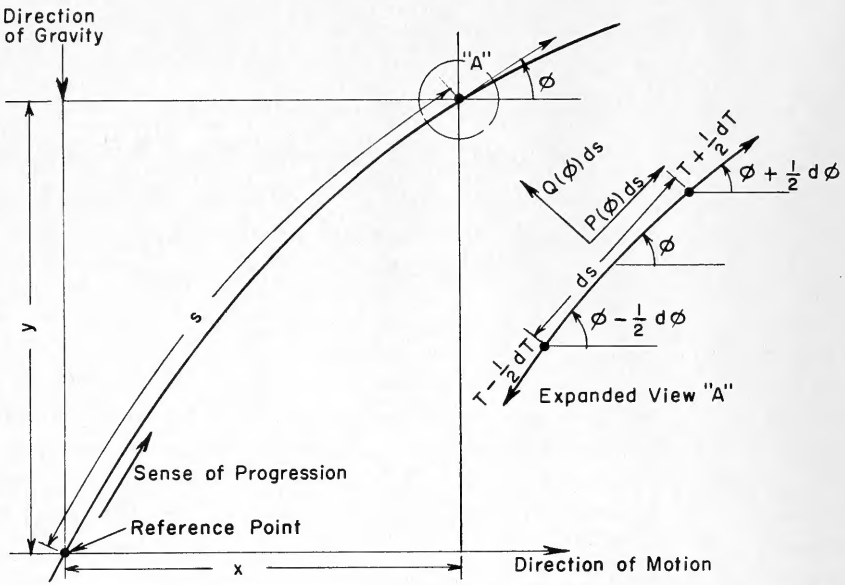

Figure 1 - Coordinate System

$$\eta = \int_{\phi_0}^{\phi} \frac{\sin \phi}{-\sin \phi \ |\sin \phi| + w \cos \phi} \, d\phi \qquad [1d]$$

where $f = F/R$ and $w = W/R$.

VALUES OF WEIGHT AND FRICTIONAL RESISTANCE PARAMETERS COVERED

The critical angle ϕ_c is related to the weight parameter, $w = W/R$, by the equation

$$\phi_c = \cos^{-1}\left(-\frac{w}{2} \pm \sqrt{1 + \frac{w^2}{4}}\right)$$

where the positive sign of the radical is taken for all values of $w > 0$ The values of w for the critical angles covered in the present tables are as follows:

ϕ_c degrees	w	ϕ_c degrees	w
0	0	6	0.0109864
1	0.0003046	7	0.0149637
2	0.0012187	8	0.0195595
3	0.0027428	9	0.0247768
4	0.0048778	10	0.0306189
5	0.0076251		

Figure 2 presents a plot of w for the entire range of critical angles from 0 to 180 degrees.

The tables of Report 687 covered values of the frictional resistance parameter f of 0.01, 0.02, and 0.03. The present tables include, in addition, $f = 0.1$.

NUMERICAL METHODS AND PROCEDURES

The numerical computations were executed with the UNIVAC by the Applied Mathematics Laboratory at the David Taylor Model Basin. All numerical integrations were made using Simpson's rule with a correction term. Explicitly, the formula used was

$$\int_{x_n-2h}^{x_n} y\,dx = \frac{h}{3}[y_n + 4y_{n-1} + y_{n-2}] - \frac{h}{90}[y_n - 4y_{n-1} + 6y_{n-2} - 4y_{n-3} + y_{n-4}] \quad [2]$$

The integrations of the functions for Table 1 (Quadrant 1) of this supplement were started at $\phi = 90$ degrees. Except for the case $\phi_c = 0$ the integrations were performed in steps of -0.5 degrees until the value $\phi = \phi_c + 5$ degrees was reached. Then the method described in Appendix 3 of TMB Report 687 was applied using steps of -0.1 degrees. The integrations were terminated either when $\phi - \phi_c$ became less than 0.5 degree or when σ exceeded 300.

The methods described in Appendix 3 of TMB Report 687 were applied for evaluating the functions given in Table 2 (Quadrant 3). The integrations were started at $\phi = 180$ degrees and performed in steps of $+0.1$ degree. Computations were terminated either when $180° + \phi_c - \phi$ became less than 0.5 degree or when σ exceeded 300.

The integrations for Table 3 (Quadrant 2) were started at $\phi = 180$ degrees and carried to $\phi = 90$ degrees. The integrations were performed in steps of -0.1 degree for the critical angles $\phi_c = 1$, 2 and 3 degrees. For the other critical angles, steps of -0.5 degree were used.

The methods given in Appendix 4, of Report 687 were used to determine the values of the functions in Table 1 for the case where $\phi_c = 0$. The following intervals of the independent variables were used:

Range of ϕ degrees	Interval of Intergration degrees
$90 > \phi > 15$	-0.5
$15 > \phi > 10$	-0.25
$10 > \phi > 5$	-0.1
$50 > \phi > 1.2$	-0.05
$1.2 > \phi > 0.5$	-0.001

Figure 2 - Relationship Between the Critical Angle ϕ_c and the Weight Parameter w

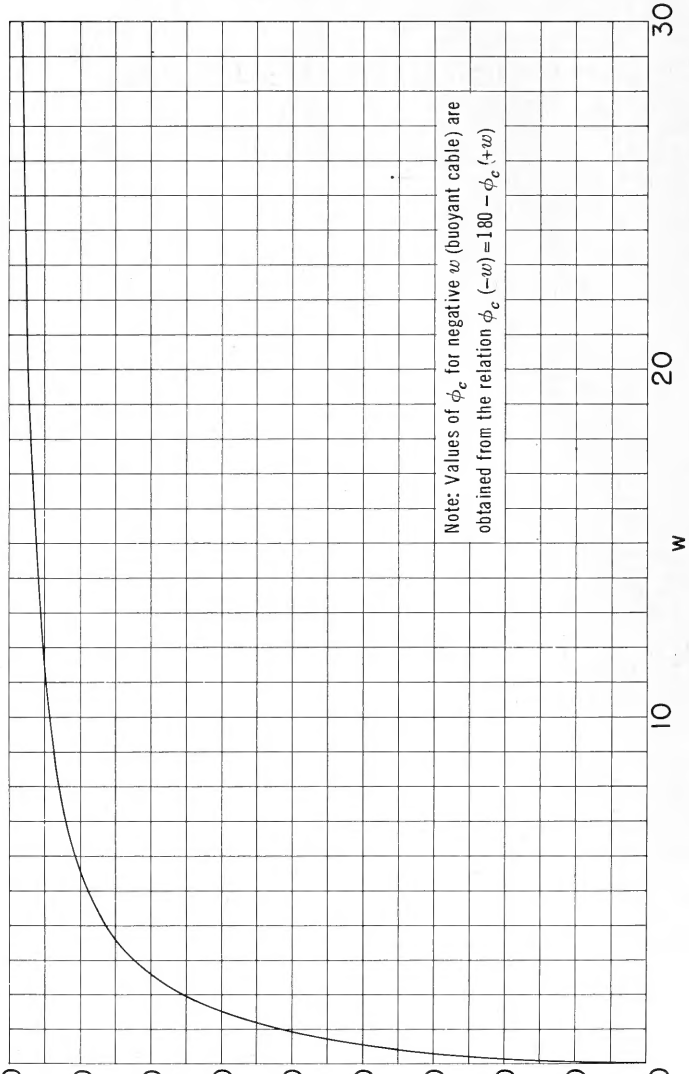

Figure 2a - Values of w less than 30

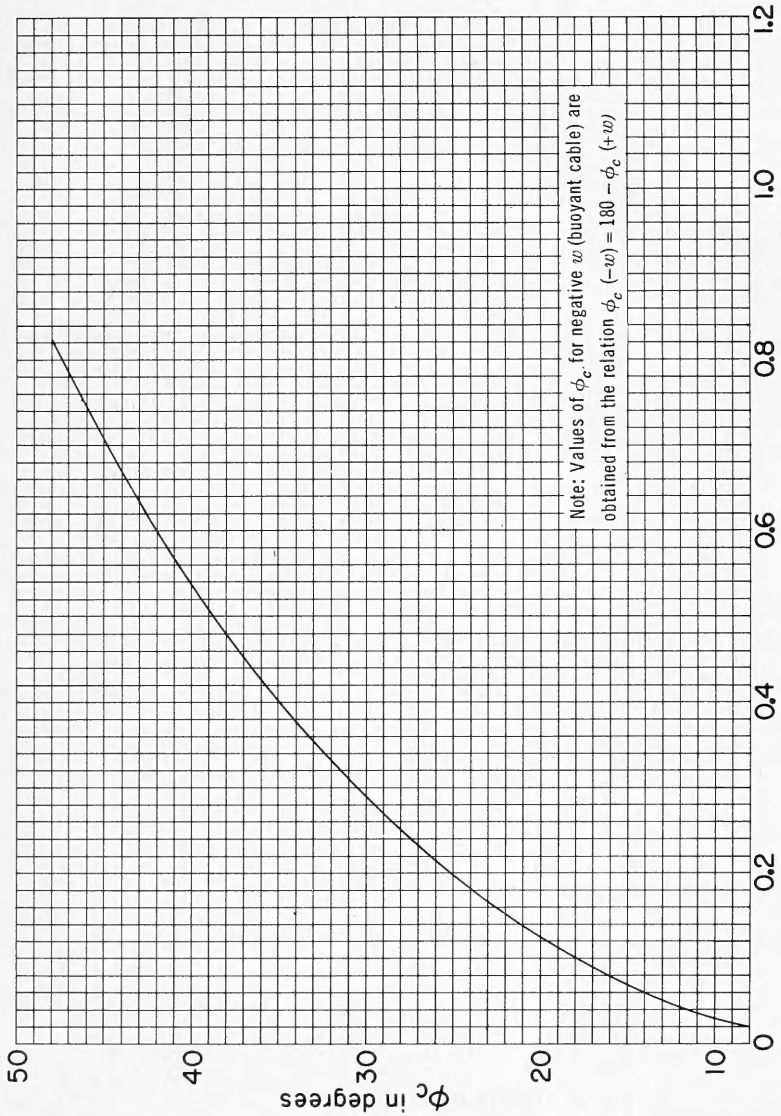

Figure 2b - Values of w less than 0.8

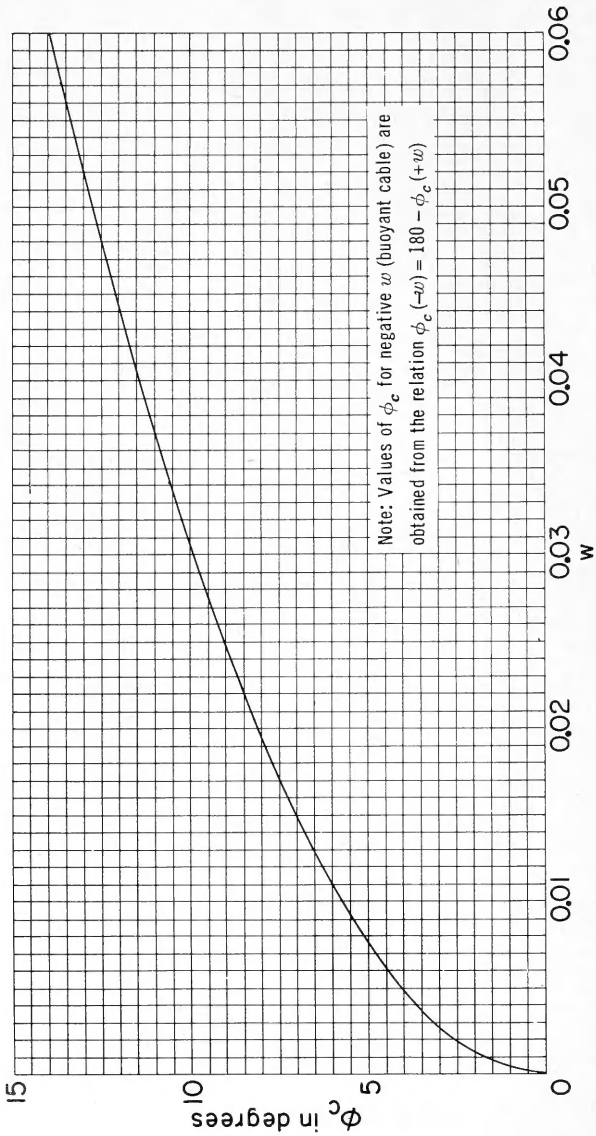

Figure 2c - Values of w less than 0.06

CHECKS ON ACCURACY

Comparisons were made for those portions of the present tables which overlap with the tables given in Report 687. The maximum difference in any of the functions τ, σ, ξ, and η is 0.0001. Only a few points failed to satisfy the tolerance test $|\tau - 1 \pm f\sigma - wh| < 0.00001$.* These points occured in the tables for the critical angles $\phi_c = 1$, 2, and 3 degrees. Even here, the maximum value of $|\tau - 1 \pm f\sigma - wh|$ is always less than 0.00005. It is believed that the maximum error in any of the tabulated values is never greater than one unit in the least significant figure.

*The sign of the $\pm\sigma$ term must be appropriately chosen. See TMB Report 687, Equations [17], [18], and [19].

TABLE 1 - QUADRANT 1

Reference Point at $\phi = 90°$

$\phi_c = 0°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.5	3.1452				214.5228			
0.6	2.5984	6.7517			159.8397	287.5834		
0.7	2.2670	5.1394			126.7030	206.9712		
0.8	2.0465	4.1883	8.5716		104.6540	159.4164	252.3860	
0.9	1.8900	3.5720	6.7511		88.9982	128.6016	191.7026	
1.0	1.7734	3.1450	5.5773		77.3402	107.2477	152.5756	
1.1	1.6834	2.8338	4.7704		68.3385	91.6893	125.6784	
1.2	1.6119	2.5981	4.1878		61.1870	79.9062	106.2613	
1.4	1.5056	2.2668	3.4128		50.5574	63.3376	80.4254	
1.6	1.4305	2.0463	2.9271		43.0474	52.3127	64.2371	
1.8	1.3747	1.8897	2.5977	24.0961	37.4658	44.4843	53.2557	230.9614
2.0	1.3316	1.7731	2.3610	17.5249	33.1575	38.6546	45.3669	165.2495
2.2	1.2973	1.6831	2.1835	13.5052	29.7329	34.1531	39.4495	125.0518
2.4	1.2695	1.6115	2.0458	10.8691	26.9461	30.5766	34.8593	98.6914
2.6	1.2463	1.5534	1.9361	9.0446	24.6347	27.6691	31.2018	80.4463
2.8	1.2269	1.5052	1.8467	7.7264	22.6868	25.2603	28.0230	67.2644
3.0	1.2102	1.4647	1.7726	6.7404	21.0231	23.2330	25.7525	57.4036
3.2	1.1959	1.4301	1.7102	5.9813	19.5857	21.5037	23.6721	49.8126
3.4	1.1833	1.4002	1.6569	5.3827	18.3314	20.0116	21.8972	43.8271
3.6	1.1723	1.3742	1.6110	4.9011	17.2274	18.7113	20.3657	39.0107
3.8	1.1625	1.3514	1.5709	4.5067	16.2482	17.5682	19.0312	35.0673
4.0	1.1537	1.3311	1.5358	4.1790	15.3737	16.5555	17.8584	31.7898
4.2	1.1459	1.3130	1.5046	3.9030	14.5881	15.6522	16.8198	29.0298
4.4	1.1388	1.2968	1.4768	3.6679	13.8785	14.8415	15.8937	26.6789
4.6	1.1323	1.2822	1.4519	3.4656	13.2342	14.1100	15.0629	24.6559
4.8	1.1265	1.2689	1.4294	3.2899	12.6468	13.4465	14.3136	22.8994
5.0	1.1211	1.2568	1.4090	3.1362	12.1089	12.8420	13.6343	21.3618
5.5	1.1094	1.2309	1.3656	2.8251	10.9438	11.5427	12.1852	18.2509
6.0	1.0998	1.2096	1.3303	2.5894	9.9817	10.4799	11.0112	15.8943
6.5	1.0917	1.1919	1.3012	2.4053	9.1736	9.5943	10.0409	14.0533
7.0	1.0849	1.1769	1.2768	2.2579	8.4852	8.8452	9.2255	12.5790
7.5	1.0789	1.1641	1.2559	2.1374	7.8917	8.2031	8.5308	11.3737
8.0	1.0737	1.1529	1.2380	2.0371	7.3746	7.6465	7.9318	10.3712
8.5	1.0692	1.1432	1.2223	1.9525	6.9201	7.1595	7.4100	9.5251
9.0	1.0652	1.1346	1.2085	1.8802	6.5173	6.7297	6.9513	8.8019
9.5	1.0616	1.1270	1.1963	1.8177	6.1579	6.3475	6.5449	8.1771
10.0	1.0584	1.1201	1.1855	1.7632	5.8352	6.0054	6.1823	7.6320
10.5	1.0554	1.1139	1.1757	1.7152	5.5437	5.6974	5.8567	7.1524
11.0	1.0528	1.1084	1.1669	1.6727	5.2792	5.4185	5.5628	6.7273
11.5	1.0504	1.1033	1.1589	1.6348	5.0380	5.1649	5.2960	6.3479
12.0	1.0482	1.0987	1.1516	1.6007	4.8171	4.9331	5.0528	6.0074
12.5	1.0461	1.0944	1.1449	1.5700	4.6140	4.7204	4.8302	5.6999
13.0	1.0443	1.0905	1.1388	1.5421	4.4267	4.5246	4.6255	5.4210
13.5	1.0425	1.0869	1.1331	1.5167	4.2533	4.3437	4.4367	5.1669
14.0	1.0409	1.0835	1.1279	1.4934	4.0923	4.1760	4.2621	4.9343
14.5	1.0394	1.0804	1.1230	1.4721	3.9424	4.0202	4.0999	4.7207
15.0	1.0380	1.0775	1.1185	1.4524	3.8026	3.8749	3.9490	4.5238
16.0	1.0355	1.0722	1.1103	1.4173	3.5489	3.6119	3.6764	4.1728
17.0	1.0332	1.0676	1.1031	1.3869	3.3249	3.3802	3.4367	3.8692
18.0	1.0313	1.0635	1.0967	1.3604	3.1255	3.1744	3.2242	3.6039
19.0	1.0295	1.0598	1.0910	1.3370	2.9468	2.9902	3.0345	3.3699
20.0	1.0279	1.0565	1.0859	1.3162	2.7856	2.8244	2.8639	3.1620
21.0	1.0264	1.0535	1.0813	1.2976	2.6393	2.6741	2.7096	2.9759
22.0	1.0251	1.0507	1.0771	1.2808	2.5060	2.5374	2.5693	2.8083
23.0	1.0238	1.0482	1.0732	1.2656	2.3838	2.4122	2.4411	2.6565
24.0	1.0227	1.0459	1.0697	1.2518	2.2715	2.2972	2.3234	2.5183
25.0	1.0217	1.0438	1.0664	1.2392	2.1677	2.1912	2.2150	2.3918
26.0	1.0207	1.0419	1.0634	1.2276	2.0715	2.0929	2.1147	2.2756
27.0	1.0198	1.0400	1.0606	1.2168	1.9820	2.0016	2.0215	2.1684
28.0	1.0190	1.0383	1.0580	1.2069	1.8985	1.9165	1.9348	2.0692
29.0	1.0182	1.0367	1.0556	1.1977	1.8204	1.8370	1.8538	1.9770
30.0	1.0175	1.0352	1.0533	1.1891	1.7471	1.7624	1.7778	1.8911
31.0	1.0168	1.0338	1.0512	1.1811	1.6782	1.6923	1.7065	1.8108
32.0	1.0161	1.0325	1.0492	1.1736	1.6132	1.6262	1.6394	1.7355
33.0	1.0155	1.0313	1.0473	1.1665	1.5518	1.5638	1.5760	1.6648

$\phi_c = 0°$

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.5	213.4989				7.0040			
0.6	158.8183	286.5272			6.4835	8.6358		
0.7	125.6837	205.9201			6.1097	7.7281		
0.8	103.6367	158.3694	251.3014		5.8223	7.1088	9.1156	
0.9	87.9826	127.5581	190.6247		5.5908	6.6535	8.2196	
1.0	76.3262	106.2071	151.5030		5.3980	6.3005	7.5731	
1.1	67.3260	90.6513	124.6104		5.2332	6.0161	7.0816	
1.2	60.1759	78.8706	105.1972		5.0900	5.7800	6.6927	
1.4	49.5490	62.3062	79.3679		4.8500	5.4063	6.1104	
1.6	42.0415	51.2850	63.1850		4.6541	5.1188	5.6887	
1.8	36.4625	43.4600	52.2084	229.6363	4.4890	4.8873	5.3640	13.5374
2.0	32.1565	37.6335	44.3239	163.9600	4.3464	4.6945	5.1032	11.3688
2.2	28.7342	33.1350	38.4105	123.7892	4.2212	4.5299	4.8868	9.9011
2.4	25.9497	29.5614	33.8239	97.4499	4.1095	4.3866	4.7029	8.8462
2.6	23.6405	26.6567	30.1699	79.2221	4.0088	4.2599	4.5436	8.0522
2.8	21.6947.	24.2506	27.1944	66.0548	3.9171	4.1466	4.4034	7.4324
3.0	20.0331	22.2258	24.7271	56.2066	3.8330	4.0441	4.2786	6.9343
3.2	18.5978	20.4991	22.6498	48.6266	3.7554	3.9506	4.1662	6.5243
3.4	17.3456	19.0095	20.8777	42.6510	3.6832	3.8648	4.0641	6.1802
3.6	16.2436	17.7116	19.3491	37.8437	3.6158	3.7855	3.9706	5.8864
3.8	15.2665	16.5709	18.0174	33.9035	3.5527	3.7118	3.8846	5.6322
4.0	14.3941	15.5605	16.8473	30.6385	3.4932	3.6429	3.8048	5.4094
4.2	13.6105	14.6595	15.8113	27.8856	3.4371	3.5784	3.7306	5.2122
4.4	12.9028	13.8511	14.8879	25.5413	3.3839	3.5176	3.6612	5.0361
4.6	12.2605	13.1218	14.0597	23.5245	3.3334	3.4602	3.5961	4.8774
4.8	11.6750	12.4605	13.3129	21.7739	3.2853	3.4059	3.5347	4.7336
5.0	11.1391	11.8583	12.6361	20.2419	3.2393	3.3543	3.4767	4.6023
5.5	9.9790	10.5644	11.1930	17.1440	3.1329	3.2356	3.3443	4.3183
6.0	9.0216	9.5069	10.0249	14.7992	3.0366	3.1292	3.2269	4.0826
6.5	8.2183	8.6267	9.0603	12.9692	2.9487	3.0329	3.1214	3.8825
7.0	7.5347	7.8827	8.2506	11.5050	2.8679	2.9450	3.0256	3.7095
7.5	6.9459	7.2457	7.5615	10.3094	2.7931	2.8640	2.9380	3.5575
8.0	6.4336	6.6942	6.9679	9.3160	2.7234	2.7890	2.8573	3.4225
8.5	5.9838	6.2123	6.4515	8.4787	2.6582	2.7192	2.7825	3.3012
9.0	5.5857	5.7874	5.9981	7.7639	2.5970	2.6538	2.7128	3.1912
9.5	5.2309	5.4102	5.5970	7.1472	2.5392	2.5924	2.6475	3.0909
10.0	4.9129	5.0731	5.2396	6.6099	2.4846	2.5345	2.5861	2.9986
10.5	4.6261	4.7699	4.9193	6.1380	2.4328	2.4797	2.5282	2.9133
11.0	4.3661	4.4960	4.6305	5.7203	2.3834	2.4277	2.4734	2.8340
11.5	4.1296	4.2472	4.3688	5.3483	2.3364	2.3783	2.4213	2.7601
12.0	3.9133	4.0202	4.1307	5.0148	2.2914	2.3311	2.3718	2.6907
12.5	3.7148	3.8124	3.9131	4.7144	2.2483	2.2860	2.3246	2.6255
13.0	3.5321	3.6215	3.7135	4.4424	2.2070	2.2428	2.2794	2.5640
13.5	3.3633	3.4454	3.5298	4.1950	2.1673	2.2013	2.2362	2.5058
14.0	3.2070	3.2825	3.3601	3.9691	2.1290	2.1615	2.1947	2.4505
14.5	3.0617	3.1314	3.2030	3.7621	2.0921	2.1231	2.1548	2.3979
15.0	2.9265	2.9909	3.0570	3.5716	2.0565	2.0861	2.1164	2.3478
16.0	2.6821	2.7375	2.7943	3.2334	1.9888	2.0159	2.0436	2.2541
17.0	2.4673	2.5153	2.5645	2.9423	1.9252	1.9501	1.9755	2.1679
18.0	2.2771	2.3190	2.3613	2.6892	1.8653	1.8883	1.9117	2.0882
19.0	2.1076	2.1444	2.1819	2.4673	1.8086	1.8299	1.8515	2.0140
20.0	1.9556	1.9880	2.0211	2.2713	1.7548	1.7745	1.7946	1.9446
21.0	1.8186	1.8473	1.8765	2.0970	1.7036	1.7219	1.7406	1.8795
22.0	1.6945	1.7200	1.7460	1.9411	1.6548	1.6718	1.6892	1.8181
23.0	1.5817	1.6044	1.6276	1.8008	1.6080	1.6240	1.6401	1.7600
24.0	1.4786	1.4990	1.5196	1.6740	1.5632	1.5781	1.5932	1.7049
25.0	1.3842	1.4024	1.4210	1.5590	1.5202	1.5341	1.5483	1.6525
26.0	1.2973	1.3138	1.3304	1.4541	1.4788	1.4919	1.5051	1.6025
27.0	1.2173	1.2321	1.2471	1.3582	1.4389	1.4511	1.4635	1.5546
28.0	1.1432	1.1566	1.1701	1.2701	1.4004	1.4119	1.4235	1.5088
29.0	1.0746	1.0867	1.0989	1.1891	1.3631	1.3739	1.3848	1.4649.
30.0	1.0108	1.0217	1.0328	1.1143	1.3270	1.3372	1.3474	1.4226
31.0	0.9514	0.9613	0.9714	1.0451	1.2920	1.3016	1.3113	1.3818
32.0	0.8960	0.9050	0.9141	0.9809	1.2581	1.2671	1.2762	1.3425
33.0	0.8442	0.8524	0.8606	0.9213	1.2251	1.2336	1.2421	1.3045

$\phi_c = 0°$ (continued)

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
34.0	1.0149	1.0301	1.0455	1.1598	1.4936	1.5048	1.5160	1.5981
35.0	1.0144	1.0290	1.0438	1.1535	1.4384	1.4487	1.4592	1.5352
36.0	1.0139	1.0279	1.0422	1.1476	1.3859	1.3955	1.4052	1.4756
37.0	1.0134	1.0269	1.0406	1.1419	1.3359	1.3448	1.3538	1.4191
38.0	1.0129	1.0259	1.0391	1.1365	1.2882	1.2965	1.3048	1.3655
39.0	1.0124	1.0250	1.0377	1.1314	1.2426	1.2503	1.2581	1.3144
40.0	1.0120	1.0241	1.0364	1.1266	1.1989	1.2061	1.2133	1.2657
41.0	1.0116	1.0233	1.0351	1.1219	1.1570	1.1637	1.1704	1.2191
42.0	1.0112	1.0225	1.0339	1.1175	1.1168	1.1230	1.1293	1.1746
43.0	1.0108	1.0217	1.0327	1.1132	1.0781	1.0840	1.0898	1.1320
44.0	1.0104	1.0209	1.0316	1.1091	1.0409	1.0463	1.0518	1.0910
45.0	1.0101	1.0202	1.0305	1.1052	1.0050	1.0101	1.0152	1.0517
46.0	1.0097	1.0195	1.0294	1.1014	0.9704	0.9751	0.9798	1.0139
47.0	1.0094	1.0188	1.0284	1.0977	0.9369	0.9413	0.9457	0.9774
48.0	1.0090	1.0182	1.0274	1.0942	0.9045	0.9086	0.9127	0.9422
49.0	1.0087	1.0175	1.0264	1.0908	0.8731	0.8769	0.8807	0.9082
50.0	1.0084	1.0169	1.0255	1.0875	0.8426	0.8462	0.8498	0.8753
51.0	1.0081	1.0163	1.0246	1.0843	0.8131	0.8164	0.8197	0.8435
52.0	1.0078	1.0157	1.0237	1.0813	0.7843	0.7874	0.7905	0.8126
53.0	1.0076	1.0152	1.0229	1.0783	0.7564	0.7593	0.7621	0.7827
54.0	1.0073	1.0146	1.0220	1.0754	0.7292	0.7318	0.7345	0.7536
55.0	1.0070	1.0141	1.0212	1.0725	0.7027	0.7051	0.7076	0.7253
56.0	1.0068	1.0136	1.0204	1.0698	0.6768	0.6791	0.6814	0.6978
57.0	1.0065	1.0131	1.0197	1.0671	0.6515	0.6536	0.6558	0.6710
58.0	1.0063	1.0126	1.0189	1.0645	0.6268	0.6288	0.6308	0.6448
59.0	1.0060	1.0121	1.0182	1.0619	0.6027	0.6045	0.6063	0.6193
60.0	1.0058	1.0116	1.0175	1.0594	0.5790	0.5807	0.5824	0.5943
61.0	1.0056	1.0111	1.0168	1.0570	0.5558	0.5574	0.5589	0.5700
62.0	1.0053	1.0107	1.0161	1.0546	0.5331	0.5345	0.5360	0.5461
63.0	1.0051	1.0102	1.0154	1.0523	0.5108	0.5121	0.5134	0.5227
64.0	1.0049	1.0098	1.0147	1.0500	0.4889	0.4901	0.4913	0.4998
65.0	1.0047	1.0094	1.0141	1.0477	0.4674	0.4685	0.4696	0.4774
66.0	1.0045	1.0089	1.0134	1.0455	0.4462	0.4472	0.4482	0.4553
67.0	1.0043	1.0085	1.0128	1.0434	0.4254	0.4263	0.4272	0.4336
68.0	1.0040	1.0081	1.0122	1.0412	0.4048	0.4057	0.4065	0.4123
69.0	1.0038	1.0077	1.0116	1.0391	0.3846	0.3853	0.3861	0.3913
70.0	1.0036	1.0073	1.0110	1.0371	0.3646	0.3653	0.3660	0.3707
71.0	1.0034	1.0069	1.0104	1.0350	0.3449	0.3455	0.3461	0.3503
72.0	1.0033	1.0065	1.0098	1.0330	0.3254	0.3260	0.3265	0.3303
73.0	1.0031	1.0061	1.0092	1.0310	0.3062	0.3067	0.3071	0.3105
74.0	1.0029	1.0058	1.0086	1.0291	0.2872	0.2876	0.2880	0.2909
75.0	1.0027	1.0054	1.0081	1.0272	0.2683	0.2687	0.2690	0.2716
76.0	1.0025	1.0050	1.0075	1.0252	0.2496	0.2500	0.2503	0.2525
77.0	1.0023	1.0046	1.0070	1.0234	0.2311	0.2314	0.2317	0.2336
78.0	1.0021	1.0043	1.0064	1.0215	0.2128	0.2130	0.2132	0.2148
79.0	1.0019	1.0039	1.0058	1.0196	0.1946	0.1948	0.1949	0.1963
80.0	1.0018	1.0035	1.0053	1.0178	0.1765	0.1766	0.1768	0.1779
81.0	1.0016	1.0032	1.0048	1.0160	0.1585	0.1586	0.1588	0.1596
82.0	1.0014	1.0028	1.0042	1.0142	0.1406	0.1407	0.1408	0.1415
83.0	1.0012	1.0025	1.0037	1.0124	0.1229	0.1229	0.1230	0.1235
84.0	1.0011	1.0021	1.0032	1.0106	0.1052	0.1052	0.1053	0.1057
85.0	1.0009	1.0018	1.0026	1.0088	0.0875	0.0876	0.0876	0.0879
86.0	1.0007	1.0014	1.0021	1.0070	0.0700	0.0700	0.0700	0.0702
87.0	1.0005	1.0010	1.0016	1.0053	0.0524	0.0524	0.0524	0.0525
88.0	1.0003	1.0007	1.0010	1.0035	0.0349	0.0349	0.0349	0.0350
89.0	1.0002	1.0003	1.0005	1.0017	0.0175	0.0175	0.0175	0.0175
90.0	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000

$\phi_c = 0°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
34.0	0.7957	0.8031	0.8106	0.8657	1.1930	1.2010	1.2090	1.2677
35.0	0.7502	0.7569	0.7638	0.8138	1.1617	1.1692	1.1768	1.2320
36.0	0.7074	0.7136	0.7198	0.7653	1.1312	1.1383	1.1455	1.1975
37.0	0.6672	0.6729	0.6785	0.7199	1.1015	1.1082	1.1149	1.1639
38.0	0.6294	0.6345	0.6397	0.6773	1.0724	1.0787	1.0851	1.1312
39.0	0.5937	0.5983	0.6031	0.6374	1.0440	1.0500	1.0560	1.0994
40.0	0.5600	0.5642	0.5685	0.5998	1.0163	1.0219	1.0275	1.0684
41.0	0.5281	0.5320	0.5359	0.5644	0.9891	0.9944	0.9997	1.0382
42.0	0.4980	0.5016	0.5051	0.5311	0.9624	0.9674	0.9725	1.0087
43.0	0.4695	0.4727	0.4760	0.4996	0.9363	0.9410	0.9458	0.9799
44.0	0.4425	0.4454	0.4484	0.4699	0.9107	0.9151	0.9196	0.9517
45.0	0.4169	0.4196	0.4223	0.4419	0.8855	0.8897	0.8939	0.9242
46.0	0.3926	0.3951	0.3975	0.4153	0.8608	0.8648	0.8687	0.8972
47.0	0.3695	0.3718	0.3740	0.3902	0.8365	0.8402	0.8440	0.8707
48.0	0.3477	0.3497	0.3517	0.3664	0.8126	0.8161	0.8196	0.8448
49.0	0.3268	0.3287	0.3306	0.3439	0.7891	0.7924	0.7957	0.8193
50.0	0.3071	0.3088	0.3104	0.3226	0.7660	0.7691	0.7721	0.7943
51.0	0.2883	0.2898	0.2913	0.3023	0.7432	0.7461	0.7490	0.7697
52.0	0.2704	0.2718	0.2732	0.2831	0.7207	0.7234	0.7261	0.7456
53.0	0.2534	0.2546	0.2559	0.2649	0.6985	0.7011	0.7036	0.7218
54.0	0.2372	0.2383	0.2395	0.2476	0.6766	0.6790	0.6814	0.6985
55.0	0.2218	0.2228	0.2238	0.2311	0.6550	0.6573	0.6595	0.6754
56.0	0.2071	0.2080	0.2090	0.2155	0.6337	0.6358	0.6379	0.6527
57.0	0.1932	0.1940	0.1948	0.2007	0.6127	0.6146	0.6165	0.6304
58.0	0.1799	0.1807	0.1814	0.1867	0.5918	0.5936	0.5954	0.6083
59.0	0.1673	0.1680	0.1686	0.1734	0.5712	0.5729	0.5746	0.5866
60.0	0.1553	0.1559	0.1565	0.1607	0.5509	0.5524	0.5540	0.5651
61.0	0.1439	0.1444	0.1449	0.1487	0.5307	0.5321	0.5336	0.5439
62.0	0.1330	0.1335	0.1340	0.1373	0.5107	0.5121	0.5134	0.5229
63.0	0.1227	0.1232	0.1236	0.1265	0.4909	0.4922	0.4934	0.5022
64.0	0.1130	0.1133	0.1137	0.1163	0.4713	0.4725	0.4736	0.4817
65.0	0.1037	0.1040	0.1043	0.1066	0.4519	0.4529	0.4540	0.4614
66.0	0.0949	0.0952	0.0955	0.0975	0.4326	0.4336	0.4345	0.4413
67.0	0.0866	0.0868	0.0871	0.0888	0.4135	0.4144	0.4153	0.4214
68.0	0.0787	0.0790	0.0792	0.0807	0.3946	0.3953	0.3961	0.4017
69.0	0.0713	0.0715	0.0717	0.0730	0.3757	0.3764	0.3772	0.3822
70.0	0.0643	0.0645	0.0646	0.0657	0.3570	0.3577	0.3583	0.3629
71.0	0.0578	0.0579	0.0580	0.0590	0.3384	0.3390	0.3396	0.3437
72.0	0.0516	0.0517	0.0518	0.0526	0.3200	0.3205	0.3210	0.3247
73.0	0.0458	0.0459	0.0460	0.0466	0.3016	0.3021	0.3025	0.3058
74.0	0.0404	0.0405	0.0405	0.0411	0.2834	0.2838	0.2842	0.2870
75.0	0.0353	0.0354	0.0355	0.0359	0.2652	0.2655	0.2659	0.2684
76.0	0.0307	0.0307	0.0308	0.0311	0.2471	0.2474	0.2477	0.2499
77.0	0.0263	0.0264	0.0264	0.0267	0.2291	0.2294	0.2297	0.2315
78.0	0.0224	0.0224	0.0224	0.0227	0.2112	0.2114	0.2117	0.2132
79.0	0.0187	0.0188	0.0188	0.0190	0.1934	0.1936	0.1937	0.1951
80.0	0.0154	0.0155	0.0155	0.0156	0.1756	0.1757	0.1759	0.1770
81.0	0.0125	0.0125	0.0125	0.0126	0.1579	0.1580	0.1581	0.1590
82.0	0.0098	0.0098	0.0099	0.0099	0.1402	0.1403	0.1404	0.1411
83.0	0.0075	0.0075	0.0075	0.0076	0.1226	0.1226	0.1227	0.1232
84.0	0.0055	0.0055	0.0055	0.0055	0.1050	0.1050	0.1051	0.1055
85.0	0.0038	0.0038	0.0038	0.0038	0.0874	0.0875	0.0875	0.0878
86.0	0.0024	0.0024	0.0024	0.0025	0.0699	0.0699	0.0699	0.0701
87.0	0.0014	0.0014	0.0014	0.0014	0.0524	0.0524	0.0524	0.0525
88.0	0.0006	0.0006	0.0006	0.0006	0.0349	0.0349	0.0349	0.0350
89.0	0.0002	0.0002	0.0002	0.0002	0.0175	0.0175	0.0175	0.0175
90.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

$\phi_c = 1°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
1°5	1°5879	2°5179	3°9925		58°6326	75°8046	99°6817	
2°0	1°3715	1°8786	2°5732	23°2791	37°0117	43°8552	52°3857	222°7488
2°5	1°2761	1°6264	2°0730	11°3269	27°4807	31°2538	35°7174	103°2409
3°0	1°2208	1°4888	1°8155	7°2805	21°9644	24°3749	27°1380	62°7823
3°5	1°1844	1°4014	1°6581	5°3817	18°3310	20°0100	21°8941	43°7977
4°0	1°1585	1°3408	1°5517	4°3153	15°7447	16°9835	18°3521	33°1365
4°5	1°1391	1°2962	1°4750	3°6447	13°8049	14°7572	15°7971	26°4316
5°0	1°1239	1°2620	1°4170	3°1889	12°2935	13°0488	13°8659	21°8746
5°5	1°1118	1°2349	1°3717	2°8612	11°0816	11°6953	12°3543	18°5983
6°0	1°1018	1°2129	1°3351	2°6153	10°0875	10°5960	11°1387	16°1404
6°5	1°0935	1°1946	1°3051	2°4246	9°2567	9°6849	10°1395	14°2339
7°0	1°0864	1°1792	1°2800	2°2727	8°5518	8°9172	9°3036	12°7155
7°5	1°0803	1°1661	1°2587	2°1490	7°9459	8°2614	8°5937	11°4794
8°0	1°0750	1°1547	1°2404	2°0465	7°4194	7°6946	7°9833	10°4548
8°5	1°0704	1°1448	1°2244	1°9602	6°9576	7°1996	7°4527	9°5924
9°0	1°0663	1°1361	1°2104	1°8867	6°5491	6°7635	6°9872	8°8570
9°5	1°0626	1°1283	1°1981	1°8232	6°1851	6°3763	6°5754	8°2227
10°0	1°0593	1°1214	1°1870	1°7679	5°8586	6°0302	6°2084	7°6702
10°5	1°0564	1°1151	1°1772	1°7194	5°5641	5°7188	5°8793	7°1848
11°0	1°0537	1°1095	1°1682	1°6764	5°2970	5°4373	5°5824	6°7550
11°5	1°0512	1°1044	1°1601	1°6380	5°0537	5°1813	5°3133	6°3719
12°0	1°0490	1°0997	1°1528	1°6036	4°8310	4°9476	5°0680	6°0282
12°5	1°0470	1°0954	1°1460	1°5726	4°6264	4°7334	4°8437	5°7181
13°0	1°0451	1°0914	1°1398	1°5445	4°4378	4°5362	4°6376	5°4371
13°5	1°0433	1°0878	1°1341	1°5189	4°2633	4°3541	4°4475	5°1811
14°0	1°0417	1°0844	1°1288	1°4954	4°1013	4°1854	4°2718	4°9470
14°5	1°0401	1°0812	1°1239	1°4739	3°9506	4°0287	4°1087	4°7321
15°0	1°0387	1°0783	1°1194	1°4541	3°8100	3°8826	3°9570	4°5340
15°5	1°0374	1°0755	1°1151	1°4358	3°6785	3°7461	3°8154	4°3509
16°0	1°0362	1°0730	1°1111	1°4188	3°5552	3°6184	3°6830	4°1812
17°0	1°0339	1°0683	1°1039	1°3883	3°3302	3°3857	3°4423	3°8761
18°0	1°0319	1°0642	1°0975	1°3616	3°1301	3°1790	3°2290	3°6097
19°0	1°0301	1°0604	1°0917	1°3381	2°9507	2°9942	3°0386	3°3749
20°0	1°0284	1°0571	1°0866	1°3172	2°7890	2°8278	2°8674	3°1662
21°0	1°0269	1°0541	1°0819	1°2985	2°6423	2°6772	2°7127	2°9796
22°0	1°0256	1°0513	1°0777	1°2817	2°5086	2°5400	2°5720	2°8115
23°0	1°0244	1°0488	1°0738	1°2665	2°3861	2°4146	2°4435	2°6593
24°0	1°0232	1°0465	1°0703	1°2526	2°2735	2°2994	2°3256	2°5207
25°0	1°0222	1°0443	1°0670	1°2399	2°1695	2°1930	2°2169	2°3940
26°0	1°0212	1°0423	1°0640	1°2282	2°0731	2°0946	2°1164	2°2776
27°0	1°0203	1°0405	1°0611	1°2175	1°9835	2°0032	2°0231	2°1702
28°0	1°0194	1°0388	1°0585	1°2075	1°8999	1°9179	1°9362	2°0708
29°0	1°0186	1°0372	1°0561	1°1983	1°8216	1°8382	1°8550	1°9764
30°0	1°0179	1°0357	1°0538	1°1897	1°7483	1°7635	1°7790	1°8924
31°0	1°0172	1°0343	1°0516	1°1816	1°6792	1°6933	1°7076	1°8119
32°0	1°0165	1°0329	1°0496	1°1741	1°6141	1°6272	1°6403	1°7366
33°0	1°0159	1°0317	1°0477	1°1670	1°5526	1°5647	1°5769	1°6657
34°0	1°0153	1°0305	1°0459	1°1603	1°4944	1°5056	1°5168	1°5990
35°0	1°0147	1°0293	1°0442	1°1540	1°4391	1°4495	1°4599	1°5360
36°0	1°0142	1°0283	1°0425	1°1480	1°3866	1°3962	1°4059	1°4763
37°0	1°0137	1°0272	1°0410	1°1423	1°3365	1°3454	1°3544	1°4198
38°0	1°0132	1°0263	1°0395	1°1370	1°2887	1°2970	1°3054	1°3661
39°0	1°0127	1°0253	1°0381	1°1318	1°2431	1°2508	1°2586	1°3150
40°0	1°0123	1°0244	1°0367	1°1269	1°1994	1°2066	1°2138	1°2662
41°0	1°0119	1°0236	1°0354	1°1223	1°1575	1°1642	1°1709	1°2196
42°0	1°0115	1°0228	1°0342	1°1178	1°1172	1°1235	1°1297	1°1751
43°0	1°0111	1°0220	1°0330	1°1135	1°0785	1°0843	1°0902	1°1324
44°0	1°0107	1°0212	1°0318	1°1094	1°0413	1°0467	1°0521	1°0914
45°0	1°0103	1°0205	1°0307	1°1055	1°0053	1°0104	1°0155	1°0521
46°0	1°0100	1°0198	1°0297	1°1017	0°9707	0°9754	0°9801	1°0142
47°0	1°0096	1°0191	1°0286	1°0980	0°9372	0°9416	0°9460	0°9777
48°0	1°0093	1°0184	1°0276	1°0945	0°9047	0°9088	0°9129	0°9425
49°0	1°0090	1°0178	1°0267	1°0911	0°8733	0°8771	0°8810	0°9085
50°0	1°0087	1°0172	1°0257	1°0878	0°8429	0°8464	0°8500	0°8756

$\phi_c = 1°$ Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
1°5	57°6158	74°7618	98°6084		5°1823	5°8947	6°8340	
2°0	36°0046	42°8266	51°3332	221°4043	4°5379	4°9458	5°4341	13°7931
2°5	26°4808	30°2346	34°6775	101°9846	4°1681	4°4575	4°7891	9°2108
3°0	20°9708	23°3636	26°1078	61°5715	3°9053	4°1300	4°3809	7°2949
3°5	17°3432	19°0057	20°8723	42°6171	3°7003	3°8838	4°0853	6°2275
4°0	14°7624	15°9856	17°3378	31°9765	3°5317	3°6866	3°8545	5°5341
4°5	12°8279	13°7654	14°7596	25°2918	3°3883	3°5221	3°6657	5°0392
5°0	11°3217	12°0628	12°8652	20°7504	3°2634	3°3809	3°5062	4°6631
5°5	10°1149	10°7150	11°3600	17°4878	3°1527	3°2573	3°3681	4°3640
6°0	9°1257	9°6212	10°1505	15°0423	3°0533	3°1473	3°2465	4°1182
6°5	8°2998	8°7155	9°1572	13°1471	2°9629	3°0482	3°1379	3°9110
7°0	7°5998	7°9532	8°3270	11°6391	2°8801	2°9581	3°0397	3°7328
7°5	6°9988	7°3026	7°6228	10°4129	2°8037	2°8754	2°9502	3°5769
8°0	6°4771	6°7409	7°0180	9°3976	2°7328	2°7990	2°8679	3°4389
8°5	6°0201	6°2510	6°4929	8°5441	2°6666	2°7280	2°7919	3°3153
9°0	5°6163	5°8200	6°0328	7°8172	2°6045	2°6617	2°7211	3°2035
9°5	5°2570	5°4378	5°6263	7°1912	2°5460	2°5995	2°6549	3°1016
10°0	4°9353	5°0967	5°2646	6°6467	2°4907	2°5409	2°5928	3°0081
10°5	4°6454	4°7904	4°9408	6°1690	2°4383	2°4856	2°5343	2°9217
11°0	4°3830	4°5137	4°6491	5°7468	2°3885	2°4331	2°4789	2°8416
11°5	4°1444	4°2627	4°3851	5°3710	2°3411	2°3832	2°4264	2°7669
12°0	3°9264	4°0339	4°1450	5°0345	2°2957	2°3356	2°3765	2°6969
12°5	3°7264	3°8245	3°9258	4°7315	2°2523	2°2901	2°3289	2°6312
13°0	3°5424	3°6322	3°7247	4°4574	2°2107	2°2466	2°2834	2°5692
13°5	3°3726	3°4550	3°5398	4°2083	2°1707	2°2049	2°2399	2°5105
14°0	3°2153	3°2911	3°3691	3°9809	2°1323	2°1648	2°1981	2°4549
14°5	3°0692	3°1392	3°2110	3°7725	2°0952	2°1262	2°1580	2°4020
15°0	2°9333	2°9979	3°0643	3°5810	2°0594	2°0891	2°1194	2°3516
15°5	2°8064	2°8663	2°9277	3°4044	2°0248	2°0532	2°0822	2°3034
16°0	2°6877	2°7433	2°8003	3°2410	1°9913	2°0185	2°0462	2°2574
17°0	2°4720	2°5202	2°5695	2°9485	1°9275	1°9524	1°9779	2°1708
18°0	2°2811	2°3231	2°3660	2°6943	1°8673	1°8903	1°9138	2°0907
19°0	2°1110	2°1478	2°1854	2°4716	1°8104	1°8317	1°8534	2°0162
20°0	1°9585	1°9910	2°0241	2°2750	1°7565	1°7762	1°7963	1°9466
21°0	1°8211	1°8499	1°8792	2°1001	1°7051	1°7235	1°7421	1°8813
22°0	1°6967	1°7223	1°7483	1°9437	1°6561	1°6732	1°6906	1°8197
23°0	1°5836	1°6064	1°6295	1°8031	1°6093	1°6252	1°6414	1°7615
24°0	1°4803	1°5007	1°5214	1°6760	1°5644	1°5793	1°5944	1°7063
25°0	1°3856	1°4039	1°4225	1°5607	1°5213	1°5352	1°5494	1°6537
26°0	1°2986	1°3151	1°3318	1°4556	1°4798	1°4929	1°5061	1°6036
27°0	1°2184	1°2332	1°2483	1°3595	1°4398	1°4521	1°4645	1°5557
28°0	1°1443	1°1576	1°1712	1°2713	1°4012	1°4127	1°4244	1°5098
29°0	1°0755	1°0876	1°0998	1°1902	1°3639	1°3747	1°3856	1°4658
30°0	1°0116	1°0226	1°0337	1°1153	1°3277	1°3379	1°3482	1°4234
31°0	0°9521	0°9621	0°9721	1°0460	1°2927	1°3023	1°3120	1°3826
32°0	0°8966	0°9057	0°9148	0°9817	1°2587	1°2677	1°2768	1°3432
33°0	0°8448	0°8530	0°8613	0°9219	1°2257	1°2342	1°2427	1°3051
34°0	0°7962	0°8037	0°8112	0°8663	1°1935	1°2015	1°2096	1°2683
35°0	0°7506	0°7574	0°7643	0°8144	1°1622	1°1698	1°1774	1°2326
36°0	0°7079	0°7140	0°7203	0°7658	1°1317	1°1388	1°1460	1°1980
37°0	0°6676	0°6732	0°6789	0°7204	1°1019	1°1086	1°1154	1°1644
38°0	0°6297	0°6349	0°6400	0°6777	1°0729	1°0792	1°0856	1°1317
39°0	0°5940	0°5987	0°6034	0°6377	1°0444	1°0504	1°0564	1°0998
40°0	0°5603	0°5645	0°5688	0°6001	1°0166	1°0223	1°0279	1°0688
41°0	0°5284	0°5323	0°5362	0°5647	0°9894	0°9947	1°0001	1°0386
42°0	0°4982	0°5018	0°5054	0°5313	0°9628	0°9678	0°9728	1°0091
43°0	0°4697	0°4730	0°4762	0°4998	0°9366	0°9413	0°9461	0°9802
44°0	0°4427	0°4456	0°4486	0°4701	0°9110	0°9154	0°9199	0°9520
45°0	0°4171	0°4198	0°4225	0°4421	0°8858	0°8900	0°8942	0°9245
46°0	0°3928	0°3952	0°3977	0°4155	0°8611	0°8650	0°8690	0°8974
47°0	0°3697	0°3719	0°3742	0°3904	0°8368	0°8405	0°8442	0°8710
48°0	0°3478	0°3498	0°3519	0°3666	0°8129	0°8163	0°8199	0°8450
49°0	0°3270	0°3288	0°3307	0°3440	0°7893	0°7926	0°7959	0°8195
50°0	0°3072	0°3089	0°3106	0°3227	0°7662	0°7692	0°7723	0°7945

ϕ_c = 1° (continued)

ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
51•0	1•0084	1•0166	1•0248	1•0846	0•8133	0•8166	0•8199	0•8437
52•0	1•0081	1•0160	1•0239	1•0815	0•7845	0•7876	0•7907	0•8128
53•0	1•0078	1•0154	1•0231	1•0785	0•7566	0•7594	0•7623	0•7829
54•0	1•0075	1•0148	1•0222	1•0756	0•7294	0•7320	0•7347	0•7538
55•0	1•0072	1•0143	1•0214	1•0728	0•7028	0•7053	0•7078	0•7255
56•0	1•0070	1•0138	1•0206	1•0700	0•6769	0•6792	0•6815	0•6979
57•0	1•0067	1•0133	1•0199	1•0673	0•6517	0•6538	0•6559	0•6711
58•0	1•0064	1•0128	1•0191	1•0647	0•6269	0•6289	0•6309	0•6449
59•0	1•0062	1•0123	1•0184	1•0621	0•6028	0•6046	0•6064	0•6194
60•0	1•0060	1•0118	1•0176	1•0596	0•5791	0•5808	0•5825	0•5945
61•0	1•0057	1•0113	1•0169	1•0572	0•5559	0•5575	0•5590	0•5701
62•0	1•0055	1•0108	1•0162	1•0548	0•5332	0•5346	0•5361	0•5462
63•0	1•0053	1•0104	1•0156	1•0524	0•5109	0•5122	0•5135	0•5228
64•0	1•0050	1•0099	1•0149	1•0501	0•4890	0•4902	0•4914	0•4999
65•0	1•0048	1•0095	1•0142	1•0479	0•4675	0•4686	0•4697	0•4774
66•0	1•0046	1•0091	1•0136	1•0457	0•4463	0•4473	0•4483	0•4554
67•0	1•0044	1•0087	1•0129	1•0435	0•4254	0•4263	0•4272	0•4337
68•0	1•0042	1•0082	1•0123	1•0414	0•4049	0•4057	0•4065	0•4124
69•0	1•0040	1•0078	1•0117	1•0393	0•3846	0•3854	0•3861	0•3914
70•0	1•0038	1•0074	1•0111	1•0372	0•3647	0•3653	0•3660	0•3707
71•0	1•0036	1•0070	1•0105	1•0351	0•3450	0•3456	0•3461	0•3504
72•0	1•0034	1•0066	1•0099	1•0331	0•3255	0•3260	0•3265	0•3303
73•0	1•0032	1•0062	1•0093	1•0311	0•3062	0•3067	0•3072	0•3105
74•0	1•0030	1•0058	1•0087	1•0292	0•2872	0•2876	0•2880	0•2909
75•0	1•0028	1•0055	1•0082	1•0272	0•2683	0•2687	0•2691	0•2716
76•0	1•0026	1•0051	1•0076	1•0253	0•2497	0•2500	0•2503	0•2525
77•0	1•0024	1•0047	1•0070	1•0234	0•2312	0•2314	0•2317	0•2336
78•0	1•0022	1•0043	1•0065	1•0215	0•2128	0•2130	0•2132	0•2148
79•0	1•0020	1•0040	1•0059	1•0197	0•1946	0•1948	0•1950	0•1963
80•0	1•0018	1•0036	1•0054	1•0178	0•1765	0•1766	0•1768	0•1779
81•0	1•0016	1•0032	1•0048	1•0160	0•1585	0•1586	0•1588	0•1597
82•0	1•0014	1•0029	1•0043	1•0142	0•1406	0•1407	0•1408	0•1415
83•0	1•0013	1•0025	1•0037	1•0124	0•1229	0•1229	0•1230	0•1235
84•0	1•0011	1•0021	1•0032	1•0106	0•1052	0•1052	0•1053	0•1057
85•0	1•0009	1•0018	1•0027	1•0088	0•0875	0•0876	0•0876	0•0879
86•0	1•0007	1•0014	1•0021	1•0070	0•0700	0•0700	0•0700	0•0702
87•0	1•0005	1•0011	1•0016	1•0053	0•0524	0•0524	0•0524	0•0525
88•0	1•0004	1•0007	1•0011	1•0035	0•0349	0•0349	0•0349	0•0350
89•0	1•0002	1•0004	1•0005	1•0018	0•0175	0•0175	0•0175	0•0175
90•0	1•0000	1•0000	1•0000	1•0000	0•0000	0•0000	0•0000	0•0000

ϕ_c = 1° (continued)

Table 1

ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
51•0	0•2884	0•2899	0•2914	0•3024	0•7433	0•7462	0•7491	0•7699
52•0	0•2705	0•2719	0•2732	0•2832	0•7209	0•7236	0•7263	0•7458
53•0	0•2535	0•2547	0•2560	0•2650	0•6987	0•7012	0•7038	0•7220
54•0	0•2373	0•2384	0•2395	0•2476	0•6768	0•6792	0•6816	0•6986
55•0	0•2219	0•2229	0•2239	0•2312	0•6552	0•6574	0•6596	0•6756
56•0	0•2072	0•2081	0•2090	0•2156	0•6339	0•6359	0•6380	0•6529
57•0	0•1932	0•1941	0•1949	0•2008	0•6128	0•6147	0•6167	0•6305
58•0	0•1800	0•1807	0•1814	0•1867	0•5919	0•5937	0•5956	0•6084
59•0	0•1673	0•1680	0•1687	0•1734	0•5713	0•5730	0•5747	0•5867
60•0	0•1553	0•1559	0•1565	0•1607	0•5510	0•5525	0•5541	0•5652
61•0	0•1439	0•1444	0•1450	0•1487	0•5308	0•5322	0•5337	0•5439
62•0	0•1331	0•1335	0•1340	0•1373	0•5108	0•5121	0•5135	0•5230
63•0	0•1228	0•1232	0•1236	0•1265	0•4910	0•4922	0•4935	0•5022
64•0	0•1130	0•1134	0•1137	0•1163	0•4714	0•4725	0•4737	0•4817
65•0	0•1037	0•1040	0•1044	0•1066	0•4520	0•4530	0•4541	0•4614
66•0	0•0949	0•0952	0•0955	0•0975	0•4327	0•4337	0•4346	0•4414
67•0	0•0866	0•0869	0•0871	0•0888	0•4136	0•4144	0•4153	0•4215
68•0	0•0788	0•0790	0•0792	0•0807	0•3946	0•3954	0•3962	0•4018
69•0	0•0713	0•0715	0•0717	0•0730	0•3758	0•3765	0•3772	0•3823
70•0	0•0643	0•0645	0•0647	0•0658	0•3571	0•3577	0•3584	0•3629
71•0	0•0578	0•0579	0•0580	0•0590	0•3385	0•3391	0•3396	0•3437
72•0	0•0516	0•0517	0•0518	0•0526	0•3200	0•3205	0•3210	0•3247
73•0	0•0458	0•0459	0•0460	0•0466	0•3016	0•3021	0•3026	0•3058
74•0	0•0404	0•0405	0•0405	0•0411	0•2834	0•2838	0•2842	0•2870
75•0	0•0353	0•0354	0•0355	0•0359	0•2652	0•2656	0•2659	0•2684
76•0	0•0307	0•0307	0•0308	0•0311	0•2471	0•2474	0•2478	0•2499
77•0	0•0263	0•0264	0•0264	0•0267	0•2291	0•2294	0•2297	0•2315
78•0	0•0224	0•0224	0•0224	0•0227	0•2112	0•2114	0•2117	0•2133
79•0	0•0187	0•0188	0•0188	0•0190	0•1934	0•1936	0•1938	0•1951
80•0	0•0154	0•0155	0•0155	0•0156	0•1756	0•1757	0•1759	0•1770
81•0	0•0125	0•0125	0•0125	0•0126	0•1579	0•1580	0•1581	0•1590
82•0	0•0098	0•0098	0•0099	0•0099	0•1402	0•1403	0•1404	0•1411
83•0	0•0075	0•0075	0•0075	0•0076	0•1226	0•1226	0•1227	0•1232
84•0	0•0055	0•0055	0•0055	0•0055	0•1050	0•1050	0•1051	0•1055
85•0	0•0038	0•0038	0•0038	0•0038	0•0874	0•0875	0•0875	0•0878
86•0	0•0024	0•0024	0•0024	0•0025	0•0699	0•0699	0•0699	0•0701
87•0	0•0014	0•0014	0•0014	0•0014	0•0524	0•0524	0•0524	0•0525
88•0	0•0006	0•0006	0•0006	0•0006	0•0349	0•0349	0•0349	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 2°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
2•5	1•3770	1•8862	2•5837	23•3762	37•1269	43•9951	52•5569	223•5759
3•0	1•2652	1•5930	2•0057	10•0626	26•0045	29•3754	33•3287	90•5158
3•5	1•2098	1•4570	1•7547	6•4487	20•5031	22•5991	24•9807	54•4011
4•0	1•1752	1•3752	1•6092	4•8349	17•0715	18•5249	20•1432	38•2759
4•5	1•1511	1•3196	1•5128	3•9368	14•6835	15•7590	16•9394	29•3029
5•0	1•1332	1•2790	1•4437	3•3699	12•9095	13•7409	14•6437	23•6396
5•5	1•1192	1•2480	1•3915	2•9816	11•5322	12•1958	12•9102	19•7607
6•0	1•1081	1•2233	1•3506	2•6998	10•4282	10•9708	11•5511	16•9468
6•5	1•0989	1•2032	1•3175	2•4866	9•5214	9•9738	10•4548	14•8169
7•0	1•0912	1•1866	1•2903	2•3197	8•7620	9•1451	9•5506	13•1511
7•5	1•0846	1•1724	1•2674	2•1858	8•1160	8•4447	8•7912	11•8137
8•0	1•0790	1•1603	1•2479	2•0760	7•5593	7•8445	8•1440	10•7173
8•5	1•0740	1•1498	1•2310	1•9843	7•0741	7•3239	7•5854	9•8025
9•0	1•0697	1•1406	1•2163	1•9067	6•6473	6•8679	7•0982	9•0279
9•5	1•0658	1•1325	1•2033	1•8402	6•2688	6•4650	6•6693	8•3638
10•0	1•0624	1•1252	1•1918	1•7825	5•9306	6•1062	6•2887	7•7882
10•5	1•0593	1•1187	1•1816	1•7320	5•6265	5•7846	5•9486	7•2845
11•0	1•0564	1•1129	1•1723	1•6875	5•3516	5•4946	5•6427	6•8401
11•5	1•0539	1•1076	1•1640	1•6479	5•1017	5•2316	5•3660	6•4452
12•0	1•0515	1•1027	1•1563	1•6125	4•8735	4•9921	5•1145	6•0918
12•5	1•0494	1•0983	1•1494	1•5806	4•6642	4•7729	4•8849	5•7738
13•0	1•0474	1•0942	1•1430	1•5518	4•4716	4•5715	4•6743	5•4861
13•5	1•0456	1•0904	1•1372	1•5255	4•2937	4•3857	4•4804	5•2245
14•0	1•0439	1•0869	1•1317	1•5016	4•1288	4•2139	4•3014	4•9856
14•5	1•0423	1•0837	1•1267	1•4796	3•9755	4•0545	4•1355	4•7666
15•0	1•0408	1•0807	1•1220	1•4594	3•8327	3•9060	3•9813	4•5650
15•5	1•0395	1•0779	1•1177	1•4407	3•6992	3•7675	3•8375	4•3789
16•0	1•0382	1•0752	1•1136	1•4234	3•5741	3•6379	3•7032	4•2065
16•5	1•0370	1•0728	1•1098	1•4073	3•4567	3•5164	3•5774	4•0464
17•0	1•0358	1•0704	1•1062	1•3924	3•3462	3•4021	3•4593	3•8971
18•0	1•0337	1•0662	1•0996	1•3653	3•1437	3•1931	3•2435	3•6273
19•0	1•0318	1•0624	1•0938	1•3414	2•9625	3•0063	3•0510	3•3898
20•0	1•0301	1•0589	1•0885	1•3203	2•7992	2•8383	2•8782	3•1791
21•0	1•0286	1•0558	1•0838	1•3014	2•6513	2•6864	2•7221	2•9907
22•0	1•0272	1•0530	1•0795	1•2843	2•5165	2•5481	2•5803	2•8212
23•0	1•0259	1•0504	1•0755	1•2689	2•3931	2•4217	2•4508	2•6678
24•0	1•0247	1•0480	1•0719	1•2549	2•2797	2•3057	2•3321	2•5282
25•0	1•0236	1•0458	1•0686	1•2421	2•1751	2•1987	2•2227	2•4006
26•0	1•0226	1•0438	1•0655	1•2303	2•0781	2•0997	2•1216	2•2835
27•0	1•0216	1•0419	1•0626	1•2194	1•9880	2•0077	2•0278	2•1755
28•0	1•0208	1•0402	1•0600	1•2094	1•9040	1•9221	1•9404	2•0755
29•0	1•0199	1•0385	1•0575	1•2001	1•8253	1•8420	1•8588	1•9827
30•0	1•0191	1•0370	1•0551	1•1914	1•7516	1•7670	1•7825	1•8962
31•0	1•0184	1•0355	1•0529	1•1832	1•6823	1•6964	1•7107	1•8155
32•0	1•0177	1•0341	1•0509	1•1756	1•6169	1•6300	1•6432	1•7397
33•0	1•0170	1•0329	1•0489	1•1685	1•5552	1•5673	1•5795	1•6686
34•0	1•0164	1•0316	1•0471	1•1617	1•4968	1•5079	1•5193	1•6016
35•0	1•0158	1•0305	1•0453	1•1553	1•4413	1•4517	1•4621	1•5384
36•0	1•0153	1•0294	1•0436	1•1493	1•3886	1•3982	1•4079	1•4786
37•0	1•0147	1•0283	1•0421	1•1436	1•3383	1•3473	1•3563	1•4218
38•0	1•0142	1•0273	1•0405	1•1382	1•2904	1•2988	1•3071	1•3680
39•0	1•0137	1•0263	1•0391	1•1330	1•2446	1•2524	1•2602	1•3167
40•0	1•0132	1•0254	1•0377	1•1281	1•2008	1•2080	1•2153	1•2678
41•0	1•0128	1•0245	1•0364	1•1234	1•1588	1•1655	1•1723	1•2211

$\phi_c = 2°$

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
2•5	36•1073	42•9518	51•4868	222•1565	4•7251	5•1773	5•7219	15•2964
3•0	24•9975	28•3484	32•2801	89•2427	4•1985	4•4860	4•8139	9•0674
3•5	19•5048	21•5829	23•9455	53•1848	3•8888	4•1047	4•3444	7•0446
4•0	16•0805	17•5173	19•1182	37•0937	3•6654	3•8395	4•0297	5•9977
4•5	13•6991	14•7590	15•9231	28•1451	3•4890	3•6353	3•7931	5•3360
5•0	11•9311	12•7478	13•6352	22•5012	3•3424	3•4686	3•6035	4•8687
5•5	10•5596	11•2091	11•9090	18•6385	3•2166	3•3275	3•4452	4•5148
6•0	9•4611	9•9904	10•5567	15•8387	3•1062	3•2049	3•3092	4•2335
6•5	8•5596	8•9992	9•4670	13•7214	3•0076	3•0965	3•1900	4•0020
7•0	7•8055	8•1763	8•5690	12•0671	2•9184	2•9992	3•0839	3•8065
7•5	7•1647	7•4815	7•8157	10•7404	2•8370	2•9109	2•9882	3•6379
8•0	6•6130	6•8867	7•1744	9•6540	2•7620	2•8300	2•9009	3•4902
8•5	6•1329	6•3715	6•6216	8•7486	2•6924	2•7554	2•8209	3•3591
9•0	5•7111	5•9208	6•1401	7•9831	2•6275	2•6861	2•7468	3•2413
9•5	5•3374	5•5231	5•7167	7•3276	2•5667	2•6213	2•6779	3•1346
10•0	5•0041	5•1695	5•3416	6•7603	2•5094	2•5606	2•6135	3•0372
10•5	4•7049	4•8531	5•0069	6•2646	2•4554	2•5034	2•5530	2•9476
11•0	4•4348	4•5681	4•7063	5•8280	2•4041	2•4493	2•4959	2•8648
11•5	4•1897	4•3102	4•4350	5•4407	2•3554	2•3980	2•4420	2•7878
12•0	3•9663	4•0757	4•1888	5•0947	2•3089	2•3493	2•3908	2•7158
12•5	3•7618	3•8615	3•9643	4•7839	2•2645	2•3028	2•3421	2•6484
13•0	3•5739	3•6650	3•7589	4•5033	2•2220	2•2583	2•2956	2•5849
13•5	3•4007	3•4843	3•5703	4•2486	2•1812	2•2158	2•2512	2•5250
14•0	3•2405	3•3174	3•3964	4•0166	2•1421	2•1750	2•2086	2•4682
14•5	3•0920	3•1628	3•2355	3•8043	2•1043	2•1357	2•1678	2•4143
15•0	2•9538	3•0193	3•0864	3•6094	2•0680	2•0979	2•1285	2•3630
15•5	2•8250	2•8856	2•9477	3•4299	2•0329	2•0615	2•0907	2•3140
16•0	2•7047	2•7609	2•8185	3•2639	1•9989	2•0263	2•0543	2•2673
16•5	2•5919	2•6442	2•6977	3•1102	1•9661	1•9923	2•0191	2•2224
17•0	2•4862	2•5348	2•5846	2•9673	1•9342	1•9594	1•9851	2•1795
18•0	2•2930	2•3354	2•3787	2•7099	1•8734	1•8966	1•9202	2•0984
19•0	2•1211	2•1583	2•1962	2•4847	1•8159	1•8373	1•8592	2•0231
20•0	1•9672	2•0000	2•0333	2•2860	1•7614	1•7813	1•8015	1•9527
21•0	1•8286	1•8576	1•8871	2•1095	1•7096	1•7281	1•7468	1•8868
22•0	1•7033	1•7290	1•7551	1•9518	1•6603	1•6774	1•6949	1•8247
23•0	1•5893	1•6122	1•6355	1•8101	1•6131	1•6291	1•6454	1•7660
24•0	1•4853	1•5058	1•5266	1•6821	1•5679	1•5828	1•5980	1•7104
25•0	1•3901	1•4084	1•4271	1•5660	1•5245	1•5385	1•5527	1•6575
26•0	1•3025	1•3191	1•3358	1•4603	1•4828	1•4959	1•5092	1•6071
27•0	1•2219	1•2368	1•2518	1•3636	1•4425	1•4549	1•4673	1•5589
28•0	1•1473	1•1608	1•1744	1•2750	1•4037	1•4153	1•4270	1•5127
29•0	1•0782	1•0904	1•1027	1•1934	1•3662	1•3771	1•3881	1•4685
30•0	1•0141	1•0251	1•0362	1•1181	1•3299	1•3402	1•3505	1•4259
31•0	0•9543	0•9643	0•9744	1•0485	1•2948	1•3044	1•3141	1•3849
32•0	0•8986	0•9077	0•9168	0•9840	1•2606	1•2697	1•2788	1•3453
33•0	0•8465	0•8548	0•8631	0•9240	1•2275	1•2360	1•2446	1•3071
34•0	0•7978	0•8053	0•8128	0•8681	1•1952	1•2032	1•2113	1•2702
35•0	0•7521	0•7589	0•7658	0•8160	1•1638	1•1713	1•1790	1•2344
36•0	0•7092	0•7154	0•7216	0•7673	1•1332	1•1403	1•1475	1•1996
37•0	0•6688	0•6744	0•6801	0•7217	1•1033	1•1100	1•1168	1•1659
38•0	0•6308	0•6359	0•6411	0•6789	1•0741	1•0805	1•0869	1•1331
39•0	0•5949	0•5996	0•6044	0•6388	1•0456	1•0516	1•0576	1•1012
40•0	0•5611	0•5654	0•5697	0•6011	1•0178	1•0234	1•0291	1•0701
41•0	0•5292	0•5331	0•5370	0•5656	0•9905	0•9958	1•0011	1•0397

ϕ_c = 2° (continued)

ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
42•0	1•0124	1•0237	1•0351	1•1189	1•1185	1•1247	1•1310	1•1764
43•0	1•0119	1•0229	1•0339	1•1146	1•0797	1•0855	1•0914	1•1337
44•0	1•0115	1•0221	1•0327	1•1104	1•0423	1•0478	1•0532	1•0926
45•0	1•0111	1•0213	1•0316	1•1064	1•0063	1•0114	1•0165	1•0531
46•0	1•0108	1•0206	1•0305	1•1026	0•9716	0•9763	0•9811	1•0152
47•0	1•0104	1•0199	1•0294	1•0989	0•9380	0•9424	0•9468	0•9786
48•0	1•0100	1•0192	1•0284	1•0954	0•9055	0•9096	0•9138	0•9433
49•0	1•0097	1•0185	1•0274	1•0919	0•8741	0•8779	0•8817	0•9092
50•0	1•0094	1•0179	1•0265	1•0886	0•8435	0•8471	0•8507	0•8763
51•0	1•0090	1•0173	1•0255	1•0854	0•8139	0•8172	0•8206	0•8444
52•0	1•0087	1•0166	1•0246	1•0823	0•7851	0•7882	0•7913	0•8135
53•0	1•0084	1•0161	1•0237	1•0792	0•7571	0•7600	0•7629	0•7834
54•0	1•0081	1•0155	1•0229	1•0763	0•7299	0•7325	0•7352	0•7543
55•0	1•0078	1•0149	1•0221	1•0734	0•7033	0•7058	0•7082	0•7260
56•0	1•0075	1•0144	1•0212	1•0706	0•6774	0•6797	0•6820	0•6984
57•0	1•0073	1•0138	1•0204	1•0679	0•6521	0•6542	0•6563	0•6715
58•0	1•0070	1•0133	1•0197	1•0653	0•6273	0•6293	0•6313	0•6453
59•0	1•0067	1•0128	1•0189	1•0627	0•6031	0•6049	0•6068	0•6198
60•0	1•0065	1•0123	1•0182	1•0602	0•5794	0•5811	0•5828	0•5948
61•0	1•0062	1•0118	1•0174	1•0577	0•5562	0•5578	0•5593	0•5704
62•0	1•0060	1•0113	1•0167	1•0553	0•5335	0•5349	0•5363	0•5465
63•0	1•0057	1•0108	1•0160	1•0529	0•5112	0•5125	0•5138	0•5231
64•0	1•0055	1•0104	1•0153	1•0506	0•4892	0•4904	0•4916	0•5001
65•0	1•0052	1•0099	1•0146	1•0483	0•4677	0•4688	0•4699	0•4776
66•0	1•0050	1•0095	1•0140	1•0461	0•4465	0•4475	0•4485	0•4555
67•0	1•0048	1•0090	1•0133	1•0439	0•4256	0•4265	0•4274	0•4338
68•0	1•0045	1•0086	1•0127	1•0417	0•4050	0•4059	0•4067	0•4125
69•0	1•0043	1•0082	1•0120	1•0396	0•3848	0•3855	0•3863	0•3915
70•0	1•0041	1•0077	1•0114	1•0375	0•3648	0•3655	0•3661	0•3708
71•0	1•0039	1•0073	1•0108	1•0355	0•3451	0•3457	0•3463	0•3505
72•0	1•0036	1•0069	1•0102	1•0334	0•3256	0•3261	0•3266	0•3304
73•0	1•0034	1•0065	1•0096	1•0314	0•3063	0•3068	0•3073	0•3106
74•0	1•0032	1•0061	1•0090	1•0294	0•2873	0•2877	0•2881	0•2910
75•0	1•0030	1•0057	1•0084	1•0275	0•2684	0•2688	0•2691	0•2717
76•0	1•0028	1•0053	1•0078	1•0256	0•2497	0•2500	0•2503	0•2525
77•0	1•0026	1•0049	1•0072	1•0236	0•2312	0•2315	0•2317	0•2336
78•0	1•0024	1•0045	1•0067	1•0217	0•2128	0•2131	0•2133	0•2149
79•0	1•0022	1•0041	1•0061	1•0199	0•1946	0•1948	0•1950	0•1963
80•0	1•0020	1•0037	1•0055	1•0180	0•1765	0•1767	0•1768	0•1779
81•0	1•0018	1•0034	1•0050	1•0162	0•1585	0•1587	0•1588	0•1597
82•0	1•0016	1•0030	1•0044	1•0143	0•1407	0•1408	0•1409	0•1416
83•0	1•0014	1•0026	1•0038	1•0125	0•1229	0•1230	0•1230	0•1236
84•0	1•0012	1•0022	1•0033	1•0107	0•1052	0•1052	0•1053	0•1057
85•0	1•0010	1•0019	1•0027	1•0089	0•0875	0•0876	0•0876	0•0879
86•0	1•0008	1•0015	1•0022	1•0071	0•0700	0•0700	0•0700	0•0702
87•0	1•0006	1•0011	1•0016	1•0053	0•0524	0•0524	0•0525	0•0525
88•0	1•0004	1•0007	1•0011	1•0035	0•0349	0•0349	0•0349	0•0350
89•0	1•0002	1•0004	1•0005	1•0018	0•0175	0•0175	0•0175	0•0175
90•0	1•0000	1•0000	1•0000	1•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 2°$ (continued) Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
42·0	0·4990	0·5025	0·5061	0·5321	0·9638	0·9688	0·9738	1·0102
43·0	0·4704	0·4736	0·4769	0·5006	0·9376	0·9423	0·9470	0·9812
44·0	0·4433	0·4462	0·4492	0·4708	0·9119	0·9163	0·9208	0·9530
45·0	0·4176	0·4203	0·4230	0·4426	0·8866	0·8908	0·8950	0·9253
46·0	0·3932	0·3957	0·3982	0·4160	0·8618	0·8658	0·8698	0·8983
47·0	0·3701	0·3724	0·3746	0·3908	0·8375	0·8412	0·8449	0·8717
48·0	0·3482	0·3502	0·3523	0·3670	0·8135	0·8170	0·8205	0·8457
49·0	0·3273	0·3292	0·3310	0·3444	0·7900	0·7932	0·7966	0·8202
50·0	0·3075	0·3092	0·3109	0·3230	0·7668	0·7698	0·7729	0·7951
51·0	0·2887	0·2902	0·2917	0·3027	0·7439	0·7468	0·7497	0·7705
52·0	0·2707	0·2721	0·2735	0·2835	0·7214	0·7241	0·7268	0·7463
53·0	0·2537	0·2549	0·2562	0·2652	0·6992	0·7017	0·7043	0·7225
54·0	0·2375	0·2386	0·2397	0·2479	0·6772	0·6796	0·6820	0·6991
55·0	0·2220	0·2231	0·2241	0·2314	0·6556	0·6578	0·6601	0·6760
56·0	0·2074	0·2083	0·2092	0·2158	0·6342	0·6363	0·6384	0·6533
57·0	0·1934	0·1942	0·1950	0·2010	0·6131	0·6151	0·6170	0·6309
58·0	0·1801	0·1808	0·1816	0·1869	0·5923	0·5941	0·5959	0·6088
59·0	0·1675	0·1681	0·1688	0·1735	0·5717	0·5733	0·5750	0·5870
60·0	0·1554	0·1560	0·1566	0·1609	0·5512	0·5528	0·5544	0·5655
61·0	0·1440	0·1445	0·1451	0·1488	0·5310	0·5325	0·5339	0·5442
62·0	0·1332	0·1336	0·1341	0·1374	0·5111	0·5124	0·5137	0·5232
63·0	0·1228	0·1233	0·1237	0·1266	0·4912	0·4925	0·4937	0·5025
64·0	0·1131	0·1134	0·1138	0·1164	0·4716	0·4728	0·4739	0·4819
65·0	0·1038	0·1041	0·1044	0·1067	0·4522	0·4532	0·4543	0·4616
66·0	0·0950	0·0953	0·0955	0·0975	0·4329	0·4338	0·4348	0·4415
67·0	0·0867	0·0869	0·0872	0·0889	0·4137	0·4146	0·4155	0·4216
68·0	0·0788	0·0790	0·0792	0·0807	0·3948	0·3955	0·3963	0·4019
69·0	0·0714	0·0716	0·0717	0·0730	0·3759	0·3766	0·3773	0·3824
70·0	0·0644	0·0645	0·0647	0·0658	0·3572	0·3578	0·3585	0·3630
71·0	0·0578	0·0579	0·0580	0·0590	0·3386	0·3392	0·3397	0·3438
72·0	0·0516	0·0517	0·0518	0·0526	0·3201	0·3206	0·3211	0·3248
73·0	0·0458	0·0459	0·0460	0·0467	0·3017	0·3022	0·3026	0·3059
74·0	0·0404	0·0405	0·0405	0·0411	0·2835	0·2839	0·2843	0·2871
75·0	0·0354	0·0354	0·0355	0·0359	0·2653	0·2656	0·2660	0·2685
76·0	0·0307	0·0307	0·0308	0·0311	0·2472	0·2475	0·2478	0·2500
77·0	0·0264	0·0264	0·0264	0·0267	0·2292	0·2295	0·2297	0·2316
78·0	0·0224	0·0224	0·0224	0·0227	0·2113	0·2115	0·2117	0·2133
79·0	0·0187	0·0188	0·0188	0·0190	0·1934	0·1936	0·1938	0·1951
80·0	0·0154	0·0155	0·0155	0·0156	0·1756	0·1758	0·1759	0·1770
81·0	0·0125	0·0125	0·0125	0·0126	0·1579	0·1580	0·1581	0·1590
82·0	0·0098	0·0098	0·0099	0·0099	0·1402	0·1403	0·1404	0·1411
83·0	0·0075	0·0075	0·0075	0·0076	0·1226	0·1226	0·1227	0·1233
84·0	0·0055	0·0055	0·0055	0·0055	0·1050	0·1050	0·1051	0·1055
85·0	0·0038	0·0038	0·0038	0·0038	0·0874	0·0875	0·0875	0·0878
86·0	0·0024	0·0024	0·0024	0·0025	0·0699	0·0699	0·0699	0·0701
87·0	0·0014	0·0014	0·0014	0·0014	0·0524	0·0524	0·0524	0·0525
88·0	0·0006	0·0006	0·0006	0·0006	0·0349	0·0349	0·0349	0·0350
89·0	0·0002	0·0002	0·0002	0·0002	0·0175	0·0175	0·0175	0·0175
90·0	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000

$\phi_c = 3°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
3°5	1°2920	1°6505	2°1083	11°7015	27°9763	31°8620	36°4666	106°7209
4°0	1°2165	1°4647	1°7635	6°4687	20°5569	22°6566	25°0420	54°4843
4°5	1°1772	1°3725	1°6002	4°6860	16°7064	18°0938	19°6348	36°6933
5°0	1°1518	1°3145	1°5002	3°7834	14°2205	15°2262	16°3266	27°6877
5°5	1°1336	1°2738	1°4313	3°2371	12°4430	13°2132	14°0469	22°2383
6°0	1°1197	1°2432	1°3803	2°8705	11°0925	11°7047	12°3620	18°5822
6°5	1°1087	1°2192	1°3407	2°6072	10°0239	10°5240	11°0573	15°9575
7°0	1°0997	1°1998	1°3091	2°4089	9°1531	9°5702	10°0126	13°9807
7°5	1°0922	1°1838	1°2830	2°2541	8°4275	8°7811	9°1545	12°4377
8°0	1°0858	1°1702	1°2612	2°1298	7°8121	8°1161	8°4358	11°1995
8°5	1°0803	1°1586	1°2426	2°0278	7°2827	7°5469	7°8238	10°1836
9°0	1°0755	1°1486	1°2265	1°9426	6°8218	7°0536	7°2959	9°3349
9°5	1°0713	1°1397	1°2125	1°8703	6°4164	6°6216	6°8354	8°6150
10°0	1°0675	1°1319	1°2002	1°8081	6°0569	6°2397	6°4298	7°9967
10°5	1°0642	1°1249	1°1892	1°7542	5°7355	5°8995	6°0696	7°4597
11°0	1°0611	1°1187	1°1793	1°7069	5°4464	5°5942	5°7474	6°9889
11°5	1°0584	1°1130	1°1705	1°6650	5°1848	5°3188	5°4574	6°5728
12°0	1°0559	1°1079	1°1625	1°6278	4°9468	5°0688	5°1948	6°2021
12°5	1°0536	1°1032	1°1552	1°5943	4°7293	4°8408	4°9558	5°8699
13°0	1°0514	1°0989	1°1485	1°5642	4°5297	4°6320	4°7374	5°5704
13°5	1°0495	1°0949	1°1423	1°5369	4°3458	4°4400	4°5368	5°2989
14°0	1°0477	1°0913	1°1367	1°5120	4°1757	4°2627	4°3520	5°0517
14°5	1°0460	1°0879	1°1314	1°4892	4°0180	4°0985	4°1812	4°8256
15°0	1°0444	1°0847	1°1266	1°4683	3°8712	3°9460	4°0226	4°6180
15°5	1°0430	1°0818	1°1220	1°4491	3°7343	3°8039	3°8751	4°4266
16°0	1°0416	1°0790	1°1178	1°4312	3°6062	3°6711	3°7375	4°2497
16°5	1°0403	1°0764	1°1138	1°4147	3°4862	3°5468	3°6088	4°0855
17°0	1°0391	1°0740	1°1101	1°3993	3°3733	3°4301	3°4881	3°9328
17°5	1°0379	1°0717	1°1066	1°3849	3°2671	3°3203	3°3747	3°7904
18°0	1°0368	1°0696	1°1033	1°3715	3°1669	3°2169	3°2680	3°6572
19°0	1°0348	1°0656	1°0973	1°3471	2°9824	3°0268	3°0720	3°4152
20°0	1°0330	1°0620	1°0919	1°3255	2°8165	2°8561	2°8964	3°2008
21°0	1°0314	1°0588	1°0870	1°3061	2°6664	2°7018	2°7379	3°0094
22°0	1°0299	1°0559	1°0825	1°2888	2°5298	2°5617	2°5942	2°8374
23°0	1°0285	1°0532	1°0784	1°2731	2°4049	2°4338	2°4631	2°6820
24°0	1°0272	1°0507	1°0747	1°2588	2°2902	2°3164	2°3430	2°5408
25°0	1°0260	1°0484	1°0712	1°2457	2°1844	2°2083	2°2324	2°4118
26°0	1°0249	1°0463	1°0681	1°2338	2°0865	2°1083	2°1303	2°2934
27°0	1°0239	1°0443	1°0651	1°2227	1°9956	2°0155	2°0356	2°1843
28°0	1°0230	1°0425	1°0624	1°2125	1°9108	1°9290	1°9475	2°0835
29°0	1°0221	1°0408	1°0598	1°2030	1°8316	1°8483	1°8653	1°9899
30°0	1°0212	1°0391	1°0574	1°1942	1°7573	1°7727	1°7883	1°9027
31°0	1°0204	1°0376	1°0551	1°1859	1°6874	1°7017	1°7160	1°8213
32°0	1°0197	1°0362	1°0530	1°1782	1°6217	1°6348	1°6481	1°7451
33°0	1°0190	1°0348	1°0509	1°1709	1°5595	1°5717	1°5839	1°6735
34°0	1°0183	1°0335	1°0490	1°1641	1°5007	1°5120	1°5233	1°6061
35°0	1°0176	1°0323	1°0472	1°1576	1°4449	1°4553	1°4659	1°5425
36°0	1°0170	1°0312	1°0455	1°1515	1°3919	1°4016	1°4113	1°4823
37°0	1°0164	1°0301	1°0439	1°1457	1°3414	1°3504	1°3595	1°4253
38°0	1°0159	1°0290	1°0423	1°1402	1°2933	1°3016	1°3101	1°3711
39°0	1°0153	1°0280	1°0408	1°1350	1°2473	1°2550	1°2629	1°3196
40°0	1°0148	1°0270	1°0394	1°1300	1°2033	1°2105	1°2178	1°2705
41°0	1°0143	1°0261	1°0380	1°1252	1°1611	1°1678	1°1746	1°2236
42°0	1°0139	1°0252	1°0367	1°1206	1°1205	1°1268	1°1331	1°1787

$\phi_c = 3°$ Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
3•5	26•9507	30•8135	35•3931	105•3653	4•4741	4•8187	5•2169	10•7398
4•0	19•5469	21•6275	23•9924	53•2374	3•9932	4•2225	4•4775	7•3741
4•5	15•7068	17•0771	18•6000	35•4946	3•7093	3•8861	4•0790	6•0659
5•0	13•2294	14•2193	15•3031	26•5196	3•5041	3•6495	3•8060	5•3238
5•5	11•4593	12•2147	13•0329	21•0930	3•3418	3•4657	3•5980	4•8269
6•0	10•1156	10•7138	11•3565	17•4552	3•2068	3•3149	3•4295	4•4616
6•5	9•0533	9•5400	10•0595	14•8460	3•0906	3•1865	3•2877	4•1764
7•0	8•1886	8•5928	9•0220	12•8829	2•9884	3•0746	3•1650	3•9444
7•5	7•4688	7•8101	8•1708	11•3522	2•8969	2•9751	3•0569	3•7500
8•0	6•8590	7•1511	7•4586	10•1253	2•8140	2•8855	2•9600	3•5832
8•5	6•3351	6•5878	6•8530	9•1199	2•7381	2•8039	2•8723	3•4376
9•0	5•8795	6•1003	6•3312	8•2810	2•6680	2•7289	2•7920	3•3086
9•5	5•4794	5•6738	5•8767	7•5705	2•6029	2•6595	2•7181	3•1929
10•0	5•1251	5•2974	5•4769	6•9611	2•5420	2•5948	2•6494	3•0883
10•5	4•8088	4•9626	5•1225	6•4327	2•4849	2•5343	2•5853	2•9928
11•0	4•5248	4•6628	4•8059	5•9702	2•4310	2•4774	2•5253	2•9050
11•5	4•2682	4•3926	4•5214	5•5620	2•3800	2•4237	2•4687	2•8239
12•0	4•0352	4•1479	4•2643	5•1991	2•3315	2•3728	2•4153	2•7484
12•5	3•8227	3•9251	4•0308	4•8745	2•2854	2•3244	2•3646	2•6779
13•0	3•6280	3•7214	3•8178	4•5823	2•2413	2•2784	2•3164	2•6119
13•5	3•4489	3•5345	3•6226	4•3181	2•1992	2•2344	2•2704	2•5497
14•0	3•2838	3•3623	3•4431	4•0779	2•1588	2•1922	2•2265	2•4909
14•5	3•1309	3•2052	3•2774	3•8588	2•1200	2•1518	2•1845	2•4353
15•0	2•9889	3•0556	3•1241	3•6580	2•0826	2•1130	2•1441	2•3824
15•5	2•8568	2•9185	2•9818	3•4734	2•0466	2•0756	2•1053	2•3321
16•0	2•7336	2•7908	2•8494	3•3031	2•0118	2•0396	2•0680	2•2841
16•5	2•6183	2•6714	2•7258	3•1455	1•9782	2•0048	2•0320	2•2382
17•0	2•5103	2•5597	2•6103	2•9993	1•9457	1•9712	1•9972	2•1942
17•5	2•4088	2•4549	2•5020	2•8632	1•9142	1•9387	1•9636	2•1519
18•0	2•3133	2•3563	2•4003	2•7364	1•8837	1•9071	1•9310	2•1113
19•0	2•1384	2•1760	2•2144	2•5068	1•8252	1•8468	1•8689	2•0346
20•0	1•9820	2•0151	2•0489	2•3047	1•7698	1•7899	1•8103	1•9630
21•0	1•8414	1•8706	1•9005	2•1255	1•7173	1•7359	1•7548	1•8960
22•0	1•7143	1•7403	1•7667	1•9655	1•6672	1•6845	1•7021	1•8331
23•0	1•5989	1•6221	1•6456	1•8219	1•6194	1•6356	1•6520	1•7736
24•0	1•4937	1•5144	1•5354	1•6923	1•5737	1•5888	1•6041	1•7173
25•0	1•3975	1•4160	1•4348	1•5749	1•5299	1•5440	1•5583	1•6638
26•0	1•3091	1•3257	1•3426	1•4681	1•4877	1•5009	1•5143	1•6129
27•0	1•2277	1•2427	1•2579	1•3705	1•4472	1•4595	1•4721	1•5642
28•0	1•1525	1•1660	1•1797	1•2810	1•4080	1•4196	1•4314	1•5177
29•0	1•0829	1•0951	1•1075	1•1988	1•3702	1•3811	1•3922	1•4730
30•0	1•0182	1•0293	1•0405	1•1229	1•3336	1•3439	1•3543	1•4301
31•0	0•9580	0•9681	0•9782	1•0528	1•2982	1•3079	1•3176	1•3888
32•0	0•9019	0•9110	0•9202	0•9877	1•2638	1•2729	1•2821	1•3490
33•0	0•8495	0•8578	0•8662	0•9274	1•2305	1•2390	1•2476	1•3105
34•0	0•8005	0•8080	0•8156	0•8711	1•1980	1•2061	1•2142	1•2733
35•0	0•7545	0•7613	0•7683	0•8187	1•1664	1•1740	1•1817	1•2373
36•0	0•7113	0•7176	0•7239	0•7697	1•1356	1•1428	1•1500	1•2023
37•0	0•6708	0•6764	0•6822	0•7239	1•1056	1•1123	1•1191	1•1684
38•0	0•6326	0•6377	0•6430	0•6809	1•0763	1•0827	1•0891	1•1354
39•0	0•5966	0•6013	0•6060	0•6406	1•0477	1•0537	1•0597	1•1034
40•0	0•5626	0•5669	0•5712	0•6027	1•0197	1•0253	1•0310	1•0721
41•0	0•5305	0•5344	0•5384	0•5670	0•9923	0•9976	1•0030	1•0417
42•0	0•5002	0•5037	0•5073	0•5334	0•9654	0•9704	0•9755	1•0120

ϕ_c = 3° (continued)

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
43·0	1·0134	1·0243	1·0354	1·1163	1·0816	1·0875	1·0933	1·1358
44·0	1·0129	1·0235	1·0342	1·1121	1·0441	1·0496	1·0551	1·0945
45·0	1·0125	1·0227	1·0330	1·1080	1·0080	1·0131	1·0182	1·0549
46·0	1·0121	1·0219	1·0319	1·1042	0·9731	0·9779	0·9826	1·0168
47·0	1·0117	1·0212	1·0308	1·1004	0·9394	0·9439	0·9483	0·9801
48·0	1·0113	1·0205	1·0297	1·0968	0·9069	0·9110	0·9151	0·9447
49·0	1·0109	1·0198	1·0287	1·0933	0·8753	0·8791	0·8830	0·9106
50·0	1·0106	1·0191	1·0277	1·0899	0·8447	0·8483	0·8518	0·8775
51·0	1·0102	1·0184	1·0267	1·0867	0·8150	0·8183	0·8216	0·8455
52·0	1·0098	1·0178	1·0258	1·0835	0·7861	0·7892	0·7923	0·8145
53·0	1·0095	1·0171	1·0248	1·0804	0·7580	0·7609	0·7638	0·7844
54·0	1·0092	1·0165	1·0240	1·0774	0·7307	0·7334	0·7361	0·7552
55·0	1·0088	1·0159	1·0231	1·0745	0·7041	0·7066	0·7090	0·7268
56·0	1·0085	1·0154	1·0222	1·0717	0·6781	0·6804	0·6827	0·6991
57·0	1·0082	1·0148	1·0214	1·0690	0·6527	0·6549	0·6570	0·6722
58·0	1·0079	1·0142	1·0206	1·0663	0·6279	0·6299	0·6319	0·6460
59·0	1·0076	1·0137	1·0198	1·0636	0·6037	0·6055	0·6073	0·6204
60·0	1·0073	1·0132	1·0190	1·0611	0·5800	0·5816	0·5833	0·5953
61·0	1·0070	1·0126	1·0183	1·0586	0·5567	0·5583	0·5598	0·5709
62·0	1·0067	1·0121	1·0175	1·0561	0·5339	0·5353	0·5368	0·5469
63·0	1·0065	1·0116	1·0168	1·0537	0·5116	0·5129	0·5142	0·5235
64·0	1·0062	1·0111	1·0161	1·0514	0·4896	0·4908	0·4920	0·5005
65·0	1·0059	1·0106	1·0154	1·0491	0·4680	0·4691	0·4702	0·4780
66·0	1·0057	1·0101	1·0147	1·0468	0·4468	0·4478	0·4488	0·4559
67·0	1·0054	1·0097	1·0140	1·0446	0·4259	0·4268	0·4277	0·4341
68·0	1·0051	1·0092	1·0133	1·0424	0·4053	0·4061	0·4069	0·4128
69·0	1·0049	1·0087	1·0126	1·0402	0·3850	0·3858	0·3865	0·3917
70·0	1·0046	1·0083	1·0120	1·0381	0·3650	0·3657	0·3663	0·3711
71·0	1·0044	1·0078	1·0113	1·0360	0·3453	0·3458	0·3464	0·3507
72·0	1·0041	1·0074	1·0107	1·0339	0·3257	0·3263	0·3268	0·3306
73·0	1·0039	1·0070	1·0101	1·0319	0·3065	0·3069	0·3074	0·3107
74·0	1·0037	1·0065	1·0094	1·0299	0·2874	0·2878	0·2882	0·2911
75·0	1·0034	1·0061	1·0088	1·0279	0·2685	0·2689	0·2692	0·2718
76·0	1·0032	1·0057	1·0082	1·0259	0·2498	0·2501	0·2504	0·2526
77·0	1·0029	1·0053	1·0076	1·0240	0·2313	0·2315	0·2318	0·2337
78·0	1·0027	1·0048	1·0070	1·0221	0·2129	0·2131	0·2134	0·2150
79·0	1·0025	1·0044	1·0064	1·0202	0·1947	0·1949	0·1951	0·1964
80·0	1·0022	1·0040	1·0058	1·0183	0·1766	0·1767	0·1769	0·1780
81·0	1·0020	1·0036	1·0052	1·0164	0·1586	0·1587	0·1588	0·1597
82·0	1·0018	1·0032	1·0046	1·0145	0·1407	0·1408	0·1409	0·1416
83·0	1·0016	1·0028	1·0040	1·0127	0·1229	0·1230	0·1231	0·1236
84·0	1·0013	1·0024	1·0034	1·0109	0·1052	0·1052	0·1053	0·1057
85·0	1·0011	1·0020	1·0029	1·0090	0·0875	0·0876	0·0876	0·0879
86·0	1·0009	1·0016	1·0023	1·0072	0·0700	0·0700	0·0700	0·0702
87·0	1·0007	1·0012	1·0017	1·0054	0·0524	0·0524	0·0525	0·0526
88·0	1·0004	1·0008	1·0011	1·0036	0·0349	0·0349	0·0349	0·0350
89·0	1·0002	1·0004	1·0006	1·0018	0·0175	0·0175	0·0175	0·0175
90·0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000

$\phi_c = 3°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
43•0	0•4715	0•4747	0•4780	0•5018	0•9391	0•9438	0•9486	0•9829
44•0	0•4443	0•4472	0•4502	0•4719	0•9133	0•9178	0•9223	0•9546
45•0	0•4185	0•4212	0•4239	0•4436	0•8880	0•8922	0•8964	0•9268
46•0	0•3941	0•3965	0•3990	0•4169	0•8631	0•8671	0•8711	0•8996
47•0	0•3709	0•3731	0•3754	0•3916	0•8387	0•8424	0•8462	0•8730
48•0	0•3488	0•3509	0•3529	0•3677	0•8147	0•8182	0•8217	0•8469
49•0	0•3279	0•3298	0•3317	0•3451	0•7910	0•7943	0•7976	0•8213
50•0	0•3081	0•3097	0•3114	0•3236	0•7678	0•7708	0•7740	0•7962
51•0	0•2892	0•2907	0•2922	0•3033	0•7448	0•7477	0•7506	0•7715
52•0	0•2712	0•2726	0•2740	0•2839	0•7222	0•7250	0•7277	0•7472
53•0	0•2541	0•2554	0•2566	0•2656	0•7000	0•7025	0•7051	0•7234
54•0	0•2378	0•2390	0•2401	0•2483	0•6780	0•6804	0•6828	0•6999
55•0	0•2224	0•2234	0•2244	0•2318	0•6563	0•6585	0•6608	0•6768
56•0	0•2077	0•2086	0•2095	0•2161	0•6349	0•6370	0•6391	0•6540
57•0	0•1937	0•1945	0•1953	0•2012	0•6138	0•6157	0•6176	0•6315
58•0	0•1803	0•1811	0•1818	0•1871	0•5928	0•5947	0•5965	0•6094
59•0	0•1677	0•1683	0•1690	0•1737	0•5722	0•5739	0•5755	0•5875
60•0	0•1556	0•1562	0•1568	0•1610	0•5517	0•5533	0•5549	0•5660
61•0	0•1442	0•1447	0•1452	0•1490	0•5315	0•5329	0•5344	0•5447
62•0	0•1333	0•1338	0•1342	0•1376	0•5115	0•5128	0•5141	0•5237
63•0	0•1230	0•1234	0•1238	0•1268	0•4916	0•4929	0•4941	0•5029
64•0	0•1132	0•1135	0•1139	0•1165	0•4720	0•4731	0•4742	0•4823
65•0	0•1039	0•1042	0•1045	0•1068	0•4525	0•4535	0•4546	0•4620
66•0	0•0951	0•0954	0•0956	0•0976	0•4332	0•4341	0•4351	0•4418
67•0	0•0867	0•0870	0•0872	0•0890	0•4140	0•4149	0•4158	0•4219
68•0	0•0789	0•0791	0•0793	0•0808	0•3950	0•3958	0•3966	0•4022
69•0	0•0714	0•0716	0•0718	0•0731	0•3761	0•3768	0•3776	0•3826
70•0	0•0644	0•0646	0•0647	0•0658	0•3574	0•3580	0•3587	0•3632
71•0	0•0578	0•0580	0•0581	0•0590	0•3388	0•3393	0•3399	0•3440
72•0	0•0516	0•0517	0•0519	0•0526	0•3203	0•3208	0•3213	0•3250
73•0	0•0458	0•0459	0•0460	0•0467	0•3019	0•3023	0•3028	0•3060
74•0	0•0404	0•0405	0•0406	0•0411	0•2836	0•2840	0•2844	0•2873
75•0	0•0354	0•0354	0•0355	0•0359	0•2654	0•2657	0•2661	0•2686
76•0	0•0307	0•0307	0•0308	0•0312	0•2473	0•2476	0•2479	0•2501
77•0	0•0264	0•0264	0•0264	0•0267	0•2293	0•2295	0•2298	0•2317
78•0	0•0224	0•0224	0•0225	0•0227	0•2113	0•2116	0•2118	0•2134
79•0	0•0188	0•0188	0•0188	0•0190	0•1935	0•1937	0•1938	0•1952
80•0	0•0155	0•0155	0•0155	0•0156	0•1757	0•1758	0•1760	0•1771
81•0	0•0125	0•0125	0•0125	0•0126	0•1579	0•1580	0•1582	0•1591
82•0	0•0098	0•0099	0•0099	0•0099	0•1402	0•1403	0•1404	0•1411
83•0	0•0075	0•0075	0•0075	0•0076	0•1226	0•1227	0•1227	0•1233
84•0	0•0055	0•0055	0•0055	0•0055	0•1050	0•1051	0•1051	0•1055
85•0	0•0038	0•0038	0•0038	0•0038	0•0874	0•0875	0•0875	0•0878
86•0	0•0024	0•0024	0•0024	0•0025	0•0699	0•0699	0•0700	0•0701
87•0	0•0014	0•0014	0•0014	0•0014	0•0524	0•0524	0•0524	0•0525
88•0	0•0006	0•0006	0•0006	0•0006	0•0349	0•0349	0•0349	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_o = 4°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
4°5	1°2491	1°5299	1°8738	7°7492	22°8042	25°3740	28°3292	67°0624
5°0	1°1912	1°3939	1°6312	4°9018	17°2396	18°7101	20°3477	38°7019
5°5	1°1602	1°3239	1°5107	3°8050	14°2750	15°2842	16°3883	27°7823
6°0	1°1397	1°2786	1°4345	3°2084	12°3232	13°0757	13°8894	21°8448
6°5	1°1248	1°2462	1°3806	2°8288	10°9049	11°4945	12°1265	18°0686
7°0	1°1133	1°2214	1°3400	2°5642	9°8124	10°2899	10°7985	15°4381
7°5	1°1040	1°2017	1°3081	2°3685	8°9375	9°3338	9°7535	13°4927
8°0	1°0963	1°1855	1°2821	2°2173	8°2169	8°5520	8°9053	11°9914
8°5	1°0898	1°1720	1°2604	2°0969	7°6107	7°8983	8°2004	10°7954
9°0	1°0842	1°1605	1°2421	1°9985	7°0922	7°3420	7°6036	9°8189
9°5	1°0794	1°1505	1°2263	1°9166	6°6427	6°8619	7°0907	9°0055
10°0	1°0751	1°1418	1°2125	1°8471	6°2485	6°4425	6°6445	8°3170
10°5	1°0713	1°1340	1°2004	1°7875	5°8995	6°0725	6°2522	7°7261
11°0	1°0679	1°1272	1°1897	1°7358	5°5881	5°7434	5°9043	7°2133
11°5	1°0649	1°1210	1°1800	1°6904	5°3083	5°4484	5°5934	6°7638
12°0	1°0621	1°1154	1°1714	1°6503	5°0552	5°1823	5°3136	6°3663
12°5	1°0595	1°1103	1°1635	1°6145	4°8251	4°9409	5°0604	6°0123
13°0	1°0572	1°1057	1°1563	1°5824	4°6149	4°7208	4°8300	5°6947
13°5	1°0551	1°1014	1°1498	1°5534	4°4219	4°5192	4°6193	5°4083
14°0	1°0531	1°0975	1°1438	1°5272	4°2441	4°3337	4°4259	5°1485
14°5	1°0512	1°0939	1°1382	1°5032	4°0797	4°1625	4°2476	4°9117
15°0	1°0495	1°0905	1°1330	1°4813	3°9271	4°0039	4°0826	4°6950
15°5	1°0479	1°0874	1°1283	1°4611	3°7851	3°8565	3°9296	4°4958
16°0	1°0464	1°0844	1°1238	1°4425	3°6526	3°7191	3°7871	4°3121
16°5	1°0450	1°0817	1°1196	1°4252	3°5287	3°5906	3°6541	4°1421
17°0	1°0437	1°0791	1°1157	1°4092	3°4124	3°4703	3°5296	3°9843
17°5	1°0424	1°0767	1°1120	1°3943	3°3030	3°3574	3°4129	3°8373
18°0	1°0413	1°0744	1°1086	1°3804	3°2000	3°2510	3°3031	3°7002
18°5	1°0401	1°0722	1°1053	1°3674	3°1028	3°1508	3°1997	3°5719
19°0	1°0391	1°0702	1°1022	1°3552	3°0109	3°0560	3°1021	3°4515
20°0	1°0371	1°0664	1°0966	1°3328	2°8412	2°8814	2°9224	3°2318
21°0	1°0353	1°0630	1°0914	1°3129	2°6879	2°7239	2°7605	3°0361
22°0	1°0337	1°0599	1°0868	1°2951	2°5487	2°5811	2°6140	2°8606
23°0	1°0322	1°0570	1°0825	1°2789	2°4216	2°4509	2°4806	2°7023
24°0	1°0308	1°0544	1°0786	1°2643	2°3051	2°3316	2°3585	2°5586
25°0	1°0295	1°0520	1°0750	1°2509	2°1977	2°2218	2°2462	2°4276
26°0	1°0283	1°0498	1°0717	1°2387	2°0984	2°1204	2°1427	2°3074
27°0	1°0272	1°0477	1°0686	1°2274	2°0063	2°0264	2°0467	2°1969
28°0	1°0261	1°0457	1°0657	1°2169	1°9205	1°9389	1°9575	2°0947
29°0	1°0251	1°0439	1°0630	1°2072	1°8403	1°8572	1°8743	2°0000
30°0	1°0242	1°0422	1°0605	1°1982	1°7653	1°7808	1°7965	1°9119
31°0	1°0233	1°0406	1°0582	1°1898	1°6947	1°7090	1°7235	1°8296
32°0	1°0225	1°0391	1°0559	1°1819	1°6283	1°6415	1°6549	1°7526
33°0	1°0217	1°0376	1°0538	1°1745	1°5656	1°5778	1°5902	1°6804
34°0	1°0209	1°0363	1°0518	1°1675	1°5063	1°5176	1°5290	1°6123
35°0	1°0202	1°0350	1°0499	1°1609	1°4500	1°4605	1°4711	1°5482
36°0	1°0195	1°0337	1°0481	1°1546	1°3966	1°4064	1°4162	1°4875
37°0	1°0189	1°0325	1°0464	1°1487	1°3458	1°3548	1°3639	1°4301
38°0	1°0182	1°0314	1°0448	1°1431	1°2973	1°3057	1°3142	1°3755
39°0	1°0176	1°0303	1°0432	1°1378	1°2510	1°2588	1°2667	1°3237
40°0	1°0171	1°0293	1°0417	1°1327	1°2067	1°2139	1°2213	1°2742
41°0	1°0165	1°0283	1°0402	1°1278	1°1642	1°1710	1°1778	1°2270
42°0	1°0160	1°0273	1°0389	1°1231	1°1235	1°1298	1°1361	1°1819
43°0	1°0154	1°0264	1°0375	1°1187	1°0843	1°0902	1°0961	1°1387

$\phi_c = 4°$

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
4•5	21•7702	24•3177	27•2487	65•7311	4•3081	4•5922	4•9127	8•8088
5•0	16•2245	17•6764	19•2943	37•4660	3•8505	4•0444	4•2569	6•4849
5•5	13•2723	14•2647	15•3513	26•5917	3•5803	3•7322	3•8961	5•4913
6•0	11•3302	12•0674	12•8650	20•6839	3•3852	3•5116	3•6465	4•8986
6•5	9•9203	10•4955	11•1125	16•9300	3•2311	3•3398	3•4549	4•4886
7•0	8•8353	9•2993	9•7936	14•3177	3•1029	3•1984	3•2991	4•1801
7•5	7•9674	8•3507	8•7571	12•3878	2•9926	3•0779	3•1674	3•9349
8•0	7•2534	7•5761	7•9166	10•9002	2•8955	2•9726	3•0531	3•7327
8•5	6•6535	6•9292	7•2189	9•7166	2•8086	2•8788	2•9520	3•5613
9•0	6•1410	6•3793	6•6290	8•7514	2•7298	2•7943	2•8613	3•4129
9•5	5•6973	5•9054	6•1228	7•9486	2•6576	2•7171	2•7789	3•2823
10•0	5•3088	5•4920	5•6831	7•2700	2•5908	2•6462	2•7034	3•1657
10•5	4•9654	5•1280	5•2971	6•6886	2•5288	2•5804	2•6337	3•0607
11•0	4•6595	4•8046	4•9553	6•1847	2•4707	2•5190	2•5688	2•9651
11•5	4•3850	4•5153	4•6503	5•7438	2•4161	2•4615	2•5082	2•8774
12•0	4•1372	4•2548	4•3764	5•3547	2•3646	2•4073	2•4512	2•7965
12•5	3•9124	4•0189	4•1289	5•0087	2•3158	2•3561	2•3975	2•7214
13•0	3•7073	3•8042	3•9042	4•6990	2•2694	2•3075	2•3467	2•6513
13•5	3•5195	3•6080	3•6991	4•4201	2•2252	2•2613	2•2984	2•5857
14•0	3•3468	3•4278	3•5112	4•1678	2•1830	2•2173	2•2524	2•5240
14•5	3•1874	3•2619	3•3384	3•9383	2•1425	2•1751	2•2085	2•4657
15•0	3•0399	3•1085	3•1789	3•7287	2•1037	2•1348	2•1666	2•4105
15•5	2•9029	2•9662	3•0312	3•5365	2•0663	2•0960	2•1263	2•3582
16•0	2•7754	2•8340	2•8941	3•3597	2•0304	2•0587	2•0876	2•3083
16•5	2•6563	2•7107	2•7664	3•1965	1•9957	2•0228	2•0504	2•2607
17•0	2•5450	2•5955	2•6472	3•0454	1•9622	1•9881	2•0146	2•2153
17•5	2•4406	2•4876	2•5357	2•9051	1•9298	1•9546	1•9799	2•1717
18•0	2•3425	2•3863	2•4312	2•7745	1•8984	1•9222	1•9465	2•1299
18•5	2•2501	2•2911	2•3330	2•6526	1•8679	1•8908	1•9141	2•0897
19•0	2•1631	2•2014	2•2405	2•5386	1•8384	1•8604	1•8827	2•0510
20•0	2•0031	2•0368	2•0711	2•3314	1•7817	1•8021	1•8228	1•9777
21•0	1•8595	1•8893	1•9195	2•1482	1•7281	1•7470	1•7661	1•9092
22•0	1•7300	1•7564	1•7832	1•9849	1•6771	1•6946	1•7124	1•8450
23•0	1•6126	1•6361	1•6599	1•8386	1•6285	1•6448	1•6614	1•7844
24•0	1•5057	1•5267	1•5479	1•7069	1•5820	1•5973	1•6127	1•7271
25•0	1•4080	1•4268	1•4458	1•5876	1•5375	1•5518	1•5662	1•6728
26•0	1•3184	1•3352	1•3523	1•4792	1•4948	1•5081	1•5216	1•6211
27•0	1•2359	1•2511	1•2664	1•3802	1•4537	1•4662	1•4788	1•5718
28•0	1•1598	1•1735	1•1873	1•2896	1•4141	1•4258	1•4376	1•5246
29•0	1•0894	1•1017	1•1142	1•2064	1•3758	1•3868	1•3979	1•4794
30•0	1•0240	1•0352	1•0465	1•1296	1•3389	1•3492	1•3596	1•4360
31•0	0•9633	0•9734	0•9836	1•0588	1•3031	1•3128	1•3226	1•3943
32•0	0•9066	0•9158	0•9251	0•9931	1•2684	1•2775	1•2867	1•3541
33•0	0•8537	0•8621	0•8705	0•9322	1•2347	1•2433	1•2520	1•3152
34•0	0•8043	0•8118	0•8195	0•8754	1•2019	1•2100	1•2182	1•2777
35•0	0•7579	0•7648	0•7718	0•8226	1•1701	1•1777	1•1854	1•2414
36•0	0•7144	0•7207	0•7270	0•7732	1•1391	1•1463	1•1535	1•2062
37•0	0•6736	0•6793	0•6850	0•7270	1•1088	1•1156	1•1225	1•1720
38•0	0•6351	0•6403	0•6455	0•6837	1•0793	1•0857	1•0922	1•1388
39•0	0•5988	0•6036	0•6084	0•6431	1•0505	1•0565	1•0626	1•1065
40•0	0•5647	0•5690	0•5733	0•6050	1•0223	1•0280	1•0337	1•0750
41•0	0•5324	0•5363	0•5403	0•5691	0•9947	1•0001	1•0055	1•0444
42•0	0•5019	0•5055	0•5091	0•5353	0•9678	0•9728	0•9779	1•0145
43•0	0•4730	0•4763	0•4796	0•5034	0•9413	0•9461	0•9508	0•9853

$\phi_c = 4°$ (continued)

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
44·0	1·0149	1·0255	1·0362	1·1144	1·0467	1·0521	1·0576	1·0973
45·0	1·0144	1·0247	1·0350	1·1103	1·0103	1·0154	1·0206	1·0575
46·0	1·0140	1·0238	1·0338	1·1063	0·9753	0·9801	0·9848	1·0192
47·0	1·0135	1·0230	1·0326	1·1025	0·9415	0·9459	0·9503	0·9823
48·0	1·0131	1·0223	1·0315	1·0988	0·9087	0·9128	0·9170	0·9467
49·0	1·0126	1·0215	1·0304	1·0953	0·8770	0·8809	0·8847	0·9124
50·0	1·0122	1·0208	1·0294	1·0918	0·8463	0·8499	0·8535	0·8792
51·0	1·0118	1·0200	1·0284	1·0885	0·8165	0·8198	0·8231	0·8471
52·0	1·0114	1·0194	1·0274	1·0852	0·7875	0·7906	0·7937	0·8160
53·0	1·0110	1·0187	1·0264	1·0821	0·7593	0·7622	0·7651	0·7858
54·0	1·0106	1·0180	1·0255	1·0791	0·7319	0·7346	0·7373	0·7565
55·0	1·0103	1·0174	1·0245	1·0761	0·7052	0·7077	0·7102	0·7280
56·0	1·0099	1·0167	1·0236	1·0732	0·6791	0·6814	0·6837	0·7002
57·0	1·0095	1·0161	1·0228	1·0704	0·6537	0·6558	0·6579	0·6732
58·0	1·0092	1·0155	1·0219	1·0677	0·6288	0·6308	0·6328	0·6469
59·0	1·0088	1·0149	1·0211	1·0650	0·6045	0·6063	0·6082	0·6212
60·0	1·0085	1·0143	1·0202	1·0624	0·5807	0·5824	0·5841	0·5961
61·0	1·0082	1·0138	1·0194	1·0598	0·5574	0·5589	0·5605	0·5716
62·0	1·0078	1·0132	1·0186	1·0573	0·5345	0·5360	0·5374	0·5476
63·0	1·0075	1·0127	1·0179	1·0549	0·5121	0·5134	0·5148	0·5241
64·0	1·0072	1·0121	1·0171	1·0525	0·4901	0·4913	0·4925	0·5011
65·0	1·0069	1·0116	1·0163	1·0501	0·4685	0·4696	0·4707	0·4785
66·0	1·0066	1·0111	1·0156	1·0478	0·4472	0·4482	0·4492	0·4563
67·0	1·0063	1·0106	1·0149	1·0455	0·4263	0·4272	0·4281	0·4345
68·0	1·0060	1·0101	1·0142	1·0433	0·4057	0·4065	0·4073	0·4131
69·0	1·0057	1·0096	1·0134	1·0411	0·3853	0·3861	0·3868	0·3921
70·0	1·0054	1·0091	1·0127	1·0389	0·3653	0·3660	0·3666	0·3713
71·0	1·0051	1·0086	1·0121	1·0368	0·3455	0·3461	0·3467	0·3509
72·0	1·0048	1·0081	1·0114	1·0347	0·3260	0·3265	0·3270	0·3308
73·0	1·0045	1·0076	1·0107	1·0326	0·3067	0·3071	0·3076	0·3109
74·0	1·0043	1·0071	1·0100	1·0305	0·2876	0·2880	0·2884	0·2913
75·0	1·0040	1·0067	1·0094	1·0285	0·2687	0·2690	0·2694	0·2719
76·0	1·0037	1·0062	1·0087	1·0265	0·2499	0·2503	0·2506	0·2528
77·0	1·0034	1·0058	1·0081	1·0245	0·2314	0·2317	0·2319	0·2338
78·0	1·0032	1·0053	1·0074	1·0225	0·2130	0·2132	0·2135	0·2151
79·0	1·0029	1·0048	1·0068	1·0206	0·1948	0·1949	0·1951	0·1965
80·0	1·0026	1·0044	1·0062	1·0187	0·1766	0·1768	0·1769	0·1780
81·0	1·0024	1·0039	1·0055	1·0168	0·1586	0·1588	0·1589	0·1598
82·0	1·0021	1·0035	1·0049	1·0149	0·1407	0·1408	0·1409	0·1416
83·0	1·0018	1·0031	1·0043	1·0130	0·1229	0·1230	0·1231	0·1236
84·0	1·0016	1·0026	1·0037	1·0111	0·1052	0·1053	0·1053	0·1057
85·0	1·0013	1·0022	1·0031	1·0092	0·0876	0·0876	0·0876	0·0879
86·0	1·0010	1·0017	1·0024	1·0074	0·0700	0·0700	0·0700	0·0702
87·0	1·0008	1·0013	1·0018	1·0055	0·0524	0·0524	0·0525	0·0526
88·0	1·0005	1·0009	1·0012	1·0037	0·0349	0·0349	0·0349	0·0350
89·0	1·0003	1·0004	1·0006	1·0018	0·0175	0·0175	0·0175	0·0175
90·0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000

$\phi_c = 4°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.01
44·0	0·4457	0·4436	0·4517	0·4734	0·9154	0·9198	0·9244	0·9568
45·0	0·4198	0·4225	0·4252	0·4450	0·8899	0·8941	0·8984	0·9289
46·0	0·3952	0·3977	0·4002	0·4181	0·8649	0·8689	0·8729	0·9016
47·0	0·3719	0·3742	0·3764	0·3928	0·8404	0·8441	0·8479	0·8748
48·0	0·3498	0·3518	0·3539	0·3687	0·8163	0·8198	0·8233	0·8486
49·0	0·3288	0·3306	0·3325	0·3460	0·7925	0·7958	0·7991	0·8229
50·0	0·3088	0·3105	0·3122	0·3244	0·7691	0·7722	0·7754	0·7977
51·0	0·2899	0·2914	0·2929	0·3040	0·7461	0·7490	0·7520	0·7729
52·0	0·2718	0·2732	0·2746	0·2846	0·7235	0·7262	0·7289	0·7485
53·0	0·2547	0·2559	0·2572	0·2662	0·7011	0·7037	0·7062	0·7246
54·0	0·2383	0·2395	0·2406	0·2488	0·6791	0·6815	0·6839	0·7010
55·0	0·2228	0·2239	0·2249	0·2322	0·6573	0·6595	0·6618	0·6778
56·0	0·2081	0·2090	0·2099	0·2165	0·6358	0·6379	0·6400	0·6550
57·0	0·1940	0·1949	0·1957	0·2016	0·6146	0·6166	0·6185	0·6324
58·0	0·1807	0·1814	0·1822	0·1875	0·5936	0·5955	0·5973	0·6102
59·0	0·1680	0·1686	0·1693	0·1741	0·5729	0·5746	0·5763	0·5883
60·0	0·1559	0·1565	0·1571	0·1613	0·5524	0·5540	0·5555	0·5667
61·0	0·1444	0·1449	0·1455	0·1492	0·5321	0·5336	0·5350	0·5454
62·0	0·1335	0·1340	0·1344	0·1378	0·5121	0·5134	0·5147	0·5243
63·0	0·1232	0·1236	0·1240	0·1269	0·4922	0·4934	0·4946	0·5034
64·0	0·1133	0·1137	0·1141	0·1167	0·4725	0·4736	0·4747	0·4828
65·0	0·1040	0·1043	0·1047	0·1069	0·4529	0·4540	0·4550	0·4624
66·0	0·0952	0·0955	0·0958	0·0978	0·4336	0·4345	0·4355	0·4423
67·0	0·0868	0·0871	0·0873	0·0891	0·4144	0·4153	0·4161	0·4223
68·0	0·0790	0·0792	0·0794	0·0809	0·3953	0·3961	0·3969	0·4025
69·0	0·0715	0·0717	0·0719	0·0732	0·3764	0·3771	0·3779	0·3829
70·0	0·0645	0·0646	0·0648	0·0659	0·3577	0·3583	0·3590	0·3635
71·0	0·0579	0·0580	0·0581	0·0591	0·3390	0·3396	0·3402	0·3443
72·0	0·0517	0·0518	0·0519	0·0527	0·3205	0·3210	0·3215	0·3252
73·0	0·0459	0·0460	0·0461	0·0467	0·3021	0·3025	0·3030	0·3062
74·0	0·0405	0·0405	0·0406	0·0412	0·2838	0·2842	0·2846	0·2874
75·0	0·0354	0·0355	0·0355	0·0360	0·2655	0·2659	0·2663	0·2688
76·0	0·0307	0·0308	0·0308	0·0312	0·2474	0·2477	0·2480	0·2502
77·0	0·0264	0·0264	0·0265	0·0268	0·2294	0·2297	0·2299	0·2318
78·0	0·0224	0·0224	0·0225	0·0227	0·2114	0·2117	0·2119	0·2135
79·0	0·0188	0·0188	0·0188	0·0190	0·1935	0·1937	0·1939	0·1952
80·0	0·0155	0·0155	0·0155	0·0156	0·1757	0·1759	0·1760	0·1771
81·0	0·0125	0·0125	0·0125	0·0126	0·1580	0·1581	0·1582	0·1591
82·0	0·0098	0·0099	0·0099	0·0099	0·1403	0·1404	0·1405	0·1412
83·0	0·0075	0·0075	0·0075	0·0076	0·1226	0·1227	0·1228	0·1233
84·0	0·0055	0·0055	0·0055	0·0056	0·1050	0·1051	0·1051	0·1055
85·0	0·0038	0·0038	0·0038	0·0038	0·0875	0·0875	0·0875	0·0878
86·0	0·0024	0·0024	0·0024	0·0025	0·0699	0·0699	0·0700	0·0701
87·0	0·0014	0·0014	0·0014	0·0014	0·0524	0·0524	0·0524	0·0525
88·0	0·0006	0·0006	0·0006	0·0006	0·0349	0·0349	0·0349	0·0350
89·0	0·0002	0·0002	0·0002	0·0002	0·0175	0·0175	0·0175	0·0175
90·0	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000

$\phi_c = 5°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
5•5	1•2264	1•4600	1•7380	5•8881	19•4503	21•3093	23•4046	48•2911
6•0	1•1784	1•3517	1•5505	4•0506	14•9868	16•0925	17•3069	30•0541
6•5	1•1523	1•2946	1•4544	3•2863	12•5700	13•3488	14•1919	22•4733
7•0	1•1347	1•2570	1•3925	2•8507	10•9587	11•5512	12•1863	18•1566
7•5	1•1217	1•2297	1•3480	2•5643	9•7753	10•2471	10•7493	15•3194
8•0	1•1116	1•2085	1•3140	2•3595	8•8554	9•2428	9•6528	13•2923
8•5	1•1033	1•1916	1•2868	2•2048	8•1125	8•4379	8•7806	11•7622
9•0	1•0965	1•1775	1•2646	2•0833	7•4962	7•7742	8•0658	10•5611
9•5	1•0906	1•1657	1•2459	1•9851	6•9743	7•2150	7•4667	9•5903
10•0	1•0855	1•1554	1•2299	1•9038	6•5251	6•7358	6•9556	8•7877
10•5	1•0811	1•1466	1•2160	1•8353	6•1333	6•3196	6•5134	8•1118
11•0	1•0771	1•1387	1•2038	1•7767	5•7881	5•9540	6•1263	7•5340
11•5	1•0736	1•1318	1•1931	1•7259	5•4810	5•6298	5•7840	7•0339
12•0	1•0704	1•1255	1•1834	1•6815	5•2056	5•3399	5•4789	6•5964
12•5	1•0675	1•1199	1•1748	1•6422	4•9572	5•0790	5•2048	6•2101
13•0	1•0649	1•1147	1•1669	1•6073	4•7316	4•8426	4•9571	5•8664
13•5	1•0625	1•1101	1•1598	1•5759	4•5257	4•6273	4•7319	5•5583
14•0	1•0603	1•1058	1•1532	1•5476	4•3369	4•4303	4•5262	5•2806
14•5	1•0582	1•1018	1•1472	1•5220	4•1631	4•2491	4•3375	5•0287
15•0	1•0563	1•0981	1•1417	1•4986	4•0025	4•0820	4•1636	4•7992
15•5	1•0545	1•0947	1•1365	1•4772	3•8535	3•9272	4•0027	4•5891
16•0	1•0528	1•0916	1•1317	1•4575	3•7142	3•7833	3•8535	4•3961
16•5	1•0512	1•0886	1•1273	1•4393	3•5854	3•6493	3•7146	4•2180
17•0	1•0498	1•0858	1•1231	1•4224	3•4644	3•5240	3•5850	4•0531
17•5	1•0484	1•0832	1•1192	1•4068	3•3509	3•4066	3•4636	3•9000
18•0	1•0471	1•0807	1•1155	1•3922	3•2441	3•2964	3•3498	3•7574
18•5	1•0458	1•0784	1•1120	1•3785	3•1436	3•1927	3•2428	3•6243
19•0	1•0446	1•0762	1•1088	1•3658	3•0486	3•0948	3•1419	3•4997
19•5	1•0435	1•0741	1•1057	1•3538	2•9588	3•0023	3•0467	3•3827
20•0	1•0424	1•0722	1•1027	1•3425	2•8738	2•9148	2•9566	3•2728
21•0	1•0404	1•0685	1•0973	1•3218	2•7163	2•7530	2•7903	3•0714
22•0	1•0386	1•0652	1•0924	1•3033	2•5736	2•6065	2•6400	2•8912
23•0	1•0369	1•0621	1•0879	1•2866	2•4436	2•4733	2•5035	2•7290
24•0	1•0354	1•0593	1•0837	1•2715	2•3246	2•3515	2•3788	2•5821
25•0	1•0340	1•0567	1•0800	1•2577	2•2151	2•2395	2•2643	2•4483
26•0	1•0326	1•0543	1•0764	1•2450	2•1140	2•1363	2•1588	2•3258
27•0	1•0314	1•0521	1•0732	1•2334	2•0203	2•0406	2•0612	2•2133
28•0	1•0302	1•0500	1•0701	1•2226	1•9331	1•9517	1•9706	2•1094
29•0	1•0291	1•0480	1•0673	1•2127	1•8518	1•8689	1•8861	2•0132
30•0	1•0280	1•0462	1•0646	1•2034	1•7756	1•7913	1•8072	1•9238
31•0	1•0270	1•0444	1•0621	1•1947	1•7042	1•7186	1•7333	1•8404
32•0	1•0261	1•0428	1•0598	1•1866	1•6369	1•6503	1•6638	1•7624
33•0	1•0252	1•0412	1•0575	1•1790	1•5735	1•5858	1•5983	1•6893
34•0	1•0243	1•0398	1•0554	1•1718	1•5135	1•5249	1•5365	1•6205
35•0	1•0235	1•0384	1•0534	1•1651	1•4567	1•4673	1•4779	1•5556
36•0	1•0227	1•0370	1•0515	1•1587	1•4027	1•4125	1•4224	1•4944
37•0	1•0220	1•0357	1•0497	1•1526	1•3514	1•3605	1•3697	1•4363
38•0	1•0213	1•0345	1•0479	1•1468	1•3025	1•3109	1•3195	1•3813
39•0	1•0206	1•0334	1•0463	1•1414	1•2558	1•2636	1•2716	1•3289
40•0	1•0199	1•0322	1•0447	1•1361	1•2111	1•2184	1•2258	1•2791
41•0	1•0193	1•0312	1•0432	1•1311	1•1683	1•1751	1•1820	1•2315
42•0	1•0187	1•0301	1•0417	1•1264	1•1273	1•1336	1•1400	1•1861
43•0	1•0181	1•0291	1•0403	1•1218	1•0879	1•0938	1•0997	1•1425
44•0	1•0175	1•0281	1•0389	1•1174	1•0499	1•0554	1•0609	1•1008

$\phi_c = 5°$

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
5•5	18•4062	20•2432	22•3149	46•9683	4•1890	4•4340	4•7057	7•7415
6•0	13•9649	15•0524	16•2475	28•8216	3•7443	3•9144	4•0985	5•9289
6•5	11•5624	12•3249	13•1509	21•2855	3•4821	3•6166	3•7606	5•1072
7•0	9•9622	10•5397	11•1592	16•9986	3•2931	3•4058	3•5254	4•6013
7•5	8•7883	9•2461	9•7336	14•1840	3•1440	3•2415	3•3443	4•2440
8•0	7•8767	8•2509	8•6471	12•1754	3•0201	3•1063	3•1967	3•9711
8•5	7•1416	7•4543	7•7839	10•6610	2•9136	2•9909	3•0717	3•7518
9•0	6•5324	6•7983	7•0774	9•4739	2•8199	2•8900	2•9630	3•5693
9•5	6•0173	6•2463	6•4861	8•5157	2•7361	2•8002	2•8668	3•4134
10•0	5•5745	5•7741	5•9824	7•7247	2•6600	2•7191	2•7803	3•2776
10•5	5•1891	5•3645	5•5472	7•0595	2•5904	2•6451	2•7016	3•1574
11•0	4•8498	5•0053	5•1669	6•4919	2•5260	2•5769	2•6295	3•0497
11•5	4•5486	4•6873	4•8312	6•0013	2•4661	2•5137	2•5627	2•9521
12•0	4•2791	4•4036	4•5324	5•5730	2•4101	2•4547	2•5006	2•8631
12•5	4•0363	4•1485	4•2646	5•1955	2•3574	2•3993	2•4425	2•7812
13•0	3•8162	3•9180	4•0230	4•8603	2•3076	2•3472	2•3878	2•7053
13•5	3•6158	3•7084	3•8038	4•5604	2•2604	2•2978	2•3362	2•6347
14•0	3•4325	3•5170	3•6040	4•2906	2•2156	2•2510	2•2874	2•5687
14•5	3•2640	3•3414	3•4211	4•0465	2•1728	2•2064	2•2409	2•5068
15•0	3•1086	3•1798	3•2529	3•8246	2•1319	2•1639	2•1966	2•4484
15•5	2•9649	3•0304	3•0977	3•6219	2•0927	2•1232	2•1544	2•3931
16•0	2•8314	2•8920	2•9541	3•4361	2•0551	2•0841	2•1139	2•3407
16•5	2•7072	2•7633	2•8208	3•2651	2•0189	2•0466	2•0750	2•2909
17•0	2•5913	2•6433	2•6966	3•1072	1•9840	2•0105	2•0376	2•2434
17•5	2•4829	2•5313	2•5807	2•9610	1•9503	1•9757	2•0017	2•1980
18•0	2•3812	2•4263	2•4723	2•8252	1•9178	1•9421	1•9670	2•1545
18•5	2•2857	2•3277	2•3707	2•6988	1•8863	1•9097	1•9334	2•1128
19•0	2•1958	2•2351	2•2752	2•5808	1•8558	1•8782	1•9010	2•0728
19•5	2•1111	2•1478	2•1853	2•4704	1•8262	1•8477	1•8696	2•0342
20•0	2•0310	2•0654	2•1005	2•3669	1•7975	1•8182	1•8392	1•9971
21•0	1•8835	1•9138	1•9447	2•1782	1•7423	1•7615	1•7810	1•9266
22•0	1•7507	1•7776	1•8049	2•0105	1•6901	1•7079	1•7259	1•8606
23•0	1•6306	1•6545	1•6787	1•8607	1•6403	1•6569	1•6737	1•7985
24•0	1•5215	1•5427	1•5643	1•7259	1•5929	1•6083	1•6240	1•7400
25•0	1•4218	1•4409	1•4602	1•6042	1•5475	1•5619	1•5765	1•6845
26•0	1•3306	1•3476	1•3650	1•4937	1•5040	1•5175	1•5311	1•6318
27•0	1•2467	1•2621	1•2776	1•3930	1•4622	1•4748	1•4876	1•5816
28•0	1•1694	1•1832	1•1972	1•3008	1•4219	1•4338	1•4457	1•5337
29•0	1•0979	1•1104	1•1230	1•2163	1•3831	1•3942	1•4055	1•4878
30•0	1•0316	1•0429	1•0543	1•1385	1•3456	1•3561	1•3666	1•4437
31•0	0•9701	0•9803	0•9906	1•0666	1•3094	1•3192	1•3291	1•4014
32•0	0•9127	0•9220	0•9313	1•0001	1•2742	1•2835	1•2928	1•3607
33•0	0•8592	0•8676	0•8761	0•9384	1•2402	1•2488	1•2576	1•3214
34•0	0•8092	0•8168	0•8246	0•8810	1•2071	1•2152	1•2235	1•2834
35•0	0•7624	0•7693	0•7763	0•8276	1•1749	1•1826	1•1903	1•2467
36•0	0•7184	0•7248	0•7311	0•7777	1•1436	1•1508	1•1581	1•2111
37•0	0•6772	0•6829	0•6887	0•7310	1•1130	1•1198	1•1267	1•1766
38•0	0•6384	0•6436	0•6489	0•6874	1•0832	1•0897	1•0962	1•1431
39•0	0•6018	0•6066	0•6114	0•6464	1•0542	1•0602	1•0663	1•1105
40•0	0•5673	0•5717	0•5761	0•6079	1•0258	1•0315	1•0372	1•0788
41•0	0•5348	0•5388	0•5428	0•5718	0•9980	1•0034	1•0088	1•0479
42•0	0•5041	0•5077	0•5113	0•5377	0•9708	0•9759	0•9810	1•0178
43•0	0•4750	0•4783	0•4816	0•5056	0•9441	0•9489	0•9537	0•9884
44•0	0•4475	0•4505	0•4535	0•4753	0•9180	0•9225	0•9271	0•9597

ϕ_c = 5° (continued)

ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	1•0169	1•0272	1•0376	1•1132	1•0134	1•0185	1•0236	1•0607
46•0	1•0164	1•0263	1•0363	1•1091	0•9781	0•9829	0•9877	1•0222
47•0	1•0159	1•0254	1•0351	1•1052	0•9441	0•9485	0•9530	0•9851
48•0	1•0154	1•0246	1•0339	1•1014	0•9111	0•9153	0•9195	0•9493
49•0	1•0149	1•0237	1•0327	1•0978	0•8793	0•8831	0•8870	0•9148
50•0	1•0144	1•0229	1•0316	1•0942	0•8484	0•8520	0•8556	0•8814
51•0	1•0139	1•0222	1•0305	1•0908	0•8184	0•8217	0•8251	0•8491
52•0	1•0134	1•0214	1•0294	1•0875	0•7893	0•7924	0•7955	0•8179
53•0	1•0130	1•0207	1•0284	1•0843	0•7610	0•7639	0•7668	0•7875
54•0	1•0125	1•0199	1•0274	1•0812	0•7334	0•7361	0•7388	0•7581
55•0	1•0121	1•0192	1•0264	1•0781	0•7066	0•7091	0•7116	0•7294
56•0	1•0117	1•0185	1•0254	1•0752	0•6804	0•6827	0•6851	0•7016
57•0	1•0112	1•0179	1•0245	1•0723	0•6549	0•6570	0•6592	0•6745
58•0	1•0108	1•0172	1•0236	1•0695	0•6299	0•6319	0•6339	0•6481
59•0	1•0104	1•0165	1•0227	1•0667	0•6055	0•6074	0•6092	0•6223
60•0	1•0100	1•0159	1•0218	1•0640	0•5817	0•5833	0•5850	0•5971
61•0	1•0096	1•0153	1•0209	1•0614	0•5583	0•5598	0•5614	0•5725
62•0	1•0093	1•0147	1•0201	1•0588	0•5353	0•5368	0•5382	0•5484
63•0	1•0089	1•0141	1•0192	1•0563	0•5129	0•5142	0•5155	0•5248
64•0	1•0085	1•0135	1•0184	1•0539	0•4908	0•4920	0•4932	0•5018
65•0	1•0081	1•0129	1•0176	1•0514	0•4691	0•4702	0•4713	0•4791
66•0	1•0078	1•0123	1•0168	1•0491	0•4478	0•4488	0•4498	0•4569
67•0	1•0074	1•0117	1•0160	1•0467	0•4268	0•4277	0•4286	0•4351
68•0	1•0071	1•0112	1•0153	1•0444	0•4061	0•4069	0•4078	0•4136
69•0	1•0067	1•0106	1•0145	1•0422	0•3857	0•3865	0•3872	0•3925
70•0	1•0064	1•0101	1•0137	1•0399	0•3657	0•3663	0•3670	0•3717
71•0	1•0060	1•0095	1•0130	1•0378	0•3458	0•3464	0•3470	0•3513
72•0	1•0057	1•0090	1•0123	1•0356	0•3263	0•3268	0•3273	0•3311
73•0	1•0054	1•0085	1•0115	1•0335	0•3069	0•3074	0•3079	0•3112
74•0	1•0050	1•0079	1•0108	1•0313	0•2878	0•2882	0•2886	0•2915
75•0	1•0047	1•0074	1•0101	1•0293	0•2689	0•2692	0•2696	0•2721
76•0	1•0044	1•0069	1•0094	1•0272	0•2501	0•2504	0•2507	0•2529
77•0	1•0041	1•0064	1•0087	1•0252	0•2315	0•2318	0•2321	0•2340
78•0	1•0037	1•0059	1•0080	1•0231	0•2131	0•2134	0•2136	0•2152
79•0	1•0034	1•0054	1•0073	1•0211	0•1949	0•1950	0•1952	0•1966
80•0	1•0031	1•0049	1•0067	1•0192	0•1767	0•1769	0•1770	0•1781
81•0	1•0028	1•0044	1•0060	1•0172	0•1587	0•1588	0•1590	0•1598
82•0	1•0025	1•0039	1•0053	1•0152	0•1408	0•1409	0•1410	0•1417
83•0	1•0022	1•0034	1•0046	1•0133	0•1230	0•1231	0•1231	0•1237
84•0	1•0019	1•0029	1•0040	1•0114	0•1052	0•1053	0•1054	0•1057
85•0	1•0015	1•0024	1•0033	1•0095	0•0876	0•0876	0•0877	0•0879
86•0	1•0012	1•0019	1•0026	1•0076	0•0700	0•0700	0•0700	0•0702
87•0	1•0009	1•0014	1•0020	1•0057	0•0524	0•0525	0•0525	0•0526
88•0	1•0006	1•0010	1•0013	1•0038	0•0349	0•0349	0•0349	0•0350
89•0	1•0003	1•0005	1•0007	1•0019	0•0175	0•0175	0•0175	0•0175
90•0	1•0000	1•0000	1•0000	1•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 5°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•4214	0•4241	0•4269	0•4468	0•8924	0•8967	0•9009	0•9316
46•0	0•3967	0•3992	0•4017	0•4198	0•8673	0•8713	0•8753	0•9041
47•0	0•3732	0•3755	0•3778	0•3942	0•8426	0•8463	0•8501	0•8772
48•0	0•3510	0•3531	0•3551	0•3700	0•8183	0•8218	0•8254	0•8508
49•0	0•3299	0•3318	0•3336	0•3472	0•7944	0•7977	0•8011	0•8250
50•0	0•3098	0•3115	0•3132	0•3255	0•7709	0•7741	0•7772	0•7996
51•0	0•2907	0•2923	0•2938	0•3050	0•7478	0•7507	0•7537	0•7747
52•0	0•2726	0•2740	0•2754	0•2855	0•7250	0•7278	0•7305	0•7502
53•0	0•2554	0•2567	0•2579	0•2670	0•7026	0•7051	0•7077	0•7261
54•0	0•2390	0•2401	0•2413	0•2495	0•6804	0•6828	0•6852	0•7025
55•0	0•2234	0•2244	0•2255	0•2329	0•6586	0•6608	0•6631	0•6792
56•0	0•2086	0•2095	0•2105	0•2171	0•6370	0•6391	0•6412	0•6562
57•0	0•1945	0•1953	0•1962	0•2021	0•6157	0•6177	0•6196	0•6336
58•0	0•1811	0•1818	0•1826	0•1879	0•5947	0•5965	0•5983	0•6113
59•0	0•1683	0•1690	0•1697	0•1745	0•5739	0•5756	0•5773	0•5893
60•0	0•1562	0•1568	0•1574	0•1617	0•5533	0•5549	0•5564	0•5676
61•0	0•1447	0•1452	0•1458	0•1496	0•5329	0•5344	0•5359	0•5462
62•0	0•1338	0•1342	0•1347	0•1381	0•5128	0•5141	0•5155	0•5251
63•0	0•1234	0•1238	0•1242	0•1272	0•4929	0•4941	0•4953	0•5042
64•0	0•1135	0•1139	0•1143	0•1169	0•4731	0•4742	0•4754	0•4835
65•0	0•1042	0•1045	0•1048	0•1071	0•4535	0•4546	0•4556	0•4630
66•0	0•0954	0•0956	0•0959	0•0979	0•4341	0•4351	0•4360	0•4428
67•0	0•0870	0•0872	0•0875	0•0892	0•4149	0•4157	0•4166	0•4228
68•0	0•0791	0•0793	0•0795	0•0810	0•3958	0•3966	0•3974	0•4030
69•0	0•0716	0•0718	0•0720	0•0733	0•3768	0•3775	0•3783	0•3834
70•0	0•0646	0•0647	0•0649	0•0660	0•3580	0•3587	0•3593	0•3639
71•0	0•0580	0•0581	0•0582	0•0592	0•3393	0•3399	0•3405	0•3446
72•0	0•0517	0•0519	0•0520	0•0528	0•3208	0•3213	0•3218	0•3255
73•0	0•0459	0•0460	0•0461	0•0468	0•3023	0•3028	0•3032	0•3065
74•0	0•0405	0•0406	0•0406	0•0412	0•2840	0•2844	0•2848	0•2877
75•0	0•0354	0•0355	0•0356	0•0360	0•2657	0•2661	0•2664	0•2690
76•0	0•0307	0•0308	0•0308	0•0312	0•2476	0•2479	0•2482	0•2504
77•0	0•0264	0•0264	0•0265	0•0268	0•2295	0•2298	0•2301	0•2319
78•0	0•0224	0•0225	0•0225	0•0227	0•2116	0•2118	0•2120	0•2136
79•0	0•0188	0•0188	0•0188	0•0190	0•1937	0•1938	0•1940	0•1954
80•0	0•0155	0•0155	0•0155	0•0156	0•1758	0•1760	0•1761	0•1772
81•0	0•0125	0•0125	0•0125	0•0126	0•1580	0•1582	0•1583	0•1592
82•0	0•0099	0•0099	0•0099	0•0099	0•1403	0•1404	0•1405	0•1412
83•0	0•0075	0•0075	0•0075	0•0076	0•1227	0•1227	0•1228	0•1233
84•0	0•0055	0•0055	0•0055	0•0056	0•1051	0•1051	0•1052	0•1055
85•0	0•0038	0•0038	0•0038	0•0038	0•0875	0•0875	0•0876	0•0878
86•0	0•0024	0•0024	0•0024	0•0025	0•0699	0•0700	0•0700	0•0702
87•0	0•0014	0•0014	0•0014	0•0014	0•0524	0•0524	0•0524	0•0525
88•0	0•0006	0•0006	0•0006	0•0006	0•0349	0•0349	0•0349	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 6°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
6°5	1°2160	1°4178	1°6531	4°8429	17°0904	18°5165	20°1007	37°6531
7°0	1°1737	1°3264	1°4988	3°5269	13°3499	14°2223	15°1704	24°6592
7°5	1°1504	1°2773	1°4182	2°9499	11°3025	11°9289	12°6014	18°9687
8°0	1°1346	1°2447	1°3654	2°6104	9°9257	10°4094	10°9244	15°6227
8°5	1°1228	1°2207	1°3271	2°3817	8°9071	9°2970	9°7096	13°3717
9°0	1°1135	1°2020	1°2974	2°2152	8°1100	8°4335	8°7742	11°7339
9°5	1°1059	1°1868	1°2736	2°0875	7°4626	7°7367	8°0242	10°4791
10°0	1°0995	1°1742	1°2539	1°9860	6°9225	7°1585	7°4052	9°4817
10°5	1°0940	1°1634	1°2372	1°9029	6°4628	6°6686	6°8832	8°6669
11°0	1°0892	1°1541	1°2229	1°8335	6°0653	6°2467	6°4353	7°9868
11°5	1°0850	1°1460	1°2103	1°7745	5°7173	5°8785	6°0458	7°4093
12°0	1°0812	1°1387	1°1993	1°7236	5°4092	5°5537	5°7032	6°9119
12°5	1°0778	1°1323	1°1895	1°6793	5°1342	5°2644	5°3989	6°4785
13°0	1°0748	1°1265	1°1806	1°6402	4°8868	5°0048	5°1265	6°0970
13°5	1°0720	1°1212	1°1726	1°6055	4°6628	4°7703	4°8810	5°7583
14°0	1°0694	1°1164	1°1654	1°5744	4°4588	4°5571	4°6582	5°4554
14°5	1°0670	1°1119	1°1587	1°5464	4°2721	4°3623	4°4551	5°1826
15°0	1°0648	1°1079	1°1526	1°5210	4°1004	4°1835	4°2689	4°9356
15°5	1°0628	1°1041	1°1470	1°4979	3°9419	4°0187	4°0976	4°7106
16°0	1°0609	1°1006	1°1418	1°4767	3°7950	3°8662	3°9393	4°5049
16°5	1°0591	1°0973	1°1369	1°4572	3°6584	3°7247	3°7925	4°3159
17°0	1°0574	1°0943	1°1324	1°4392	3°5311	3°5923	3°6560	4°1416
17°5	1°0558	1°0914	1°1282	1°4226	3°4120	3°4696	3°5286	3°9804
18°0	1°0543	1°0887	1°1242	1°4071	3°3003	3°3542	3°4094	3°8306
18°5	1°0529	1°0862	1°1204	1°3927	3°1954	3°2459	3°2976	3°6912
19°0	1°0516	1°0838	1°1169	1°3792	3°0965	3°1440	3°1925	3°5610
19°5	1°0503	1°0815	1°1136	1°3665	3°0032	3°0479	3°0935	3°4391
20°0	1°0491	1°0793	1°1104	1°3547	2°9150	2°9571	3°0000	3°3248
20°5	1°0480	1°0773	1°1074	1°3435	2°8314	2°8711	2°9116	3°2172
21°0	1°0469	1°0753	1°1046	1°3330	2°7521	2°7896	2°8279	3°1159
22°0	1°0448	1°0717	1°0993	1°3136	2°6049	2°6386	2°6728	2°9297
23°0	1°0429	1°0684	1°0945	1°2962	2°4712	2°5015	2°5323	2°7625
24°0	1°0411	1°0653	1°0901	1°2804	2°3490	2°3764	2°4042	2°6114
25°0	1°0395	1°0625	1°0861	1°2661	2°2368	2°2617	2°2869	2°4742
26°0	1°0380	1°0599	1°0823	1°2530	2°1334	2°1560	2°1790	2°3488
27°0	1°0366	1°0575	1°0788	1°2409	2°0377	2°0584	2°0793	2°2338
28°0	1°0352	1°0552	1°0756	1°2297	1°9489	1°9677	1°9868	2°1278
29°0	1°0340	1°0531	1°0726	1°2194	1°8660	1°8833	1°9008	2°0297
30°0	1°0328	1°0511	1°0697	1°2098	1°7886	1°8045	1°8205	1°9387
31°0	1°0316	1°0492	1°0671	1°2009	1°7159	1°7306	1°7454	1°8539
32°0	1°0306	1°0474	1°0645	1°1925	1°6477	1°6612	1°6748	1°7746
33°0	1°0295	1°0457	1°0621	1°1846	1°5833	1°5958	1°6084	1°7004
34°0	1°0286	1°0441	1°0599	1°1772	1°5225	1°5340	1°5457	1°6306
35°0	1°0276	1°0426	1°0577	1°1703	1°4649	1°4756	1°4864	1°5649
36°0	1°0267	1°0411	1°0557	1°1637	1°4103	1°4202	1°4302	1°5028
37°0	1°0259	1°0397	1°0537	1°1574	1°3584	1°3676	1°3768	1°4441
38°0	1°0250	1°0384	1°0519	1°1515	1°3089	1°3174	1°3260	1°3884
39°0	1°0242	1°0371	1°0501	1°1458	1°2617	1°2696	1°2776	1°3355
40°0	1°0235	1°0359	1°0484	1°1404	1°2166	1°2240	1°2314	1°2851

$\phi_c = 6°$ Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
6•5	16•0348	17•4390	18•9998	36•3304	4•1001	4•3174	4•5556	7•0633
7•0	12•3199	13•1742	14•1034	23•4255	3•6625	3•8151	3•9791	5•5458
7•5	10•2888	10•8991	11•5548	17•7801	3•4048	3•5265	3•6558	4•8302
8•0	8•9246	9•3934	9•8931	14•4645	3•2195	3•3220	3•4301	4•3800
8•5	7•9165	8•2925	8•6908	12•2368	3•0735	3•1626	3•2560	4•0576
9•0	7•1286	7•4391	7•7662	10•6180	2•9524	3•0314	3•1139	3•8088
9•5	6•4896	6•7513	7•0260	9•3795	2•8484	2•9195	2•9934	3•6073
10•0	5•9573	6•1814	6•4160	8•3965	2•7570	2•8216	2•8887	3•4385
10•5	5•5049	5•6994	5•9023	7•5947	2•6753	2•7345	2•7959	3•2937
11•0	5•1144	5•2849	5•4623	6•9265	2•6012	2•6558	2•7124	3•1669
11•5	4•7731	4•9237	5•0802	6•3600	2•5333	2•5840	2•6364	3•0543
12•0	4•4715	4•6057	4•7448	5•8731	2•4706	2•5179	2•5667	2•9531
12•5	4•2027	4•3230	4•4474	5•4495	2•4123	2•4566	2•5021	2•8611
13•0	3•9614	4•0698	4•1818	5•0774	2•3577	2•3993	2•4420	2•7770
13•5	3•7434	3•8415	3•9427	4•7478	2•3064	2•3456	2•3858	2•6994
14•0	3•5452	3•6344	3•7264	4•4535	2•2579	2•2949	2•3329	2•6274
14•5	3•3642	3•4457	3•5295	4•1891	2•2119	2•2470	2•2829	2•5603
15•0	3•1982	3•2728	3•3494	3•9502	2•1682	2•2015	2•2355	2•4974
15•5	3•0452	3•1138	3•1841	3•7332	2•1266	2•1581	2•1904	2•4382
16•0	2•9039	2•9670	3•0318	3•5352	2•0867	2•1167	2•1475	2•3824
16•5	2•7728	2•8311	2•8908	3•3537	2•0485	2•0771	2•1064	2•3295
17•0	2•6508	2•7048	2•7601	3•1869	2•0118	2•0391	2•0670	2•2793
17•5	2•5371	2•5872	2•6384	3•0328	1•9765	2•0026	2•0293	2•2315
18•0	2•4307	2•4773	2•5249	2•8902	1•9424	1•9674	1•9929	2•1859
18•5	2•3311	2•3744	2•4187	2•7578	1•9096	1•9335	1•9579	2•1422
19•0	2•2375	2•2779	2•3192	2•6345	1•8778	1•9008	1•9242	2•1004
19•5	2•1494	2•1872	2•2258	2•5195	1•8471	1•8691	1•8915	2•0602
20•0	2•0663	2•1017	2•1378	2•4118	1•8172	1•8384	1•8600	2•0216
20•5	1•9879	2•0211	2•0549	2•3109	1•7883	1•8087	1•8294	1•9843
21•0	1•9137	1•9448	1•9765	2•2162	1•7602	1•7798	1•7997	1•9484
22•0	1•7768	1•8043	1•8322	2•0429	1•7063	1•7244	1•7429	1•8802
23•0	1•6532	1•6776	1•7024	1•8884	1•6551	1•6720	1•6891	1•8163
24•0	1•5412	1•5629	1•5849	1•7499	1•6064	1•6221	1•6380	1•7560
25•0	1•4391	1•4585	1•4782	1•6250	1•5599	1•5746	1•5894	1•6991
26•0	1•3458	1•3632	1•3808	1•5118	1•5154	1•5291	1•5430	1•6452
27•0	1•2602	1•2757	1•2916	1•4089	1•4727	1•4855	1•4985	1•5939
28•0	1•1813	1•1953	1•2096	1•3148	1•4317	1•4437	1•4558	1•5449
29•0	1•1085	1•1212	1•1340	1•2287	1•3922	1•4034	1•4148	1•4982
30•0	1•0411	1•0525	1•0641	1•1494	1•3541	1•3646	1•3753	1•4533
31•0	0•9785	0•9889	0•9993	1•0763	1•3172	1•3271	1•3371	1•4103
32•0	0•9203	0•9297	0•9391	1•0088	1•2815	1•2908	1•3003	1•3689
33•0	0•8660	0•8745	0•8831	0•9461	1•2470	1•2557	1•2646	1•3290
34•0	0•8153	0•8230	0•8308	0•8880	1•2134	1•2216	1•2300	1•2905
35•0	0•7679	0•7749	0•7820	0•8338	1•1808	1•1886	1•1964	1•2533
36•0	0•7234	0•7298	0•7362	0•7833	1•1491	1•1564	1•1638	1•2173
37•0	0•6816	0•6875	0•6933	0•7361	1•1182	1•1251	1•1320	1•1823
38•0	0•6424	0•6477	0•6530	0•6919	1•0881	1•0946	1•1011	1•1484
39•0	0•6055	0•6103	0•6151	0•6505	1•0587	1•0648	1•0710	1•1155
40•0	0•5706	0•5750	0•5795	0•6116	1•0300	1•0358	1•0416	1•0835

$\phi_c = 6°$ (continued)

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
41·0	1·0227	1·0347	1·0467	1·1353	1·1734	1·1803	1·1872	1·2371
42·0	1·0220	1·0335	1·0452	1·1303	1·1320	1·1384	1·1448	1·1912
43·0	1·0213	1·0324	1·0436	1·1256	1·0922	1·0981	1·1041	1·1473
44·0	1·0207	1·0314	1·0422	1·1211	1·0539	1·0595	1·0650	1·1052
45·0	1·0200	1·0303	1·0408	1·1167	1·0171	1·0223	1·0274	1·0648
46·0	1·0194	1·0293	1·0394	1·1126	0·9816	0·9864	0·9912	1·0259
47·0	1·0188	1·0284	1·0381	1·1085	0·9473	0·9517	0·9562	0·9885
48·0	1·0182	1·0274	1·0368	1·1046	0·9141	0·9183	0·9225	0·9525
49·0	1·0176	1·0265	1·0355	1·1009	0·8820	0·8859	0·8898	0·9178
50·0	1·0170	1·0256	1·0343	1·0972	0·8509	0·8545	0·8582	0·8842
51·0	1·0164	1·0248	1·0331	1·0937	0·8208	0·8241	0·8275	0·8517
52·0	1·0159	1·0239	1·0320	1·0903	0·7915	0·7946	0·7978	0·8202
53·0	1·0154	1·0231	1·0309	1·0870	0·7630	0·7659	0·7688	0·7897
54·0	1·0148	1·0223	1·0298	1·0837	0·7353	0·7380	0·7407	0·7601
55·0	1·0143	1·0215	1·0287	1·0806	0·7083	0·7108	0·7134	0·7313
56·0	1·0138	1·0207	1·0277	1·0776	0·6820	0·6844	0·6867	0·7033
57·0	1·0133	1·0200	1·0266	1·0746	0·6564	0·6585	0·6607	0·6761
58·0	1·0129	1·0192	1·0256	1·0717	0·6313	0·6333	0·6353	0·6495
59·0	1·0124	1·0185	1·0247	1·0688	0·6068	0·6086	0·6105	0·6236
60·0	1·0119	1·0178	1·0237	1·0661	0·5828	0·5845	0·5862	0·5983
61·0	1·0115	1·0171	1·0228	1·0634	0·5593	0·5609	0·5625	0·5736
62·0	1·0110	1·0164	1·0219	1·0607	0·5363	0·5378	0·5392	0·5494
63·0	1·0106	1·0157	1·0209	1·0581	0·5138	0·5151	0·5164	0·5258
64·0	1·0101	1·0151	1·0201	1·0556	0·4916	0·4928	0·4940	0·5026
65·0	1·0097	1·0144	1·0192	1·0531	0·4699	0·4710	0·4721	0·4799
66·0	1·0093	1·0138	1·0183	1·0506	0·4485	0·4495	0·4505	0·4576
67·0	1·0088	1·0131	1·0175	1·0482	0·4274	0·4283	0·4292	0·4357
68·0	1·0084	1·0125	1·0166	1·0459	0·4067	0·4075	0·4083	0·4142
69·0	1·0080	1·0119	1·0158	1·0435	0·3863	0·3870	0·3877	0·3930
70·0	1·0076	1·0113	1·0150	1·0412	0·3661	0·3668	0·3675	0·3722
71·0	1·0072	1·0107	1·0142	1·0390	0·3462	0·3468	0·3474	0·3517
72·0	1·0068	1·0101	1·0134	1·0367	0·3266	0·3272	0·3277	0·3315
73·0	1·0064	1·0095	1·0126	1·0345	0·3072	0·3077	0·3082	0·3115
74·0	1·0060	1·0089	1·0118	1·0323	0·2881	0·2885	0·2889	0·2918
75·0	1·0056	1·0083	1·0110	1·0302	0·2691	0·2695	0·2698	0·2724
76·0	1·0052	1·0077	1·0103	1·0281	0·2503	0·2506	0·2510	0·2532
77·0	1·0048	1·0072	1·0095	1·0260	0·2317	0·2320	0·2323	0·2342
78·0	1·0045	1·0066	1·0087	1·0239	0·2133	0·2135	0·2137	0·2153
79·0	1·0041	1·0060	1·0080	1·0218	0·1950	0·1952	0·1954	0·1967
80·0	1·0037	1·0055	1·0073	1·0198	0·1768	0·1770	0·1771	0·1782
81·0	1·0033	1·0049	1·0065	1·0177	0·1588	0·1589	0·1590	0·1599
82·0	1·0030	1·0044	1·0058	1·0157	0·1409	0·1410	0·1411	0·1418
83·0	1·0026	1·0038	1·0050	1·0137	0·1230	0·1231	0·1232	0·1237
84·0	1·0022	1·0033	1·0043	1·0117	0·1053	0·1053	0·1054	0·1058
85·0	1·0018	1·0027	1·0036	1·0098	0·0876	0·0876	0·0877	0·0880
86·0	1·0015	1·0022	1·0029	1·0078	0·0700	0·0700	0·0701	0·0702
87·0	1·0011	1·0016	1·0022	1·0058	0·0525	0·0525	0·0525	0·0526
88·0	1·0007	1·0011	1·0014	1·0039	0·0349	0·0349	0·0350	0·0350
89·0	1·0004	1·0005	1·0007	1·0019	0·0175	0·0175	0·0175	0·0175
90·0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000

$\phi_c = 6°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
41•0	0•5378	0•5418	0•5458	0•5751	1•0020	1•0074	1•0128	1•0523
42•0	0•5068	0•5104	0•5141	0•5407	0•9745	0•9796	0•9848	1•0218
43•0	0•4774	0•4808	0•4841	0•5083	0•9476	0•9525	0•9573	0•9922
44•0	0•4497	0•4527	0•4558	0•4778	0•9213	0•9258	0•9304	0•9632
45•0	0•4234	0•4262	0•4289	0•4490	0•8955	0•8998	0•9040	0•9349
46•0	0•3985	0•4010	0•4035	0•4217	0•8702	0•8742	0•8782	0•9072
47•0	0•3749	0•3772	0•3795	0•3960	0•8453	0•8491	0•8528	0•8801
48•0	0•3525	0•3546	0•3567	0•3717	0•8208	0•8244	0•8279	0•8535
49•0	0•3312	0•3331	0•3350	0•3486	0•7968	0•8001	0•8035	0•8275
50•0	0•3110	0•3127	0•3145	0•3268	0•7732	0•7763	0•7794	0•8019
51•0	0•2919	0•2934	0•2950	0•3061	0•7499	0•7528	0•7558	0•7769
52•0	0•2736	0•2750	0•2764	0•2865	0•7270	0•7297	0•7325	0•7522
53•0	0•2563	0•2576	0•2588	0•2680	0•7044	0•7070	0•7095	0•7280
54•0	0•2398	0•2410	0•2421	0•2504	0•6821	0•6845	0•6870	0•7042
55•0	0•2241	0•2252	0•2262	0•2336	0•6602	0•6624	0•6647	0•6808
56•0	0•2092	0•2102	0•2111	0•2178	0•6385	0•6406	0•6427	0•6577
57•0	0•1951	0•1959	0•1968	0•2027	0•6171	0•6190	0•6210	0•6350
58•0	0•1816	0•1824	0•1831	0•1885	0•5959	0•5978	0•5996	0•6126
59•0	0•1688	0•1695	0•1701	0•1749	0•5750	0•5767	0•5784	0•5905
60•0	0•1566	0•1572	0•1578	0•1621	0•5544	0•5560	0•5575	0•5688
61•0	0•1451	0•1456	0•1461	0•1499	0•5340	0•5354	0•5369	0•5473
62•0	0•1341	0•1346	0•1350	0•1384	0•5137	0•5151	0•5164	0•5260
63•0	0•1237	0•1241	0•1245	0•1275	0•4937	0•4950	0•4962	0•5050
64•0	0•1138	0•1142	0•1145	0•1171	0•4739	0•4750	0•4762	0•4843
65•0	0•1044	0•1047	0•1051	0•1074	0•4542	0•4553	0•4563	0•4638
66•0	0•0955	0•0958	0•0961	0•0981	0•4348	0•4357	0•4367	0•4435
67•0	0•0872	0•0874	0•0876	0•0894	0•4155	0•4163	0•4172	0•4234
68•0	0•0792	0•0794	0•0796	0•0812	0•3963	0•3971	0•3979	0•4035
69•0	0•0717	0•0719	0•0721	0•0734	0•3773	0•3780	0•3788	0•3839
70•0	0•0647	0•0648	0•0650	0•0661	0•3585	0•3591	0•3598	0•3643
71•0	0•0580	0•0582	0•0583	0•0593	0•3397	0•3403	0•3409	0•3450
72•0	0•0518	0•0519	0•0520	0•0528	0•3211	0•3216	0•3222	0•3258
73•0	0•0460	0•0461	0•0462	0•0468	0•3026	0•3031	0•3036	0•3068
74•0	0•0405	0•0406	0•0407	0•0413	0•2843	0•2847	0•2851	0•2879
75•0	0•0355	0•0355	0•0356	0•0361	0•2660	0•2663	0•2667	0•2692
76•0	0•0308	0•0308	0•0309	0•0312	0•2478	0•2481	0•2484	0•2506
77•0	0•0264	0•0265	0•0265	0•0268	0•2297	0•2300	0•2302	0•2321
78•0	0•0224	0•0225	0•0225	0•0227	0•2117	0•2119	0•2122	0•2137
79•0	0•0188	0•0188	0•0188	0•0190	0•1938	0•1940	0•1942	0•1955
80•0	0•0155	0•0155	0•0155	0•0156	0•1759	0•1761	0•1762	0•1773
81•0	0•0125	0•0125	0•0125	0•0126	0•1581	0•1583	0•1584	0•1593
82•0	0•0099	0•0099	0•0099	0•0099	0•1404	0•1405	0•1406	0•1413
83•0	0•0075	0•0075	0•0075	0•0076	0•1227	0•1228	0•1229	0•1234
84•0	0•0055	0•0055	0•0055	0•0056	0•1051	0•1051	0•1052	0•1056
85•0	0•0038	0•0038	0•0038	0•0038	0•0875	0•0875	0•0876	0•0878
86•0	0•0024	0•0024	0•0024	0•0025	0•0699	0•0700	0•0700	0•0702
87•0	0•0014	0•0014	0•0014	0•0014	0•0524	0•0524	0•0525	0•0526
88•0	0•0006	0•0006	0•0006	0•0006	0•0349	0•0349	0•0349	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 7°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
7°5	1°2137	1°3929	1°5984	4°1898	15°3381	16°4784	17°7313	30°9111
8°0	1°1749	1°3123	1°4657	3°1786	12°1046	12°8172	13°5856	20°9985
8°5	1°1532	1°2685	1°3953	2°7182	10°3214	10°8407	11°3946	16°4910
9°0	1°1384	1°2391	1°3487	2°4407	9°1150	9°5206	9°9502	13°7776
9°5	1°1273	1°2173	1°3145	2°2506	8°2176	8°5477	8°8954	11°9205
10°0	1°1185	1°2002	1°2879	2°1101	7°5119	7°7881	8°0777	10°5507
10°5	1°1112	1°1862	1°2664	2°0012	6°9362	7°1719	7°4182	9°4894
11°0	1°1050	1°1745	1°2484	1°9136	6°4540	6°6582	6°8710	8°6377
11°5	1°0997	1°1645	1°2332	1°8414	6°0420	6°2211	6°4073	7°9361
12°0	1°0950	1°1558	1°2200	1°7806	5°6845	5°8432	6°0077	7°3462
12°5	1°0909	1°1481	1°2084	1°7286	5°3704	5°5121	5°6588	6°8420
13°0	1°0872	1°1413	1°1981	1°6835	5°0916	5°2190	5°3507	6°4052
13°5	1°0838	1°1352	1°1889	1°6439	4°8419	4°9572	5°0761	6°0225
14°0	1°0808	1°1296	1°1807	1°6089	4°6167	4°7215	4°8296	5°6841
14°5	1°0780	1°1246	1°1732	1°5776	4°4122	4°5080	4°6066	5°3822
15°0	1°0754	1°1199	1°1663	1°5494	4°2255	4°3134	4°4038	5°1111
15°5	1°0730	1°1157	1°1600	1°5239	4°0542	4°1352	4°2183	4°8661
16°0	1°0708	1°1117	1°1542	1°5008	3°8963	3°9711	4°0479	4°6434
16°5	1°0687	1°1080	1°1488	1°4796	3°7502	3°8196	3°8906	4°4399
17°0	1°0668	1°1046	1°1438	1°4601	3°6146	3°6791	3°7450	4°2532
17°5	1°0649	1°1014	1°1392	1°4421	3°4883	3°5483	3°6097	4°0812
18°0	1°0632	1°0984	1°1348	1°4255	3°3703	3°4263	3°4836	3°9222
18°5	1°0616	1°0956	1°1307	1°4101	3°2597	3°3121	3°3657	3°7746
19°0	1°0601	1°0930	1°1269	1°3957	3°1558	3°2050	3°2552	3°6372
19°5	1°0586	1°0904	1°1232	1°3822	3°0580	3°1042	3°1513	3°5090
20°0	1°0572	1°0881	1°1198	1°3696	2°9658	3°0092	3°0536	3°3891
20°5	1°0559	1°0858	1°1166	1°3578	2°8786	2°9195	2°9613	3°2765
21°0	1°0546	1°0837	1°1135	1°3466	2°7960	2°8346	2°8740	3°1707
21°5	1°0534	1°0816	1°1106	1°3361	2°7176	2°7542	2°7913	3°0710
22°0	1°0523	1°0797	1°1078	1°3262	2°6432	2°6777	2°7129	2°9769
23°0	1°0501	1°0760	1°1026	1°3078	2°5048	2°5358	2°5674	2°8034
24°0	1°0481	1°0727	1°0978	1°2913	2°3787	2°4067	2°4351	2°6472
25°0	1°0462	1°0696	1°0934	1°2763	2°2632	2°2886	2°3143	2°5057
26°0	1°0445	1°0667	1°0894	1°2625	2°1570	2°1800	2°2034	2°3767
27°0	1°0428	1°0640	1°0857	1°2499	2°0589	2°0799	2°1012	2°2586
28°0	1°0413	1°0615	1°0822	1°2383	1°9679	1°9871	2°0065	2°1499
29°0	1°0398	1°0592	1°0789	1°2276	1°8832	1°9008	1°9186	2°0496
30°0	1°0385	1°0570	1°0758	1°2176	1°8041	1°8203	1°8366	1°9566
31°0	1°0372	1°0549	1°0730	1°2083	1°7301	1°7449	1°7599	1°8700
32°0	1°0359	1°0529	1°0702	1°1996	1°6605	1°6742	1°6881	1°7893
33°0	1°0347	1°0511	1°0677	1°1914	1°5951	1°6077	1°6205	1°7137
34°0	1°0336	1°0493	1°0652	1°1837	1°5333	1°5449	1°5567	1°6427
35°0	1°0325	1°0476	1°0629	1°1765	1°4748	1°4856	1°4965	1°5759
36°0	1°0315	1°0460	1°0607	1°1696	1°4194	1°4294	1°4395	1°5129
37°0	1°0305	1°0444	1°0586	1°1631	1°3667	1°3760	1°3854	1°4534
38°0	1°0295	1°0430	1°0566	1°1570	1°3166	1°3252	1°3339	1°3969
39°0	1°0286	1°0416	1°0547	1°1511	1°2688	1°2768	1°2849	1°3433
40°0	1°0277	1°0402	1°0528	1°1455	1°2231	1°2306	1°2381	1°2923
41°0	1°0269	1°0389	1°0510	1°1402	1°1795	1°1864	1°1933	1°2437

$\phi_c = 7°$ Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
7°5	14°2694	15°3879	16°6176	29°5831	4°0325	4°2292	4°4429	6°5950
8°0	11°0652	11°7599	12°5095	19°7601	3°5982	3°7375	3°8863	5°2653
8°5	9°3004	9°8038	10°3411	15°2990	3°3430	3°4546	3°5726	4°6205
9°0	8°1080	8°4990	8°9134	12°6170	3°1597	3°2541	3°3533	4°2085
9°5	7°2222	7°5387	7°8723	10°7840	3°0156	3°0979	3°1839	3°9105
10°0	6°5267	6°7900	7°0664	9°4340	2°8962	2°9694	3°0456	3°6788
10°5	5°9602	6°1836	6°4174	8°3896	2°7939	2°8598	2°9283	3°4901
11°0	5°4864	5°6790	5°8798	7°5528	2°7040	2°7641	2°8263	3°3314
11°5	5°0823	5°2503	5°4249	6°8647	2°6236	2°6788	2°7359	3°1946
12°0	4°7323	4°8802	5°0337	6°2871	2°5509	2°6019	2°6546	3°0745
12°5	4°4254	4°5567	4°6928	5°7943	2°4843	2°5317	2°5806	2°9676
13°0	4°1534	4°2708	4°3923	5°3683	2°4228	2°4670	2°5126	2°8712
13°5	3°9104	4°0160	4°1250	4°9958	2°3655	2°4071	2°4497	2°7835
14°0	3°6916	3°7871	3°8855	4°6671	2°3120	2°3511	2°3911	2°7031
14°5	3°4934	3°5801	3°6694	4°3745	2°2617	2°2985	2°3363	2°6289
15°0	3°3129	3°3919	3°4733	4°1123	2°2142	2°2490	2°2846	2°5599
15°5	3°1476	3°2200	3°2943	3°8759	2°1691	2°2021	2°2359	2°4954
16°0	2°9956	3°0621	3°1303	3°6616	2°1263	2°1576	2°1896	2°4350
16°5	2°8554	2°9166	2°9793	3°4662	2°0854	2°1152	2°1456	2°3781
17°0	2°7256	2°7820	2°8399	3°2874	2°0464	2°0747	2°1037	2°3243
17°5	2°6049	2°6572	2°7107	3°1232	2°0089	2°0359	2°0636	2°2733
18°0	2°4925	2°5410	2°5906	2°9717	1°9729	1°9988	2°0251	2°2248
18°5	2°3875	2°4325	2°4786	2°8315	1°9383	1°9630	1°9882	2°1786
19°0	2°2891	2°3311	2°3739	2°7015	1°9049	1°9286	1°9527	2°1344
19°5	2°1968	2°2359	2°2759	2°5805	1°8727	1°8954	1°9184	2°0922
20°0	2°1100	2°1465	2°1839	2°4675	1°8415	1°8633	1°8854	2°0516
20°5	2°0282	2°0624	2°0973	2°3619	1°8113	1°8322	1°8535	2°0127
21°0	1°9509	1°9830	2°0157	2°2630	1°7821	1°8021	1°8225	1°9752
21°5	1°8779	1°9080	1°9386	2°1701	1°7537	1°7730	1°7926	1°9391
22°0	1°8088	1°8370	1°8658	2°0826	1°7261	1°7447	1°7635	1°9042
23°0	1°6809	1°7059	1°7313	1°9224	1°6731	1°6904	1°7078	1°8378
24°0	1°5652	1°5874	1°6100	1°7791	1°6229	1°6389	1°6551	1°7756
25°0	1°4601	1°4800	1°5001	1°6503	1°5750	1°5899	1°6050	1°7169
26°0	1°3643	1°3820	1°4000	1°5339	1°5293	1°5432	1°5573	1°6614
27°0	1°2764	1°2923	1°3085	1°4282	1°4855	1°4985	1°5117	1°6087
28°0	1°1957	1°2100	1°2245	1°3318	1°4435	1°4557	1°4680	1°5585
29°0	1°1213	1°1342	1°1472	1°2436	1°4031	1°4145	1°4261	1°5107
30°0	1°0525	1°0641	1°0759	1°1626	1°3642	1°3749	1°3857	1°4649
31°0	0°9887	0°9992	1°0098	1°0881	1°3266	1°3366	1°3468	1°4210
32°0	0°9294	0°9389	0°9485	1°0192	1°2903	1°2997	1°3092	1°3788
33°0	0°8742	0°8828	0°8915	0°9555	1°2551	1°2640	1°2729	1°3382
34°0	0°8226	0°8305	0°8384	0°8963	1°2210	1°2293	1°2378	1°2990
35°0	0°7745	0°7816	0°7888	0°8412	1°1879	1°1957	1°2037	1°2612
36°0	0°7293	0°7358	0°7423	0°7900	1°1557	1°1631	1°1706	1°2246
37°0	0°6870	0°6929	0°6988	0°7421	1°1244	1°1314	1°1384	1°1892
38°0	0°6472	0°6526	0°6580	0°6973	1°0939	1°1004	1°1070	1°1548
39°0	0°6098	0°6147	0°6196	0°6553	1°0641	1°0703	1°0765	1°1214
40°0	0°5746	0°5790	0°5835	0°6160	1°0351	1°0409	1°0468	1°0890
41°0	0°5414	0°5454	0°5495	0°5790	1°0067	1°0122	1°0177	1°0574

$\phi_c = 7°$ (continued)

ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
42·0	1·0260	1·0376	1·0493	1·1351	1·1376	1·1440	1·1505	1·1973
43·0	1·0252	1·0364	1·0477	1·1302	1·0974	1·1034	1·1094	1·1529
44·0	1·0244	1·0352	1·0461	1·1255	1·0587	1·0643	1·0699	1·1104
45·0	1·0237	1·0341	1·0445	1·1210	1·0215	1·0267	1·0320	1·0696
46·0	1·0229	1·0329	1·0431	1·1167	0·9857	0·9905	0·9954	1·0304
47·0	1·0222	1·0319	1·0416	1·1125	0·9511	0·9556	0·9601	0·9927
48·0	1·0215	1·0308	1·0402	1·1085	0·9177	0·9219	0·9261	0·9563
49·0	1·0208	1·0298	1·0389	1·1046	0·8853	0·8892	0·8931	0·9213
50·0	1·0201	1·0288	1·0375	1·1008	0·8540	0·8576	0·8613	0·8874
51·0	1·0195	1·0278	1·0363	1·0971	0·8236	0·8270	0·8304	0·8547
52·0	1·0189	1·0269	1·0350	1·0936	0·7941	0·7972	0·8004	0·8230
53·0	1·0182	1·0260	1·0338	1·0902	0·7654	0·7684	0·7713	0·7923
54·0	1·0176	1·0251	1·0326	1·0868	0·7376	0·7403	0·7430	0·7624
55·0	1·0170	1·0242	1·0314	1·0836	0·7104	0·7129	0·7155	0·7335
56·0	1·0164	1·0233	1·0303	1·0804	0·6840	0·6863	0·6886	0·7053
57·0	1·0158	1·0225	1·0292	1·0773	0·6581	0·6603	0·6625	0·6779
58·0	1·0153	1·0217	1·0281	1·0743	0·6329	0·6349	0·6369	0·6512
59·0	1·0147	1·0209	1·0270	1·0714	0·6083	0·6102	0·6120	0·6252
60·0	1·0142	1·0201	1·0260	1·0685	0·5842	0·5859	0·5876	0·5998
61·0	1·0136	1·0193	1·0250	1·0657	0·5606	0·5622	0·5638	0·5749
62·0	1·0131	1·0185	1·0240	1·0630	0·5375	0·5389	0·5404	0·5507
63·0	1·0126	1·0177	1·0230	1·0603	0·5148	0·5162	0·5175	0·5269
64·0	1·0120	1·0170	1·0220	1·0576	0·4926	0·4938	0·4950	0·5036
65·0	1·0115	1·0163	1·0210	1·0550	0·4707	0·4719	0·4730	0·4808
66·0	1·0110	1·0155	1·0201	1·0525	0·4493	0·4503	0·4513	0·4584
67·0	1·0105	1·0148	1·0192	1·0500	0·4281	0·4291	0·4300	0·4365
68·0	1·0100	1·0141	1·0182	1·0475	0·4073	0·4082	0·4090	0·4149
69·0	1·0095	1·0134	1·0173	1·0451	0·3869	0·3876	0·3883	0·3936
70·0	1·0090	1·0127	1·0164	1·0427	0·3667	0·3673	0·3680	0·3728
71·0	1·0086	1·0120	1·0155	1·0404	0·3467	0·3473	0·3479	0·3522
72·0	1·0081	1·0114	1·0147	1·0381	0·3271	0·3276	0·3281	0·3319
73·0	1·0076	1·0107	1·0138	1·0358	0·3076	0·3081	0·3086	0·3119
74·0	1·0071	1·0100	1·0129	1·0335	0·2884	0·2888	0·2892	0·2922
75·0	1·0067	1·0094	1·0121	1·0313	0·2694	0·2698	0·2701	0·2727
76·0	1·0062	1·0087	1·0113	1·0291	0·2506	0·2509	0·2512	0·2534
77·0	1·0058	1·0081	1·0104	1·0269	0·2319	0·2322	0·2325	0·2344
78·0	1·0053	1·0074	1·0096	1·0248	0·2135	0·2137	0·2139	0·2155
79·0	1·0049	1·0068	1·0088	1·0226	0·1951	0·1953	0·1955	0·1969
80·0	1·0044	1·0062	1·0080	1·0205	0·1770	0·1771	0·1773	0·1784
81·0	1·0040	1·0055	1·0071	1·0184	0·1589	0·1590	0·1591	0·1600
82·0	1·0035	1·0049	1·0063	1·0163	0·1409	0·1410	0·1411	0·1418
83·0	1·0031	1·0043	1·0055	1·0142	0·1231	0·1232	0·1232	0·1238
84·0	1·0026	1·0037	1·0047	1·0122	0·1053	0·1054	0·1054	0·1058
85·0	1·0022	1·0031	1·0039	1·0101	0·0876	0·0877	0·0877	0·0880
86·0	1·0017	1·0024	1·0031	1·0081	0·0700	0·0700	0·0701	0·0702
87·0	1·0013	1·0018	1·0024	1·0060	0·0525	0·0525	0·0525	0·0526
88·0	1·0009	1·0012	1·0016	1·0040	0·0349	0·0350	0·0350	0·0350
89·0	1·0004	1·0006	1·0008	1·0020	0·0175	0·0175	0·0175	0·0175
90·0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000

$\phi_c = 7°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
42•0	0•5100	0•5137	0•5174	0•5442	0•9790	0•9841	0•9893	1•0267
43•0	0•4804	0•4837	0•4871	0•5115	0•9518	0•9567	0•9616	0•9967
44•0	0•4523	0•4554	0•4585	0•4807	0•9252	0•9298	0•9344	0•9674
45•0	0•4258	0•4286	0•4314	0•4516	0•8992	0•9035	0•9078	0•9388
46•0	0•4007	0•4032	0•4058	0•4241	0•8736	0•8776	0•8817	0•9109
47•0	0•3769	0•3792	0•3815	0•3981	0•8485	0•8523	0•8561	0•8835
48•0	0•3543	0•3564	0•3585	0•3736	0•8238	0•8274	0•8310	0•8567
49•0	0•3328	0•3347	0•3366	0•3504	0•7996	0•8030	0•8063	0•8305
50•0	0•3125	0•3142	0•3159	0•3284	0•7758	0•7789	0•7821	0•8048
51•0	0•2932	0•2947	0•2963	0•3075	0•7524	0•7553	0•7583	0•7795
52•0	0•2748	0•2762	0•2776	0•2878	0•7293	0•7320	0•7348	0•7547
53•0	0•2574	0•2586	0•2599	0•2691	0•7065	0•7091	0•7117	0•7303
54•0	0•2408	0•2419	0•2431	0•2514	0•6841	0•6865	0•6890	0•7064
55•0	0•2250	0•2260	0•2271	0•2346	0•6620	0•6643	0•6666	0•6828
56•0	0•2100	0•2110	0•2119	0•2186	0•6402	0•6423	0•6445	0•6596
57•0	0•1958	0•1966	0•1975	0•2035	0•6187	0•6207	0•6226	0•6367
58•0	0•1822	0•1830	0•1837	0•1891	0•5974	0•5993	0•6011	0•6142
59•0	0•1694	0•1700	0•1707	0•1755	0•5764	0•5781	0•5798	0•5920
60•0	0•1571	0•1577	0•1583	0•1626	0•5557	0•5573	0•5588	0•5701
61•0	0•1455	0•1460	0•1466	0•1504	0•5351	0•5366	0•5381	0•5485
62•0	0•1345	0•1350	0•1354	0•1388	0•5148	0•5162	0•5175	0•5272
63•0	0•1240	0•1244	0•1249	0•1278	0•4947	0•4960	0•4972	0•5061
64•0	0•1141	0•1145	0•1148	0•1175	0•4748	0•4760	0•4771	0•4853
65•0	0•1047	0•1050	0•1053	0•1076	0•4551	0•4561	0•4572	0•4647
66•0	0•0958	0•0961	0•0963	0•0984	0•4356	0•4365	0•4375	0•4443
67•0	0•0873	0•0876	0•0878	0•0896	0•4162	0•4171	0•4179	0•4242
68•0	0•0794	0•0796	0•0798	0•0813	0•3970	0•3978	0•3986	0•4042
69•0	0•0719	0•0721	0•0722	0•0736	0•3779	0•3786	0•3793	0•3845
70•0	0•0648	0•0650	0•0651	0•0662	0•3590	0•3596	0•3603	0•3649
71•0	0•0582	0•0583	0•0584	0•0594	0•3402	0•3408	0•3414	0•3455
72•0	0•0519	0•0520	0•0521	0•0529	0•3215	0•3221	0•3226	0•3263
73•0	0•0461	0•0462	0•0463	0•0469	0•3030	0•3035	0•3039	0•3072
74•0	0•0406	0•0407	0•0408	0•0413	0•2846	0•2850	0•2854	0•2883
75•0	0•0355	0•0356	0•0357	0•0361	0•2663	0•2666	0•2670	0•2695
76•0	0•0308	0•0309	0•0309	0•0313	0•2480	0•2484	0•2487	0•2508
77•0	0•0265	0•0265	0•0265	0•0268	0•2299	0•2302	0•2305	0•2323
78•0	0•0225	0•0225	0•0225	0•0228	0•2119	0•2121	0•2123	0•2139
79•0	0•0188	0•0188	0•0189	0•0190	0•1939	0•1941	0•1943	0•1956
80•0	0•0155	0•0155	0•0155	0•0157	0•1760	0•1762	0•1764	0•1774
81•0	0•0125	0•0125	0•0125	0•0126	0•1582	0•1584	0•1585	0•1594
82•0	0•0099	0•0099	0•0099	0•0099	0•1405	0•1406	0•1407	0•1414
83•0	0•0075	0•0075	0•0075	0•0076	0•1228	0•1229	0•1229	0•1235
84•0	0•0055	0•0055	0•0055	0•0056	0•1051	0•1052	0•1052	0•1056
85•0	0•0038	0•0038	0•0038	0•0038	0•0875	0•0876	0•0876	0•0879
86•0	0•0024	0•0024	0•0024	0•0025	0•0700	0•0700	0•0700	0•0702
87•0	0•0014	0•0014	0•0014	0•0014	0•0524	0•0525	0•0525	0•0526
88•0	0•0006	0•0006	0•0006	0•0006	0•0349	0•0349	0•0350	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_e = 8°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
8•5	1•2177	1•3799	1•5638	3•7526	13•9862	14•9269	15•9514	26•3030
9•0	1•1806	1•3064	1•4455	2•9353	11•1253	11•7231	12•3634	18•3647
9•5	1•1598	1•2660	1•3820	2•5523	9•5392	9•9799	10•4475	14•6517
10•0	1•1455	1•2387	1•3396	2•3173	8•4613	8•8087	9•1750	12•3764
10•5	1•1346	1•2184	1•3083	2•1540	7•6563	7•9412	8•2401	10•7984
11•0	1•1259	1•2023	1•2838	2•0321	7•0210	7•2609	7•5116	9•6223
11•5	1•1188	1•1891	1•2638	1•9367	6•5009	6•7068	6•9214	8•7029
12•0	1•1126	1•1780	1•2471	1•8594	6•0639	6•2432	6•4296	7•9596
12•5	1•1073	1•1684	1•2329	1•7952	5•6894	5•8474	6•0113	7•3432
13•0	1•1027	1•1601	1•2204	1•7408	5•3636	5•5042	5•6496	6•8219
13•5	1•0985	1•1527	1•2095	1•6940	5•0765	5•2026	5•3328	6•3741
14•0	1•0948	1•1461	1•1998	1•6532	4•8211	4•9348	5•0522	5•9842
14•5	1•0914	1•1401	1•1911	1•6173	4•5918	4•6951	4•8014	5•6413
15•0	1•0883	1•1347	1•1832	1•5853	4•3845	4•4787	4•5756	5•3367
15•5	1•0854	1•1298	1•1760	1•5566	4•1959	4•2822	4•3709	5•0641
16•0	1•0828	1•1252	1•1694	1•5307	4•0234	4•1028	4•1843	4•8184
16•5	1•0803	1•1211	1•1633	1•5073	3•8647	3•9380	4•0132	4•5956
17•0	1•0780	1•1172	1•1577	1•4858	3•7183	3•7862	3•8557	4•3925
17•5	1•0759	1•1135	1•1525	1•4661	3•5825	3•6456	3•7101	4•2065
18•0	1•0739	1•1101	1•1476	1•4480	3•4563	3•5150	3•5750	4•0353
18•5	1•0720	1•1070	1•1431	1•4312	3•3384	3•3932	3•4492	3•8772
19•0	1•0702	1•1040	1•1388	1•4156	3•2282	3•2795	3•3318	3•7307
19•5	1•0685	1•1011	1•1348	1•4011	3•1247	3•1728	3•2218	3•5945
20•0	1•0669	1•0985	1•1310	1•3876	3•0274	3•0726	3•1186	3•4674
20•5	1•0653	1•0960	1•1275	1•3749	2•9357	2•9782	3•0214	3•3485
21•0	1•0639	1•0936	1•1241	1•3630	2•8491	2•8890	2•9298	3•2371
21•5	1•0625	1•0913	1•1209	1•3518	2•7670	2•8048	2•8432	3•1324
22•0	1•0611	1•0891	1•1178	1•3412	2•6893	2•7249	2•7612	3•0338
22•5	1•0598	1•0870	1•1149	1•3312	2•6154	2•6491	2•6834	2•9407
23•0	1•0586	1•0850	1•1121	1•3217	2•5451	2•5770	2•6095	2•8526
24•0	1•0563	1•0813	1•1069	1•3042	2•4142	2•4429	2•4721	2•6901
25•0	1•0541	1•0779	1•1022	1•2883	2•2946	2•3206	2•3470	2•5433
26•0	1•0521	1•0747	1•0978	1•2739	2•1850	2•2086	2•2325	2•4099
27•0	1•0502	1•0717	1•0937	1•2606	2•0839	2•1054	2•1271	2•2880
28•0	1•0484	1•0689	1•0899	1•2484	1•9904	2•0100	2•0298	2•1762
29•0	1•0467	1•0664	1•0863	1•2371	1•9035	1•9214	1•9395	2•0731
30•0	1•0451	1•0639	1•0830	1•2267	1•8225	1•8389	1•8555	1•9777
31•0	1•0436	1•0616	1•0799	1•2169	1•7467	1•7618	1•7771	1•8891
32•0	1•0422	1•0594	1•0769	1•2078	1•6757	1•6896	1•7037	1•8065
33•0	1•0408	1•0573	1•0741	1•1993	1•6089	1•6217	1•6347	1•7293
34•0	1•0395	1•0554	1•0715	1•1913	1•5459	1•5578	1•5697	1•6570
35•0	1•0383	1•0535	1•0690	1•1837	1•4864	1•4974	1•5084	1•5889
36•0	1•0371	1•0517	1•0666	1•1766	1•4300	1•4402	1•4504	1•5248
37•0	1•0359	1•0500	1•0643	1•1698	1•3765	1•3859	1•3954	1•4642
38•0	1•0348	1•0483	1•0621	1•1634	1•3256	1•3343	1•3431	1•4069
39•0	1•0337	1•0468	1•0600	1•1573	1•2771	1•2852	1•2934	1•3525
40•0	1•0327	1•0452	1•0580	1•1515	1•2308	1•2383	1•2459	1•3007
41•0	1•0317	1•0438	1•0560	1•1459	1•1865	1•1935	1•2006	1•2514
42•0	1•0307	1•0424	1•0542	1•1406	1•1441	1•1506	1•1572	1•2044

$\phi_c = 8°$

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
8°5	12°9032	13°8220	14°8234	24°9657	3°9810	4°1618	4°3567	6°2540
9°0	10°0754	10°6553	11°2769	17°1190	3°5473	3°6762	3°8130	5°0519
9°5	8°5098	8°9346	9°3858	13°4540	3°2929	3°3965	3°5057	4°4566
10°0	7°4474	7°7803	8°1316	11°2115	3°1106	3°1985	3°2905	4°0719
10°5	6°6552	6°9266	7°2116	9°6586	2°9675	3°0443	3°1243	3°7915
11°0	6°0310	6°2582	6°4959	8°5031	2°8491	2°9175	2°9885	3°5723
11°5	5°5209	5°7148	5°9170	7°6013	2°7477	2°8095	2°8735	3°3931
12°0	5°0931	5°2609	5°4355	6°8736	2°6588	2°7151	2°7734	3°2419
12°5	4°7271	4°8741	5°0267	6°2712	2°5794	2°6312	2°6847	3°1112
13°0	4°4093	4°5393	4°6739	5°7628	2°5075	2°5555	2°6049	2°9962
13°5	4°1299	4°2457	4°3655	5°3268	2°4417	2°4864	2°5323	2°8936
14°0	3°8818	3°9857	4°0929	4°9482	2°3810	2°4228	2°4656	2°8009
14°5	3°6596	3°7533	3°8499	4°6157	2°3246	2°3637	2°4039	2°7166
15°0	3°4591	3°5441	3°6315	4°3212	2°2718	2°3087	2°3464	2°6390
15°5	3°2771	3°3545	3°4340	4°0582	2°2222	2°2570	2°2926	2°5673
16°0	3°1111	3°1818	3°2544	3°8217	2°1754	2°2083	2°2420	2°5007
16°5	2°9588	3°0236	3°0902	3°6078	2°1310	2°1622	2°1941	2°4383
17°0	2°8185	2°8782	2°9393	3°4133	2°0888	2°1185	2°1487	2°3798
17°5	2°6889	2°7439	2°8003	3°2357	2°0486	2°0768	2°1056	2°3247
18°0	2°5686	2°6195	2°6716	3°0727	2°0101	2°0370	2°0644	2°2725
18°5	2°4567	2°5039	2°5522	2°9225	1°9732	1°9989	2°0250	2°2230
19°0	2°3523	2°3962	2°4410	2°7838	1°9378	1°9623	1°9873	2°1759
19°5	2°2547	2°2955	2°3371	2°6552	1°9037	1°9271	1°9510	2°1310
20°0	2°1631	2°2011	2°2400	2°5356	1°8708	1°8933	1°9161	2°0881
20°5	2°0770	2°1126	2°1488	2°4241	1°8390	1°8606	1°8825	2°0469
21°0	1°9960	2°0292	2°0631	2°3199	1°8083	1°8290	1°8500	2°0075
21°5	1°9195	1°9507	1°9824	2°2223	1°7786	1°7985	1°8187	1°9695
22°0	1°8473	1°8765	1°9062	2°1306	1°7498	1°7689	1°7883	1°9330
22°5	1°7789	1°8063	1°8343	2°0445	1°7218	1°7402	1°7588	1°8977
23°0	1°7141	1°7399	1°7661	1°9633	1°6946	1°7123	1°7302	1°8637
24°0	1°5940	1°6169	1°6401	1°8142	1°6425	1°6589	1°6755	1°7989
25°0	1°4853	1°5056	1°5263	1°6806	1°5929	1°6082	1°6236	1°7380
26°0	1°3863	1°4044	1°4229	1°5602	1°5457	1°5599	1°5743	1°6806
27°0	1°2958	1°3121	1°3286	1°4511	1°5006	1°5139	1°5273	1°6263
28°0	1°2128	1°2274	1°2423	1°3519	1°4574	1°4698	1°4824	1°5746
29°0	1°1365	1°1496	1°1629	1°2614	1°4160	1°4276	1°4393	1°5255
30°0	1°0660	1°0778	1°0898	1°1783	1°3761	1°3870	1°3980	1°4785
31°0	1°0007	1°0114	1°0223	1°1020	1°3377	1°3479	1°3582	1°4335
32°0	0°9401	0°9498	0°9596	1°0316	1°3006	1°3101	1°3198	1°3904
33°0	0°8838	0°8926	0°9014	0°9665	1°2647	1°2737	1°2828	1°3489
34°0	0°8313	0°8392	0°8473	0°9061	1°2299	1°2384	1°2469	1°3090
35°0	0°7822	0°7895	0°7967	0°8500	1°1962	1°2042	1°2122	1°2705
36°0	0°7363	0°7429	0°7495	0°7978	1°1635	1°1710	1°1785	1°2332
37°0	0°6933	0°6993	0°7053	0°7491	1°1317	1°1387	1°1458	1°1972
38°0	0°6529	0°6583	0°6638	0°7036	1°1007	1°1073	1°1140	1°1623
39°0	0°6150	0°6199	0°6249	0°6610	1°0705	1°0767	1°0830	1°1284
40°0	0°5792	0°5837	0°5883	0°6211	1°0410	1°0469	1°0528	1°0955
41°0	0°5456	0°5497	0°5538	0°5836	1°0123	1°0178	1°0234	1°0635
42°0	0°5138	0°5175	0°5213	0°5484	0°9842	0°9894	0°9946	1°0324

ϕ_c = 8° (continued)

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
43•0	1•0297	1•0410	1•0524	1•1355	1•1034	1•1095	1•1156	1•1595
44•0	1•0288	1•0397	1•0506	1•1307	1•0643	1•0700	1•0756	1•1164
45•0	1•0279	1•0384	1•0490	1•1260	1•0267	1•0320	1•0373	1•0752
46•0	1•0271	1•0372	1•0473	1•1215	0•9905	0•9954	1•0003	1•0356
47•0	1•0262	1•0359	1•0458	1•1171	0•9556	0•9601	0•9647	0•9975
48•0	1•0254	1•0348	1•0442	1•1129	0•9218	0•9260	0•9303	0•9608
49•0	1•0246	1•0336	1•0427	1•1088	0•8891	0•8931	0•8970	0•9254
50•0	1•0238	1•0325	1•0413	1•1049	0•8575	0•8612	0•8649	0•8912
51•0	1•0230	1•0314	1•0399	1•1011	0•8269	0•8303	0•8337	0•8582
52•0	1•0223	1•0304	1•0385	1•0974	0•7972	0•8003	0•8035	0•8262
53•0	1•0216	1•0293	1•0372	1•0939	0•7683	0•7712	0•7742	0•7952
54•0	1•0208	1•0283	1•0359	1•0904	0•7402	0•7429	0•7456	0•7652
55•0	1•0201	1•0273	1•0346	1•0870	0•7128	0•7154	0•7179	0•7360
56•0	1•0194	1•0264	1•0334	1•0837	0•6862	0•6885	0•6909	0•7077
57•0	1•0187	1•0254	1•0322	1•0805	0•6602	0•6624	0•6646	0•6801
58•0	1•0181	1•0245	1•0310	1•0774	0•6348	0•6369	0•6389	0•6532
59•0	1•0174	1•0236	1•0298	1•0743	0•6101	0•6119	0•6138	0•6270
60•0	1•0168	1•0227	1•0286	1•0713	0•5858	0•5875	0•5893	0•6015
61•0	1•0161	1•0218	1•0275	1•0684	0•5621	0•5637	0•5653	0•5765
62•0	1•0155	1•0209	1•0264	1•0655	0•5389	0•5403	0•5418	0•5521
63•0	1•0149	1•0201	1•0253	1•0627	0•5161	0•5174	0•5187	0•5282
64•0	1•0142	1•0192	1•0242	1•0600	0•4937	0•4949	0•4962	0•5048
65•0	1•0136	1•0184	1•0232	1•0573	0•4718	0•4729	0•4740	0•4819
66•0	1•0130	1•0176	1•0221	1•0547	0•4502	0•4512	0•4522	0•4594
67•0	1•0124	1•0168	1•0211	1•0520	0•4290	0•4299	0•4308	0•4374
68•0	1•0119	1•0160	1•0201	1•0495	0•4081	0•4089	0•4098	0•4157
69•0	1•0113	1•0152	1•0191	1•0470	0•3876	0•3883	0•3891	0•3944
70•0	1•0107	1•0144	1•0181	1•0445	0•3673	0•3680	0•3686	0•3734
71•0	1•0101	1•0136	1•0171	1•0420	0•3473	0•3479	0•3485	0•3528
72•0	1•0096	1•0129	1•0162	1•0396	0•3276	0•3281	0•3286	0•3324
73•0	1•0090	1•0121	1•0152	1•0373	0•3081	0•3085	0•3090	0•3124
74•0	1•0085	1•0114	1•0143	1•0349	0•2888	0•2892	0•2896	0•2926
75•0	1•0079	1•0106	1•0133	1•0326	0•2697	0•2701	0•2705	0•2730
76•0	1•0074	1•0099	1•0124	1•0303	0•2509	0•2512	0•2515	0•2537
77•0	1•0068	1•0092	1•0115	1•0280	0•2322	0•2325	0•2327	0•2346
78•0	1•0063	1•0084	1•0106	1•0258	0•2137	0•2139	0•2141	0•2157
79•0	1•0057	1•0077	1•0097	1•0235	0•1953	0•1955	0•1957	0•1970
80•0	1•0052	1•0070	1•0088	1•0213	0•1771	0•1773	0•1774	0•1785
81•0	1•0047	1•0063	1•0079	1•0191	0•1590	0•1591	0•1593	0•1601
82•0	1•0042	1•0056	1•0070	1•0170	0•1410	0•1411	0•1412	0•1419
83•0	1•0036	1•0049	1•0061	1•0148	0•1232	0•1232	0•1233	0•1238
84•0	1•0031	1•0042	1•0052	1•0127	0•1054	0•1054	0•1055	0•1059
85•0	1•0026	1•0035	1•0043	1•0105	0•0877	0•0877	0•0878	0•0880
86•0	1•0021	1•0028	1•0035	1•0084	0•0700	0•0701	0•0701	0•0703
87•0	1•0016	1•0021	1•0026	1•0063	0•0525	0•0525	0•0525	0•0526
88•0	1•0010	1•0014	1•0017	1•0042	0•0350	0•0350	0•0350	0•0350
89•0	1•0005	1•0007	1•0009	1•0021	0•0175	0•0175	0•0175	0•0175
90•0	1•0000	1•0000	1•0000	1•0000	0•0000	0•0000	0•0000	0•0000

ϕ_c = 8° (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
43•0	0•4838	0•4872	0•4906	0•5153	0•9567	0•9616	0•9665	1•0020
44•0	0•4554	0•4585	0•4616	0•4841	0•9298	0•9344	0•9390	0•9724
45•0	0•4286	0•4314	0•4343	0•4546	0•9034	0•9078	0•9121	0•9435
46•0	0•4032	0•4058	0•4083	0•4269	0•8776	0•8817	0•8858	0•9152
47•0	0•3792	0•3815	0•3838	0•4006	0•8522	0•8561	0•8599	0•8876
48•0	0•3564	0•3585	0•3606	0•3758	0•8274	0•8310	0•8346	0•8605
49•0	0•3347	0•3366	0•3386	0•3524	0•8029	0•8063	0•8097	0•8340
50•0	0•3142	0•3159	0•3177	0•3302	0•7789	0•7820	0•7852	0•8080
51•0	0•2947	0•2963	0•2979	0•3092	0•7552	0•7582	0•7612	0•7825
52•0	0•2762	0•2776	0•2790	0•2893	0•7320	0•7347	0•7375	0•7575
53•0	0•2586	0•2599	0•2612	0•2704	0•7090	0•7116	0•7143	0•7330
54•0	0•2419	0•2431	0•2442	0•2526	0•6865	0•6889	0•6913	0•7088
55•0	0•2260	0•2271	0•2281	0•2356	0•6642	0•6665	0•6688	0•6851
56•0	0•2109	0•2119	0•2128	0•2196	0•6422	0•6444	0•6465	0•6617
57•0	0•1966	0•1974	0•1983	0•2043	0•6206	0•6226	0•6245	0•6387
58•0	0•1830	0•1837	0•1845	0•1899	0•5992	0•6010	0•6029	0•6160
59•0	0•1700	0•1707	0•1714	0•1762	0•5781	0•5798	0•5815	0•5937
60•0	0•1577	0•1583	0•1589	0•1632	0•5572	0•5588	0•5603	0•5717
61•0	0•1460	0•1466	0•1471	0•1509	0•5365	0•5380	0•5395	0•5499
62•0	0•1349	0•1354	0•1359	0•1393	0•5161	0•5175	0•5188	0•5285
63•0	0•1244	0•1248	0•1253	0•1283	0•4959	0•4971	0•4984	0•5073
64•0	0•1144	0•1148	0•1152	0•1178	0•4759	0•4770	0•4782	0•4864
65•0	0•1050	0•1053	0•1056	0•1080	0•4561	0•4571	0•4582	0•4657
66•0	0•0960	0•0963	0•0966	0•0986	0•4365	0•4374	0•4384	0•4452
67•0	0•0876	0•0878	0•0881	0•0898	0•4170	0•4179	0•4188	0•4250
68•0	0•0796	0•0798	0•0800	0•0815	0•3977	0•3985	0•3993	0•4050
69•0	0•0721	0•0722	0•0724	0•0737	0•3786	0•3793	0•3800	0•3851
70•0	0•0650	0•0651	0•0653	0•0664	0•3596	0•3602	0•3609	0•3655
71•0	0•0583	0•0584	0•0585	0•0595	0•3407	0•3413	0•3419	0•3460
72•0	0•0520	0•0521	0•0522	0•0530	0•3220	0•3225	0•3231	0•3268
73•0	0•0462	0•0462	0•0463	0•0470	0•3034	0•3039	0•3044	0•3076
74•0	0•0407	0•0408	0•0408	0•0414	0•2850	0•2854	0•2858	0•2887
75•0	0•0356	0•0357	0•0357	0•0362	0•2666	0•2670	0•2673	0•2698
76•0	0•0309	0•0309	0•0310	0•0313	0•2483	0•2486	0•2490	0•2511
77•0	0•0265	0•0265	0•0266	0•0269	0•2302	0•2304	0•2307	0•2326
78•0	0•0225	0•0225	0•0226	0•0228	0•2121	0•2123	0•2125	0•2141
79•0	0•0188	0•0189	0•0189	0•0191	0•1941	0•1943	0•1945	0•1958
80•0	0•0155	0•0155	0•0156	0•0157	0•1762	0•1763	0•1765	0•1776
81•0	0•0125	0•0125	0•0126	0•0126	0•1583	0•1585	0•1586	0•1595
82•0	0•0099	0•0099	0•0099	0•0100	0•1406	0•1407	0•1408	0•1415
83•0	0•0075	0•0075	0•0076	0•0076	0•1228	0•1229	0•1230	0•1235
84•0	0•0055	0•0055	0•0055	0•0056	0•1052	0•1052	0•1053	0•1057
85•0	0•0038	0•0038	0•0038	0•0039	0•0876	0•0876	0•0876	0•0879
86•0	0•0024	0•0024	0•0024	0•0025	0•0700	0•0700	0•0700	0•0702
87•0	0•0014	0•0014	0•0014	0•0014	0•0525	0•0525	0•0525	0•0526
88•0	0•0006	0•0006	0•0006	0•0006	0•0349	0•0349	0•0350	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 9°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
9•5	1•2268	1•3760	1•5434	3•4465	12•9135	13•7085	14•5682	22•9788
10•0	1•1903	1•3068	1•4348	2•7597	10•3358	10•8478	11•3933	16•3868
10•5	1•1696	1•2686	1•3761	2•4308	8•9013	9•2823	9•6849	13•2358
11•0	1•1553	1•2426	1•3366	2•2259	7•9232	8•2258	8•5437	11•2779
11•5	1•1444	1•2231	1•3072	2•0821	7•1906	7•4403	7•7015	9•9059
12•0	1•1357	1•2076	1•2841	1•9738	6•6107	6•8221	7•0425	8•8747
12•5	1•1285	1•1949	1•2652	1•8884	6•1348	6•3171	6•5066	8•0631
13•0	1•1223	1•1841	1•2494	1•8187	5•7339	5•8934	6•0588	7•4029
13•5	1•1169	1•1748	1•2357	1•7606	5•3896	5•5307	5•6766	6•8525
14•0	1•1121	1•1666	1•2238	1•7111	5•0894	5•2153	5•3453	6•3849
14•5	1•1078	1•1594	1•2133	1•6683	4•8243	4•9375	5•0543	5•9814
15•0	1•1040	1•1529	1•2039	1•6308	4•5879	4•6904	4•7960	5•6289
15•5	1•1005	1•1470	1•1955	1•5976	4•3754	4•4687	4•5646	5•3176
16•0	1•0972	1•1416	1•1878	1•5680	4•1828	4•2682	4•3558	5•0402
16•5	1•0943	1•1367	1•1808	1•5414	4•0073	4•0857	4•1661	4•7912
17•0	1•0915	1•1322	1•1744	1•5173	3•8465	3•9188	3•9928	4•5662
17•5	1•0889	1•1280	1•1684	1•4953	3•6984	3•7653	3•8337	4•3616
18•0	1•0865	1•1241	1•1629	1•4752	3•5615	3•6235	3•6870	4•1746
18•5	1•0843	1•1204	1•1578	1•4567	3•4344	3•4921	3•5511	4•0029
19•0	1•0822	1•1170	1•1530	1•4396	3•3160	3•3698	3•4248	3•8447
19•5	1•0801	1•1138	1•1485	1•4238	3•2053	3•2557	3•3070	3•6981
20•0	1•0782	1•1108	1•1443	1•4090	3•1017	3•1488	3•1969	3•5621
20•5	1•0764	1•1079	1•1403	1•3953	3•0043	3•0485	3•0936	3•4353
21•0	1•0747	1•1052	1•1365	1•3824	2•9125	2•9541	2•9965	3•3169
21•5	1•0731	1•1026	1•1330	1•3703	2•8260	2•8652	2•9051	3•2059
22•0	1•0715	1•1002	1•1296	1•3589	2•7441	2•7810	2•8187	3•1017
22•5	1•0700	1•0978	1•1264	1•3482	2•6665	2•7014	2•7369	3•0036
23•0	1•0685	1•0956	1•1233	1•3380	2•5928	2•6259	2•6594	2•9111
23•5	1•0672	1•0934	1•1204	1•3284	2•5228	2•5541	2•5858	2•8237
24•0	1•0658	1•0914	1•1176	1•3193	2•4561	2•4857	2•5159	2•7408
25•0	1•0633	1•0875	1•1123	1•3024	2•3316	2•3584	2•3855	2•5876
26•0	1•0610	1•0840	1•1075	1•2871	2•2178	2•2421	2•2666	2•4489
27•0	1•0588	1•0807	1•1030	1•2731	2•1132	2•1352	2•1575	2•3226
28•0	1•0567	1•0776	1•0989	1•2602	2•0167	2•0367	2•0570	2•2069
29•0	1•0547	1•0747	1•0950	1•2483	1•9272	1•9455	1•9640	2•1006
30•0	1•0529	1•0719	1•0913	1•2373	1•8439	1•8606	1•8776	2•0024
31•0	1•0511	1•0693	1•0879	1•2270	1•7661	1•7815	1•7971	1•9113
32•0	1•0495	1•0669	1•0847	1•2174	1•6933	1•7075	1•7218	1•8266
33•0	1•0479	1•0646	1•0816	1•2085	1•6250	1•6380	1•6512	1•7475
34•0	1•0463	1•0624	1•0787	1•2001	1•5606	1•5726	1•5848	1•6735
35•0	1•0449	1•0603	1•0759	1•1921	1•4998	1•5110	1•5222	1•6040
36•0	1•0435	1•0583	1•0733	1•1847	1•4423	1•4526	1•4630	1•5385
37•0	1•0421	1•0564	1•0708	1•1776	1•3878	1•3974	1•4070	1•4768
38•0	1•0408	1•0545	1•0684	1•1709	1•3360	1•3448	1•3538	1•4184
39•0	1•0396	1•0528	1•0661	1•1645	1•2867	1•2949	1•3032	1•3630
40•0	1•0384	1•0511	1•0639	1•1584	1•2396	1•2473	1•2549	1•3104
41•0	1•0372	1•0494	1•0618	1•1526	1•1947	1•2018	1•2089	1•2604
42•0	1•0360	1•0478	1•0597	1•1470	1•1517	1•1582	1•1648	1•2126
43•0	1•0349	1•0463	1•0578	1•1417	1•1104	1•1165	1•1227	1•1671

$\phi_c = 9°$

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
9°5	11°8148	12°5879	13°4245	21°6291	3°9423	4°1104	4°2906	5°9970
10°0	9°2742	9°7682	10°2951	15°1316	3°5071	3°6275	3°7547	4°8851
10°5	7°8625	8°2277	8°6138	12°0307	3°2523	3°3494	3°4513	4°3256
11°0	6°9015	7°1896	7°4926	10°1070	3°0701	3°1526	3°2387	3°9610
11°5	6°1829	6°4192	6°6666	8°7614	2°9273	2°9995	3°0746	3°6936
12°0	5°6152	5°8140	6°0214	7°7517	2°8093	2°8737	2°9405	3°4838
12°5	5°1501	5°3205	5°4977	6°9585	2°7084	2°7666	2°8269	3°3118
13°0	4°7591	4°9072	5°0609	6°3146	2°6200	2°6732	2°7281	3°1661
13°5	4°4239	4°5541	4°6889	5°7789	2°5411	2°5901	2°6405	3°0401
14°0	4°1323	4°2477	4°3671	5°3247	2°4697	2°5151	2°5618	2°9290
14°5	3°8754	3°9785	4°0850	4°9336	2°4045	2°4468	2°4902	2°8297
15°0	3°6468	3°7396	3°8352	4°5926	2°3444	2°3839	2°4245	2°7400
15°5	3°4417	3°5256	3°6120	4°2923	2°2885	2°3256	2°3636	2°6581
16°0	3°2564	3°3326	3°4110	4°0254	2°2362	2°2712	2°3069	2°5829
16°5	3°0879	3°1574	3°2289	3°7863	2°1871	2°2201	2°2539	2°5132
17°0	2°9339	2°9976	3°0629	3°5708	2°1408	2°1720	2°2040	2°4484
17°5	2°7925	2°8510	2°9110	3°3754	2°0969	2°1265	2°1568	2°3877
18°0	2°6620	2°7160	2°7712	3°1973	2°0551	2°0833	2°1120	2°3307
18°5	2°5413	2°5912	2°6422	3°0343	2°0153	2°0421	2°0695	2°2769
19°0	2°4292	2°4754	2°5226	2°8844	1°9773	2°0028	2°0289	2°2261
19°5	2°3247	2°3676	2°4114	2°7461	1°9408	1°9652	1°9901	2°1778
20°0	2°2272	2°2670	2°3077	2°6180	1°9058	1°9291	1°9529	2°1318
20°5	2°1358	2°1729	2°2109	2°4991	1°8721	1°8944	1°9171	2°0879
21°0	2°0500	2°0847	2°1201	2°3883	1°8396	1°8610	1°8828	2°0460
21°5	1°9693	2°0017	2°0348	2°2849	1°8082	1°8287	1°8496	2°0058
22°0	1°8933	1°9236	1°9546	2°1881	1°7779	1°7976	1°8176	1°9672
22°5	1°8215	1°8499	1°8789	2°0973	1°7485	1°7674	1°7866	1°9300
23°0	1°7535	1°7802	1°8074	2°0120	1°7200	1°7382	1°7567	1°8943
23°5	1°6892	1°7143	1°7398	1°9317	1°6924	1°7099	1°7276	1°8597
24°0	1°6281	1°6517	1°6758	1°8559	1°6655	1°6823	1°6994	1°8264
25°0	1°5149	1°5359	1°5572	1°7164	1°6139	1°6296	1°6454	1°7629
26°0	1°4122	1°4309	1°4498	1°5912	1°5649	1°5795	1°5942	1°7032
27°0	1°3185	1°3353	1°3522	1°4782	1°5183	1°5318	1°5456	1°6468
28°0	1°2329	1°2479	1°2630	1°3756	1°4737	1°4864	1°4992	1°5934
29°0	1°1542	1°1677	1°1813	1°2821	1°4310	1°4428	1°4548	1°5427
30°0	1°0817	1°0938	1°1061	1°1966	1°3900	1°4011	1°4123	1°4943
31°0	1°0147	1°0257	1°0367	1°1182	1°3505	1°3609	1°3714	1°4481
32°0	0°9527	0°9625	0°9725	1°0459	1°3125	1°3222	1°3321	1°4039
33°0	0°8950	0°9039	0°9130	0°9792	1°2758	1°2849	1°2941	1°3614
34°0	0°8413	0°8494	0°8576	0°9175	1°2403	1°2488	1°2575	1°3205
35°0	0°7912	0°7986	0°8060	0°8602	1°2058	1°2139	1°2220	1°2812
36°0	0°7444	0°7511	0°7578	0°8069	1°1725	1°1800	1°1877	1°2432
37°0	0°7006	0°7067	0°7128	0°7573	1°1400	1°1472	1°1544	1°2065
38°0	0°6595	0°6650	0°6706	0°7110	1°1085	1°1152	1°1220	1°1709
39°0	0°6209	0°6259	0°6309	0°6676	1°0778	1°0841	1°0905	1°1364
40°0	0°5846	0°5891	0°5937	0°6270	1°0479	1°0538	1°0598	1°1030
41°0	0°5504	0°5545	0°5587	0°5890	1°0187	1°0243	1°0299	1°0705
42°0	0°5182	0°5219	0°5257	0°5532	0°9902	0°9954	1°0007	1°0389
43°0	0°4878	0°4912	0°4946	0°5196	0°9623	0°9672	0°9722	1°0081

ϕ_c = 9° (continued)

ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
44•0	1•0339	1•0448	1•0559	1•1366	1•0708	1•0765	1•0822	1•1234
45•0	1•0328	1•0434	1•0540	1•1317	1•0327	1•0380	1•0433	1•0816
46•0	1•0318	1•0420	1•0522	1•1269	0•9960	1•0010	1•0059	1•0415
47•0	1•0308	1•0406	1•0505	1•1224	0•9607	0•9653	0•9699	1•0030
48•0	1•0299	1•0393	1•0488	1•1180	0•9265	0•9308	0•9351	0•9658
49•0	1•0289	1•0380	1•0472	1•1138	0•8935	0•8975	0•9015	0•9301
50•0	1•0280	1•0368	1•0456	1•1097	0•8616	0•8653	0•8690	0•8956
51•0	1•0271	1•0355	1•0441	1•1057	0•8307	0•8341	0•8375	0•8622
52•0	1•0262	1•0344	1•0426	1•1018	0•8006	0•8038	0•8070	0•8299
53•0	1•0254	1•0332	1•0411	1•0981	0•7715	0•7745	0•7774	0•7987
54•0	1•0245	1•0321	1•0397	1•0945	0•7432	0•7459	0•7487	0•7684
55•0	1•0237	1•0309	1•0383	1•0909	0•7156	0•7181	0•7207	0•7390
56•0	1•0229	1•0298	1•0369	1•0875	0•6888	0•6911	0•6935	0•7104
57•0	1•0221	1•0288	1•0355	1•0841	0•6626	0•6648	0•6669	0•6826
58•0	1•0213	1•0277	1•0342	1•0809	0•6370	0•6390	0•6411	0•6555
59•0	1•0205	1•0267	1•0329	1•0777	0•6121	0•6139	0•6158	0•6291
60•0	1•0197	1•0257	1•0317	1•0745	0•5877	0•5894	0•5911	0•6034
61•0	1•0190	1•0247	1•0304	1•0715	0•5638	0•5654	0•5670	0•5783
62•0	1•0182	1•0237	1•0292	1•0685	0•5404	0•5419	0•5433	0•5537
63•0	1•0175	1•0227	1•0280	1•0656	0•5175	0•5188	0•5202	0•5297
64•0	1•0168	1•0218	1•0268	1•0627	0•4950	0•4963	0•4975	0•5062
65•0	1•0161	1•0208	1•0256	1•0599	0•4730	0•4741	0•4752	0•4831
66•0	1•0154	1•0199	1•0245	1•0571	0•4513	0•4523	0•4533	0•4605
67•0	1•0147	1•0190	1•0234	1•0544	0•4300	0•4309	0•4318	0•4384
68•0	1•0140	1•0181	1•0222	1•0517	0•4090	0•4098	0•4107	0•4166
69•0	1•0133	1•0172	1•0211	1•0491	0•3883	0•3891	0•3899	0•3952
70•0	1•0126	1•0163	1•0200	1•0465	0•3680	0•3687	0•3693	0•3741
71•0	1•0119	1•0154	1•0190	1•0439	0•3479	0•3485	0•3491	0•3534
72•0	1•0113	1•0146	1•0179	1•0414	0•3281	0•3287	0•3292	0•3330
73•0	1•0106	1•0137	1•0168	1•0389	0•3086	0•3090	0•3095	0•3129
74•0	1•0100	1•0129	1•0158	1•0365	0•2892	0•2896	0•2901	0•2930
75•0	1•0093	1•0120	1•0148	1•0340	0•2701	0•2705	0•2708	0•2734
76•0	1•0087	1•0112	1•0137	1•0316	0•2512	0•2515	0•2518	0•2541
77•0	1•0080	1•0104	1•0127	1•0293	0•2325	0•2327	0•2330	0•2349
78•0	1•0074	1•0095	1•0117	1•0269	0•2139	0•2141	0•2144	0•2160
79•0	1•0068	1•0087	1•0107	1•0246	0•1955	0•1957	0•1959	0•1972
80•0	1•0061	1•0079	1•0097	1•0223	0•1773	0•1774	0•1776	0•1787
81•0	1•0055	1•0071	1•0087	1•0200	0•1591	0•1593	0•1594	0•1603
82•0	1•0049	1•0063	1•0077	1•0177	0•1411	0•1412	0•1413	0•1420
83•0	1•0043	1•0055	1•0068	1•0155	0•1232	0•1233	0•1234	0•1239
84•0	1•0037	1•0047	1•0058	1•0132	0•1054	0•1055	0•1055	0•1059
85•0	1•0030	1•0039	1•0048	1•0110	0•0877	0•0878	0•0878	0•0881
86•0	1•0024	1•0031	1•0038	1•0088	0•0701	0•0701	0•0701	0•0703
87•0	1•0018	1•0024	1•0029	1•0066	0•0525	0•0525	0•0525	0•0526
88•0	1•0012	1•0016	1•0019	1•0044	0•0350	0•0350	0•0350	0•0350
89•0	1•0006	1•0008	1•0010	1•0022	0•0175	0•0175	0•0175	0•0175
90•0	1•0000	1•0000	1•0000	1•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 9°$ (continued)

Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
44•0	0•4590	0•4621	0•4653	0•4880	0•9350	0•9397	0•9444	0•9780
45•0	0•4319	0•4347	0•4375	0•4582	0•9083	0•9127	0•9171	0•9488
46•0	0•4062	0•4087	0•4113	0•4300	0•8822	0•8863	0•8904	0•9201
47•0	0•3818	0•3842	0•3865	0•4035	0•8565	0•8604	0•8643	0•8922
48•0	0•3587	0•3609	0•3630	0•3784	0•8314	0•8350	0•8387	0•8648
49•0	0•3369	0•3388	0•3408	0•3547	0•8067	0•8101	0•8135	0•8380
50•0	0•3161	0•3179	0•3196	0•3323	0•7824	0•7856	0•7888	0•8118
51•0	0•2965	0•2980	0•2996	0•3111	0•7585	0•7615	0•7645	0•7860
52•0	0•2778	0•2792	0•2806	0•2910	0•7350	0•7378	0•7406	0•7608
53•0	0•2600	0•2613	0•2626	0•2720	0•7119	0•7145	0•7172	0•7360
54•0	0•2432	0•2443	0•2455	0•2539	0•6891	0•6916	0•6940	0•7116
55•0	0•2272	0•2282	0•2293	0•2368	0•6667	0•6690	0•6713	0•6877
56•0	0•2120	0•2129	0•2139	0•2207	0•6446	0•6467	0•6488	0•6641
57•0	0•1975	0•1984	0•1992	0•2053	0•6227	0•6247	0•6267	0•6409
58•0	0•1838	0•1845	0•1853	0•1908	0•6012	0•6030	0•6049	0•6181
59•0	0•1707	0•1714	0•1721	0•1770	0•5799	0•5816	0•5833	0•5956
60•0	0•1584	0•1590	0•1596	0•1639	0•5589	0•5605	0•5621	0•5735
61•0	0•1466	0•1471	0•1477	0•1515	0•5381	0•5396	0•5411	0•5516
62•0	0•1354	0•1359	0•1364	0•1398	0•5176	0•5189	0•5203	0•5300
63•0	0•1249	0•1253	0•1257	0•1287	0•4972	0•4985	0•4998	0•5087
64•0	0•1148	0•1152	0•1156	0•1182	0•4771	0•4783	0•4794	0•4877
65•0	0•1053	0•1057	0•1060	0•1083	0•4572	0•4583	0•4593	0•4669
66•0	0•0963	0•0966	0•0969	0•0990	0•4375	0•4384	0•4394	0•4463
67•0	0•0878	0•0881	0•0883	0•0901	0•4179	0•4188	0•4197	0•4260
68•0	0•0798	0•0800	0•0802	0•0818	0•3986	0•3994	0•4002	0•4059
69•0	0•0722	0•0724	0•0726	0•0739	0•3793	0•3801	0•3808	0•3859
70•0	0•0651	0•0653	0•0654	0•0666	0•3603	0•3609	0•3616	0•3662
71•0	0•0584	0•0586	0•0587	0•0596	0•3414	0•3419	0•3425	0•3467
72•0	0•0521	0•0522	0•0524	0•0532	0•3226	0•3231	0•3236	0•3273
73•0	0•0463	0•0463	0•0464	0•0471	0•3039	0•3044	0•3048	0•3081
74•0	0•0408	0•0408	0•0409	0•0415	0•2854	0•2858	0•2862	0•2891
75•0	0•0357	0•0357	0•0358	0•0362	0•2670	0•2673	0•2677	0•2702
76•0	0•0309	0•0310	0•0310	0•0314	0•2487	0•2490	0•2493	0•2515
77•0	0•0265	0•0266	0•0266	0•0269	0•2304	0•2307	0•2310	0•2329
78•0	0•0225	0•0226	0•0226	0•0228	0•2123	0•2126	0•2128	0•2144
79•0	0•0189	0•0189	0•0189	0•0191	0•1943	0•1945	0•1947	0•1960
80•0	0•0155	0•0156	0•0156	0•0157	0•1764	0•1765	0•1767	0•1778
81•0	0•0125	0•0126	0•0126	0•0127	0•1585	0•1586	0•1587	0•1596
82•0	0•0099	0•0099	0•0099	0•0100	0•1407	0•1408	0•1409	0•1416
83•0	0•0075	0•0076	0•0076	0•0076	0•1229	0•1230	0•1231	0•1236
84•0	0•0055	0•0055	0•0055	0•0056	0•1052	0•1053	0•1054	0•1057
85•0	0•0038	0•0038	0•0038	0•0039	0•0876	0•0876	0•0877	0•0880
86•0	0•0024	0•0024	0•0025	0•0025	0•0700	0•0700	0•0701	0•0702
87•0	0•0014	0•0014	0•0014	0•0014	0•0525	0•0525	0•0525	0•0526
88•0	0•0006	0•0006	0•0006	0•0006	0•0350	0•0350	0•0350	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

$\phi_c = 10°$

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
10•5	1•2403	1•3793	1•5338	3•2258	12•0439	12•7290	13•4655	20•4823
11•0	1•2033	1•3126	1•4317	2•6308	9•6870	10•1330	10•6061	14•8525
11•5	1•1823	1•2755	1•3761	2•3407	8•3719	8•7063	9•0584	12•1149
12•0	1•1677	1•2502	1•3385	2•1580	7•4730	7•7403	8•0202	10•3952
12•5	1•1566	1•2311	1•3104	2•0286	6•7982	7•0199	7•2511	9•1800
13•0	1•1476	1•2159	1•2882	1•9305	6•2630	6•4515	6•6476	8•2606
13•5	1•1401	1•2033	1•2700	1•8526	5•8228	5•9860	6•1553	7•5328
14•0	1•1337	1•1926	1•2546	1•7888	5•4513	5•5946	5•7429	6•9379
14•5	1•1281	1•1834	1•2414	1•7352	5•1316	5•2588	5•3901	6•4399
15•0	1•1231	1•1753	1•2298	1•6894	4•8524	4•9662	5•0835	6•0151
15•5	1•1187	1•1680	1•2195	1•6497	4•6054	4•7080	4•8137	5•6473
16•0	1•1146	1•1615	1•2103	1•6147	4•3848	4•4779	4•5737	5•3249
16•5	1•1110	1•1556	1•2020	1•5837	4•1861	4•2711	4•3583	5•0393
17•0	1•1076	1•1502	1•1945	1•5560	4•0059	4•0837	4•1636	4•7842
17•5	1•1044	1•1452	1•1875	1•5309	3•8413	3•9130	3•9865	4•5546
18•0	1•1015	1•1406	1•1812	1•5082	3•6904	3•7566	3•8244	4•3466
18•5	1•0988	1•1364	1•1753	1•4874	3•5511	3•6125	3•6753	4•1571
19•0	1•0962	1•1324	1•1698	1•4684	3•4223	3•4793	3•5376	3•9835
19•5	1•0938	1•1287	1•1647	1•4508	3•3024	3•3556	3•4098	3•8238
20•0	1•0915	1•1252	1•1599	1•4345	3•1907	3•2403	3•2910	3•6763
20•5	1•0894	1•1219	1•1554	1•4194	3•0862	3•1327	3•1800	3•5396
21•0	1•0873	1•1188	1•1511	1•4053	2•9881	3•0317	3•0762	3•4123
21•5	1•0854	1•1158	1•1471	1•3921	2•8959	2•9369	2•9786	3•2936
22•0	1•0835	1•1130	1•1433	1•3797	2•8090	2•8475	2•8868	3•1825
22•5	1•0818	1•1104	1•1397	1•3681	2•7268	2•7632	2•8002	3•0782
23•0	1•0801	1•1078	1•1363	1•3571	2•6491	2•6834	2•7183	2•9802
23•5	1•0784	1•1054	1•1330	1•3468	2•5753	2•6077	2•6407	2•8878
24•0	1•0769	1•1031	1•1299	1•3370	2•5052	2•5359	2•5671	2•8005
24•5	1•0754	1•1008	1•1269	1•3277	2•4385	2•4676	2•4972	2•7179
25•0	1•0739	1•0987	1•1241	1•3188	2•3749	2•4025	2•4306	2•6396
26•0	1•0712	1•0947	1•1187	1•3024	2•2561	2•2811	2•3064	2•4945
27•0	1•0686	1•0909	1•1138	1•2874	2•1473	2•1699	2•1929	2•3628
28•0	1•0662	1•0874	1•1092	1•2737	2•0471	2•0677	2•0886	2•2426
29•0	1•0639	1•0842	1•1049	1•2611	1•9545	1•9733	1•9923	2•1324
30•0	1•0617	1•0811	1•1008	1•2494	1•8685	1•8857	1•9031	2•0308
31•0	1•0597	1•0782	1•0971	1•2385	1•7884	1•8042	1•8201	1•9369
32•0	1•0577	1•0755	1•0935	1•2284	1•7136	1•7280	1•7426	1•8497
33•0	1•0559	1•0729	1•0901	1•2190	1•6434	1•6567	1•6701	1•7684
34•0	1•0541	1•0704	1•0869	1•2101	1•5774	1•5897	1•6020	1•6924
35•0	1•0524	1•0680	1•0839	1•2017	1•5152	1•5265	1•5379	1•6212
36•0	1•0508	1•0658	1•0810	1•1938	1•4564	1•4669	1•4774	1•5543
37•0	1•0492	1•0636	1•0782	1•1864	1•4007	1•4104	1•4202	1•4911
38•0	1•0477	1•0616	1•0756	1•1793	1•3479	1•3568	1•3659	1•4315
39•0	1•0462	1•0596	1•0731	1•1726	1•2976	1•3059	1•3143	1•3751
40•0	1•0448	1•0577	1•0706	1•1662	1•2497	1•2574	1•2652	1•3215
41•0	1•0435	1•0558	1•0683	1•1601	1•2040	1•2111	1•2183	1•2705
42•0	1•0421	1•0540	1•0661	1•1542	1•1602	1•1669	1•1736	1•2220
43•0	1•0408	1•0523	1•0639	1•1486	1•1183	1•1245	1•1307	1•1757
44•0	1•0396	1•0506	1•0618	1•1433	1•0781	1•0839	1•0897	1•1314

$\phi_c = 10°$ Table 1

$\phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
10•5	10•9282	11•5912	12•3046	19•1175	3•9141	4•0719	4•2403	5•7989
11•0	8•6125	9•0405	9•4950	13•5859	3•4757	3•5891	3•7085	4•7525
11•5	7•3226	7•6412	7•9770	10•9007	3•2196	3•3112	3•4071	4•2195
12•0	6•4425	6•6954	6•9604	9•2169	3•0367	3•1147	3•1959	3•8698
12•5	5•7830	5•9914	6•2089	8•0294	2•8937	2•9620	3•0329	3•6122
13•0	5•2610	5•4370	5•6202	7•1326	2•7756	2•8367	2•8998	3•4094
13•5	4•8325	4•9839	5•1410	6•4241	2•6748	2•7300	2•7871	3•2427
14•0	4•4716	4•6037	4•7404	5•8463	2•5865	2•6370	2•6891	3•1014
14•5	4•1618	4•2782	4•3985	5•3636	2•5079	2•5544	2•6023	2•9789
15•0	3•8917	3•9952	4•1020	4•9528	2•4368	2•4799	2•5242	2•8708
15•5	3•6534	3•7461	3•8417	4•5979	2•3719	2•4121	2•4533	2•7741
16•0	3•4411	3•5247	3•6107	4•2876	2•3120	2•3496	2•3882	2•6866
16•5	3•2504	3•3261	3•4039	4•0134	2•2564	2•2917	2•3279	2•6067
17•0	3•0778	3•1467	3•2175	3•7692	2•2045	2•2378	2•2718	2•5332
17•5	2•9207	2•9836	3•0483	3•5499	2•1557	2•1872	2•2193	2•4652
18•0	2•7769	2•8346	2•8938	3•3518	2•1097	2•1395	2•1699	2•4018
18•5	2•6446	2•6978	2•7523	3•1718	2•0661	2•0944	2•1232	2•3424
19•0	2•5226	2•5717	2•6218	3•0074	2•0247	2•0515	2•0789	2•2866
19•5	2•4095	2•4549	2•5013	2•8566	1•9852	2•0108	2•0368	2•2340
20•0	2•3043	2•3464	2•3894	2•7178	1•9474	1•9718	1•9967	2•1841
20•5	2•2063	2•2454	2•2853	2•5895	1•9113	1•9346	1•9583	2•1368
21•0	2•1146	2•1501	2•1882	2•4705	1•8765	1•8988	1•9215	2•0917
21•5	2•0286	2•0626	2•0973	2•3598	1•8431	1•8644	1•8861	2•0487
22•0	1•9479	1•9796	2•0120	2•2566	1•8109	1•8313	1•8521	2•0075
22•5	1•8718	1•9015	1•9318	2•1602	1•7798	1•7994	1•8193	1•9681
23•0	1•8001	1•8279	1•8563	2•0697	1•7497	1•7685	1•7877	1•9302
23•5	1•7323	1•7584	1•7850	1•9848	1•7206	1•7387	1•7570	1•8937
24•0	1•6682	1•6927	1•7177	1•9049	1•6924	1•7098	1•7274	1•8585
24•5	1•6073	1•6304	1•6539	1•8296	1•6650	1•6817	1•6987	1•8246
25•0	1•5496	1•5713	1•5934	1•7585	1•6383	1•6545	1•6708	1•7918
26•0	1•4424	1•4617	1•4813	1•6275	1•5872	1•6022	1•6173	1•7294
27•0	1•3450	1•3622	1•3797	1•5096	1•5387	1•5526	1•5667	1•6706
28•0	1•2561	1•2715	1•2872	1•4030	1•4924	1•5054	1•5186	1•6152
29•0	1•1747	1•1886	1•2026	1•3062	1•4483	1•4604	1•4726	1•5626
30•0	1•0999	1•1123	1•1249	1•2178	1•4059	1•4173	1•4287	1•5126
31•0	1•0309	1•0421	1•0534	1•1368	1•3653	1•3759	1•3866	1•4649
32•0	0•9670	0•9771	0•9874	1•0625	1•3262	1•3361	1•3461	1•4194
33•0	0•9078	0•9170	0•9262	0•9939	1•2885	1•2978	1•3072	1•3757
34•0	0•8528	0•8611	0•8694	0•9306	1•2521	1•2608	1•2696	1•3338
35•0	0•8015	0•8090	0•8166	0•8719	1•2168	1•2250	1•2333	1•2934
36•0	0•7537	0•7605	0•7673	0•8174	1•1827	1•1904	1•1982	1•2546
37•0	0•7089	0•7151	0•7213	0•7666	1•1496	1•1568	1•1641	1•2170
38•0	0•6670	0•6726	0•6782	0•7193	1•1174	1•1242	1•1311	1•1807
39•0	0•6277	0•6327	0•6379	0•6751	1•0861	1•0925	1•0990	1•1456
40•0	0•5907	0•5953	0•6000	0•6338	1•0557	1•0617	1•0677	1•1115
41•0	0•5559	0•5601	0•5643	0•5950	1•0260	1•0316	1•0373	1•0784
42•0	0•5231	0•5270	0•5308	0•5587	0•9970	1•0023	1•0076	1•0463
43•0	0•4922	0•4957	0•4992	0•5245	0•9687	0•9737	0•9787	1•0150
44•0	0•4631	0•4662	0•4694	0•4924	0•9410	0•9457	0•9504	0•9845

$\phi_c = 10°$ (continued)

$\phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45·0	1·0384	1·0490	1·0598	1·1381	1·0395	1·0448	1·0502	1·0890
46·0	1·0372	1·0474	1·0578	1·1332	1·0023	1·0073	1·0123	1·0483
47·0	1·0360	1·0459	1·0559	1·1284	0·9665	0·9711	0·9758	1·0092
48·0	1·0349	1·0444	1·0540	1·1238	0·9319	0·9362	0·9405	0·9716
49·0	1·0338	1·0430	1·0522	1·1193	0·8985	0·9025	0·9065	0·9354
50·0	1·0327	1·0416	1·0505	1·1150	0·8662	0·8699	0·8737	0·9005
51·0	1·0317	1·0402	1·0488	1·1109	0·8349	0·8384	0·8419	0·8667
52·0	1·0307	1·0389	1·0471	1·1068	0·8046	0·8078	0·8110	0·8341
53·0	1·0296	1·0375	1·0455	1·1029	0·7752	0·7781	0·7811	0·8025
54·0	1·0287	1·0363	1·0439	1·0991	0·7465	0·7493	0·7521	0·7719
55·0	1·0277	1·0350	1·0424	1·0954	0·7187	0·7213	0·7239	0·7423
56·0	1·0267	1·0338	1·0408	1·0918	0·6916	0·6940	0·6964	0·7134
57·0	1·0258	1·0326	1·0394	1·0882	0·6652	0·6674	0·6696	0·6854
58·0	1·0249	1·0314	1·0379	1·0848	0·6395	0·6415	0·6435	0·6581
59·0	1·0240	1·0302	1·0365	1·0815	0·6143	0·6162	0·6181	0·6315
60·0	1·0231	1·0290	1·0351	1·0782	0·5898	0·5915	0·5932	0·6056
61·0	1·0222	1·0279	1·0337	1·0750	0·5657	0·5673	0·5689	0·5802
62·0	1·0213	1·0268	1·0323	1·0718	0·5422	0·5436	0·5451	0·5555
63·0	1·0205	1·0257	1·0310	1·0688	0·5191	0·5205	0·5218	0·5313
64·0	1·0196	1·0246	1·0297	1·0657	0·4965	0·4977	0·4990	0·5077
65·0	1·0188	1·0236	1·0284	1·0628	0·4743	0·4754	0·4765	0·4845
66·0	1·0180	1·0225	1·0271	1·0599	0·4525	0·4535	0·4545	0·4618
67·0	1·0171	1·0215	1·0259	1·0570	0·4311	0·4320	0·4329	0·4395
68·0	1·0163	1·0205	1·0246	1·0542	0·4100	0·4108	0·4117	0·4176
69·0	1·0155	1·0195	1·0234	1·0515	0·3892	0·3900	0·3907	0·3961
70·0	1·0147	1·0185	1·0222	1·0487	0·3688	0·3695	0·3702	0·3750
71·0	1·0140	1·0175	1·0210	1·0461	0·3486	0·3492	0·3498	0·3541
72·0	1·0132	1·0165	1·0198	1·0434	0·3288	0·3293	0·3298	0·3336
73·0	1·0124	1·0155	1·0187	1·0408	0·3091	0·3096	0·3101	0·3134
74·0	1·0117	1·0146	1·0175	1·0382	0·2897	0·2901	0·2906	0·2935
75·0	1·0109	1·0136	1·0163	1·0357	0·2705	0·2709	0·2713	0·2739
76·0	1·0101	1·0127	1·0152	1·0332	0·2516	0·2519	0·2522	0·2544
77·0	1·0094	1·0117	1·0141	1·0307	0·2328	0·2331	0·2333	0·2352
78·0	1·0087	1·0108	1·0130	1·0282	0·2142	0·2144	0·2146	0·2163
79·0	1·0079	1·0099	1·0119	1·0258	0·1957	0·1959	0·1961	0·1975
80·0	1·0072	1·0090	1·0107	1·0233	0·1774	0·1776	0·1778	0·1789
81·0	1·0064	1·0080	1·0097	1·0209	0·1593	0·1594	0·1595	0·1604
82·0	1·0057	1·0071	1·0086	1·0186	0·1412	0·1413	0·1414	0·1421
83·0	1·0050	1·0062	1·0075	1·0162	0·1233	0·1234	0·1235	0·1240
84·0	1·0043	1·0053	1·0064	1·0138	0·1055	0·1056	0·1056	0·1060
85·0	1·0036	1·0044	1·0053	1·0115	0·0878	0·0878	0·0878	0·0881
86·0	1·0028	1·0035	1·0043	1·0092	0·0701	0·0701	0·0702	0·0703
87·0	1·0021	1·0027	1·0032	1·0069	0·0525	0·0525	0·0525	0·0526
88·0	1·0014	1·0018	1·0021	1·0046	0·0350	0·0350	0·0350	0·0350
89·0	1·0007	1·0009	1·0011	1·0023	0·0175	0·0175	0·0175	0·0175
90·0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000

ϕ_c = 10° (continued)

Table 1

ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•4355	0•4384	0•4413	0•4621	0•9139	0•9183	0•9228	0•9548
46•0	0•4095	0•4121	0•4147	0•4336	0•8874	0•8916	0•8957	0•9257
47•0	0•3848	0•3872	0•3896	0•4067	0•8614	0•8653	0•8692	0•8974
48•0	0•3615	0•3636	0•3658	0•3813	0•8359	0•8396	0•8433	0•8697
49•0	0•3393	0•3413	0•3432	0•3573	0•8109	0•8144	0•8178	0•8426
50•0	0•3183	0•3201	0•3219	0•3347	0•7864	0•7896	0•7928	0•8160
51•0	0•2984	0•3000	0•3017	0•3132	0•7622	0•7652	0•7683	0•7900
52•0	0•2796	0•2810	0•2825	0•2929	0•7385	0•7413	0•7442	0•7645
53•0	0•2616	0•2629	0•2643	0•2737	0•7151	0•7178	0•7204	0•7394
54•0	0•2446	0•2458	0•2470	0•2555	0•6921	0•6946	0•6971	0•7148
55•0	0•2285	0•2295	0•2306	0•2382	0•6695	0•6718	0•6741	0•6906
56•0	0•2131	0•2141	0•2150	0•2219	0•6472	0•6493	0•6515	0•6669
57•0	0•1985	0•1994	0•2003	0•2064	0•6251	0•6272	0•6292	0•6435
58•0	0•1847	0•1855	0•1862	0•1917	0•6034	0•6053	0•6072	0•6205
59•0	0•1716	0•1723	0•1729	0•1779	0•5820	0•5837	0•5855	0•5978
60•0	0•1591	0•1597	0•1603	0•1647	0•5608	0•5624	0•5640	0•5755
61•0	0•1473	0•1478	0•1483	0•1522	0•5399	0•5414	0•5429	0•5534
62•0	0•1360	0•1365	0•1370	0•1404	0•5192	0•5206	0•5219	0•5317
63•0	0•1254	0•1258	0•1262	0•1293	0•4987	0•5000	0•5013	0•5103
64•0	0•1153	0•1157	0•1160	0•1187	0•4785	0•4797	0•4808	0•4891
65•0	0•1057	0•1061	0•1064	0•1087	0•4585	0•4595	0•4606	0•4682
66•0	0•0967	0•0970	0•0973	0•0993	0•4386	0•4396	0•4406	0•4475
67•0	0•0881	0•0884	0•0886	0•0904	0•4190	0•4199	0•4208	0•4271
68•0	0•0801	0•0803	0•0805	0•0820	0•3995	0•4003	0•4011	0•4068
69•0	0•0725	0•0727	0•0728	0•0742	0•3802	0•3809	0•3817	0•3868
70•0	0•0653	0•0655	0•0656	0•0668	0•3611	0•3617	0•3624	0•3670
71•0	0•0586	0•0587	0•0588	0•0598	0•3421	0•3426	0•3432	0•3474
72•0	0•0523	0•0524	0•0525	0•0533	0•3232	0•3237	0•3242	0•3280
73•0	0•0464	0•0465	0•0466	0•0472	0•3045	0•3049	0•3054	0•3087
74•0	0•0409	0•0409	0•0410	0•0416	0•2859	0•2863	0•2867	0•2896
75•0	0•0357	0•0358	0•0359	0•0363	0•2674	0•2677	0•2681	0•2706
76•0	0•0310	0•0310	0•0311	0•0314	0•2490	0•2493	0•2496	0•2518
77•0	0•0266	0•0266	0•0267	0•0270	0•2308	0•2310	0•2313	0•2332
78•0	0•0226	0•0226	0•0226	0•0229	0•2126	0•2128	0•2130	0•2146
79•0	0•0189	0•0189	0•0189	0•0191	0•1945	0•1947	0•1949	0•1962
80•0	0•0156	0•0156	0•0156	0•0157	0•1765	0•1767	0•1768	0•1779
81•0	0•0126	0•0126	0•0126	0•0127	0•1586	0•1587	0•1589	0•1598
82•0	0•0099	0•0099	0•0099	0•0100	0•1408	0•1409	0•1410	0•1417
83•0	0•0076	0•0076	0•0076	0•0076	0•1230	0•1231	0•1232	0•1237
84•0	0•0055	0•0055	0•0055	0•0056	0•1053	0•1054	0•1054	0•1058
85•0	0•0038	0•0038	0•0038	0•0039	0•0877	0•0877	0•0877	0•0880
86•0	0•0025	0•0025	0•0025	0•0025	0•0700	0•0701	0•0701	0•0703
87•0	0•0014	0•0014	0•0014	0•0014	0•0525	0•0525	0•0525	0•0526
88•0	0•0006	0•0006	0•0006	0•0006	0•0350	0•0350	0•0350	0•0350
89•0	0•0002	0•0002	0•0002	0•0002	0•0175	0•0175	0•0175	0•0175
90•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000

TABLE 2 - QUADRANT 3

Reference Point at $\phi = 180°$

$\phi_c = 1°$

$\phi°$ - 180°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°3699	1°8766	1°8766	23°2709	-36°9876	-43°8280	-43°8280	-222°7048

$\phi_c = 2°$

$\phi°$ - 180°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0759	1°1576	1°2455	2°0784	-7°5900	-7°8780	-8°1806	-10°7834
1°0	1°1706	1°3701	1°6035	4°8238	-17°0402	-18°4920	-20°1087	-38°2326
1°5	1°3221	1°7470	2°3085	16°2405	-32°1472	-37°3139	-43°5877	-152°3675

$\phi_c = 3°$

$\phi°$ - 180°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0327	1°0664	1°1012	1°3788	-3°2638	-3°3171	-3°3715	-3°7874
1°0	1°0686	1°1417	1°2198	1°9383	-6°8404	-7°0744	-7°3190	-9°3800
1°5	1°1110	1°2338	1°3703	2°8551	-11°0582	-11°6696	-12°3260	-18°5426
2°0	1°1670	1°3608	1°5868	4°6518	-16°6124	-17°9920	-19°5244	-36°4941
2°5	1°2593	1°5833	1°9906	9°8852	-25°7426	-29°0549	-32°9354	-88°7707

$\phi_c = 4°$

$\phi°$ - 180°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0182	1°0367	1°0555	1°1971	-1°8147	-1°8312	-1°8479	-1°9704
1°0	1°0374	1°0760	1°1161	1°4416	-3°7235	-3°7928	-3°8639	-4°4136
1°5	1°0584	1°1199	1°1849	1°7588	-5°8057	-5°9743	-6°1493	-7°5828
2°0	1°0826	1°1711	1°2669	2°1968	-8°1824	-8°5171	-8°8700	-11°9559
2°5	1°1120	1°2351	1°3717	2°8599	-11°0712	-11°6839	-12°3418	-18°5743
3°0	1°1518	1°3240	1°5219	4°0352	-14°9583	-16°0766	-17°3064	-30°2995
3°5	1°2183	1°4790	1°7954	6°9767	-21°4267	-23°7205	-26°3419	-59°6318

$\phi_c = 5°$

$\phi°$ - 180°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0116	1°0233	1°0351	1°1217	-1°1549	-1°1616	-1°1683	-1°2168
1°0	1°0236	1°0477	1°0723	1°2613	-2°3475	-2°3751	-2°4031	-2°6117
1°5	1°0364	1°0738	1°1125	1°4256	-3°6065	-3°6716	-3°7382	-4°2518
2°0	1°0504	1°1026	1°1574	1°6251	-4°9698	-5°0933	-5°2208	-6°2420
2°5	1°0661	1°1353	1°2089	1°8774	-6°4924	-6°7031	-6°9229	-8°7574
3°0	1°0844	1°1740	1°2709	2°2150	-8°2637	-8°6051	-8°9652	-12°1207
3°5	1°1072	1°2228	1°3505	2°7065	-10°4501	-10°9959	-11°5797	-17°0141
4°0	1°1385	1°2911	1°4643	3°5327	-13°4267	-14°3274	-15°3087	-25°2357
4°5	1°1912	1°4101	1°6691	5°4351	-18°4157	-20°1091	-22°0102	-44°1515

$\phi_c = 1°$ Table 2

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	36°9909	43°8358	43°8358	223°9633	0°1776	0°2205	0°2205	1°4755

$\phi_c = 2°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	7°5899	7°8779	8°1805	10°7834	0°0339	0°0356	0°0374	0°0533
1°0	17°0393	18°4910	20°1076	38°2312	0°1597	0°1775	0°1976	0°4336
1°5	32°1436	37°3101	43°5839	152°4239	0°4965	0°5988	0°7253	3°0680

$\phi_c = 3°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	3°2638	3°3170	3°3714	3°7873	0°0144	0°0147	0°0150	0°0175
1°0	6°8401	7°0740	7°3186	9°3795	0°0615	0°0643	0°0672	0°0924
1°5	11°0568	11°6681	12°3244	18°5398	0°1542	0°1654	0°1775	0°2960
2°0	16°6083	17°9875	19°5194	36°4829	0°3252	0°3603	0°3997	0°8545
2°5	25°7320	29°0426	32°9212	88°7366	0°6881	0°8006	0°9342	2°9584

$\phi_c = 4°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°8147	1°8312	1°8479	1°9703	0°0080	0°0081	0°0082	0°0089
1°0	3°7233	3°7926	3°8637	4°4133	0°0330	0°0339	0°0347	0°0413
1°5	5°8050	5°9735	6°1485	7°5818	0°0786	0°0816	0°0848	0°1111
2°0	8°1805	8°5151	8°8680	11°9528	0°1515	0°1596	0°1683	0°2458
2°5	11°0671	11°6795	12°3370	18°5660	0°2654	0°2846	0°3053	0°5079
3°0	14°9497	16°0671	17°2958	30°2775	0°4529	0°4966	0°5451	1°0762
3°5	21°4079	23°6991	26°3170	59°5686	0°8228	0°9340	1°0613	2°7643

$\phi_c = 5°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°1549	1°1616	1°1683	1°2168	0°0051	0°0051	0°0051	0°0054
1°0	2°3474	2°3749	2°4029	2°6115	0°0207	0°0210	0°0214	0°0238
1°5	3°6061	3°6711	3°7377	4°2513	0°0482	0°0494	0°0506	0°0598
2°0	4°9687	5°0922	5°2197	6°2405	0°0900	0°0929	0°0960	0°1209
2°5	6°4901	6°7007	6°9204	8°7539	0°1499	0°1563	0°1630	0°2201
3°0	8°2594	8°6005	8°9604	12°1134	0°2351	0°2478	0°2613	0°3823
3°5	10°4423	10°9374	11°5706	16°9988	0°3594	0°3838	0°4101	0°6612
4°0	13°4124	14°3118	15°2915	25°2026	0°5549	0°6027	0°6551	1°2026
4°5	18°3879	20°0778	21°9749	44°0690	0°9271	1°0342	1°1555	2°6193

$\phi_c = 6°$

$\phi° - 180°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0080	1°0161	1°0242	1°0829	−0°7994	−0°8026	−0°8058	−0°8287
1°0	1°0163	1°0328	1°0494	1°1741	−1°6167	−1°6297	−1°6429	−1°7395
1°5	1°0250	1°0503	1°0762	1°2761	−2°4649	−2°4953	−2°5262	−2°7571
2°0	1°0343	1°0690	1°1049	1°3924	−3°3598	−3°4163	−3°4740	−3°9161
2°5	1°0443	1°0894	1°1365	1°5281	−4°3220	−4°4154	−4°5114	−5°2670
3°0	1°0554	1°1122	1°1720	1°6910	−5°3801	−5°5248	−5°6746	−6°8878
3°5	1°0682	1°1384	1°2132	1°8942	−6°5776	−6°7938	−7°0195	−8°9074
4°0	1°0833	1°1697	1°2630	2°1614	−7°9865	−8°3052	−8°6409	−11°5595
4°5	1°1022	1°2095	1°3271	2°5414	−9°7420	−10°2161	−10°7210	−15°3288
5°0	1°1285	1°2653	1°4187	3°1601	−12°1501	−12°8872	−13°6840	−21°4594
5°5	1°1732	1°3626	1°5826	4°5117	−16°2065	−17°5170	−18°9687	−34°8404

$\phi_c = 7°$

$\phi° - 180°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0059	1°0118	1°0177	1°0602	−0°5859	−0°5876	−0°5893	−0°6016
1°0	1°0120	1°0239	1°0360	1°1248	−1°1814	−1°1884	−1°1954	−1°2463
1°5	1°0183	1°0365	1°0551	1°1949	−1°7933	−1°8094	−1°8257	−1°9452
2°0	1°0249	1°0498	1°0753	1°2720	−2°4294	−2°4589	−2°4889	−2°7129
2°5	1°0320	1°0640	1°0970	1°3581	−3°0991	−3°1471	−3°1961	−3°5690
3°0	1°0397	1°0793	1°1205	1°4560	−3°8146	−3°8874	−3°9620	−4°5405
3°5	1°0481	1°0962	1°1465	1°5696	−4°5925	−4°6979	−4°8065	−5°6672
4°0	1°0576	1°1153	1°1761	1°7052	−5°4562	−5°6050	−5°7592	−7°0097
4°5	1°0686	1°1373	1°2105	1°8728	−6°4422	−6°6495	−6°8658	−8°6677
5°0	1°0817	1°1639	1°2523	2°0907	−7°6110	−7°9004	−8°2044	−10°8201
5°5	1°0984	1°1978	1°3063	2°3961	−9°0769	−9°4883	−9°9245	−13°8324
6°0	1°1216	1°2457	1°3834	2°8827	−11°0987	−11°7134	−12°3734	−18°6263
6°5	1°1614	1°3291	1°5209	3°9087	−14°5178	−15°5684	−16°7202	−28°7204

$\phi_c = 8°$

$\phi° - 180°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0045	1°0090	1°0135	1°0457	−0°4477	−0°4488	−0°4498	−0°4569
1°0	1°0092	1°0183	1°0274	1°0940	−0°9011	−0°9052	−0°9093	−0°9386
1°5	1°0140	1°0278	1°0418	1°1455	−1°3640	−1°3733	−1°3827	−1°4508
2°0	1°0190	1°0378	1°0569	1°2008	−1°8406	−1°8576	−1°8747	−2°0008
2°5	1°0244	1°0483	1°0728	1°2609	−2°3361	−2°3634	−2°3911	−2°5976
3°0	1°0301	1°0595	1°0897	1°3271	−2°8565	−2°8973	−2°9389	−3°2530
3°5	1°0362	1°0715	1°1080	1°4009	−3°4096	−3°4677	−3°5271	−3°9830
4°0	1°0429	1°0847	1°1281	1°4846	−4°0054	−4°0855	−4°1679	−4°8096
4°5	1°0504	1°0993	1°1504	1°5816	−4°6579	−4°7663	−4°8781	−5°7651
5°0	1°0589	1°1158	1°1759	1°6967	−5°3875	−5°5325	−5°6827	−6°8986
5°5	1°0688	1°1352	1°2057	1°8384	−6°2254	−6°4190	−6°6205	−8°2900
6°0	1°0807	1°1586	1°2420	2°0211	−7°2242	−7°4848	−7°7579	−10°0821
6°5	1°0960	1°1886	1°2891	2°2745	−8°4830	−8°8421	−9°2215	−12°5635
7°0	1°1174	1°2311	1°3564	2°6724	−10°2266	−10°7480	−11°3049	−16°4519
7°5	1°1544	1°3054	1°4761	3°4900	−13°1852	−14°0507	−14°9918	−24°4308

$\phi_c = 6°$ Table 2

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°7993	0°8025	0°8058	0°8287	0°0035	0°0035	0°0035	0°0037
1°0	1°6166	1°6296	1°6428	1°7394	0°0142	0°0144	0°0145	0°0157
1°5	2°4646	2°4950	2°5259	2°7567	0°0327	0°0333	0°0338	0°0379
2°0	3°3591	3°4156	3°4732	3°9152	0°0601	0°0615	0°0628	0°0735
2°5	4°3205	4°4139	4°5099	5°2650	0°0979	0°1007	0°1036	0°1267
3°0	5°3774	5°5220	5°6717	6°8640	0°1488	0°1541	0°1595	0°2047
3°5	6°5730	6°7890	7°0144	8°9003	0°2168	0°2262	0°2360	0°3195
4°0	7°9789	8°2971	8°6324	11°5467	0°3091	0°3252	0°3422	0°4935
4°5	9°7295	10°2027	10°7067	15°3056	0°4396	0°4672	0°4968	0°7740
5°0	12°1292	12°8646	13°6595	21°4149	0°6396	0°6892	0°7431	1°2842
5°5	16°1688	17°4751	18°9222	34°7411	1°0129	1°1153	1°2296	2°5185

$\phi_c = 7°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°5859	0°5876	0°5893	0°6016	0°0026	0°0026	0°0026	0°0027
1°0	1°1814	1°1884	1°1954	1°2462	0°0104	0°0104	0°0105	0°0111
1°5	1°7931	1°8092	1°8255	1°9450	0°0237	0°0240	0°0243	0°0264
2°0	2°4289	2°4584	2°4884	2°7123	0°0432	0°0439	0°0446	0°0499
2°5	3°0981	3°1461	3°1951	3°5677	0°0695	0°0709	0°0724	0°0836
3°0	3°8128	3°8855	3°9600	4°5381	0°1039	0°1065	0°1092	0°1303
3°5	4°5893	4°6947	4°8032	5°6630	0°1480	0°1525	0°1571	0°1943
4°0	5°4512	5°5998	5°7538	7°0026	0°2046	0°2119	0°2195	0°2823
4°5	6°4345	6°6415	6°8574	8°6560	0°2778	0°2894	0°3017	0°4055
5°0	7°5993	7°8880	8°1913	10°8009	0°3747	0°3932	0°4127	0°5841
5°5	9°0590	9°4692	9°9042	13°8005	0°5091	0°5388	0°5705	0°8606
6°0	11°0705	11°6830	12°3407	18°5701	0°7122	0°7624	0°8166	1°3428
6°5	14°4695	15°5153	16°6618	28°6050	1°0862	1°1641	1°2922	2°4489

$\phi_c = 8°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°4477	0°4487	0°4498	0°4569	0°0020	0°0020	0°0020	0°0020
1°0	0°9011	0°9051	0°9092	0°9385	0°0079	0°0079	0°0080	0°0083
1°5	1°3638	1°3731	1°3825	1°4506	0°0180	0°0182	0°0183	0°0195
2°0	1°8403	1°8572	1°8743	2°0004	0°0326	0°0330	0°0334	0°0364
2°5	2°3354	2°3626	2°3903	2°5967	0°0520	0°0528	0°0537	0°0598
3°0	2°8552	2°8959	2°9375	3°2514	0°0770	0°0785	0°0800	0°0913
3°5	3°4073	3°4654	3°5247	3°9802	0°1084	0°1108	0°1134	0°1328
4°0	4°0018	4°0819	4°1641	4°8050	0°1474	0°1513	0°1553	0°1869
4°5	4°6526	4°7608	4°8724	5°7579	0°1958	0°2018	0°2080	0°2578
5°0	5°3796	5°5243	5°6742	6°8874	0°2563	0°2653	0°2747	0°3518
5°5	6°2140	6°4071	6°6081	8°2730	0°3331	0°3465	0°3606	0°4794
6°0	7°2078	7°4675	7°7397	10°0561	0°4333	0°4535	0°4748	0°6593
6°5	8°4591	8°8167	9°1945	12°5226	0°5706	0°6015	0°6344	0°9301
7°0	10°1905	10°7094	11°2635	16°3839	0°7760	0°8261	0°8799	1°3806
7°5	13°1256	13°9857	14°9210	24°2994	1°1509	1°2446	1°3472	2°4010

$\phi_c = 9°$

$\phi° - 180°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0036	1°0071	1°0107	1°0359	−0°3532	−0°3538	−0°3545	−0°3589
1°0	1°0073	1°0144	1°0216	1°0735	−0°7099	−0°7124	−0°7150	−0°7330
1°5	1°0111	1°0219	1°0329	1°1129	−1°0725	−1°0782	−1°0840	−1°1258
2°0	1°0151	1°0297	1°0446	1°1548	−1°4436	−1°4540	−1°4645	−1°5410
2°5	1°0193	1°0379	1°0568	1°1995	−1°8260	−1°8427	−1°8596	−1°9836
3°0	1°0237	1°0465	1°0697	1°2476	−2°2233	−2°2480	−2°2731	−2°4594
3°5	1°0285	1°0556	1°0834	1°3000	−2°6395	−2°6744	−2°7098	−2°9761
4°0	1°0336	1°0654	1°0982	1°3577	−3°0798	−3°1272	−3°1756	−3°5435
4°5	1°0391	1°0760	1°1142	1°4220	−3°5508	−3°6138	−3°6783	−4°1749
5°0	1°0453	1°0877	1°1318	1°4949	−4°0612	−4°1436	−4°2283	−4°8891
5°5	1°0522	1°1007	1°1515	1°5791	−4°6234	−4°7301	−4°8402	−5°7127
6°0	1°0601	1°1157	1°1741	1°6789	−5°2551	−5°3929	−5°5357	−6°6867
6°5	1°0693	1°1331	1°2007	1°8012	−5°9839	−6°1627	−6°3485	−7°8774
7°0	1°0806	1°1544	1°2332	1°9581	−6°8565	−7°0910	−7°3363	−9°4023
7°5	1°0951	1°1818	1°2754	2°1742	−7°9605	−8°2764	−8°6091	−11°4972
8°0	1°1156	1°2208	1°3358	2°5097	−9°4950	−9°9441	−10°4214	−14°7430
8°5	1°1510	1°2889	1°4433	3°1863	−12°1069	−12°8356	−13°6226	−21°2764

$\phi_c = 10°$

$\phi° - 180°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	1°0029	1°0058	1°0086	1°0290	−0°2857	−0°2861	−0°2865	−0°2894
1°0	1°0059	1°0117	1°0175	1°0590	−0°5736	−0°5753	−0°5769	−0°5887
1°5	1°0090	1°0177	1°0265	1°0904	−0°8654	−0°8692	−0°8729	−0°8999
2°0	1°0123	1°0240	1°0359	1°1232	−1°1627	−1°1695	−1°1763	−1°2255
2°5	1°0157	1°0306	1°0457	1°1579	−1°4673	−1°4781	−1°4890	−1°5681
3°0	1°0193	1°0374	1°0559	1°1947	−1°7814	−1°7973	−1°8133	−1°9312
3°5	1°0231	1°0446	1°0666	1°2342	−2°1073	−2°1295	−2°1520	−2°3187
4°0	1°0272	1°0523	1°0780	1°2767	−2°4479	−2°4778	−2°5083	−2°7357
4°5	1°0316	1°0605	1°0902	1°3230	−2°8068	−2°8461	−2°8862	−3°1889
5°0	1°0364	1°0694	1°1034	1°3741	−3°1884	−3°2392	−3°2911	−3°6866
5°5	1°0416	1°0790	1°1178	1°4310	−3°5986	−3°6633	−3°7296	−4°2403
6°0	1°0475	1°0897	1°1337	1°4955	−4°0453	−4°1270	−4°2109	−4°8659
6°5	1°0540	1°1018	1°1516	1°5699	−4°5393	−4°6421	−4°7481	−5°5863
7°0	1°0616	1°1155	1°1722	1°6580	−5°0966	−5°2262	−5°3602	−6°4364
7°5	1°0706	1°1318	1°1965	1°7656	−5°7421	−5°9065	−6°0773	−7°4725
8°0	1°0815	1°1516	1°2263	1°9032	−6°5175	−6°7293	−6°9502	−8°7938
8°5	1°0957	1°1773	1°2650	2°0916	−7°5018	−7°7821	−8°0764	−10°5985
9°0	1°1158	1°2139	1°3206	2°3818	−8°8743	−9°2660	−9°6808	−13°3708
9°5	1°1508	1°2782	1°4195	2°9589	−11°2169	−11°8414	−12°5120	−18°8698

$\phi_c = 9°$ Table 2

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°3532	0°3538	0°3544	0°3589	0°0015	0°0015	0°0016	0°0016
1°0	0°7099	0°7124	0°7149	0°7330	0°0062	0°0062	0°0063	0°0065
1°5	1°0724	1°0781	1°0839	1°1256	0°0141	0°0142	0°0143	0°0151
2°0	1°4433	1°4537	1°4642	1°5407	0°0255	0°0257	0°0260	0°0278
2°5	1°8254	1°8421	1°8590	1°9829	0°0405	0°0410	0°0415	0°0452
3°0	2°2223	2°2470	2°2720	2°4582	0°0596	0°0604	0°0613	0°0680
3°5	2°6378	2°6726	2°7080	2°9740	0°0832	0°0846	0°0861	0°0973
4°0	3°0772	3°1245	3°1728	3°5402	0°1120	0°1143	0°1166	0°1345
4°5	3°5468	3°6097	3°6741	4°1699	0°1469	0°1504	0°1539	0°1813
5°0	4°0555	4°1377	4°2222	4°8816	0°1892	0°1943	0°1995	0°2405
5°5	4°6153	4°7218	4°8316	5°7018	0°2407	0°2480	0°2555	0°3160
6°0	5°2438	5°3812	5°5235	6°6708	0°3040	0°3145	0°3253	0°4137
6°5	5°9683	6°1464	6°3315	7°8545	0°3835	0°3983	0°4139	0°5435
7°0	6°8348	7°0683	7°3124	9°3687	0°4862	0°5076	0°5301	0°7231
7°5	7°9299	8°2442	8°5750	11°4468	0°6257	0°6574	0°6910	0°9880
8°0	9°4504	9°8965	10°3707	14°6628	0°8331	0°8828	0°9359	1°4269
8°5	12°0355	12°7582	13°5388	21°1289	1°2092	1°2993	1°3970	2°3687

$\phi_c = 10°$

$\phi° - 180°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°2857	0°2861	0°2865	0°2894	0°0012	0°0012	0°0013	0°0013
1°0	0°5736	0°5752	0°5769	0°5886	0°0050	0°0050	0°0051	0°0052
1°5	0°8653	0°8691	0°8728	0°8998	0°0114	0°0115	0°0115	0°0120
2°0	1°1625	1°1692	1°1760	1°2252	0°0205	0°0206	0°0208	0°0219
2°5	1°4669	1°4776	1°4885	1°5676	0°0324	0°0328	0°0331	0°0354
3°0	1°7806	1°7964	1°8124	1°9302	0°0475	0°0481	0°0486	0°0528
3°5	2°1059	2°1281	2°1506	2°3171	0°0660	0°0669	0°0679	0°0748
4°0	2°4458	2°4757	2°5061	2°7333	0°0883	0°0897	0°0912	0°1021
4°5	2°8037	2°8430	2°8830	3°1852	0°1149	0°1170	0°1192	0°1357
5°0	3°1840	3°2347	3°2864	3°6812	0°1465	0°1496	0°1527	0°1770
5°5	3°5925	3°6570	3°7231	4°2325	0°1841	0°1884	0°1929	0°2277
6°0	4°0369	4°1184	4°2020	4°8550	0°2289	0°2349	0°2412	0°2904
6°5	4°5279	4°6304	4°7360	5°5711	0°2827	0°2910	0°2997	0°3690
7°0	5°0814	5°2105	5°3439	6°4153	0°3482	0°3597	0°3717	0°4690
7°5	5°7217	5°8853	6°0552	7°4431	0°4298	0°4457	0°4623	0°5999
8°0	6°4900	6°7005	6°9201	8°7523	0°5344	0°5568	0°5801	0°7783
8°5	7°4641	7°7425	8°0346	10°5332	0°6759	0°7081	0°7420	1°0378
9°0	8°8206	9°2090	9°6203	13°2781	0°8851	0°9342	0°9865	1°4605
9°5	11°1331	11°7510	12°4147	18°7058	1°2629	1°3496	1°4432	2°3480

TABLE 3 - QUADRANT 2

Reference Point at $\phi = 180°$

$\phi_c = 1°$

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000
0°5	0·7667	0·5879	0·4507	0·0702	23·3287	20·6073	18·3092	9·3032
1°0	0·6377	0·4066	0·2593	0·0111	36·2382	29·6721	24·6921	9·8932
1°5	0·5695	0·3243	0·1847	0·0036	43·0589	33·7885	27·1792	9·9684
2°0	0·5304	0·2812	0·1491	0·0018	46·9770	35·9429	28·3642	9·9867
2°5	0·5057	0·2557	0·1293	0·0011	49·4457	37·2215	29·0266	9·9933
3°0	0·4890	0·2390	0·1168	0·0008	51·1213	38·0546	29·4408	9·9965
3°5	0·4770	0·2274	0·1084	0·0006	52·3250	38·6357	29·7214	9·9982
4°0	0·4680	0·2189	0·1024	0·0005	53·2283	39·0623	29·9229	9·9992
4°5	0·4610	0·2124	0·0979	0·0004	53·9297	39·3880	30·0741	9·9999
5°0	0·4554	0·2073	0·0943	0·0004	54·4895	39·6443	30·1915	10·0004
6°0	0·4470	0·1997	0·0892	0·0003	55·3257	40·0215	30·3616	10·0011
7°0	0·4411	0·1945	0·0857	0·0003	55·9199	40·2852	30·4786	10·0015
8°0	0·4367	0·1906	0·0832	0·0003	56·3636	40·4798	30·5640	10·0017
9°0	0·4333	0·1876	0·0812	0·0002	56·7075	40·6293	30·6290	10·0019
10°0	0·4306	0·1852	0·0797	0·0002	56·9819	40·7478	30·6801	10·0021
11°0	0·4283	0·1833	0·0785	0·0002	57·2061	40·8440	30·7214	10·0022
12°0	0·4265	0·1817	0·0774	0·0002	57·3927	40·9237	30·7554	10·0023
13°0	0·4249	0·1804	0·0766	0·0002	57·5506	40·9908	30·7840	10·0023
14°0	0·4236	0·1793	0·0759	0·0002	57·6859	41·0482	30·8083	10·0024
15°0	0·4224	0·1783	0·0752	0·0002	57·8032	41·0977	30·8293	10·0025
16°0	0·4214	0·1774	0·0747	0·0002	57·9060	41·1411	30·8475	10·0025
17°0	0·4205	0·1766	0·0742	0·0002	57·9968	41·1793	30·8636	10·0025
18°0	0·4197	0·1760	0·0738	0·0002	58·0777	41·2132	30·8778	10·0026
19°0	0·4190	0·1754	0·0734	0·0002	58·1502	41·2436	30·8906	10·0026
20°0	0·4183	0·1748	0·0731	0·0002	58·2157	41·2710	30·9020	10·0026
21°0	0·4177	0·1743	0·0728	0·0002	58·2751	41·2958	30·9124	10·0026
22°0	0·4172	0·1739	0·0725	0·0002	58·3292	41·3184	30·9218	10·0027
23°0	0·4167	0·1735	0·0722	0·0002	58·3788	41·3390	30·9304	10·0027
24°0	0·4162	0·1731	0·0720	0·0002	58·4245	41·3580	30·9383	10·0027
25°0	0·4158	0·1727	0·0718	0·0002	58·4667	41·3755	30·9456	10·0027
26°0	0·4154	0·1724	0·0716	0·0002	58·5058	41·3918	30·9523	10·0027
27°0	0·4151	0·1721	0·0714	0·0002	58·5421	41·4069	30·9586	10·0027
28°0	0·4147	0·1718	0·0712	0·0001	58·5761	41·4209	30·9644	10·0028
29°0	0·4144	0·1716	0·0710	0·0001	58·6078	41·4341	30·9699	10·0028
30°0	0·4141	0·1713	0·0709	0·0001	58·6376	41·4464	30·9750	10·0028
31°0	0·4139	0·1711	0·0707	0·0001	58·6656	41·4580	30·9798	10·0028
32°0	0·4136	0·1709	0·0706	0·0001	58·6921	41·4689	30·9843	10·0028
33°0	0·4134	0·1707	0·0705	0·0001	58·7170	41·4792	30·9885	10·0028
34°0	0·4131	0·1705	0·0704	0·0001	58·7407	41·4890	30·9926	10·0028
35°0	0·4129	0·1703	0·0702	0·0001	58·7632	41·4983	30·9964	10·0028
36°0	0·4127	0·1701	0·0701	0·0001	58·7845	41·5071	31·0000	10·0028
37°0	0·4125	0·1700	0·0700	0·0001	58·8048	41·5155	31·0035	10·0028
38°0	0·4123	0·1698	0·0699	0·0001	58·8243	41·5235	31·0068	10·0028
39°0	0·4121	0·1697	0·0698	0·0001	58·8428	41·5311	31·0099	10·0028
40°0	0·4119	0·1695	0·0697	0·0001	58·8606	41·5384	31·0129	10·0028
41°0	0·4118	0·1694	0·0697	0·0001	58·8776	41·5454	31·0158	10·0029
42°0	0·4116	0·1692	0·0696	0·0001	58·8940	41·5521	31·0186	10·0029
43°0	0·4115	0·1691	0·0695	0·0001	58·9097	41·5586	31·0212	10·0029
44°0	0·4113	0·1690	0·0694	0·0001	58·9249	41·5648	31·0238	10·0029

$\phi_c = 1°$ Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0·0	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000
0·5	−23·3285	−20·6071	−18·3091	−9·3032	0·0935	0·0787	0·0665	0·0231
1·0	−36·2368	−29·6711	−24·6915	−9·8931	0·2564	0·1919	0·1454	0·0299
1·5	−43·0560	−33·7866	−27·1779	−9·9683	0·4022	0·2795	0·1981	0·0315
2·0	−46·9723	−35·9400	−28·3624	−9·9866	0·5204	0·3444	0·2338	0·0320
2·5	−49·4391	−37·2176	−29·0243	−9·9932	0·6166	0·3942	0·2595	0·0323
3·0	−51·1128	−38·0498	−29·4380	−9·9963	0·6966	0·4339	0·2793	0·0324
3·5	−52·3145	−38·6300	−29·7182	−9·9980	0·7645	0·4667	0·2951	0·0325
4·0	−53·2159	−39·0557	−29·9193	−9·9991	0·8234	0·4946	0·3082	0·0326
4·5	−53·9155	−39·3805	−30·0700	−9·9998	0·8753	0·5186	0·3194	0·0326
5·0	−54·4733	−39·6359	−30·1870	−10·0003	0·9216	0·5398	0·3291	0·0327
6·0	−55·3057	−40·0113	−30·3563	−10·0009	1·0013	0·5758	0·3453	0·0327
7·0	−55·8961	−40·2734	−30·4726	−10·0013	1·0683	0·6055	0·3585	0·0328
8·0	−56·3360	−40·4663	−30·5573	−10·0016	1·1260	0·6308	0·3696	0·0328
9·0	−56·6762	−40·6142	−30·6216	−10·0018	1·1767	0·6529	0·3792	0·0328
10·0	−56·9468	−40·7310	−30·6720	−10·0019	1·2219	0·6724	0·3876	0·0329
11·0	−57·1673	−40·8256	−30·7126	−10·0020	1·2627	0·6899	0·3951	0·0329
12·0	−57·3501	−40·9037	−30·7459	−10·0021	1·2999	0·7057	0·4019	0·0329
13·0	−57·5042	−40·9693	−30·7738	−10·0022	1·3340	0·7203	0·4081	0·0329
14·0	−57·6358	−41·0250	−30·7975	−10·0023	1·3656	0·7336	0·4138	0·0329
15·0	−57·7494	−41·0731	−30·8178	−10·0023	1·3949	0·7460	0·4190	0·0329
16·0	−57·8485	−41·1148	−30·8354	−10·0023	1·4224	0·7576	0·4239	0·0330
17·0	−57·9356	−41·1514	−30·8508	−10·0024	1·4481	0·7684	0·4284	0·0330
18·0	−58·0127	−41·1838	−30·8644	−10·0024	1·4725	0·7787	0·4327	0·0330
19·0	−58·0815	−41·2126	−30·8764	−10·0024	1·4955	0·7883	0·4368	0·0330
20·0	−58·1432	−41·2384	−30·8872	−10·0025	1·5173	0·7974	0·4406	0·0330
21·0	−58·1988	−41·2617	−30·8969	−10·0025	1·5381	0·8061	0·4442	0·0330
22·0	−58·2492	−41·2827	−30·9057	−10·0025	1·5579	0·8144	0·4477	0·0330
23·0	−58·2950	−41·3018	−30·9136	−10·0025	1·5769	0·8223	0·4510	0·0330
24·0	−58·3369	−41·3192	−30·9209	−10·0025	1·5951	0·8299	0·4541	0·0330
25·0	−58·3753	−41·3351	−30·9275	−10·0025	1·6126	0·8371	0·4571	0·0330
26·0	−58·4106	−41·3498	−30·9336	−10·0026	1·6294	0·8441	0·4600	0·0330
27·0	−58·4431	−41·3633	−30·9392	−10·0026	1·6456	0·8508	0·4628	0·0330
28·0	−58·4732	−41·3758	−30·9444	−10·0026	1·6613	0·8573	0·4655	0·0331
29·0	−58·5011	−41·3873	−30·9492	−10·0026	1·6764	0·8636	0·4681	0·0331
30·0	−58·5271	−41·3981	−30·9536	−10·0026	1·6911	0·8697	0·4706	0·0331
31·0	−58·5512	−41·4081	−30·9577	−10·0026	1·7053	0·8756	0·4730	0·0331
32·0	−58·5737	−41·4174	−30·9616	−10·0026	1·7192	0·8813	0·4754	0·0331
33·0	−58·5948	−41·4261	−30·9652	−10·0026	1·7326	0·8868	0·4777	0·0331
34·0	−58·6145	−41·4342	−30·9685	−10·0026	1·7456	0·8922	0·4799	0·0331
35·0	−58·6331	−41·4419	−30·9717	−10·0026	1·7583	0·8974	0·4821	0·0331
36·0	−58·6504	−41·4490	−30·9746	−10·0026	1·7707	0·9026	0·4842	0·0331
37·0	−58·6668	−41·4558	−30·9774	−10·0026	1·7828	0·9075	0·4863	0·0331
38·0	−58·6822	−41·4621	−30·9800	−10·0027	1·7947	0·9124	0·4883	0·0331
39·0	−58·6967	−41·4681	−30·9825	−10·0027	1·8062	0·9172	0·4902	0·0331
40·0	−58·7104	−41·4737	−30·9848	−10·0027	1·8175	0·9218	0·4921	0·0331
41·0	−58·7234	−41·4791	−30·9870	−10·0027	1·8286	0·9264	0·4940	0·0331
42·0	−58·7356	−41·4841	−30·9891	−10·0027	1·8394	0·9308	0·4958	0·0331
43·0	−58·7472	−41·4889	−30·9910	−10·0027	1·8500	0·9352	0·4976	0·0331
44·0	−58·7582	−41·4934	−30·9929	−10·0027	1·8605	0·9395	0·4994	0·0331

ϕ_c = 1° (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•4112	0•1689	0•0694	0•0001	58•9395	41•5708	31•0263	10•0029
46•0	0•4110	0•1688	0•0693	0•0001	58•9536	41•5766	31•0286	10•0029
47•0	0•4109	0•1686	0•0692	0•0001	58•9672	41•5822	31•0309	10•0029
48•0	0•4108	0•1685	0•0691	0•0001	58•9804	41•5876	31•0331	10•0029
49•0	0•4106	0•1684	0•0691	0•0001	58•9932	41•5929	31•0353	10•0029
50•0	0•4105	0•1683	0•0690	0•0001	59•0055	41•5980	31•0374	10•0029
51•0	0•4104	0•1682	0•0690	0•0001	59•0176	41•6029	31•0394	10•0029
52•0	0•4103	0•1681	0•0689	0•0001	59•0293	41•6077	31•0414	10•0029
53•0	0•4102	0•1680	0•0688	0•0001	59•0406	41•6123	31•0433	10•0029
54•0	0•4101	0•1680	0•0688	0•0001	59•0517	41•6169	31•0451	10•0029
55•0	0•4100	0•1679	0•0687	0•0001	59•0625	41•6213	31•0469	10•0029
56•0	0•4099	0•1678	0•0687	0•0001	59•0730	41•6256	31•0487	10•0029
57•0	0•4098	0•1677	0•0686	0•0001	59•0833	41•6298	31•0504	10•0029
58•0	0•4097	0•1676	0•0686	0•0001	59•0934	41•6339	31•0521	10•0029
59•0	0•4096	0•1675	0•0685	0•0001	59•1032	41•6379	31•0538	10•0029
60•0	0•4095	0•1675	0•0685	0•0001	59•1128	41•6419	31•0554	10•0029
61•0	0•4094	0•1674	0•0684	0•0001	59•1223	41•6457	31•0569	10•0029
62•0	0•4093	0•1673	0•0684	0•0001	59•1315	41•6495	31•0585	10•0029
63•0	0•4092	0•1672	0•0683	0•0001	59•1406	41•6532	31•0600	10•0029
64•0	0•4091	0•1672	0•0683	0•0001	59•1495	41•6569	31•0615	10•0029
65•0	0•4090	0•1671	0•0683	0•0001	59•1583	41•6605	31•0630	10•0029
66•0	0•4090	0•1670	0•0682	0•0001	59•1669	41•6640	31•0644	10•0029
67•0	0•4089	0•1670	0•0682	0•0001	59•1754	41•6674	31•0658	10•0029
68•0	0•4088	0•1669	0•0681	0•0001	59•1837	41•6709	31•0672	10•0029
69•0	0•4087	0•1668	0•0681	0•0001	59•1920	41•6742	31•0686	10•0030
70•0	0•4086	0•1668	0•0681	0•0001	59•2001	41•6775	31•0699	10•0030
71•0	0•4086	0•1667	0•0680	0•0001	59•2081	41•6808	31•0713	10•0030
72•0	0•4085	0•1666	0•0680	0•0001	59•2161	41•6840	31•0726	10•0030
73•0	0•4084	0•1666	0•0679	0•0001	59•2239	41•6872	31•0739	10•0030
74•0	0•4083	0•1665	0•0679	0•0001	59•2316	41•6904	31•0752	10•0030
75•0	0•4083	0•1664	0•0679	0•0001	59•2393	41•6935	31•0765	10•0030
76•0	0•4082	0•1664	0•0678	0•0001	59•2469	41•6966	31•0777	10•0030
77•0	0•4081	0•1663	0•0678	0•0001	59•2544	41•6997	31•0790	10•0030
78•0	0•4080	0•1663	0•0677	0•0001	59•2619	41•7027	31•0802	10•0030
79•0	0•4080	0•1662	0•0677	0•0001	59•2693	41•7058	31•0814	10•0030
80•0	0•4079	0•1661	0•0677	0•0001	59•2767	41•7088	31•0827	10•0030
81•0	0•4078	0•1661	0•0676	0•0001	59•2840	41•7117	31•0839	10•0030
82•0	0•4077	0•1660	0•0676	0•0001	59•2913	41•7147	31•0851	10•0030
83•0	0•4077	0•1660	0•0676	0•0001	59•2985	41•7177	31•0863	10•0030
84•0	0•4076	0•1659	0•0675	0•0001	59•3057	41•7206	31•0875	10•0030
85•0	0•4075	0•1659	0•0675	0•0001	59•3129	41•7235	31•0887	10•0030
86•0	0•4075	0•1658	0•0675	0•0001	59•3201	41•7264	31•0898	10•0030
87•0	0•4074	0•1657	0•0674	0•0001	59•3272	41•7293	31•0910	10•0030
88•0	0•4073	0•1657	0•0674	0•0001	59•3343	41•7322	31•0922	10•0030
89•0	0•4073	0•1656	0•0674	0•0001	59•3414	41•7351	31•0934	10•0030
90•0	0•4072	0•1656	0•0673	0•0001	59•3486	41•7380	31•0946	10•0030

ϕ_c = 1° (continued) Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45°0	−58°7686	−41°4977	−30°9946	−10°0027	1°8707	0°9437	0°5011	0°0331
46°0	−58°7785	−41°5017	−30°9963	−10°0027	1°8808	0°9478	0°5028	0°0331
47°0	−58°7879	−41°5056	−30°9979	−10°0027	1°8906	0°9519	0°5045	0°0331
48°0	−58°7968	−41°5092	−30°9994	−10°0027	1°9004	0°9559	0°5061	0°0331
49°0	−58°8053	−41°5127	−31°0008	−10°0027	1°9099	0°9598	0°5077	0°0331
50°0	−58°8133	−41°5160	−31°0022	−10°0027	1°9194	0°9637	0°5093	0°0331
51°0	−58°8210	−41°5191	−31°0035	−10°0027	1°9286	0°9675	0°5109	0°0331
52°0	−58°8282	−41°5221	−31°0047	−10°0027	1°9378	0°9712	0°5124	0°0331
53°0	−58°8352	−41°5249	−31°0058	−10°0027	1°9468	0°9749	0°5139	0°0332
54°0	−58°8418	−41°5276	−31°0069	−10°0027	1°9557	0°9785	0°5154	0°0332
55°0	−58°8480	−41°5302	−31°0080	−10°0027	1°9645	0°9821	0°5169	0°0332
56°0	−58°8540	−41°5327	−31°0090	−10°0027	1°9732	0°9857	0°5183	0°0332
57°0	−58°8597	−41°5350	−31°0100	−10°0027	1°9818	0°9892	0°5198	0°0332
58°0	−58°8651	−41°5372	−31°0109	−10°0027	1°9902	0°9927	0°5212	0°0332
59°0	−58°8702	−41°5393	−31°0117	−10°0027	1°9986	0°9961	0°5226	0°0332
60°0	−58°8751	−41°5413	−31°0125	−10°0027	2°0069	0°9995	0°5240	0°0332
61°0	−58°8797	−41°5432	−31°0133	−10°0027	2°0151	1°0029	0°5254	0°0332
62°0	−58°8842	−41°5450	−31°0140	−10°0027	2°0232	1°0062	0°5267	0°0332
63°0	−58°8883	−41°5467	−31°0147	−10°0027	2°0313	1°0095	0°5281	0°0332
64°0	−58°8923	−41°5483	−31°0154	−10°0027	2°0393	1°0127	0°5294	0°0332
65°0	−58°8961	−41°5499	−31°0160	−10°0027	2°0472	1°0160	0°5307	0°0332
66°0	−58°8997	−41°5513	−31°0166	−10°0027	2°0550	1°0192	0°5320	0°0332
67°0	−58°9031	−41°5527	−31°0172	−10°0027	2°0628	1°0223	0°5333	0°0332
68°0	−58°9062	−41°5540	−31°0177	−10°0027	2°0705	1°0255	0°5346	0°0332
69°0	−58°9093	−41°5553	−31°0182	−10°0027	2°0782	1°0286	0°5359	0°0332
70°0	−58°9121	−41°5564	−31°0187	−10°0027	2°0858	1°0317	0°5372	0°0332
71°0	−58°9148	−41°5575	−31°0192	−10°0027	2°0934	1°0348	0°5384	0°0332
72°0	−58°9173	−41°5585	−31°0196	−10°0027	2°1009	1°0379	0°5397	0°0332
73°0	−58°9197	−41°5595	−31°0200	−10°0027	2°1084	1°0409	0°5409	0°0332
74°0	−58°9219	−41°5604	−31°0203	−10°0027	2°1158	1°0440	0°5421	0°0332
75°0	−58°9239	−41°5612	−31°0207	−10°0027	2°1232	1°0470	0°5434	0°0332
76°0	−58°9258	−41°5620	−31°0210	−10°0027	2°1306	1°0500	0°5446	0°0332
77°0	−58°9276	−41°5627	−31°0213	−10°0027	2°1379	1°0530	0°5458	0°0332
78°0	−58°9292	−41°5634	−31°0215	−10°0027	2°1452	1°0559	0°5470	0°0332
79°0	−58°9307	−41°5640	−31°0218	−10°0027	2°1524	1°0589	0°5482	0°0332
80°0	−58°9320	−41°5645	−31°0220	−10°0027	2°1597	1°0619	0°5494	0°0332
81°0	−58°9332	−41°5650	−31°0222	−10°0027	2°1669	1°0648	0°5506	0°0332
82°0	−58°9343	−41°5655	−31°0224	−10°0027	2°1741	1°0677	0°5518	0°0332
83°0	−58°9352	−41°5658	−31°0226	−10°0027	2°1813	1°0706	0°5530	0°0332
84°0	−58°9361	−41°5662	−31°0227	−10°0027	2°1884	1°0736	0°5542	0°0332
85°0	−58°9367	−41°5665	−31°0228	−10°0027	2°1956	1°0765	0°5554	0°0332
86°0	−58°9373	−41°5667	−31°0229	−10°0027	2°2027	1°0794	0°5566	0°0332
87°0	−58°9377	−41°5669	−31°0230	−10°0027	2°2098	1°0823	0°5577	0°0332
88°0	−58°9381	−41°5670	−31°0230	−10°0027	2°2170	1°0852	0°5589	0°0332
89°0	−58°9382	−41°5671	−31°0230	−10°0027	2°2241	1°0881	0°5601	0°0332
90°0	−58°9383	−41°5671	−31°0231	−10°0027	2°2312	1°0909	0°5613	0°0332

$\phi_c = 2°$

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°9323	0°8691	0°8102	0°4958	6°7765	6°5468	6°3276	5°0425
1°0	0°8758	0°7668	0°6715	0°2650	12°4371	11°6636	10°9544	7°3503
1°5	0°8319	0°6918	0°5754	0°1583	16°8356	15°4185	14°1604	8°4175
2°0	0°7989	0°6379	0°5094	0°1054	20°1507	18°1205	16°3631	8°9466
2°5	0°7740	0°5988	0°4632	0°0768	22°6449	20°0811	17°9043	9°2332
3°0	0°7551	0°5698	0°4300	0°0599	24°5462	21°5339	19°0145	9°4023
3°5	0°7405	0°5478	0°4053	0°0492	26°0230	22°6374	19°8390	9°5096
4°0	0°7289	0°5307	0°3864	0°0419	27°1928	23°4960	20°4692	9°5820
4°5	0°7195	0°5171	0°3717	0°0368	28°1370	24°1790	20°9634	9°6333
5°0	0°7118	0°5061	0°3598	0°0330	28°9122	24°7332	21°3595	9°6711
6°0	0°7000	0°4894	0°3421	0°0279	30°1042	25°5736	21°9520	9°7224
7°0	0°6915	0°4774	0°3296	0°0246	30°9741	26°1779	22°3719	9°7552
8°0	0°6850	0°4684	0°3203	0°0224	31°6350	26°6320	22°6838	9°7778
9°0	0°6799	0°4614	0°3131	0°0207	32°1532	26°9850	22°9243	9°7942
10°0	0°6758	0°4558	0°3074	0°0195	32°5701	27°2671	23°1151	9°8066
11°0	0°6724	0°4512	0°3028	0°0185	32°9128	27°4976	23°2702	9°8162
12°0	0°6696	0°4474	0°2990	0°0178	33°1993	27°6894	23°3987	9°8240
13°0	0°6673	0°4442	0°2957	0°0171	33°4426	27°8517	23°5069	9°8303
14°0	0°6652	0°4415	0°2930	0°0166	33°6517	27°9907	23°5993	9°8356
15°0	0°6635	0°4391	0°2906	0°0162	33°8334	28°1111	23°6791	9°8401
16°0	0°6619	0°4370	0°2886	0°0158	33°9929	28°2165	23°7488	9°8440
17°0	0°6606	0°4352	0°2867	0°0155	34°1341	28°3096	23°8102	9°8473
18°0	0°6594	0°4336	0°2851	0°0152	34°2599	28°3925	23°8647	9°8502
19°0	0°6583	0°4321	0°2837	0°0149	34°3729	28°4667	23°9135	9°8528
20°0	0°6573	0°4308	0°2824	0°0147	34°4750	28°5337	23°9574	9°8551
21°0	0°6564	0°4296	0°2812	0°0145	34°5676	28°5944	23°9972	9°8571
22°0	0°6556	0°4286	0°2801	0°0143	34°6522	28°6497	24°0334	9°8590
23°0	0°6549	0°4276	0°2792	0°0141	34°7297	28°7003	24°0665	9°8607
24°0	0°6542	0°4267	0°2783	0°0140	34°8011	28°7469	24°0968	9°8622
25°0	0°6536	0°4258	0°2774	0°0138	34°8671	28°7899	24°1249	9°8636
26°0	0°6530	0°4250	0°2767	0°0137	34°9283	28°8297	24°1508	9°8649
27°0	0°6524	0°4243	0°2760	0°0136	34°9852	28°8668	24°1749	9°8661
28°0	0°6519	0°4236	0°2753	0°0135	35°0383	28°9013	24°1974	9°8672
29°0	0°6515	0°4230	0°2747	0°0134	35°0880	28°9336	24°2184	9°8682
30°0	0°6510	0°4224	0°2741	0°0133	35°1347	28°9639	24°2380	9°8692
31°0	0°6506	0°4219	0°2736	0°0132	35°1787	28°9924	24°2565	9°8701
32°0	0°6502	0°4214	0°2730	0°0131	35°2201	29°0193	24°2739	9°8709
33°0	0°6499	0°4209	0°2726	0°0130	35°2593	29°0446	24°2904	9°8717
34°0	0°6495	0°4204	0°2721	0°0130	35°2964	29°0687	24°3059	9°8724
35°0	0°6492	0°4200	0°2717	0°0129	35°3316	29°0915	24°3207	9°8731
36°0	0°6489	0°4195	0°2713	0°0128	35°3651	29°1131	24°3347	9°8738
37°0	0°6486	0°4191	0°2709	0°0128	35°3970	29°1338	24°3480	9°8744
38°0	0°6483	0°4188	0°2705	0°0127	35°4275	29°1534	24°3607	9°8750
39°0	0°6480	0°4184	0°2701	0°0126	35°4566	29°1723	24°3729	9°8756
40°0	0°6478	0°4181	0°2698	0°0126	35°4845	29°1903	24°3845	9°8761
41°0	0°6475	0°4177	0°2695	0°0125	35°5112	29°2075	24°3956	9°8766
42°0	0°6473	0°4174	0°2692	0°0125	35°5369	29°2241	24°4063	9°8771
43°0	0°6471	0°4171	0°2689	0°0124	35°5616	29°2400	24°4166	9°8776
44°0	0°6468	0°4168	0°2686	0°0124	35°5854	29°2553	24°4265	9°8781

$\phi_c = 2°$ Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0•0	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000	0•0000
0•5	−6•7764	−6•5467	−6•3275	−5•0425	0•0289	0•0276	0•0264	0•0192
1•0	−12•4365	−11•6631	−10•9539	−7•3501	0•1021	0•0935	0•0858	0•0681
1•5	−16•8340	−15•4171	−14•1592	−8•4171	0•1972	0•1745	0•1548	0•0708
2•0	−20•1475	−18•1179	−16•3608	−8•9458	0•2977	0•2564	0•2215	0•0867
2•5	−22•6398	−20•0770	−17•9009	−9•2322	0•3951	0•3329	0•2816	0•0979
3•0	−24•5390	−21•5281	−19•0098	−9•4012	0•4860	0•4023	0•3346	0•1059
3•5	−26•0134	−22•6298	−19•8330	−9•5083	0•5695	0•4647	0•3812	0•1120
4•0	−27•1807	−23•4866	−20•4619	−9•5806	0•6458	0•5207	0•4223	0•1167
4•5	−28•1223	−24•1678	−20•9547	−9•6317	0•7156	0•5712	0•4588	0•1205
5•0	−28•8949	−24•7200	−21•3494	−9•6694	0•7797	0•6170	0•4916	0•1236
6•0	−30•0814	−25•5566	−21•9393	−9•7205	0•8934	0•6971	0•5481	0•1285
7•0	−30•9458	−26•1570	−22•3564	−9•7531	0•9915	0•7653	0•5954	0•1322
8•0	−31•6010	−26•6072	−22•6657	−9•7754	1•0775	0•8244	0•6360	0•1351
9•0	−32•1135	−26•9563	−22•9036	−9•7916	1•1539	0•8764	0•6714	0•1375
10•0	−32•5248	−27•2346	−23•0918	−9•8038	1•2226	0•9229	0•7029	0•1396
11•0	−32•8617	−27•4612	−23•2443	−9•8133	1•2849	0•9648	0•7311	0•1413
12•0	−33•1425	−27•6493	−23•3702	−9•8209	1•3420	1•0030	0•7567	0•1429
13•0	−33•3800	−27•8077	−23•4758	−9•8271	1•3946	1•0381	0•7801	0•1443
14•0	−33•5833	−27•9428	−23•5657	−9•8323	1•4434	1•0705	0•8016	0•1455
15•0	−33•7593	−28•0594	−23•6430	−9•8366	1•4888	1•1007	0•8216	0•1466
16•0	−33•9130	−28•1610	−23•7101	−9•8403	1•5314	1•1288	0•8402	0•1476
17•0	−34•0483	−28•2503	−23•7690	−9•8435	1•5715	1•1553	0•8576	0•1486
18•0	−34•1684	−28•3293	−23•8210	−9•8463	1•6093	1•1802	0•8740	0•1495
19•0	−34•2755	−28•3997	−23•8673	−9•8488	1•6452	1•2037	0•8895	0•1503
20•0	−34•3717	−28•4628	−23•9087	−9•8509	1•6792	1•2260	0•9041	0•1510
21•0	−34•4585	−28•5197	−23•9459	−9•8529	1•7117	1•2473	0•9181	0•1518
22•0	−34•5372	−28•5711	−23•9796	−9•8546	1•7426	1•2675	0•9313	0•1524
23•0	−34•6089	−28•6179	−24•0101	−9•8561	1•7723	1•2869	0•9440	0•1531
24•0	−34•6743	−28•6606	−24•0380	−9•8575	1•8007	1•3055	0•9561	0•1537
25•0	−34•7343	−28•6998	−24•0635	−9•8588	1•8281	1•3233	0•9677	0•1543
26•0	−34•7896	−28•7357	−24•0869	−9•8600	1•8544	1•3405	0•9789	0•1548
27•0	−34•8405	−28•7689	−24•1085	−9•8610	1•8798	1•3570	0•9896	0•1554
28•0	−34•8876	−28•7995	−24•1284	−9•8620	1•9043	1•3729	1•0000	0•1559
29•0	−34•9313	−28•8279	−24•1469	−9•8629	1•9281	1•3883	1•0100	0•1564
30•0	−34•9720	−28•8543	−24•1640	−9•8638	1•9511	1•4033	1•0197	0•1568
31•0	−35•0098	−28•8788	−24•1799	−9•8645	1•9734	1•4177	1•0291	0•1573
32•0	−35•0452	−28•9017	−24•1947	−9•8652	1•9950	1•4318	1•0382	0•1577
33•0	−35•0782	−28•9231	−24•2086	−9•8659	2•0160	1•4454	1•0470	0•1581
34•0	−35•1091	−28•9432	−24•2216	−9•8665	2•0365	1•4586	1•0556	0•1586
35•0	−35•1382	−28•9620	−24•2337	−9•8671	2•0565	1•4716	1•0639	0•1589
36•0	−35•1654	−28•9796	−24•2451	−9•8676	2•0759	1•4841	1•0721	0•1593
37•0	−35•1911	−28•9962	−24•2559	−9•8681	2•0949	1•4964	1•0800	0•1597
38•0	−35•2153	−29•0118	−24•2659	−9•8686	2•1134	1•5084	1•0877	0•1601
39•0	−35•2381	−29•0265	−24•2755	−9•8691	2•1316	1•5201	1•0953	0•1604
40•0	−35•2596	−29•0404	−24•2844	−9•8695	2•1493	1•5315	1•1027	0•1608
41•0	−35•2799	−29•0535	−24•2929	−9•8699	2•1667	1•5428	1•1099	0•1611
42•0	−35•2992	−29•0659	−24•3009	−9•8702	2•1837	1•5537	1•1170	0•1614
43•0	−35•3174	−29•0777	−24•3085	−9•8706	2•2004	1•5645	1•1239	0•1618
44•0	−35•3346	−29•0888	−24•3156	−9•8709	2•2168	1•5750	1•1307	0•1621

ϕ_o = 2° (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45·0	0·6466	0·4165	0·2683	0·0123	35·6083	29·2701	24·4360	9·8785
46·0	0·6464	0·4163	0·2680	0·0123	35·6305	29·2844	24·4452	9·8789
47·0	0·6462	0·4160	0·2678	0·0123	35·6519	29·2982	24·4540	9·8793
48·0	0·6461	0·4157	0·2675	0·0122	35·6726	29·3115	24·4626	9·8797
49·0	0·6459	0·4155	0·2673	0·0122	35·6927	29·3244	24·4709	9·8801
50·0	0·6457	0·4153	0·2671	0·0122	35·7122	29·3369	24·4790	9·8805
51·0	0·6455	0·4150	0·2668	0·0121	35·7311	29·3491	24·4868	9·8808
52·0	0·6454	0·4148	0·2666	0·0121	35·7494	29·3609	24·4944	9·8812
53·0	0·6452	0·4146	0·2664	0·0120	35·7673	29·3724	24·5018	9·8815
54·0	0·6450	0·4144	0·2662	0·0120	35·7847	29·3836	24·5090	9·8818
55·0	0·6449	0·4142	0·2660	0·0120	35·8017	29·3945	24·5160	9·8821
56·0	0·6447	0·4140	0·2658	0·0120	35·8182	29·4051	24·5228	9·8825
57·0	0·6446	0·4138	0·2656	0·0119	35·8344	29·4155	24·5294	9·8828
58·0	0·6444	0·4136	0·2654	0·0119	35·8502	29·4256	24·5360	9·8830
59·0	0·6443	0·4134	0·2652	0·0119	35·8656	29·4355	24·5423	9·8833
60·0	0·6442	0·4132	0·2650	0·0118	35·8808	29·4452	24·5485	9·8836
61·0	0·6440	0·4130	0·2649	0·0118	35·8956	29·4547	24·5546	9·8839
62·0	0·6439	0·4128	0·2647	0·0118	35·9102	29·4641	24·5606	9·8841
63·0	0·6438	0·4127	0·2645	0·0118	35·9244	29·4732	24·5665	9·8844
64·0	0·6437	0·4125	0·2644	0·0117	35·9384	29·4822	24·5722	9·8847
65·0	0·6435	0·4123	0·2642	0·0117	35·9522	29·4910	24·5779	9·8849
66·0	0·6434	0·4122	0·2640	0·0117	35·9658	29·4997	24·5835	9·8852
67·0	0·6433	0·4120	0·2639	0·0117	35·9791	29·5083	24·5889	9·8854
68·0	0·6432	0·4118	0·2637	0·0116	35·9923	29·5167	24·5943	9·8856
69·0	0·6431	0·4117	0·2636	0·0116	36·0052	29·5250	24·5996	9·8859
70·0	0·6430	0·4115	0·2634	0·0116	36·0180	29·5332	24·6049	9·8861
71·0	0·6428	0·4114	0·2633	0·0116	36·0306	29·5412	24·6101	9·8863
72·0	0·6427	0·4112	0·2631	0·0115	36·0431	29·5492	24·6152	9·8866
73·0	0·6426	0·4111	0·2630	0·0115	36·0554	29·5571	24·6202	9·8868
74·0	0·6425	0·4109	0·2628	0·0115	36·0676	29·5649	24·6252	9·8870
75·0	0·6424	0·4108	0·2627	0·0115	36·0797	29·5726	24·6301	9·8872
76·0	0·6423	0·4106	0·2625	0·0115	36·0917	29·5803	24·6350	9·8874
77·0	0·6422	0·4105	0·2624	0·0114	36·1035	29·5879	24·6399	9·8876
78·0	0·6421	0·4104	0·2623	0·0114	36·1153	29·5954	24·6447	9·8878
79·0	0·6420	0·4102	0·2621	0·0114	36·1269	29·6028	24·6494	9·8881
80·0	0·6419	0·4101	0·2620	0·0114	36·1385	29·6102	24·6542	9·8883
81·0	0·6418	0·4099	0·2619	0·0114	36·1500	29·6176	24·6589	9·8885
82·0	0·6417	0·4098	0·2617	0·0113	36·1615	29·6249	24·6635	9·8887
83·0	0·6416	0·4097	0·2616	0·0113	36·1729	29·6322	24·6682	9·8889
84·0	0·6415	0·4095	0·2615	0·0113	36·1842	29·6394	24·6728	9·8891
85·0	0·6414	0·4094	0·2613	0·0113	36·1955	29·6466	24·6774	9·8893
86·0	0·6413	0·4093	0·2612	0·0113	36·2068	29·6538	24·6820	9·8895
87·0	0·6412	0·4091	0·2611	0·0112	36·2180	29·6610	24·6866	9·8897
88·0	0·6411	0·4090	0·2609	0·0112	36·2292	29·6681	24·6911	9·8899
89·0	0·6410	0·4089	0·2608	0·0112	36·2404	29·6753	24·6957	9·8901
90·0	0·6409	0·4087	0·2607	0·0112	36·2516	29·6824	24·7002	9·8903

$\phi_c = 2°$ (continued)

Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.08	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45·0	−35·3510	−29·0994	−24·3224	−9·8712	2·2328	1·5854	1·1374	0·1624
46·0	−35·3665	−29·1094	−24·3289	−9·8715	2·2486	1·5956	1·1440	0·1627
47·0	−35·3812	−29·1188	−24·3350	−9·8718	2·2642	1·6056	1·1504	0·1630
48·0	−35·3952	−29·1278	−24·3408	−9·8721	2·2794	1·6154	1·1567	0·1633
49·0	−35·4085	−29·1364	−24·3463	−9·8723	2·2945	1·6251	1·1629	0·1635
50·0	−35·4212	−29·1445	−24·3515	−9·8726	2·3093	1·6346	1·1691	0·1638
51·0	−35·4332	−29·1523	−24·3565	−9·8728	2·3238	1·6440	1·1751	0·1641
52·0	−35·4446	−29·1596	−24·3612	−9·8730	2·3382	1·6532	1·1810	0·1644
53·0	−35·4555	−29·1666	−24·3657	−9·8732	2·3524	1·6623	1·1869	0·1646
54·0	−35·4659	−29·1733	−24·3700	−9·8734	2·3664	1·6713	1·1927	0·1649
55·0	−35·4757	−29·1796	−24·3740	−9·8736	2·3802	1·6802	1·1984	0·1652
56·0	−35·4851	−29·1856	−24·3779	−9·8738	2·3939	1·6889	1·2040	0·1654
57·0	−35·4940	−29·1913	−24·3816	−9·8739	2·4073	1·6976	1·2096	0·1657
58·0	−35·5025	−29·1968	−24·3851	−9·8741	2·4207	1·7061	1·2150	0·1659
59·0	−35·5106	−29·2020	−24·3884	−9·8742	2·4338	1·7146	1·2205	0·1661
60·0	−35·5183	−29·2069	−24·3916	−9·8744	2·4469	1·7230	1·2258	0·1664
61·0	−35·5256	−29·2116	−24·3946	−9·8745	2·4598	1·7312	1·2311	0·1666
62·0	−35·5325	−29·2160	−24·3974	−9·8746	2·4726	1·7394	1·2364	0·1669
63·0	−35·5391	−29·2203	−24·4001	−9·8748	2·4852	1·7476	1·2416	0·1671
64·0	−35·5454	−29·2243	−24·4027	−9·8749	2·4978	1·7556	1·2468	0·1673
65·0	−35·5513	−29·2281	−24·4051	−9·8750	2·5102	1·7636	1·2519	0·1675
66·0	−35·5569	−29·2317	−24·4074	−9·8751	2·5225	1·7715	1·2569	0·1678
67·0	−35·5622	−29·2351	−24·4096	−9·8752	2·5348	1·7793	1·2619	0·1680
68·0	−35·5673	−29·2383	−24·4117	−9·8753	2·5469	1·7871	1·2669	0·1682
69·0	−35·5720	−29·2413	−24·4136	−9·8754	2·5590	1·7948	1·2719	0·1684
70·0	−35·5765	−29·2442	−24·4155	−9·8754	2·5710	1·8025	1·2768	0·1686
71·0	−35·5807	−29·2469	−24·4172	−9·8755	2·5829	1·8101	1·2816	0·1689
72·0	−35·5847	−29·2494	−24·4188	−9·8756	2·5947	1·8177	1·2865	0·1691
73·0	−35·5884	−29·2518	−24·4203	−9·8757	2·6064	1·8252	1·2913	0·1693
74·0	−35·5918	−29·2540	−24·4217	−9·8757	2·6181	1·8327	1·2961	0·1695
75·0	−35·5951	−29·2561	−24·4231	−9·8758	2·6298	1·8401	1·3008	0·1697
76·0	−35·5981	−29·2580	−24·4243	−9·8758	2·6413	1·8475	1·3056	0·1699
77·0	−35·6008	−29·2598	−24·4254	−9·8759	2·6529	1·8549	1·3103	0·1701
78·0	−35·6034	−29·2614	−24·4265	−9·8759	2·6643	1·8622	1·3150	0·1703
79·0	−35·6057	−29·2629	−24·4274	−9·8760	2·6758	1·8695	1·3196	0·1705
80·0	−35·6078	−29·2642	−24·4283	−9·8760	2·6872	1·8768	1·3243	0·1707
81·0	−35·6097	−29·2654	−24·4290	−9·8760	2·6985	1·8840	1·3289	0·1709
82·0	−35·6114	−29·2665	−24·4297	−9·8761	2·7098	1·8913	1·3335	0·1711
83·0	−35·6129	−29·2675	−24·4303	−9·8761	2·7211	1·8985	1·3382	0·1713
84·0	−35·6142	−29·2683	−24·4309	−9·8761	2·7324	1·9057	1·3427	0·1715
85·0	−35·6153	−29·2690	−24·4313	−9·8761	2·7436	1·9129	1·3473	0·1717
86·0	−35·6161	−29·2695	−24·4317	−9·8761	2·7549	1·9200	1·3519	0·1719
87·0	−35·6168	−29·2700	−24·4319	−9·8762	2·7661	1·9272	1·3565	0·1721
88·0	−35·6173	−29·2703	−24·4321	−9·8762	2·7773	1·9343	1·3610	0·1723
89·0	−35·6176	−29·2705	−24·4323	−9·8762	2·7885	1·9415	1·3656	0·1725
90·0	−35·6177	−29·2705	−24·4323	−9·8762	2·7997	1·9486	1·3701	0·1727

$\phi_c = 3°$

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0·0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000
0·5	0·9690	0·9389	0·9098	0·7296	3·1036	3·0554	3·0083	2·7041
1·0	0·9406	0·8845	0·8318	0·5411	5·9580	5·7805	5·6101	4·5898
1·5	0·9156	0·8380	0·7670	0·4128	8·4725	8·1136	7·7750	5·8742
2·0	0·8943	0·7993	0·7144	0·3256	10·6217	10·0577	9·5335	6·7469
2·5	0·8764	0·7675	0·6721	0·2656	12·4271	11·6550	10·9469	7·3476
3·0	0·8615	0·7415	0·6382	0·2234	13·9327	12·9622	12·0819	7·7701
3·5	0·8492	0·7202	0·6109	0·1929	15·1882	14·0350	12·9985	8·0750
4·0	0·8388	0·7027	0·5886	0·1704	16·2396	14·9212	13·7455	8·3010
4·5	0·8302	0·6881	0·5703	0·1532	17·1259	15·6597	14·3609	8·4727
5·0	0·8228	0·6758	0·5550	0·1399	17·8788	16·2809	14·8734	8·6061
6·0	0·8111	0·6564	0·5313	0·1208	19·0806	17·2608	15·6723	8·7975
7·0	0·8023	0·6420	0·5138	0·1080	19·9900	17·9926	16·2613	8·9263
8·0	0·7955	0·6309	0·5005	0·0988	20·6979	18·5566	16·7107	9·0179
9·0	0·7900	0·6222	0·4900	0·0921	21·2627	19·0030	17·0635	9·0859
10·0	0·7856	0·6151	0·4816	0·0869	21·7229	19·3644	17·3472	9·1382
11·0	0·7820	0·6093	0·4748	0·0828	22·1046	19·6625	17·5801	9·1795
12·0	0·7790	0·6045	0·4690	0·0794	22·4261	19·9125	17·7745	9·2129
13·0	0·7764	0·6003	0·4642	0·0767	22·7006	20·1251	17·9392	9·2404
14·0	0·7742	0·5968	0·4600	0·0744	22·9376	20·3081	18·0804	9·2635
15·0	0·7723	0·5937	0·4564	0·0725	23·1443	20·4672	18·2030	9·2831
16·0	0·7706	0·5910	0·4533	0·0708	23·3263	20·6070	18·3103	9·3000
17·0	0·7691	0·5886	0·4505	0·0693	23·4877	20·7307	18·4050	9·3147
18·0	0·7678	0·5865	0·4481	0·0680	23·6320	20·8410	18·4894	9·3276
19·0	0·7666	0·5846	0·4459	0·0669	23·7617	20·9400	18·5650	9·3390
20·0	0·7655	0·5829	0·4439	0·0659	23·8790	21·0294	18·6331	9·3492
21·0	0·7645	0·5814	0·4421	0·0650	23·9857	21·1106	18·6949	9·3583
22·0	0·7637	0·5800	0·4405	0·0642	24·0832	21·1847	18·7512	9·3666
23·0	0·7629	0·5787	0·4390	0·0634	24·1727	21·2526	18·8027	9·3741
24·0	0·7621	0·5775	0·4376	0·0628	24·2551	21·3151	18·8501	9·3809
25·0	0·7615	0·5764	0·4363	0·0622	24·3313	21·3728	18·8938	9·3871
26·0	0·7608	0·5754	0·4352	0·0616	24·4021	21·4264	18·9343	9·3929
27·0	0·7603	0·5745	0·4341	0·0611	24·4680	21·4762	18·9720	9·3982
28·0	0·7597	0·5736	0·4331	0·0606	24·5295	21·5226	19·0071	9·4031
29·0	0·7592	0·5728	0·4321	0·0601	24·5871	21·5661	19·0399	9·4077
30·0	0·7587	0·5720	0·4313	0·0597	24·6412	21·6069	19·0707	9·4120
31·0	0·7583	0·5713	0·4304	0·0593	24·6922	21·6453	19·0996	9·4160
32·0	0·7579	0·5706	0·4297	0·0589	24·7402	21·6815	19·1269	9·4197
33·0	0·7575	0·5700	0·4289	0·0586	24·7857	21·7157	19·1526	9·4232
34·0	0·7571	0·5694	0·4282	0·0583	24·8288	21·7481	19·1770	9·4266
35·0	0·7568	0·5688	0·4276	0·0580	24·8697	21·7789	19·2001	9·4297
36·0	0·7565	0·5683	0·4269	0·0577	24·9086	21·8081	19·2221	9·4327
37·0	0·7562	0·5678	0·4264	0·0574	24·9457	21·8360	19·2430	9·4355
38·0	0·7559	0·5673	0·4258	0·0571	24·9811	21·8626	19·2630	9·4382
39·0	0·7556	0·5668	0·4252	0·0569	25·0149	21·8880	19·2820	9·4407
40·0	0·7553	0·5664	0·4247	0·0566	25·0473	21·9123	19·3003	9·4432
41·0	0·7551	0·5660	0·4242	0·0564	25·0784	21·9356	19·3178	9·4455
42·0	0·7548	0·5656	0·4238	0·0562	25·1083	21·9580	19·3345	9·4477
43·0	0·7546	0·5652	0·4233	0·0560	25·1371	21·9795	19·3507	9·4499
44·0	0·7544	0·5648	0·4229	0·0558	25·1647	22·0002	19·3662	9·4519

$\phi_e = 3°$

Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0·0	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000	0·0000
0·5	−3·1036	−3·0554	−3·0082	−2·7041	0·0134	0·0131	0·0129	0·0111
1·0	−5·9577	−5·7802	−5·6098	−4·5896	0·0505	0·0485	0·0466	0·0353
1·5	−8·4716	−8·1128	−7·7742	−5·8737	0·1051	0·0991	0·0935	0·0630
2·0	−10·6198	−10·0559	−9·5319	−6·7460	0·1705	0·1582	0·1469	0·0894
2·5	−12·4238	−11·6520	−10·9442	−7·3462	0·2412	0·2207	0·2022	0·1128
3·0	−13·9277	−12·9578	−12·0779	−7·7682	0·3132	0·2832	0·2565	0·1330
3·5	−15·1812	−14·0288	−12·9931	−8·0727	0·3842	0·3439	0·3083	0·1502
4·0	−16·2303	−14·9131	−13·7385	−8·2982	0·4528	0·4017	0·3571	0·1649
4·5	−17·1142	−15·6496	−14·3522	−8·4694	0·5184	0·4564	0·4026	0·1776
5·0	−17·8645	−16·2687	−14·8630	−8·6024	0·5807	0·5077	0·4450	0·1886
6·0	−19·0608	−17·2440	−15·6582	−8·7929	0·6953	0·6012	0·5211	0·2068
7·0	−19·9644	−17·9712	−16·2434	−8·9209	0·7979	0·6838	0·5876	0·2214
8·0	−20·6663	−18·5304	−16·6889	−9·0117	0·8901	0·7572	0·6461	0·2333
9·0	−21·2249	−18·9719	−17·0379	−9·0790	0·9734	0·8230	0·6981	0·2433
10·0	−21·6788	−19·3284	−17·3178	−9·1305	1·0492	0·8826	0·7448	0·2519
11·0	−22·0541	−19·6215	−17·5467	−9·1711	1·1187	0·9368	0·7872	0·2594
12·0	−22·3692	−19·8665	−17·7372	−9·2038	1·1827	0·9866	0·8259	0·2661
13·0	−22·6372	−20·0741	−17·8980	−9·2307	1·2421	1·0326	0·8615	0·2720
14·0	−22·8676	−20·2520	−18·0354	−9·2532	1·2973	1·0752	0·8945	0·2774
15·0	−23·0678	−20·4061	−18·1540	−9·2722	1·3491	1·1151	0·9251	0·2823
16·0	−23·2431	−20·5407	−18·2574	−9·2885	1·3977	1·1524	0·9538	0·2868
17·0	−23·3979	−20·6593	−18·3483	−9·3026	1·4435	1·1875	0·9807	0·2910
18·0	−23·5355	−20·7645	−18·4287	−9·3149	1·4868	1·2206	1·0060	0·2949
19·0	−23·6585	−20·8584	−18·5004	−9·3257	1·5280	1·2520	1·0300	0·2985
20·0	−23·7691	−20·9427	−18·5646	−9·3353	1·5671	1·2819	1·0527	0·3019
21·0	−23·8691	−21·0188	−18·6225	−9·3438	1·6045	1·3103	1·0744	0·3051
22·0	−23·9598	−21·0877	−18·6749	−9·3515	1·6402	1·3374	1·0950	0·3081
23·0	−24·0424	−21·1505	−18·7225	−9·3584	1·6744	1·3634	1·1147	0·3110
24·0	−24·1180	−21·2078	−18·7660	−9·3647	1·7073	1·3883	1·1336	0·3137
25·0	−24·1874	−21·2603	−18·8057	−9·3704	1·7389	1·4123	1·1517	0·3163
26·0	−24·2513	−21·3086	−18·8423	−9·3755	1·7693	1·4353	1·1692	0·3187
27·0	−24·3102	−21·3532	−18·8760	−9·3803	1·7987	1·4575	1·1860	0·3211
28·0	−24·3648	−21·3944	−18·9071	−9·3847	1·8271	1·4790	1·2022	0·3234
29·0	−24·4155	−21·4327	−18·9360	−9·3887	1·8546	1·4997	1·2178	0·3256
30·0	−24·4626	−21·4682	−18·9628	−9·3924	1·8813	1·5198	1·2330	0·3277
31·0	−24·5064	−21·5013	−18·9877	−9·3959	1·9071	1·5393	1·2477	0·3297
32·0	−24·5474	−21·5321	−19·0110	−9·3990	1·9322	1·5582	1·2619	0·3317
33·0	−24·5858	−21·5610	−19·0327	−9·4020	1·9567	1·5766	1·2757	0·3336
34·0	−24·6217	−21·5880	−19·0530	−9·4048	1·9804	1·5945	1·2892	0·3354
35·0	−24·6554	−21·6133	−19·0721	−9·4074	2·0036	1·6119	1·3023	0·3372
36·0	−24·6871	−21·6371	−19·0899	−9·4098	2·0262	1·6289	1·3150	0·3389
37·0	−24·7169	−21·6595	−19·1068	−9·4121	2·0482	1·6454	1·3275	0·3406
38·0	−24·7450	−21·6806	−19·1226	−9·4142	2·0698	1·6616	1·3396	0·3422
39·0	−24·7715	−21·7005	−19·1375	−9·4162	2·0909	1·6774	1·3515	0·3438
40·0	−24·7965	−21·7193	−19·1516	−9·4181	2·1115	1·6929	1·3631	0·3453
41·0	−24·8201	−21·7370	−19·1649	−9·4198	2·1317	1·7080	1·3745	0·3469
42·0	−24·8425	−21·7538	−19·1774	−9·4215	2·1515	1·7229	1·3856	0·3483
43·0	−24·8637	−21·7696	−19·1893	−9·4231	2·1709	1·7374	1·3965	0·3498
44·0	−24·8838	−21·7847	−19·2006	−9·4246	2·1899	1·7517	1·4071	0·3512

ϕ_c = 3° (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•7541	0•5644	0•4225	0•0556	25•1914	22•0202	19•3811	9•4539
46•0	0•7539	0•5641	0•4220	0•0554	25•2172	22•0395	19•3956	9•4558
47•0	0•7537	0•5638	0•4217	0•0552	25•2421	22•0581	19•4095	9•4576
48•0	0•7535	0•5634	0•4213	0•0550	25•2662	22•0762	19•4230	9•4594
49•0	0•7534	0•5631	0•4209	0•0549	25•2896	22•0937	19•4361	9•4611
50•0	0•7532	0•5628	0•4206	0•0547	25•3123	22•1106	19•4487	9•4627
51•0	0•7530	0•5625	0•4202	0•0546	25•3343	22•1270	19•4610	9•4643
52•0	0•7528	0•5622	0•4199	0•0544	25•3557	22•1430	19•4730	9•4659
53•0	0•7527	0•5620	0•4196	0•0543	25•3765	22•1586	19•4846	9•4674
54•0	0•7525	0•5617	0•4193	0•0541	25•3968	22•1737	19•4959	9•4688
55•0	0•7524	0•5614	0•4189	0•0540	25•4165	22•1885	19•5069	9•4702
56•0	0•7522	0•5612	0•4186	0•0538	25•4358	22•2029	19•5176	9•4716
57•0	0•7521	0•5609	0•4184	0•0537	25•4547	22•2169	19•5281	9•4730
58•0	0•7519	0•5607	0•4181	0•0536	25•4731	22•2306	19•5383	9•4743
59•0	0•7518	0•5604	0•4178	0•0535	25•4911	22•2441	19•5483	9•4756
60•0	0•7517	0•5602	0•4175	0•0533	25•5087	22•2572	19•5581	9•4768
61•0	0•7515	0•5600	0•4173	0•0532	25•5260	22•2701	19•5677	9•4780
62•0	0•7514	0•5598	0•4170	0•0531	25•5430	22•2827	19•5772	9•4792
63•0	0•7513	0•5595	0•4167	0•0530	25•5596	22•2951	19•5864	9•4804
64•0	0•7511	0•5593	0•4165	0•0529	25•5760	22•3073	19•5955	9•4816
65•0	0•7510	0•5591	0•4163	0•0528	25•5920	22•3193	19•6044	9•4827
66•0	0•7509	0•5589	0•4160	0•0527	25•6078	22•3310	19•6131	9•4838
67•0	0•7508	0•5587	0•4158	0•0525	25•6234	22•3426	19•6217	9•4849
68•0	0•7507	0•5585	0•4155	0•0524	25•6387	22•3540	19•6302	9•4860
69•0	0•7506	0•5583	0•4153	0•0523	25•6539	22•3653	19•6386	9•4870
70•0	0•7505	0•5581	0•4151	0•0522	25•6688	22•3764	19•6468	9•4881
71•0	0•7503	0•5579	0•4149	0•0521	25•6835	22•3873	19•6550	9•4891
72•0	0•7502	0•5577	0•4146	0•0520	25•6980	22•3981	19•6630	9•4901
73•0	0•7501	0•5576	0•4144	0•0519	25•7124	22•4088	19•6710	9•4911
74•0	0•7500	0•5574	0•4142	0•0518	25•7267	22•4194	19•6788	9•4921
75•0	0•7499	0•5572	0•4140	0•0518	25•7407	22•4299	19•6866	9•4931
76•0	0•7498	0•5570	0•4138	0•0517	25•7547	22•4402	19•6943	9•4940
77•0	0•7497	0•5568	0•4136	0•0516	25•7685	22•4505	19•7019	9•4950
78•0	0•7496	0•5567	0•4134	0•0515	25•7822	22•4607	19•7095	9•4959
79•0	0•7495	0•5565	0•4132	0•0514	25•7959	22•4708	19•7170	9•4968
80•0	0•7494	0•5563	0•4130	0•0513	25•8094	22•4808	19•7245	9•4978
81•0	0•7493	0•5561	0•4128	0•0512	25•8228	22•4908	19•7319	9•4987
82•0	0•7492	0•5560	0•4126	0•0511	25•8362	22•5007	19•7392	9•4996
83•0	0•7491	0•5558	0•4124	0•0510	25•8495	22•5106	19•7466	9•5005
84•0	0•7490	0•5556	0•4122	0•0509	25•8627	22•5204	19•7538	9•5014
85•0	0•7489	0•5555	0•4120	0•0509	25•8759	22•5302	19•7611	9•5023
86•0	0•7488	0•5553	0•4118	0•0508	25•8891	22•5400	19•7683	9•5032
87•0	0•7487	0•5551	0•4116	0•0507	25•9022	22•5497	19•7755	9•5041
88•0	0•7486	0•5550	0•4114	0•0506	25•9153	22•5594	19•7827	9•5050
89•0	0•7486	0•5548	0•4112	0•0505	25•9283	22•5691	19•7899	9•5059
90•0	0•7485	0•5546	0•4110	0•0504	25•9414	22•5788	19•7971	9•5067

$\phi_c = 3°$ (continued)

Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45·0	−24·9028	−21·7989	−19·2113	−9·4260	2·2086	1·7657	1·4176	0·3526
46·0	−24·9209	−21·8124	−19·2214	−9·4273	2·2270	1·7794	1·4279	0·3539
47·0	−24·9380	−21·8253	−19·2310	−9·4286	2·2451	1·7930	1·4380	0·3552
48·0	−24·9543	−21·8375	−19·2401	−9·4298	2·2629	1·8063	1·4480	0·3565
49·0	−24·9698	−21·8490	−19·2487	−9·4309	2·2804	1·8193	1·4578	0·3578
50·0	−24·9845	−21·8600	−19·2570	−9·4320	2·2976	1·8322	1·4674	0·3591
51·0	−24·9985	−21·8705	−19·2648	−9·4330	2·3146	1·8449	1·4769	0·3603
52·0	−25·0119	−21·8805	−19·2722	−9·4339	2·3313	1·8574	1·4862	0·3615
53·0	−25·0245	−21·8899	−19·2793	−9·4349	2·3479	1·8698	1·4954	0·3627
54·0	−25·0366	−21·8989	−19·2860	−9·4357	2·3642	1·8819	1·5045	0·3639
55·0	−25·0481	−21·9075	−19·2924	−9·4365	2·3803	1·8939	1·5135	0·3650
56·0	−25·0590	−21·9156	−19·2985	−9·4373	2·3961	1·9058	1·5223	0·3662
57·0	−25·0694	−21·9234	−19·3043	−9·4381	2·4119	1·9175	1·5311	0·3673
58·0	−25·0793	−21·9308	−19·3098	−9·4388	2·4274	1·9291	1·5397	0·3684
59·0	−25·0887	−21·9378	−19·3150	−9·4394	2·4427	1·9405	1·5482	0·3695
60·0	−25·0977	−21·9445	−19·3200	−9·4401	2·4579	1·9519	1·5567	0·3706
61·0	−25·1062	−21·9508	−19·3247	−9·4407	2·4730	1·9631	1·5650	0·3716
62·0	−25·1143	−21·9568	−19·3292	−9·4413	2·4879	1·9742	1·5733	0·3727
63·0	−25·1219	−21·9626	−19·3335	−9·4418	2·5027	1·9852	1·5815	0·3737
64·0	−25·1292	−21·9680	−19·3375	−9·4423	2·5173	1·9961	1·5896	0·3748
65·0	−25·1362	−21·9731	−19·3413	−9·4428	2·5318	2·0069	1·5976	0·3758
66·0	−25·1427	−21·9780	−19·3450	−9·4433	2·5462	2·0176	1·6056	0·3768
67·0	−25·1489	−21·9826	−19·3484	−9·4437	2·5604	2·0282	1·6135	0·3778
68·0	−25·1548	−21·9870	−19·3517	−9·4441	2·5746	2·0387	1·6214	0·3788
69·0	−25·1603	−21·9911	−19·3547	−9·4445	2·5887	2·0432	1·6291	0·3798
70·0	−25·1655	−21·9950	−19·3576	−9·4449	2·6026	2·0596	1·6369	0·3808
71·0	−25·1705	−21·9987	−19·3603	−9·4452	2·6165	2·0699	1·6446	0·3817
72·0	−25·1751	−22·0021	−19·3629	−9·4455	2·6303	2·0802	1·6522	0·3827
73·0	−25·1794	−22·0053	−19·3653	−9·4458	2·6440	2·0904	1·6598	0·3836
74·0	−25·1834	−22·0083	−19·3675	−9·4461	2·6577	2·1005	1·6673	0·3846
75·0	−25·1872	−22·0111	−19·3696	−9·4464	2·6712	2·1106	1·6748	0·3855
76·0	−25·1907	−22·0137	−19·3715	−9·4466	2·6848	2·1206	1·6822	0·3864
77·0	−25·1939	−22·0161	−19·3733	−9·4468	2·6982	2·1306	1·6897	0·3874
78·0	−25·1969	−22·0183	−19·3749	−9·4470	2·7116	2·1406	1·6971	0·3883
79·0	−25·1996	−22·0203	−19·3764	−9·4472	2·7249	2·1505	1·7044	0·3892
80·0	−25·2021	−22·0222	−19·3778	−9·4474	2·7382	2·1604	1·7117	0·3901
81·0	−25·2043	−22·0238	−19·3790	−9·4475	2·7515	2·1702	1·7190	0·3910
82·0	−25·2063	−22·0253	−19·3801	−9·4477	2·7647	2·1800	1·7263	0·3919
83·0	−25·2080	−22·0266	−19·3810	−9·4478	2·7779	2·1898	1·7336	0·3928
84·0	−25·2095	−22·0277	−19·3819	−9·4479	2·7910	2·1995	1·7408	0·3937
85·0	−25·2108	−22·0286	−19·3826	−9·4480	2·8042	2·2093	1·7480	0·3946
86·0	−25·2118	−22·0294	−19·3831	−9·4480	2·8173	2·2190	1·7552	0·3955
87·0	−25·2126	−22·0300	−19·3836	−9·4481	2·8304	2·2287	1·7624	0·3964
88·0	−25·2132	−22·0304	−19·3839	−9·4481	2·8435	2·2384	1·7696	0·3973
89·0	−25·2135	−22·0306	−19·3841	−9·4482	2·8565	2·2481	1·7768	0·3981
90·0	−25·2136	−22·0307	−19·3841	−9·4482	2·8696	2·2578	1·7840	0·3990

$\phi_c = 4°$

180°-ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°9824	0°9651	0°9480	0°8370	1°7641	1°7486	1°7332	1°6305
1°0	0°9657	0°9324	0°9003	0°7043	3°4459	3°3865	3°3285	2°9577
1°5	0°9502	0°9027	0°8575	0°5986	5°0065	4°8811	4°7600	4°0166
2°0	0°9363	0°8762	0°8199	0°5152	6°4231	6°2168	6°0194	4°8514
2°5	0°9239	0°8529	0°7873	0°4498	7°6882	7°3926	7°1123	5°5067
3°0	0°9130	0°8326	0°7593	0°3984	8°8056	8°4180	8°0531	6°0221
3°5	0°9034	0°8151	0°7353	0°3577	9°7864	9°3076	8°8601	6°4300
4°0	0°8951	0°7999	0°7148	0°3252	10°6451	10°0787	9°5524	6°7558
4°5	0°8879	0°7867	0°6971	0°2990	11°3968	10°7475	10°1476	7°0188
5°0	0°8815	0°7753	0°6819	0°2776	12°0561	11°3296	10°6615	7°2336
6°0	0°8711	0°7567	0°6573	0°2452	13°1485	12°2844	11°4961	7°5590
7°0	0°8630	0°7422	0°6384	0°2222	14°0077	13°0270	12°1379	7°7905
8°0	0°8566	0°7308	0°6236	0°2052	14°6954	13°6161	12°6426	7°9613
9°0	0°8514	0°7217	0°6117	0°1923	15°2554	14°0924	13°0476	8°0916
10°0	0°8471	0°7141	0°6020	0°1822	15°7187	14°4840	13°3786	8°1937
11°0	0°8436	0°7079	0°5940	0°1741	16°1075	14°8111	13°6537	8°2757
12°0	0°8406	0°7026	0°5873	0°1674	16°4380	15°0879	13°8856	8°3427
13°0	0°8380	0°6981	0°5816	0°1619	16°7222	15°3250	14°0835	8°3984
14°0	0°8359	0°6942	0°5766	0°1573	16°9691	15°5304	14°2543	8°4455
15°0	0°8340	0°6909	0°5723	0°1533	17°1855	15°7099	14°4031	8°4857
16°0	0°8323	0°6879	0°5686	0°1498	17°3767	15°8681	14°5341	8°5205
17°0	0°8308	0°6853	0°5653	0°1469	17°5468	16°0088	14°6501	8°5509
18°0	0°8295	0°6830	0°5623	0°1442	17°6994	16°1343	14°7537	8°5776
19°0	0°8284	0°6809	0°5597	0°1419	17°8368	16°2474	14°8467	8°6013
20°0	0°8273	0°6790	0°5573	0°1398	17°9614	16°3497	14°9308	8°6225
21°0	0°8264	0°6773	0°5551	0°1379	18°0749	16°4428	15°0071	8°6416
22°0	0°8255	0°6758	0°5532	0°1362	18°1788	16°5279	15°0768	8°6588
23°0	0°8247	0°6743	0°5514	0°1347	18°2742	16°6060	15°1407	8°6745
24°0	0°8240	0°6730	0°5497	0°1333	18°3623	16°6779	15°1995	8°6888
25°0	0°8234	0°6718	0°5482	0°1320	18°4438	16°7445	15°2538	8°7019
26°0	0°8228	0°6707	0°5468	0°1308	18°5195	16°8062	15°3042	8°7140
27°0	0°8222	0°6697	0°5455	0°1297	18°5901	16°8637	15°3510	8°7252
28°0	0°8217	0°6688	0°5443	0°1287	18°6561	16°9175	15°3948	8°7356
29°0	0°8213	0°6679	0°5431	0°1278	18°7179	16°9678	15°4357	8°7452
30°0	0°8208	0°6670	0°5421	0°1269	18°7760	17°0150	15°4741	8°7542
31°0	0°8204	0°6663	0°5411	0°1261	18°8307	17°0594	15°5102	8°7627
32°0	0°8200	0°6655	0°5401	0°1253	18°8824	17°1014	15°5442	8°7706
33°0	0°8197	0°6648	0°5393	0°1246	18°9313	17°1410	15°5764	8°7780
34°0	0°8193	0°6642	0°5384	0°1239	18°9776	17°1786	15°6069	8°7850
35°0	0°8190	0°6636	0°5376	0°1232	19°0216	17°2143	15°6358	8°7917
36°0	0°8187	0°6630	0°5369	0°1226	19°0635	17°2482	15°6633	8°7980
37°0	0°8184	0°6624	0°5362	0°1220	19°1035	17°2806	15°6895	8°8039
38°0	0°8181	0°6619	0°5355	0°1215	19°1416	17°3114	15°7145	8°8096
39°0	0°8179	0°6614	0°5349	0°1210	19°1781	17°3409	15°7383	8°8150
40°0	0°8176	0°6609	0°5343	0°1205	19°2131	17°3692	15°7612	8°8202
41°0	0°8174	0°6605	0°5337	0°1200	19°2466	17°3963	15°7831	8°8251
42°0	0°8172	0°6600	0°5331	0°1195	19°2788	17°4223	15°8041	8°8298
43°0	0°8170	0°6596	0°5326	0°1191	19°3098	17°4474	15°8243	8°8344
44°0	0°8168	0°6592	0°5320	0°1187	19°3397	17°4715	15°8438	8°8387

$\phi_c = 4°$

Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	-1.7641	-1.7485	-1.7332	-1.6304	0.0077	0.0076	0.0075	0.0069
1.0	-3.4457	-3.3864	-3.3283	-2.9575	0.0296	0.0289	0.0283	0.0241
1.5	-5.0059	-4.8806	-4.7595	-4.0162	0.0635	0.0614	0.0594	0.0470
2.0	-6.4219	-6.2157	-6.0183	-4.8507	0.1067	0.1021	0.0977	0.0723
2.5	-7.6860	-7.3906	-7.1103	-5.5054	0.1563	0.1481	0.1405	0.0979
3.0	-8.8022	-8.4148	-8.0501	-6.0202	0.2098	0.1972	0.1855	0.1226
3.5	-9.7814	-9.3030	-8.8558	-6.4274	0.2653	0.2476	0.2312	0.1456
4.0	-10.6382	-10.0723	-9.5466	-6.7526	0.3213	0.2979	0.2764	0.1669
4.5	-11.3878	-10.7394	-10.1402	-7.0149	0.3770	0.3474	0.3204	0.1863
5.0	-12.0449	-11.3195	-10.6523	-7.2289	0.4315	0.3955	0.3629	0.2041
6.0	-13.1323	-12.2699	-11.4830	-7.5529	0.5358	0.4867	0.4426	0.2351
7.0	-13.9859	-13.0078	-12.1208	-7.7828	0.6328	0.5705	0.5150	0.2612
8.0	-14.6678	-13.5919	-12.6212	-7.9522	0.7223	0.6472	0.5807	0.2834
9.0	-15.2217	-14.0629	-13.0217	-8.0811	0.8050	0.7175	0.6404	0.3026
10.0	-15.6786	-14.4492	-13.3483	-8.1818	0.8813	0.7820	0.6950	0.3195
11.0	-16.0610	-14.7707	-13.6187	-8.2624	0.9521	0.8415	0.7451	0.3344
12.0	-16.3849	-15.0420	-13.8459	-8.3280	1.0179	0.8966	0.7912	0.3477
13.0	-16.6623	-15.2735	-14.0391	-8.3825	1.0793	0.9479	0.8340	0.3598
14.0	-16.9024	-15.4732	-14.2052	-8.4282	1.1369	0.9958	0.8738	0.3707
15.0	-17.1119	-15.6470	-14.3494	-8.4672	1.1911	1.0407	0.9111	0.3808
16.0	-17.2961	-15.7995	-14.4755	-8.5007	1.2421	1.0830	0.9461	0.3901
17.0	-17.4593	-15.9342	-14.5868	-8.5298	1.2904	1.1229	0.9790	0.3987
18.0	-17.6048	-16.0541	-14.6856	-8.5553	1.3363	1.1606	1.0101	0.4067
19.0	-17.7351	-16.1613	-14.7738	-8.5778	1.3799	1.1965	1.0396	0.4143
20.0	-17.8526	-16.2578	-14.8531	-8.5978	1.4214	1.2307	1.0677	0.4213
21.0	-17.9589	-16.3450	-14.9246	-8.6157	1.4612	1.2632	1.0944	0.4280
22.0	-18.0555	-16.4241	-14.9894	-8.6317	1.4992	1.2944	1.1199	0.4343
23.0	-18.1437	-16.4963	-15.0484	-8.6462	1.5357	1.3243	1.1444	0.4403
24.0	-18.2245	-16.5623	-15.1024	-8.6593	1.5708	1.3530	1.1678	0.4460
25.0	-18.2987	-16.6228	-15.1518	-8.6712	1.6046	1.3806	1.1903	0.4515
26.0	-18.3670	-16.6786	-15.1973	-8.6822	1.6372	1.4071	1.2120	0.4567
27.0	-18.4302	-16.7301	-15.2392	-8.6922	1.6687	1.4328	1.2329	0.4617
28.0	-18.4887	-16.7777	-15.2780	-8.7014	1.6992	1.4576	1.2531	0.4664
29.0	-18.5430	-16.8219	-15.3140	-8.7098	1.7287	1.4816	1.2726	0.4711
30.0	-18.5936	-16.8630	-15.3474	-8.7177	1.7573	1.5048	1.2915	0.4755
31.0	-18.6408	-16.9013	-15.3785	-8.7250	1.7850	1.5274	1.3099	0.4798
32.0	-18.6848	-16.9371	-15.4075	-8.7317	1.8120	1.5493	1.3277	0.4839
33.0	-18.7260	-16.9705	-15.4347	-8.7380	1.8383	1.5706	1.3449	0.4879
34.0	-18.7647	-17.0019	-15.4601	-8.7438	1.8639	1.5914	1.3618	0.4918
35.0	-18.8010	-17.0313	-15.4839	-8.7493	1.8888	1.6116	1.3781	0.4955
36.0	-18.8351	-17.0589	-15.5063	-8.7544	1.9131	1.6313	1.3941	0.4992
37.0	-18.8672	-17.0849	-15.5273	-8.7592	1.9369	1.6505	1.4097	0.5027
38.0	-18.8974	-17.1094	-15.5472	-8.7637	1.9601	1.6693	1.4249	0.5062
39.0	-18.9260	-17.1325	-15.5658	-8.7680	1.9828	1.6877	1.4397	0.5096
40.0	-18.9530	-17.1543	-15.5835	-8.7720	2.0050	1.7056	1.4543	0.5128
41.0	-18.9785	-17.1749	-15.6001	-8.7757	2.0268	1.7232	1.4685	0.5161
42.0	-19.0026	-17.1944	-15.6159	-8.7792	2.0482	1.7405	1.4824	0.5192
43.0	-19.0255	-17.2129	-15.6308	-8.7826	2.0691	1.7574	1.4961	0.5222
44.0	-19.0471	-17.2304	-15.6449	-8.7857	2.0897	1.7740	1.5095	0.5252

ϕ_c = 4° (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f 0.02	f = 0.03	f = 0.1
45•0	0•8166	0•6588	0•5315	0•1183	19•3685	17•4947	15•8626	8•8429
46•0	0•8164	0•6585	0•5311	0•1179	19•3963	17•5172	15•8807	8•8469
47•0	0•8163	0•6581	0•5306	0•1175	19•4232	17•5389	15•8982	8•8508
48•0	0•8161	0•6578	0•5302	0•1172	19•4493	17•5599	15•9151	8•8545
49•0	0•8159	0•6574	0•5297	0•1168	19•4745	17•5802	15•9315	8•8582
50•0	0•8158	0•6571	0•5293	0•1165	19•4990	17•6000	15•9474	8•8617
51•0	0•8156	0•6568	0•5289	0•1161	19•5228	17•6191	15•9628	8•8651
52•0	0•8155	0•6565	0•5285	0•1158	19•5460	17•6377	15•9778	8•8684
53•0	0•8153	0•6562	0•5281	0•1155	19•5685	17•6559	15•9924	8•8715
54•0	0•8152	0•6559	0•5278	0•1152	19•5904	17•6735	16•0066	8•8746
55•0	0•8151	0•6556	0•5274	0•1149	19•6118	17•6907	16•0204	8•8777
56•0	0•8150	0•6554	0•5271	0•1146	19•6326	17•7075	16•0339	8•8806
57•0	0•8148	0•6551	0•5267	0•1144	19•6530	17•7239	16•0471	8•8835
58•0	0•8147	0•6549	0•5264	0•1141	19•6729	17•7399	16•0600	8•8863
59•0	0•8146	0•6546	0•5261	0•1138	19•6924	17•7555	16•0726	8•8890
60•0	0•8145	0•6544	0•5257	0•1136	19•7115	17•7709	16•0849	8•8916
61•0	0•8144	0•6541	0•5254	0•1133	19•7302	17•7859	16•0970	8•8943
62•0	0•8143	0•6539	0•5251	0•1131	19•7485	17•8006	16•1088	8•8968
63•0	0•8142	0•6537	0•5248	0•1129	19•7666	17•8151	16•1204	8•8993
64•0	0•8141	0•6535	0•5245	0•1126	19•7842	17•8293	16•1318	8•9018
65•0	0•8140	0•6532	0•5242	0•1124	19•8016	17•8433	16•1430	8•9042
66•0	0•8139	0•6530	0•5240	0•1122	19•8188	17•8570	16•1540	8•9065
67•0	0•8138	0•6528	0•5237	0•1119	19•8356	17•8705	16•1649	8•9088
68•0	0•8137	0•6526	0•5234	0•1117	19•8522	17•8838	16•1756	8•9111
69•0	0•8136	0•6524	0•5231	0•1115	19•8686	17•8970	16•1861	8•9134
70•0	0•8135	0•6522	0•5229	0•1113	19•8847	17•9099	16•1965	8•9156
71•0	0•8134	0•6520	0•5226	0•1111	19•9007	17•9227	16•2067	8•9178
72•0	0•8134	0•6518	0•5224	0•1109	19•9164	17•9353	16•2168	8•9199
73•0	0•8133	0•6516	0•5221	0•1107	19•9320	17•9478	16•2268	8•9220
74•0	0•8132	0•6514	0•5219	0•1105	19•9474	17•9602	16•2367	8•9241
75•0	0•8131	0•6512	0•5216	0•1103	19•9627	17•9724	16•2465	8•9262
76•0	0•8130	0•6511	0•5214	0•1101	19•9778	17•9845	16•2562	8•9283
77•0	0•8129	0•6509	0•5211	0•1099	19•9928	17•9965	16•2658	8•9303
78•0	0•8129	0•6507	0•5209	0•1097	20•0077	18•0084	16•2754	8•9323
79•0	0•8128	0•6505	0•5206	0•1095	20•0224	18•0202	16•2848	8•9343
80•0	0•8127	0•6503	0•5204	0•1093	20•0371	18•0320	16•2942	8•9363
81•0	0•8126	0•6502	0•5202	0•1091	20•0517	18•0436	16•3035	8•9382
82•0	0•8126	0•6500	0•5199	0•1090	20•0662	18•0552	16•3128	8•9402
83•0	0•8125	0•6498	0•5197	0•1088	20•0806	18•0667	16•3220	8•9421
84•0	0•8124	0•6496	0•5195	0•1086	20•0949	18•0782	16•3312	8•9440
85•0	0•8123	0•6495	0•5192	0•1084	20•1092	18•0897	16•3404	8•9459
86•0	0•8123	0•6493	0•5190	0•1082	20•1235	18•1011	16•3495	8•9478
87•0	0•8122	0•6491	0•5188	0•1081	20•1377	18•1124	16•3586	8•9497
88•0	0•8121	0•6489	0•5186	0•1079	20•1519	18•1238	16•3676	8•9516
89•0	0•8121	0•6488	0•5183	0•1077	20•1661	18•1351	16•3767	8•9535
90•0	0•8120	0•6486	0•5181	0•1075	20•1803	18•1464	16•3857	8•9554

$\phi_c = 4°$ (continued) Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	−19.0677	−17.2469	−15.6583	−8.7887	2.1099	1.7903	1.5226	0.5282
46.0	−19.0872	−17.2627	−15.6710	−8.7915	2.1297	1.8063	1.5355	0.5310
47.0	−19.1057	−17.2776	−15.6830	−8.7942	2.1492	1.8220	1.5482	0.5338
48.0	−19.1233	−17.2918	−15.6945	−8.7967	2.1684	1.8375	1.5607	0.5366
49.0	−19.1400	−17.3053	−15.7053	−8.7991	2.1873	1.8528	1.5730	0.5393
50.0	−19.1560	−17.3181	−15.7157	−8.8014	2.2060	1.8678	1.5851	0.5420
51.0	−19.1711	−17.3303	−15.7255	−8.8036	2.2243	1.8825	1.5970	0.5446
52.0	−19.1855	−17.3419	−15.7348	−8.8056	2.2424	1.8971	1.6087	0.5472
53.0	−19.1992	−17.3529	−15.7437	−8.8076	2.2603	1.9115	1.6203	0.5497
54.0	−19.2122	−17.3634	−15.7521	−8.8094	2.2779	1.9257	1.6317	0.5522
55.0	−19.2246	−17.3734	−15.7602	−8.8112	2.2953	1.9397	1.6430	0.5547
56.0	−19.2365	−17.3829	−15.7678	−8.8128	2.3125	1.9535	1.6541	0.5571
57.0	−19.2477	−17.3919	−15.7751	−8.8144	2.3295	1.9672	1.6651	0.5595
58.0	−19.2584	−17.4005	−15.7820	−8.8159	2.3463	1.9807	1.6759	0.5618
59.0	−19.2686	−17.4087	−15.7886	−8.8173	2.3629	1.9940	1.6867	0.5641
60.0	−19.2783	−17.4165	−15.7948	−8.8187	2.3793	2.0072	1.6973	0.5664
61.0	−19.2875	−17.4239	−15.8008	−8.8200	2.3956	2.0203	1.7078	0.5687
62.0	−19.2962	−17.4309	−15.8064	−8.8212	2.4118	2.0333	1.7182	0.5709
63.0	−19.3046	−17.4376	−15.8118	−8.8223	2.4277	2.0461	1.7285	0.5732
64.0	−19.3125	−17.4440	−15.8169	−8.8234	2.4436	2.0588	1.7387	0.5754
65.0	−19.3199	−17.4500	−15.8217	−8.8245	2.4593	2.0714	1.7488	0.5775
66.0	−19.3270	−17.4557	−15.8263	−8.8254	2.4748	2.0839	1.7588	0.5797
67.0	−19.3338	−17.4611	−15.8306	−8.8264	2.4903	2.0963	1.7688	0.5818
68.0	−19.3401	−17.4662	−15.8347	−8.8272	2.5056	2.1086	1.7786	0.5839
69.0	−19.3461	−17.4710	−15.8385	−8.8281	2.5209	2.1208	1.7884	0.5860
70.0	−19.3518	−17.4755	−15.8422	−8.8288	2.5360	2.1329	1.7982	0.5881
71.0	−19.3571	−17.4798	−15.8456	−8.8296	2.5510	2.1450	1.8078	0.5901
72.0	−19.3621	−17.4838	−15.8488	−8.8302	2.5660	2.1570	1.8174	0.5922
73.0	−19.3668	−17.4875	−15.8518	−8.8309	2.5808	2.1689	1.8270	0.5942
74.0	−19.3712	−17.4910	−15.8546	−8.8315	2.5956	2.1807	1.8365	0.5962
75.0	−19.3752	−17.4943	−15.8572	−8.8320	2.6103	2.1925	1.8459	0.5982
76.0	−19.3790	−17.4973	−15.8597	−8.8325	2.6250	2.2042	1.8553	0.6002
77.0	−19.3825	−17.5001	−15.8619	−8.8330	2.6395	2.2159	1.8646	0.6022
78.0	−19.3857	−17.5027	−15.8640	−8.8335	2.6541	2.2275	1.8739	0.6041
79.0	−19.3887	−17.5051	−15.8659	−8.8339	2.6685	2.2391	1.8832	0.6061
80.0	−19.3914	−17.5072	−15.8676	−8.8342	2.6829	2.2506	1.8924	0.6080
81.0	−19.3938	−17.5091	−15.8691	−8.8345	2.6973	2.2621	1.9016	0.6099
82.0	−19.3959	−17.5108	−15.8705	−8.8348	2.7116	2.2736	1.9108	0.6119
83.0	−19.3978	−17.5124	−15.8717	−8.8351	2.7259	2.2850	1.9199	0.6138
84.0	−19.3994	−17.5136	−15.8727	−8.8353	2.7402	2.2964	1.9291	0.6157
85.0	−19.4008	−17.5147	−15.8736	−8.8355	2.7544	2.3078	1.9382	0.6176
86.0	−19.4019	−17.5156	−15.8743	−8.8356	2.7686	2.3192	1.9473	0.6195
87.0	−19.4028	−17.5163	−15.8749	−8.8357	2.7828	2.3305	1.9563	0.6214
88.0	−19.4034	−17.5168	−15.8753	−8.8358	2.7970	2.3419	1.9654	0.6233
89.0	−19.4038	−17.5171	−15.8755	−8.8359	2.8112	2.3532	1.9744	0.6251
90.0	−19.4039	−17.5172	−15.8756	−8.8359	2.8254	2.3645	1.9835	0.6270

$\phi_c = 5°$

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°9887	0°9775	0°9664	0°8922	1°1342	1°1278	1°1214	1°0780
1°0	0°9778	0°9560	0°9346	0°7979	2°2341	2°2091	2°1845	2°0223
1°5	0°9675	0°9358	0°9051	0°7166	3°2814	3°2276	3°1749	2°8369
2°0	0°9579	0°9171	0°8780	0°6473	4°2631	4°1722	4°0840	3°5317
2°5	0°9491	0°9000	0°8535	0°5886	5°1712	5°0375	4°9085	4°1198
3°0	0°9411	0°8846	0°8315	0°5392	6°0027	5°8226	5°6497	4°6156
3°5	0°9339	0°8708	0°8120	0°4976	6°7584	6°5301	6°3121	5°0333
4°0	0°9274	0°8584	0°7946	0°4626	7°4418	7°1650	6°9019	5°3857
4°5	0°9216	0°8474	0°7791	0°4329	8°0580	7°7335	7°4264	5°6840
5°0	0°9164	0°8375	0°7654	0°4077	8°6130	8°2422	7°8927	5°9378
6°0	0°9075	0°8208	0°7424	0°3676	9°5634	9°1063	8°6784	6°3414
7°0	0°9005	0°8075	0°7241	0°3377	10°3386	9°8045	9°3071	6°6436
8°0	0°8947	0°7966	0°7093	0°3147	10°9766	10°3746	9°8166	6°8754
9°0	0°8900	0°7878	0°6972	0°2967	11°5075	10°8459	10°2349	7°0572
10°0	0°8861	0°7804	0°6872	0°2824	11°9540	11°2401	10°5830	7°2028
11°0	0°8828	0°7742	0°6789	0°2707	12°3338	11°5738	10°8763	7°3214
12°0	0°8801	0°7689	0°6717	0°2610	12°6600	11°8593	11°1262	7°4198
13°0	0°8777	0°7643	0°6656	0°2528	12°9428	12°1061	11°3414	7°5025
14°0	0°8757	0°7604	0°6604	0°2459	13°1902	12°3212	11°5285	7°5728
15°0	0°8739	0°7570	0°6557	0°2400	13°4083	12°5103	11°6925	7°6334
16°0	0°8724	0°7540	0°6517	0°2348	13°6019	12°6779	11°8375	7°6861
17°0	0°8710	0°7513	0°6481	0°2303	13°7750	12°8273	11°9665	7°7322
18°0	0°8698	0°7490	0°6449	0°2263	13°9306	12°9614	12°0821	7°7730
19°0	0°8687	0°7468	0°6420	0°2228	14°0712	13°0824	12°1862	7°8094
20°0	0°8678	0°7449	0°6394	0°2196	14°1991	13°1922	12°2806	7°8419
21°0	0°8669	0°7432	0°6371	0°2167	14°3158	13°2924	12°3664	7°8713
22°0	0°8662	0°7416	0°6350	0°2142	14°4228	13°3840	12°4450	7°8979
23°0	0°8655	0°7402	0°6330	0°2118	14°5213	13°4683	12°5171	7°9221
24°0	0°8648	0°7388	0°6312	0°2097	14°6123	13°5461	12°5836	7°9443
25°0	0°8643	0°7376	0°6296	0°2077	14°6966	13°6181	12°6451	7°9647
26°0	0°8637	0°7365	0°6280	0°2059	14°7751	13°6851	12°7022	7°9834
27°0	0°8632	0°7355	0°6266	0°2042	14°8483	13°7475	12°7554	8°0008
28°0	0°8628	0°7345	0°6253	0°2026	14°9168	13°8058	12°8051	8°0170
29°0	0°8624	0°7336	0°6241	0°2012	14°9810	13°8605	12°8516	8°0320
30°0	0°8620	0°7328	0°6229	0°1998	15°0415	13°9119	12°8953	8°0461
31°0	0°8617	0°7320	0°6218	0°1986	15°0984	13°9603	12°9364	8°0592
32°0	0°8613	0°7313	0°6208	0°1974	15°1522	14°0060	12°9752	8°0716
33°0	0°8610	0°7306	0°6199	0°1963	15°2032	14°0492	13°0119	8°0832
34°0	0°8608	0°7299	0°6190	0°1952	15°2515	14°0902	13°0467	8°0942
35°0	0°8605	0°7293	0°6181	0°1942	15°2974	14°1291	13°0797	8°1046
36°0	0°8603	0°7287	0°6173	0°1933	15°3412	14°1662	13°1111	8°1145
37°0	0°8600	0°7282	0°6166	0°1924	15°3829	14°2015	13°1410	8°1238
38°0	0°8598	0°7277	0°6159	0°1915	15°4227	14°2352	13°1696	8°1327
39°0	0°8596	0°7272	0°6152	0°1907	15°4609	14°2675	13°1969	8°1412
40°0	0°8594	0°7267	0°6145	0°1900	15°4974	14°2984	13°2230	8°1493
41°0	0°8592	0°7263	0°6139	0°1892	15°5325	14°3281	13°2481	8°1570
42°0	0°8591	0°7258	0°6133	0°1885	15°5662	14°3566	13°2722	8°1644
43°0	0°8589	0°7254	0°6127	0°1878	15°5987	14°3840	13°2953	8°1715
44°0	0°8588	0°7251	0°6122	0°1872	15°6299	14°4104	13°3176	8°1784

$\phi_c = 5°$ Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	-1.1342	-1.1278	-1.1214	-1.0780	0.0049	0.0049	0.0049	0.0046
1.0	-2.2339	-2.2090	-2.1844	-2.0222	0.0193	0.0190	0.0187	0.0169
1.5	-3.2811	-3.2272	-3.1746	-2.8366	0.0421	0.0412	0.0403	0.0346
2.0	-4.2623	-4.1715	-4.0832	-3.5311	0.0720	0.0700	0.0680	0.0557
2.5	-5.1697	-5.0361	-4.9070	-4.1187	0.1076	0.1039	0.1003	0.0787
3.0	-6.0003	-5.8202	-5.6474	-4.6140	0.1475	0.1415	0.1358	0.1024
3.5	-6.7547	-6.5266	-6.3087	-5.0310	0.1903	0.1815	0.1733	0.1261
4.0	-7.4367	-7.1601	-6.8973	-5.3826	0.2349	0.2230	0.2118	0.1491
4.5	-8.0512	-7.7271	-7.4203	-5.6801	0.2805	0.2651	0.2506	0.1711
5.0	-8.6042	-8.2341	-7.8851	-5.9330	0.3264	0.3072	0.2892	0.1921
6.0	-9.5503	-9.0942	-8.6672	-6.3348	0.4172	0.3897	0.3643	0.2306
7.0	-10.3205	-9.7879	-9.2919	-6.6351	0.5048	0.4686	0.4352	0.2647
8.0	-10.9531	-10.3531	-9.7970	-6.8649	0.5879	0.5428	0.5016	0.2949
9.0	-11.4781	-10.8192	-10.2108	-7.0447	0.6662	0.6123	0.5633	0.3217
10.0	-11.9186	-11.2081	-10.5541	-7.1883	0.7398	0.6773	0.6207	0.3457
11.0	-12.2920	-11.5362	-10.8424	-7.3050	0.8089	0.7380	0.6740	0.3673
12.0	-12.6116	-11.8160	-11.0873	-7.4014	0.8739	0.7949	0.7238	0.3869
13.0	-12.8878	-12.0569	-11.2974	-7.4821	0.9350	0.8483	0.7703	0.4047
14.0	-13.1283	-12.2661	-11.4794	-7.5505	0.9927	0.8984	0.8140	0.4211
15.0	-13.3395	-12.4492	-11.6382	-7.6092	1.0473	0.9458	0.8550	0.4363
16.0	-13.5261	-12.6107	-11.7779	-7.6599	1.0990	0.9905	0.8937	0.4504
17.0	-13.6920	-12.7539	-11.9016	-7.7042	1.1481	1.0329	0.9304	0.4635
18.0	-13.8404	-12.8818	-12.0118	-7.7431	1.1949	1.0732	0.9651	0.4757
19.0	-13.9738	-12.9966	-12.1106	-7.7775	1.2395	1.1116	0.9981	0.4872
20.0	-14.0943	-13.1001	-12.1995	-7.8082	1.2822	1.1483	1.0296	0.4981
21.0	-14.2036	-13.1939	-12.2800	-7.8357	1.3230	1.1833	1.0597	0.5084
22.0	-14.3032	-13.2792	-12.3530	-7.8605	1.3622	1.2169	1.0884	0.5181
23.0	-14.3942	-13.3571	-12.4197	-7.8829	1.3999	1.2491	1.1160	0.5274
24.0	-14.4776	-13.4284	-12.4806	-7.9032	1.4362	1.2801	1.1425	0.5362
25.0	-14.5544	-13.4940	-12.5366	-7.9217	1.4712	1.3100	1.1680	0.5447
26.0	-14.6252	-13.5544	-12.5882	-7.9387	1.5049	1.3388	1.1926	0.5528
27.0	-14.6908	-13.6102	-12.6358	-7.9542	1.5376	1.3667	1.2163	0.5605
28.0	-14.7515	-13.6620	-12.6798	-7.9686	1.5692	1.3936	1.2393	0.5680
29.0	-14.8080	-13.7100	-12.7207	-7.9818	1.5999	1.4197	1.2615	0.5751
30.0	-14.8606	-13.7547	-12.7588	-7.9940	1.6296	1.4450	1.2830	0.5821
31.0	-14.9097	-13.7965	-12.7942	-8.0054	1.6585	1.4695	1.3039	0.5887
32.0	-14.9555	-13.8354	-12.8273	-8.0159	1.6866	1.4934	1.3241	0.5952
33.0	-14.9985	-13.8719	-12.8582	-8.0257	1.7140	1.5166	1.3438	0.6015
34.0	-15.0388	-13.9061	-12.8872	-8.0349	1.7407	1.5392	1.3630	0.6075
35.0	-15.0766	-13.9382	-12.9144	-8.0434	1.7667	1.5613	1.3817	0.6134
36.0	-15.1123	-13.9683	-12.9400	-8.0515	1.7921	1.5828	1.4000	0.6191
37.0	-15.1458	-13.9967	-12.9640	-8.0590	1.8169	1.6038	1.4177	0.6247
38.0	-15.1774	-14.0235	-12.9867	-8.0660	1.8411	1.6244	1.4351	0.6301
39.0	-15.2073	-14.0487	-13.0081	-8.0727	1.8649	1.6445	1.4521	0.6354
40.0	-15.2355	-14.0726	-13.0283	-8.0789	1.8881	1.6641	1.4688	0.6405
41.0	-15.2621	-14.0952	-13.0473	-8.0848	1.9109	1.6834	1.4850	0.6456
42.0	-15.2874	-14.1165	-13.0654	-8.0904	1.9333	1.7023	1.5010	0.6505
43.0	-15.3113	-14.1367	-13.0824	-8.0956	1.9552	1.7208	1.5166	0.6553
44.0	-15.3340	-14.1559	-13.0986	-8.1005	1.9767	1.7389	1.5320	0.6600

$\phi_c = 5°$ (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45°0	0°8586	0°7247	0°6116	0°1866	15°6601	14°4359	13°3391	8°1849
46°0	0°8585	0°7243	0°6111	0°1860	15°6893	14°4605	13°3599	8°1913
47°0	0°8584	0°7240	0°6106	0°1854	15°7175	14°4843	13°3800	8°1974
48°0	0°8583	0°7236	0°6101	0°1848	15°7448	14°5073	13°3994	8°2032
49°0	0°8581	0°7233	0°6097	0°1843	15°7712	14°5296	13°4182	8°2089
50°0	0°8580	0°7230	0°6092	0°1838	15°7969	14°5512	13°4364	8°2144
51°0	0°8579	0°7227	0°6088	0°1833	15°8219	14°5723	13°4541	8°2198
52°0	0°8578	0°7224	0°6084	0°1828	15°8461	14°5927	13°4714	8°2250
53°0	0°8577	0°7222	0°6080	0°1823	15°8697	14°6126	13°4881	8°2300
54°0	0°8576	0°7219	0°6076	0°1819	15°8927	14°6319	13°5044	8°2349
55°0	0°8576	0°7216	0°6072	0°1814	15°9152	14°6508	13°5203	8°2396
56°0	0°8575	0°7214	0°6069	0°1810	15°9371	14°6692	13°5358	8°2442
57°0	0°8574	0°7211	0°6065	0°1806	15°9585	14°6872	13°5509	8°2488
58°0	0°8573	0°7209	0°6062	0°1802	15°9794	14°7048	13°5657	8°2532
59°0	0°8573	0°7207	0°6058	0°1798	15°9999	14°7220	13°5802	8°2575
60°0	0°8572	0°7204	0°6055	0°1794	16°0199	14°7389	13°5944	8°2617
61°0	0°8571	0°7202	0°6052	0°1790	16°0396	14°7554	13°6082	8°2658
62°0	0°8571	0°7200	0°6049	0°1786	16°0588	14°7716	13°6218	8°2698
63°0	0°8570	0°7198	0°6045	0°1782	16°0778	14°7875	13°6352	8°2737
64°0	0°8569	0°7196	0°6042	0°1779	16°0964	14°8031	13°6483	8°2776
65°0	0°8569	0°7194	0°6039	0°1775	16°1146	14°8185	13°6612	8°2814
66°0	0°8568	0°7192	0°6036	0°1772	16°1326	14°8336	13°6739	8°2851
67°0	0°8568	0°7190	0°6034	0°1768	16°1504	14°8485	13°6864	8°2888
68°0	0°8567	0°7188	0°6031	0°1765	16°1678	14°8631	13°6987	8°2924
69°0	0°8567	0°7186	0°6028	0°1762	16°1850	14°8775	13°7108	8°2959
70°0	0°8566	0°7184	0°6025	0°1758	16°2020	14°8918	13°7227	8°2994
71°0	0°8566	0°7182	0°6023	0°1755	16°2188	14°9059	13°7345	8°3028
72°0	0°8565	0°7181	0°6020	0°1752	16°2354	14°9198	13°7462	8°3062
73°0	0°8565	0°7179	0°6017	0°1749	16°2518	14°9335	13°7577	8°3096
74°0	0°8564	0°7177	0°6015	0°1746	16°2680	14°9471	13°7691	8°3129
75°0	0°8564	0°7176	0°6012	0°1743	16°2841	14°9606	13°7804	8°3162
76°0	0°8564	0°7174	0°6010	0°1740	16°3000	14°9739	13°7915	8°3194
77°0	0°8563	0°7172	0°6007	0°1737	16°3158	14°9871	13°8026	8°3226
78°0	0°8563	0°7171	0°6005	0°1734	16°3314	15°0002	13°8136	8°3258
79°0	0°8562	0°7169	0°6002	0°1731	16°3469	15°0132	13°8245	8°3289
80°0	0°8562	0°7167	0°6000	0°1728	16°3624	15°0262	13°8353	8°3320
81°0	0°8562	0°7166	0°5997	0°1725	16°3777	15°0390	13°8461	8°3351
82°0	0°8561	0°7164	0°5995	0°1723	16°3930	15°0518	13°8567	8°3382
83°0	0°8561	0°7163	0°5993	0°1720	16°4082	15°0645	13°8674	8°3413
84°0	0°8561	0°7161	0°5990	0°1717	16°4233	15°0771	13°8780	8°3443
85°0	0°8560	0°7159	0°5988	0°1714	16°4384	15°0897	13°8885	8°3473
86°0	0°8560	0°7158	0°5985	0°1711	16°4534	15°1023	13°8990	8°3503
87°0	0°8559	0°7156	0°5983	0°1709	16°4684	15°1148	13°9095	8°3533
88°0	0°8559	0°7155	0°5981	0°1706	16°4833	15°1273	13°9199	8°3563
89°0	0°8559	0°7153	0°5978	0°1703	16°4983	15°1398	13°9304	8°3593
90°0	0°8558	0°7152	0°5976	0°1700	16°5132	15°1523	13°9408	8°3622

$\phi_c = 5°$ (continued) Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	−15.3555	−14.1740	−13.1139	−8.1052	1.9978	1.7568	1.5471	0.6646
46.0	−15.3760	−14.1913	−13.1285	−8.1097	2.0186	1.7743	1.5619	0.6691
47.0	−15.3954	−14.2076	−13.1423	−8.1139	2.0391	1.7916	1.5764	0.6735
48.0	−15.4138	−14.2232	−13.1554	−8.1178	2.0592	1.8086	1.5907	0.6778
49.0	−15.4314	−14.2380	−13.1679	−8.1216	2.0790	1.8253	1.6048	0.6821
50.0	−15.4480	−14.2520	−13.1797	−8.1252	2.0986	1.8417	1.6187	0.6863
51.0	−15.4639	−14.2654	−13.1910	−8.1286	2.1178	1.8580	1.6324	0.6904
52.0	−15.4790	−14.2781	−13.2017	−8.1318	2.1368	1.8740	1.6458	0.6945
53.0	−15.4934	−14.2902	−13.2119	−8.1349	2.1555	1.8897	1.6591	0.6985
54.0	−15.5071	−14.3018	−13.2216	−8.1378	2.1740	1.9053	1.6722	0.7024
55.0	−15.5201	−14.3127	−13.2308	−8.1405	2.1923	1.9207	1.6851	0.7062
56.0	−15.5325	−14.3232	−13.2396	−8.1432	2.2103	1.9358	1.6979	0.7101
57.0	−15.5443	−14.3331	−13.2480	−8.1456	2.2282	1.9509	1.7105	0.7138
58.0	−15.5555	−14.3425	−13.2559	−8.1480	2.2458	1.9657	1.7230	0.7175
59.0	−15.5662	−14.3515	−13.2635	−8.1503	2.2633	1.9804	1.7354	0.7212
60.0	−15.5764	−14.3601	−13.2707	−8.1524	2.2806	1.9949	1.7476	0.7248
61.0	−15.5861	−14.3682	−13.2775	−8.1544	2.2977	2.0093	1.7596	0.7284
62.0	−15.5953	−14.3760	−13.2840	−8.1563	2.3146	2.0235	1.7716	0.7319
63.0	−15.6040	−14.3833	−13.2902	−8.1581	2.3314	2.0376	1.7834	0.7354
64.0	−15.6123	−14.3903	−13.2960	−8.1599	2.3480	2.0516	1.7952	0.7389
65.0	−15.6202	−14.3969	−13.3016	−8.1615	2.3645	2.0654	1.8068	0.7423
66.0	−15.6277	−14.4031	−13.3068	−8.1630	2.3809	2.0792	1.8184	0.7457
67.0	−15.6347	−14.4091	−13.3118	−8.1645	2.3972	2.0928	1.8298	0.7490
68.0	−15.6414	−14.4147	−13.3165	−8.1659	2.4133	2.1063	1.8412	0.7524
69.0	−15.6477	−14.4200	−13.3209	−8.1672	2.4293	2.1198	1.8524	0.7557
70.0	−15.6537	−14.4250	−13.3251	−8.1684	2.4452	2.1331	1.8636	0.7589
71.0	−15.6593	−14.4297	−13.3291	−8.1696	2.4610	2.1464	1.8747	0.7622
72.0	−15.6645	−14.4341	−13.3328	−8.1706	2.4768	2.1596	1.8858	0.7654
73.0	−15.6695	−14.4382	−13.3362	−8.1716	2.4924	2.1727	1.8968	0.7686
74.0	−15.6741	−14.4421	−13.3395	−8.1726	2.5079	2.1857	1.9077	0.7718
75.0	−15.6784	−14.4457	−13.3425	−8.1735	2.5234	2.1987	1.9186	0.7749
76.0	−15.6823	−14.4490	−13.3453	−8.1743	2.5388	2.2116	1.9294	0.7781
77.0	−15.6860	−14.4521	−13.3479	−8.1750	2.5542	2.2244	1.9402	0.7812
78.0	−15.6894	−14.4549	−13.3502	−8.1757	2.5695	2.2372	1.9509	0.7843
79.0	−15.6925	−14.4575	−13.3524	−8.1763	2.5847	2.2500	1.9616	0.7873
80.0	−15.6953	−14.4599	−13.3544	−8.1769	2.5999	2.2627	1.9722	0.7904
81.0	−15.6979	−14.4620	−13.3562	−8.1774	2.6150	2.2754	1.9828	0.7935
82.0	−15.7001	−14.4639	−13.3577	−8.1779	2.6301	2.2880	1.9934	0.7965
83.0	−15.7021	−14.4655	−13.3591	−8.1783	2.6451	2.3006	2.0039	0.7995
84.0	−15.7038	−14.4670	−13.3603	−8.1786	2.6602	2.3132	2.0144	0.8025
85.0	−15.7053	−14.4682	−13.3613	−8.1789	2.6752	2.3257	2.0249	0.8056
86.0	−15.7064	−14.4692	−13.3622	−8.1791	2.6901	2.3382	2.0354	0.8086
87.0	−15.7074	−14.4699	−13.3628	−8.1793	2.7051	2.3507	2.0458	0.8115
88.0	−15.7080	−14.4705	−13.3633	−8.1794	2.7200	2.3632	2.0563	0.8145
89.0	−15.7084	−14.4708	−13.3635	−8.1795	2.7350	2.3757	2.0667	0.8175
90.0	−15.7085	−14.4709	−13.3636	−8.1795	2.7499	2.3882	2.0772	0.8205

$\phi_c = 6°$

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°9921	0°9843	0°9765	0°9238	0°7894	0°7863	0°7832	0°7619
1°0	0°9845	0°9692	0°9540	0°8545	1°5620	1°5498	1°5378	1°4567
1°5	0°9772	0°9547	0°9326	0°7920	2°3086	2°2820	2°2557	2°0830
2°0	0°9703	0°9410	0°9126	0°7362	3°0216	2°9760	2°9313	2°6422
2°5	0°9639	0°9283	0°8940	0°6869	3°6956	3°6273	3°5607	3°1379
3°0	0°9579	0°9165	0°8768	0°6434	4°3272	4°2335	4°1426	3°5749
3°5	0°9524	0°9056	0°8611	0°6053	4°9148	4°7941	4°6773	3°9589
4°0	0°9474	0°8957	0°8468	0°5718	5°4588	5°3098	5°1663	4°2959
4°5	0°9428	0°8866	0°8338	0°5425	5°9602	5°7827	5°6122	4°5914
5°0	0°9386	0°8783	0°8220	0°5168	6°4213	6°2152	6°0180	4°8510
6°0	0°9313	0°8640	0°8016	0°4742	7°2331	6°9716	6°7228	5°2809
7°0	0°9253	0°8522	0°7848	0°4410	7°9166	7°6035	7°3068	5°6177
8°0	0°9204	0°8423	0°7709	0°4146	8°4940	8°1336	7°7935	5°8853
9°0	0°9162	0°8341	0°7593	0°3934	8°9846	8°5813	8°2022	6°1011
10°0	0°9128	0°8272	0°7495	0°3760	9°4043	8°9625	8°5484	6°2776
11°0	0°9099	0°8213	0°7412	0°3617	9°7661	9°2897	8°8444	6°4240
12°0	0°9075	0°8162	0°7342	0°3497	10°0804	9°5729	9°0995	6°5470
13°0	0°9054	0°8119	0°7280	0°3394	10°3554	9°8199	9°3213	6°6516
14°0	0°9036	0°8081	0°7227	0°3307	10°5978	10°0370	9°5157	6°7414
15°0	0°9020	0°8048	0°7180	0°3231	10°8129	10°2291	9°6873	6°8192
16°0	0°9006	0°8018	0°7139	0°3165	11°0049	10°4002	9°8398	6°8873
17°0	0°8995	0°7993	0°7102	0°3107	11°1772	10°5535	9°9762	6°9474
18°0	0°8984	0°7970	0°7069	0°3055	11°3328	10°6917	10°0988	7°0007
19°0	0°8975	0°7949	0°7040	0°3009	11°4740	10°8168	10°2097	7°0484
20°0	0°8967	0°7930	0°7014	0°2968	11°6026	10°9306	10°3105	7°0912
21°0	0°8960	0°7913	0°6989	0°2931	11°7203	11°0347	10°4024	7°1300
22°0	0°8953	0°7898	0°6968	0°2897	11°8285	11°1302	10°4867	7°1652
23°0	0°8947	0°7884	0°6948	0°2866	11°9283	11°2181	10°5643	7°1973
24°0	0°8942	0°7872	0°6929	0°2838	12°0207	11°2995	10°6360	7°2268
25°0	0°8937	0°7860	0°6912	0°2812	12°1064	11°3750	10°7024	7°2539
26°0	0°8933	0°7849	0°6897	0°2788	12°1863	11°4452	10°7641	7°2789
27°0	0°8929	0°7839	0°6882	0°2766	12°2610	11°5107	10°8217	7°3021
28°0	0°8926	0°7830	0°6869	0°2746	12°3309	11°5721	10°8755	7°3237
29°0	0°8923	0°7822	0°6856	0°2727	12°3965	11°6297	10°9260	7°3438
30°0	0°8920	0°7814	0°6845	0°2709	12°4583	11°6838	10°9734	7°3626
31°0	0°8917	0°7806	0°6834	0°2692	12°5166	11°7349	11°0181	7°3803
32°0	0°8915	0°7800	0°6824	0°2677	12°5717	11°7831	11°0604	7°3969
33°0	0°8913	0°7793	0°6814	0°2662	12°6240	11°8288	11°1003	7°4125
34°0	0°8911	0°7787	0°6805	0°2648	12°6736	11°8721	11°1382	7°4273
35°0	0°8909	0°7781	0°6796	0°2635	12°7207	11°9133	11°1742	7°4413
36°0	0°8908	0°7776	0°6788	0°2623	12°7656	11°9525	11°2084	7°4545
37°0	0°8906	0°7771	0°6781	0°2611	12°8085	11°9900	11°2411	7°4671
38°0	0°8905	0°7766	0°6773	0°2600	12°8495	12°0257	11°2723	7°4791
39°0	0°8904	0°7762	0°6766	0°2589	12°8887	12°0599	11°3021	7°4906
40°0	0°8902	0°7757	0°6760	0°2579	12°9263	12°0927	11°3307	7°5015
41°0	0°8901	0°7753	0°6753	0°2569	12°9625	12°1242	11°3581	7°5119
42°0	0°8900	0°7750	0°6748	0°2560	12°9972	12°1544	11°3844	7°5219
43°0	0°8900	0°7746	0°6742	0°2551	13°0306	12°1835	11°4098	7°5315
44°0	0°8899	0°7742	0°6736	0°2542	13°0629	12°2116	11°4342	7°5408

$\phi_c = 6°$ Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	-0.7894	-0.7862	-0.7832	-0.7619	0.0034	0.0034	0.0034	0.0033
1.0	-1.5619	-1.5497	-1.5377	-1.4566	0.0135	0.0134	0.0133	0.0123
1.5	-2.3084	-2.2817	-2.2555	-2.0828	0.0298	0.0293	0.0289	0.0259
2.0	-3.0210	-2.9754	-2.9307	-2.6417	0.0515	0.0505	0.0495	0.0430
2.5	-3.6945	-3.6262	-3.5597	-3.1370	0.0780	0.0760	0.0742	0.0624
3.0	-4.3253	-4.2318	-4.1409	-3.5735	0.1082	0.1051	0.1020	0.0833
3.5	-4.9120	-4.7914	-4.6747	-3.9569	0.1415	0.1368	0.1323	0.1050
4.0	-5.4548	-5.3060	-5.1627	-4.2931	0.1771	0.1705	0.1643	0.1270
4.5	-5.9549	-5.7776	-5.6073	-4.5879	0.2142	0.2056	0.1973	0.1489
5.0	-6.4144	-6.2087	-6.0117	-4.8466	0.2524	0.2413	0.2309	0.1704
6.0	-7.2224	-6.9616	-6.7133	-5.2746	0.3300	0.3136	0.2982	0.2114
7.0	-7.9016	-7.5894	-7.2936	-5.6092	0.4072	0.3850	0.3642	0.2495
8.0	-8.4741	-8.1150	-7.7761	-5.8745	0.4824	0.4541	0.4276	0.2843
9.0	-8.9593	-8.5578	-8.1804	-6.0879	0.5548	0.5201	0.4879	0.3161
10.0	-9.3732	-8.9338	-8.5218	-6.2620	0.6240	0.5830	0.5449	0.3452
11.0	-9.7290	-9.2555	-8.8128	-6.4060	0.6898	0.6425	0.5988	0.3719
12.0	-10.0370	-9.5330	-9.0628	-6.5265	0.7524	0.6989	0.6496	0.3963
13.0	-10.3055	-9.7742	-9.2794	-6.6286	0.8119	0.7523	0.6976	0.4189
14.0	-10.5412	-9.9853	-9.4685	-6.7159	0.8685	0.8030	0.7429	0.4399
15.0	-10.7494	-10.1713	-9.6346	-6.7913	0.9223	0.8510	0.7859	0.4594
16.0	-10.9344	-10.3362	-9.7816	-6.8569	0.9735	0.8967	0.8266	0.4776
17.0	-11.0997	-10.4832	-9.9123	-6.9145	1.0225	0.9403	0.8653	0.4946
18.0	-11.2481	-10.6149	-10.0293	-6.9654	1.0692	0.9818	0.9022	0.5106
19.0	-11.3819	-10.7335	-10.1344	-7.0106	1.1140	1.0215	0.9373	0.5258
20.0	-11.5032	-10.8409	-10.2294	-7.0510	1.1569	1.0594	0.9710	0.5401
21.0	-11.6135	-10.9383	-10.3156	-7.0873	1.1981	1.0959	1.0032	0.5536
22.0	-11.7141	-11.0272	-10.3940	-7.1200	1.2378	1.1309	1.0340	0.5665
23.0	-11.8063	-11.1085	-10.4657	-7.1497	1.2759	1.1645	1.0637	0.5788
24.0	-11.8910	-11.1831	-10.5314	-7.1767	1.3128	1.1970	1.0923	0.5905
25.0	-11.9691	-11.2518	-10.5918	-7.2014	1.3483	1.2282	1.1198	0.6018
26.0	-12.0412	-11.3152	-10.6475	-7.2240	1.3827	1.2585	1.1464	0.6126
27.0	-12.1080	-11.3738	-10.6990	-7.2448	1.4160	1.2877	1.1721	0.6229
28.0	-12.1700	-11.4282	-10.7468	-7.2639	1.4483	1.3160	1.1969	0.6329
29.0	-12.2277	-11.4788	-10.7912	-7.2816	1.4796	1.3435	1.2210	0.6425
30.0	-12.2815	-11.5260	-10.8325	-7.2980	1.5100	1.3702	1.2444	0.6517
31.0	-12.3317	-11.5699	-10.8710	-7.3132	1.5396	1.3961	1.2671	0.6607
32.0	-12.3787	-11.6111	-10.9070	-7.3273	1.5684	1.4213	1.2891	0.6694
33.0	-12.4228	-11.6496	-10.9407	-7.3405	1.5965	1.4458	1.3106	0.6778
34.0	-12.4641	-11.6857	-10.9723	-7.3528	1.6238	1.4697	1.3315	0.6859
35.0	-12.5030	-11.7197	-11.0019	-7.3644	1.6505	1.4930	1.3519	0.6938
36.0	-12.5396	-11.7516	-11.0298	-7.3752	1.6766	1.5158	1.3717	0.7015
37.0	-12.5740	-11.7817	-11.0561	-7.3853	1.7021	1.5381	1.3912	0.7090
38.0	-12.6065	-11.8101	-11.0808	-7.3948	1.7271	1.5598	1.4101	0.7163
39.0	-12.6373	-11.8369	-11.1042	-7.4037	1.7515	1.5811	1.4287	0.7234
40.0	-12.6663	-11.8622	-11.1262	-7.4122	1.7754	1.6020	1.4469	0.7304
41.0	-12.6938	-11.8861	-11.1471	-7.4201	1.7989	1.6224	1.4647	0.7372
42.0	-12.7198	-11.9087	-11.1668	-7.4276	1.8219	1.6425	1.4822	0.7438
43.0	-12.7444	-11.9302	-11.1855	-7.4347	1.8445	1.6621	1.4993	0.7503
44.0	-12.7678	-11.9506	-11.2032	-7.4414	1.8667	1.6815	1.5161	0.7566

ϕ_c = 6° (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•8898	0•7739	0•6731	0•2534	13•0940	12•2387	11•4578	7•5496
46•0	0•8897	0•7736	0•6726	0•2526	13•1241	12•2648	11•4805	7•5582
47•0	0•8897	0•7733	0•6721	0•2519	13•1532	12•2901	11•5025	7•5664
48•0	0•8896	0•7730	0•6717	0•2511	13•1814	12•3146	11•5238	7•5744
49•0	0•8896	0•7727	0•6712	0•2504	13•2087	12•3383	11•5444	7•5821
50•0	0•8895	0•7724	0•6708	0•2497	13•2352	12•3614	11•5644	7•5896
51•0	0•8895	0•7722	0•6703	0•2491	13•2610	12•3838	11•5838	7•5968
52•0	0•8895	0•7719	0•6699	0•2484	13•2861	12•4055	11•6027	7•6038
53•0	0•8894	0•7717	0•6696	0•2478	13•3105	12•4267	11•6211	7•6106
54•0	0•8894	0•7715	0•6692	0•2472	13•3342	12•4473	11•6390	7•6172
55•0	0•8894	0•7712	0•6688	0•2466	13•3574	12•4675	11•6564	7•6237
56•0	0•8894	0•7710	0•6685	0•2461	13•3801	12•4871	11•6735	7•6299
57•0	0•8893	0•7708	0•6681	0•2455	13•4022	12•5063	11•6901	7•6361
58•0	0•8893	0•7706	0•6678	0•2450	13•4239	12•5250	11•7064	7•6420
59•0	0•8893	0•7704	0•6674	0•2444	13•4450	12•5434	11•7223	7•6479
60•0	0•8893	0•7702	0•6671	0•2439	13•4658	12•5614	11•7378	7•6536
61•0	0•8893	0•7701	0•6668	0•2434	13•4861	12•5790	11•7531	7•6591
62•0	0•8893	0•7699	0•6665	0•2429	13•5061	12•5963	11•7681	7•6646
63•0	0•8893	0•7697	0•6662	0•2424	13•5257	12•6132	11•7827	7•6699
64•0	0•8893	0•7695	0•6659	0•2420	13•5450	12•6299	11•7972	7•6752
65•0	0•8893	0•7694	0•6656	0•2415	13•5639	12•6463	11•8114	7•6803
66•0	0•8893	0•7692	0•6654	0•2410	13•5826	12•6624	11•8253	7•6854
67•0	0•8893	0•7690	0•6651	0•2406	13•6009	12•6783	11•8390	7•6904
68•0	0•8893	0•7689	0•6648	0•2402	13•6190	12•6939	11•8526	7•6953
69•0	0•8893	0•7687	0•6645	0•2397	13•6369	12•7094	11•8659	7•7001
70•0	0•8893	0•7686	0•6643	0•2393	13•6545	12•7246	11•8791	7•7048
71•0	0•8893	0•7685	0•6640	0•2389	13•6719	12•7396	11•8921	7•7095
72•0	0•8893	0•7683	0•6638	0•2385	13•6891	12•7545	11•9049	7•7141
73•0	0•8893	0•7682	0•6635	0•2381	13•7061	12•7692	11•9176	7•7187
74•0	0•8893	0•7680	0•6633	0•2377	13•7229	12•7837	11•9301	7•7232
75•0	0•8893	0•7679	0•6630	0•2373	13•7396	12•7981	11•9426	7•7276
76•0	0•8893	0•7678	0•6628	0•2369	13•7561	12•8124	11•9549	7•7320
77•0	0•8893	0•7676	0•6626	0•2365	13•7724	12•8265	11•9671	7•7364
78•0	0•8894	0•7675	0•6623	0•2361	13•7887	12•8405	11•9792	7•7407
79•0	0•8894	0•7674	0•6621	0•2357	13•8048	12•8544	11•9912	7•7450
80•0	0•8894	0•7672	0•6619	0•2353	13•8208	12•8683	12•0031	7•7492
81•0	0•8894	0•7671	0•6617	0•2350	13•8368	12•8820	12•0150	7•7534
82•0	0•8894	0•7670	0•6614	0•2346	13•8526	12•8957	12•0267	7•7576
83•0	0•8894	0•7669	0•6612	0•2342	13•8684	12•9093	12•0385	7•7618
84•0	0•8894	0•7667	0•6610	0•2338	13•8841	12•9228	12•0501	7•7659
85•0	0•8895	0•7666	0•6608	0•2335	13•8997	12•9363	12•0618	7•7700
86•0	0•8895	0•7665	0•6605	0•2331	13•9153	12•9497	12•0734	7•7741
87•0	0•8895	0•7664	0•6603	0•2328	13•9309	12•9632	12•0849	7•7782
88•0	0•8895	0•7663	0•6601	0•2324	13•9465	12•9765	12•0965	7•7822
89•0	0•8895	0•7661	0•6599	0•2320	13•9620	12•9899	12•1080	7•7863
90•0	0•8895	0•7660	0•6597	0•2317	13•9775	13•0033	12•1195	7•7903

$\phi_c = 6°$ (continued) Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	−12.7900	−11.9699	−11.2200	−7.4477	1.8885	1.7004	1.5326	0.7629
46.0	−12.8111	−11.9882	−11.2359	−7.4537	1.9099	1.7191	1.5488	0.7690
47.0	−12.8311	−12.0056	−11.2511	−7.4594	1.9310	1.7374	1.5648	0.7749
48.0	−12.8502	−12.0222	−11.2654	−7.4648	1.9518	1.7555	1.5804	0.7808
49.0	−12.8683	−12.0379	−11.2791	−7.4699	1.9723	1.7733	1.5959	0.7866
50.0	−12.8855	−12.0529	−11.2921	−7.4747	1.9924	1.7908	1.6111	0.7923
51.0	−12.9019	−12.0671	−11.3045	−7.4793	2.0123	1.8080	1.6261	0.7978
52.0	−12.9175	−12.0806	−11.3162	−7.4837	2.0320	1.8251	1.6409	0.8033
53.0	−12.9324	−12.0935	−11.3274	−7.4878	2.0513	1.8419	1.6555	0.8087
54.0	−12.9465	−12.1058	−11.3381	−7.4918	2.0704	1.8585	1.6698	0.8140
55.0	−12.9600	−12.1175	−11.3482	−7.4955	2.0893	1.8748	1.6841	0.8193
56.0	−12.9728	−12.1286	−11.3578	−7.4990	2.1080	1.8910	1.6981	0.8245
57.0	−12.9850	−12.1392	−11.3670	−7.5024	2.1264	1.9070	1.7120	0.8296
58.0	−12.9966	−12.1493	−11.3757	−7.5056	2.1447	1.9228	1.7257	0.8346
59.0	−13.0077	−12.1589	−11.3841	−7.5087	2.1628	1.9385	1.7392	0.8396
60.0	−13.0183	−12.1680	−11.3920	−7.5116	2.1806	1.9540	1.7526	0.8445
61.0	−13.0283	−12.1767	−11.3995	−7.5143	2.1983	1.9693	1.7659	0.8493
62.0	−13.0378	−12.1849	−11.4066	−7.5169	2.2159	1.9845	1.7791	0.8541
63.0	−13.0468	−12.1927	−11.4134	−7.5194	2.2333	1.9995	1.7921	0.8589
64.0	−13.0554	−12.2002	−11.4198	−7.5217	2.2505	2.0145	1.8050	0.8636
65.0	−13.0636	−12.2072	−11.4259	−7.5239	2.2676	2.0293	1.8178	0.8682
66.0	−13.0713	−12.2139	−11.4317	−7.5260	2.2846	2.0439	1.8305	0.8728
67.0	−13.0786	−12.2203	−11.4372	−7.5280	2.3014	2.0585	1.8431	0.8774
68.0	−13.0856	−12.2263	−11.4424	−7.5299	2.3181	2.0730	1.8556	0.8819
69.0	−13.0921	−12.2319	−11.4473	−7.5317	2.3347	2.0873	1.8680	0.8864
70.0	−13.0983	−12.2372	−11.4519	−7.5333	2.3512	2.1016	1.8803	0.8908
71.0	−13.1041	−12.2423	−11.4562	−7.5349	2.3676	2.1157	1.8926	0.8952
72.0	−13.1095	−12.2470	−11.4603	−7.5364	2.3839	2.1298	1.9047	0.8996
73.0	−13.1147	−12.2514	−11.4641	−7.5377	2.4001	2.1438	1.9169	0.9039
74.0	−13.1194	−12.2555	−11.4677	−7.5390	2.4163	2.1578	1.9289	0.9082
75.0	−13.1239	−12.2594	−11.4710	−7.5402	2.4323	2.1716	1.9409	0.9125
76.0	−13.1280	−12.2629	−11.4741	−7.5413	2.4483	2.1854	1.9528	0.9168
77.0	−13.1318	−12.2662	−11.4769	−7.5423	2.4642	2.1992	1.9646	0.9210
78.0	−13.1354	−12.2693	−11.4795	−7.5432	2.4801	2.2129	1.9765	0.9252
79.0	−13.1386	−12.2720	−11.4819	−7.5441	2.4959	2.2265	1.9882	0.9294
80.0	−13.1415	−12.2746	−11.4841	−7.5449	2.5117	2.2401	1.9999	0.9336
81.0	−13.1441	−12.2768	−11.4861	−7.5456	2.5274	2.2536	2.0116	0.9378
82.0	−13.1465	−12.2788	−11.4878	−7.5462	2.5430	2.2672	2.0233	0.9419
83.0	−13.1485	−12.2806	−11.4893	−7.5467	2.5587	2.2806	2.0349	0.9460
84.0	−13.1503	−12.2822	−11.4907	−7.5472	2.5743	2.2941	2.0465	0.9501
85.0	−13.1518	−12.2834	−11.4918	−7.5476	2.5899	2.3075	2.0581	0.9542
86.0	−13.1530	−12.2845	−11.4927	−7.5479	2.6054	2.3209	2.0696	0.9583
87.0	−13.1540	−12.2853	−11.4934	−7.5482	2.6210	2.3343	2.0812	0.9624
88.0	−13.1547	−12.2859	−11.4939	−7.5483	2.6365	2.3477	2.0927	0.9664
89.0	−13.1551	−12.2863	−11.4942	−7.5484	2.6520	2.3611	2.1042	0.9705
90.0	−13.1552	−12.2864	−11.4943	−7.5485	2.6675	2.3745	2.1157	0.9745

$\phi_c = 7°$

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1°0000	1°0000	1°0000	1°0000	0°0000	0°0000	0°0000	0°0000
0°5	0°9942	0°9885	0°9827	0°9435	0°5805	0°5788	0°5772	0°5656
1°0	0°9886	0°9772	0°9660	0°8907	1°1520	1°1454	1°1388	1°0941
1°5	0°9832	0°9664	0°9499	0°8419	1°7092	1°6946	1°6801	1°5835
2°0	0°9781	0°9561	0°9346	0°7972	2°2476	2°2224	2°1975	2°0334
2°5	0°9732	0°9464	0°9202	0°7563	2°7637	2°7255	2°6880	2°4442
3°0	0°9687	0°9372	0°9067	0°7193	3°2549	3°2019	3°1501	2°8173
3°5	0°9644	0°9286	0°8941	0°6858	3°7195	3°6503	3°5829	3°1549
4°0	0°9605	0°9206	0°8824	0°6556	4°1567	4°0703	3°9863	3°4596
4°5	0°9568	0°9132	0°8715	0°6285	4°5665	4°4623	4°3612	3°7340
5°0	0°9535	0°9063	0°8615	0°6041	4°9494	4°8270	4°7086	3°9810
6°0	0°9476	0°8942	0°8439	0°5624	5°6387	5°4798	5°3269	4°4038
7°0	0°9426	0°8839	0°8289	0°5286	6°2350	6°0408	5°8546	4°7479
8°0	0°9385	0°8752	0°8163	0°5009	6°7505	6°5229	6°3054	5°0300
9°0	0°9350	0°8679	0°8055	0°4781	7°1970	6°9383	6°6920	5°2633
10°0	0°9321	0°8615	0°7964	0°4591	7°5853	7°2980	7°0251	5°4582
11°0	0°9296	0°8561	0°7885	0°4431	7°9246	7°6111	7°3140	5°6226
12°0	0°9275	0°8515	0°7817	0°4295	8°2227	7°8852	7°5660	5°7627
13°0	0°9257	0°8474	0°7758	0°4179	8°4861	8°1266	7°7874	5°8831
14°0	0°9242	0°8439	0°7706	0°4078	8°7201	8°3405	7°9830	5°9875
15°0	0°9229	0°8408	0°7660	0°3990	8°9291	8°5311	8°1568	6°0788
16°0	0°9218	0°8381	0°7620	0°3913	9°1168	8°7019	8°3123	6°1592
17°0	0°9208	0°8356	0°7584	0°3845	9°2861	8°8558	8°4520	6°2305
18°0	0°9200	0°8335	0°7551	0°3784	9°4396	8°9950	8°5782	6°2941
19°0	0°9192	0°8316	0°7522	0°3730	9°5794	9°1215	8°6928	6°3512
20°0	0°9186	0°8298	0°7496	0°3681	9°7072	9°2371	8°7972	6°4028
21°0	0°9180	0°8283	0°7473	0°3636	9°8246	9°3430	8°8929	6°4495
22°0	0°9175	0°8268	0°7451	0°3596	9°9327	9°4405	8°9807	6°4921
23°0	0°9171	0°8256	0°7431	0°3559	10°0326	9°5305	9°0618	6°5311
24°0	0°9167	0°8244	0°7413	0°3526	10°1253	9°6139	9°1368	6°5669
25°0	0°9164	0°8233	0°7397	0°3495	10°2115	9°6914	9°2065	6°5999
26°0	0°9161	0°8223	0°7382	0°3466	10°2919	9°7636	9°2714	6°6305
27°0	0°9159	0°8214	0°7367	0°3440	10°3672	9°8311	9°3320	6°6588
28°0	0°9156	0°8206	0°7354	0°3415	10°4378	9°8944	9°3887	6°6853
29°0	0°9155	0°8198	0°7342	0°3392	10°5042	9°9539	9°4420	6°7099
30°0	0°9153	0°8191	0°7331	0°3371	10°5667	10°0099	9°4921	6°7330
31°0	0°9152	0°8185	0°7320	0°3351	10°6258	10°0627	9°5394	6°7547
32°0	0°9150	0°8179	0°7310	0°3332	10°6817	10°1127	9°5841	6°7751
33°0	0°9149	0°8173	0°7301	0°3314	10°7347	10°1601	9°6264	6°7944
34°0	0°9148	0°8168	0°7292	0°3297	10°7850	10°2050	9°6666	6°8126
35°0	0°9148	0°8163	0°7284	0°3282	10°8330	10°2478	9°7048	6°8298
36°0	0°9147	0°8158	0°7276	0°3267	10°8787	10°2886	9°7411	6°8462
37°0	0°9147	0°8154	0°7269	0°3253	10°9223	10°3275	9°7758	6°8617
38°0	0°9146	0°8150	0°7262	0°3239	10°9641	10°3647	9°8090	6°8765
39°0	0°9146	0°8146	0°7255	0°3226	11°0041	10°4003	9°8407	6°8907
40°0	0°9146	0°8142	0°7249	0°3214	11°0424	10°4345	9°8711	6°9042
41°0	0°9146	0°8139	0°7243	0°3202	11°0793	10°4673	9°9003	6°9171
42°0	0°9146	0°8136	0°7238	0°3191	11°1147	10°4988	9°9284	6°9295
43°0	0°9146	0°8133	0°7232	0°3181	11°1489	10°5292	9°9554	6°9414
44°0	0°9146	0°8130	0°7227	0°3170	11°1818	10°5585	9°9815	6°9528

$\phi_c = 7°$ Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	-0.5805	-0.5788	-0.5772	-0.5656	0.0025	0.0025	0.0025	0.0024
1.0	-1.1519	-1.1453	-1.1387	-1.0940	0.0100	0.0099	0.0098	0.0093
1.5	-1.7090	-1.6944	-1.6799	-1.5834	0.0221	0.0219	0.0216	0.0200
2.0	-2.2472	-2.2219	-2.1970	-2.0330	0.0386	0.0380	0.0374	0.0337
2.5	-2.7629	-2.7247	-2.6872	-2.4435	0.0588	0.0577	0.0567	0.0498
3.0	-3.2535	-3.2005	-3.1488	-2.8162	0.0824	0.0806	0.0788	0.0677
3.5	-3.7173	-3.6482	-3.5808	-3.1533	0.1087	0.1060	0.1033	0.0868
4.0	-4.1536	-4.0673	-3.9834	-3.4573	0.1373	0.1334	0.1297	0.1067
4.5	-4.5623	-4.4582	-4.3573	-3.7309	0.1676	0.1624	0.1574	0.1270
5.0	-4.9439	-4.8217	-4.7035	-3.9771	0.1993	0.1926	0.1862	0.1474
6.0	-5.6300	-5.4715	-5.3189	-4.3980	0.2652	0.2550	0.2453	0.1878
7.0	-6.2225	-6.0288	-5.8433	-4.7398	0.3326	0.3184	0.3049	0.2267
8.0	-6.7336	-6.5068	-6.2902	-5.0195	0.3998	0.3812	0.3637	0.2634
9.0	-7.1752	-6.9177	-6.6726	-5.2503	0.4657	0.4426	0.4207	0.2978
10.0	-7.5582	-7.2725	-7.0011	-5.4425	0.5297	0.5019	0.4756	0.3300
11.0	-7.8918	-7.5803	-7.2852	-5.6042	0.5915	0.5588	0.5282	0.3599
12.0	-8.1839	-7.8489	-7.5322	-5.7414	0.6508	0.6134	0.5784	0.3878
13.0	-8.4411	-8.0846	-7.7483	-5.8590	0.7078	0.6657	0.6263	0.4138
14.0	-8.6686	-8.2926	-7.9384	-5.9605	0.7624	0.7156	0.6719	0.4382
15.0	-8.8710	-8.4772	-8.1068	-6.0489	0.8147	0.7633	0.7154	0.4610
16.0	-9.0518	-8.6418	-8.2566	-6.1264	0.8648	0.8089	0.7569	0.4825
17.0	-9.2142	-8.7893	-8.3905	-6.1948	0.9129	0.8525	0.7966	0.5027
18.0	-9.3606	-8.9220	-8.5109	-6.2554	0.9590	0.8944	0.8345	0.5218
19.0	-9.4932	-9.0421	-8.6196	-6.3096	1.0034	0.9345	0.8709	0.5400
20.0	-9.6136	-9.1510	-8.7180	-6.3582	1.0460	0.9731	0.9057	0.5572
21.0	-9.7235	-9.2502	-8.8076	-6.4020	1.0871	1.0102	0.9392	0.5735
22.0	-9.8241	-9.3409	-8.8894	-6.4416	1.1267	1.0459	0.9714	0.5891
23.0	-9.9165	-9.4241	-8.9643	-6.4776	1.1649	1.0803	1.0024	0.6040
24.0	-10.0015	-9.5005	-9.0331	-6.5104	1.2019	1.1135	1.0323	0.6183
25.0	-10.0799	-9.5711	-9.0965	-6.5405	1.2376	1.1457	1.0612	0.6320
26.0	-10.1525	-9.6363	-9.1550	-6.5681	1.2722	1.1768	1.0891	0.6451
27.0	-10.2199	-9.6967	-9.2093	-6.5935	1.3058	1.2069	1.1162	0.6578
28.0	-10.2825	-9.7528	-9.2596	-6.6169	1.3384	1.2361	1.1424	0.6700
29.0	-10.3408	-9.8051	-9.3064	-6.6386	1.3701	1.2645	1.1678	0.6818
30.0	-10.3953	-9.8538	-9.3500	-6.6587	1.4009	1.2920	1.1924	0.6931
31.0	-10.4462	-9.8994	-9.3908	-6.6774	1.4308	1.3189	1.2164	0.7041
32.0	-10.4938	-9.9420	-9.4289	-6.6948	1.4600	1.3450	1.2398	0.7148
33.0	-10.5385	-9.9819	-9.4646	-6.7110	1.4885	1.3704	1.2625	0.7252
34.0	-10.5805	-10.0194	-9.4981	-6.7262	1.5163	1.3952	1.2847	0.7352
35.0	-10.6200	-10.0547	-9.5296	-6.7404	1.5435	1.4195	1.3063	0.7450
36.0	-10.6572	-10.0879	-9.5592	-6.7537	1.5700	1.4431	1.3274	0.7545
37.0	-10.6923	-10.1192	-9.5871	-6.7662	1.5959	1.4663	1.3481	0.7637
38.0	-10.7254	-10.1487	-9.6134	-6.7780	1.6214	1.4889	1.3683	0.7727
39.0	-10.7567	-10.1766	-9.6382	-6.7890	1.6462	1.5111	1.3880	0.7815
40.0	-10.7863	-10.2029	-9.6617	-6.7995	1.6706	1.5328	1.4074	0.7901
41.0	-10.8144	-10.2279	-9.6839	-6.8093	1.6946	1.5541	1.4263	0.7985
42.0	-10.8409	-10.2515	-9.7049	-6.8186	1.7181	1.5750	1.4449	0.8067
43.0	-10.8661	-10.2739	-9.7248	-6.8273	1.7411	1.5956	1.4632	0.8148
44.0	-10.8900	-10.2951	-9.7437	-6.8356	1.7638	1.6157	1.4811	0.8226

$\phi_c = 7°$ (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•9146	0•8127	0•7222	0•3160	11•2136	10•5868	10•0066	6•9638
46•0	0•9146	0•8125	0•7218	0•3151	11•2444	10•6141	10•0309	6•9745
47•0	0•9146	0•8122	0•7213	0•3142	11•2741	10•6405	10•0543	6•9847
48•0	0•9147	0•8120	0•7209	0•3133	11•3030	10•6661	10•0771	6•9946
49•0	0•9147	0•8118	0•7205	0•3125	11•3309	10•6909	10•0991	7•0041
50•0	0•9147	0•8116	0•7201	0•3116	11•3581	10•7150	10•1205	7•0134
51•0	0•9148	0•8114	0•7197	0•3108	11•3845	10•7385	10•1413	7•0224
52•0	0•9148	0•8112	0•7193	0•3101	11•4102	10•7612	10•1615	7•0311
53•0	0•9149	0•8110	0•7190	0•3093	11•4352	10•7834	10•1811	7•0396
54•0	0•9149	0•8108	0•7186	0•3086	11•4595	10•8050	10•2003	7•0478
55•0	0•9150	0•8107	0•7183	0•3079	11•4833	10•8261	10•2189	7•0558
56•0	0•9150	0•8105	0•7180	0•3072	11•5065	10•8467	10•2372	7•0636
57•0	0•9151	0•8104	0•7176	0•3065	11•5292	10•8668	10•2550	7•0712
58•0	0•9151	0•8102	0•7173	0•3059	11•5514	10•8864	10•2724	7•0787
59•0	0•9152	0•8101	0•7170	0•3053	11•5732	10•9057	10•2894	7•0859
60•0	0•9153	0•8100	0•7168	0•3046	11•5945	10•9245	10•3061	7•0930
61•0	0•9153	0•8098	0•7165	0•3040	11•6154	10•9430	10•3225	7•1000
62•0	0•9154	0•8097	0•7162	0•3034	11•6359	10•9611	10•3385	7•1068
63•0	0•9155	0•8096	0•7160	0•3029	11•6560	10•9789	10•3542	7•1134
64•0	0•9155	0•8095	0•7157	0•3023	11•6758	10•9964	10•3697	7•1200
65•0	0•9156	0•8094	0•7154	0•3017	11•6952	11•0136	10•3849	7•1264
66•0	0•9157	0•8092	0•7152	0•3012	11•7144	11•0306	10•3999	7•1327
67•0	0•9157	0•8091	0•7150	0•3007	11•7333	11•0472	10•4146	7•1389
68•0	0•9158	0•8090	0•7147	0•3001	11•7519	11•0637	10•4291	7•1450
69•0	0•9159	0•8089	0•7145	0•2996	11•7702	11•0799	10•4435	7•1510
70•0	0•9159	0•8088	0•7143	0•2991	11•7883	11•0959	10•4576	7•1569
71•0	0•9160	0•8088	0•7140	0•2986	11•8062	11•1117	10•4715	7•1628
72•0	0•9161	0•8087	0•7138	0•2981	11•8239	11•1273	10•4853	7•1685
73•0	0•9162	0•8086	0•7136	0•2976	11•8414	11•1427	10•4990	7•1742
74•0	0•9162	0•8085	0•7134	0•2971	11•8587	11•1580	10•5124	7•1798
75•0	0•9163	0•8084	0•7132	0•2967	11•8759	11•1731	10•5258	7•1854
76•0	0•9164	0•8083	0•7130	0•2962	11•8929	11•1881	10•5390	7•1909
77•0	0•9165	0•8082	0•7128	0•2957	11•9097	11•2030	10•5521	7•1963
78•0	0•9165	0•8082	0•7126	0•2953	11•9264	11•2178	10•5651	7•2017
79•0	0•9166	0•8081	0•7124	0•2948	11•9431	11•2324	10•5780	7•2071
80•0	0•9167	0•8080	0•7122	0•2944	11•9596	11•2469	10•5909	7•2124
81•0	0•9168	0•8079	0•7120	0•2939	11•9760	11•2614	10•6036	7•2176
82•0	0•9169	0•8079	0•7118	0•2935	11•9923	11•2758	10•6163	7•2229
83•0	0•9169	0•8078	0•7116	0•2930	12•0085	11•2901	10•6289	7•2281
84•0	0•9170	0•8077	0•7114	0•2926	12•0247	11•3044	10•6415	7•2332
85•0	0•9171	0•8076	0•7112	0•2922	12•0408	11•3186	10•6540	7•2384
86•0	0•9172	0•8076	0•7110	0•2917	12•0569	11•3327	10•6664	7•2435
87•0	0•9173	0•8075	0•7109	0•2913	12•0730	11•3469	10•6789	7•2486
88•0	0•9173	0•8074	0•7107	0•2909	12•0890	11•3610	10•6913	7•2537
89•0	0•9174	0•8073	0•7105	0•2904	12•1050	11•3751	10•7037	7•2588
90•0	0•9175	0•8073	0•7103	0•2900	12•1210	11•3892	10•7161	7•2638

$\phi_c = 7°$ (continued)

Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.0°	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	−10.9127	−10.3153	−9.7616	−6.8435	1.7861	1.6355	1.4987	0.8303
46.0	−10.9342	−10.3345	−9.7786	−6.8509	1.8080	1.6550	1.5160	0.8379
47.0	−10.9547	−10.3527	−9.7948	−6.8580	1.8296	1.6742	1.5330	0.8453
48.0	−10.9742	−10.3699	−9.8102	−6.8647	1.8509	1.6931	1.5498	0.8526
49.0	−10.9927	−10.3864	−9.8248	−6.8710	1.8718	1.7117	1.5663	0.8598
50.0	−11.0104	−10.4020	−9.8387	−6.8770	1.8925	1.7300	1.5826	0.8668
51.0	−11.0272	−10.4169	−9.8519	−6.8827	1.9128	1.7480	1.5986	0.8738
52.0	−11.0431	−10.4311	−9.8644	−6.8882	1.9329	1.7659	1.6144	0.8806
53.0	−11.0584	−10.4446	−9.8764	−6.8933	1.9528	1.7835	1.6300	0.8873
54.0	−11.0729	−10.4575	−9.8878	−6.8982	1.9724	1.8008	1.6454	0.8939
55.0	−11.0867	−10.4697	−9.8986	−6.9029	1.9917	1.8180	1.6606	0.9004
56.0	−11.0998	−10.4814	−9.9090	−6.9073	2.0109	1.8349	1.6756	0.9069
57.0	−11.1124	−10.4925	−9.9188	−6.9115	2.0298	1.8517	1.6905	0.9132
58.0	−11.1243	−10.5030	−9.9282	−6.9155	2.0485	1.8683	1.7051	0.9195
59.0	−11.1357	−10.5131	−9.9371	−6.9193	2.0671	1.8847	1.7197	0.9257
60.0	−11.1465	−10.5226	−9.9455	−6.9229	2.0854	1.9009	1.7340	0.9318
61.0	−11.1568	−10.5317	−9.9536	−6.9263	2.1036	1.9170	1.7483	0.9378
62.0	−11.1665	−10.5404	−9.9612	−6.9295	2.1216	1.9330	1.7624	0.9438
63.0	−11.1758	−10.5486	−9.9685	−6.9326	2.1395	1.9487	1.7763	0.9497
64.0	−11.1847	−10.5564	−9.9754	−6.9355	2.1572	1.9644	1.7902	0.9556
65.0	−11.1930	−10.5638	−9.9820	−6.9383	2.1747	1.9799	1.8039	0.9614
66.0	−11.2010	−10.5709	−9.9882	−6.9409	2.1922	1.9953	1.8175	0.9671
67.0	−11.2085	−10.5775	−9.9940	−6.9434	2.2095	2.0106	1.8310	0.9728
68.0	−11.2156	−10.5838	−9.9996	−6.9457	2.2266	2.0258	1.8445	0.9784
69.0	−11.2224	−10.5897	−10.0048	−6.9479	2.2437	2.0409	1.8578	0.9840
70.0	−11.2287	−10.5953	−10.0098	−6.9500	2.2607	2.0559	1.8710	0.9896
71.0	−11.2347	−10.6006	−10.0144	−6.9519	2.2775	2.0708	1.8842	0.9951
72.0	−11.2403	−10.6056	−10.0188	−6.9538	2.2943	2.0856	1.8972	1.0005
73.0	−11.2455	−10.6102	−10.0229	−6.9555	2.3110	2.1003	1.9102	1.0060
74.0	−11.2505	−10.6146	−10.0267	−6.9571	2.3276	2.1149	1.9232	1.0113
75.0	−11.2550	−10.6186	−10.0303	−6.9586	2.3441	2.1295	1.9360	1.0167
76.0	−11.2593	−10.6223	−10.0336	−6.9599	2.3606	2.1440	1.9488	1.0220
77.0	−11.2632	−10.6258	−10.0367	−6.9612	2.3770	2.1585	1.9616	1.0273
78.0	−11.2668	−10.6290	−10.0395	−6.9624	2.3933	2.1729	1.9743	1.0326
79.0	−11.2702	−10.6319	−10.0421	−6.9634	2.4096	2.1872	1.9869	1.0378
80.0	−11.2732	−10.6346	−10.0444	−6.9644	2.4258	2.2016	1.9995	1.0430
81.0	−11.2759	−10.6370	−10.0465	−6.9653	2.4420	2.2158	2.0121	1.0482
82.0	−11.2783	−10.6391	−10.0484	−6.9661	2.4581	2.2300	2.0246	1.0534
83.0	−11.2804	−10.6410	−10.0500	−6.9667	2.4742	2.2442	2.0371	1.0585
84.0	−11.2822	−10.6426	−10.0515	−6.9673	2.4903	2.2584	2.0496	1.0637
85.0	−11.2838	−10.6439	−10.0527	−6.9678	2.5064	2.2725	2.0621	1.0688
86.0	−11.2851	−10.6451	−10.0536	−6.9682	2.5224	2.2867	2.0745	1.0739
87.0	−11.2860	−10.6459	−10.0544	−6.9685	2.5384	2.3008	2.0869	1.0790
88.0	−11.2867	−10.6465	−10.0549	−6.9687	2.5544	2.3149	2.0993	1.0841
89.0	−11.2871	−10.6469	−10.0553	−6.9689	2.5705	2.3290	2.1117	1.0892
90.0	−11.2873	−10.6470	−10.0554	−6.9689	2.5865	2.3430	2.1241	1.0942

$\phi_c = 8°$

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000
0°5	0·9956	0·9912	0·9868	0·9565	0·4446	0·4436	0·4426	0·4358
1°0	0·9913	0·9825	0·9739	0·9152	0·8839	0·8800	0·8761	0·8495
1°5	0·9872	0·9742	0·9614	0·8763	1·3147	1·3061	1·2975	1·2396
2°0	0·9832	0·9662	0·9494	0·8400	1·7344	1·7193	1·7045	1·6051
2°5	0·9795	0·9585	0·9380	0·8062	2·1404	2·1175	2·0950	1·9456
3°0	0·9760	0·9513	0·9272	0·7749	2·5311	2·4990	2·4676	2·2615
3°5	0·9726	0·9444	0·9170	0·7461	2·9049	2·8627	2·8213	2·5532
4°0	0·9695	0·9379	0·9074	0·7196	3·2610	3·2078	3·1558	2·8219
4°5	0·9666	0·9319	0·8984	0·6952	3·5989	3·5342	3·4710	3·0688
5°0	0·9640	0·9262	0·8900	0·6729	3·9186	3·8419	3·7671	3·2954
6°0	0·9592	0·9160	0·8748	0·6339	4·5044	4·4030	4·3047	3·6933
7°0	0·9552	0·9073	0·8618	0·6012	5·0227	4·8966	4·7748	4·0276
8°0	0·9517	0·8997	0·8505	0·5738	5·4797	5·3297	5·1852	4·3092
9°0	0·9489	0·8932	0·8408	0·5506	5·8826	5·7098	5·5438	4·5475
10°0	0·9465	0·8876	0·8324	0·5310	6·2383	6·0440	5·8578	4·7505
11°0	0·9444	0·8827	0·8251	0·5142	6·5532	6·3388	6·1338	4·9245
12°0	0·9427	0·8785	0·8187	0·4997	6·8330	6·5999	6·3774	5·0748
13°0	0·9413	0·8749	0·8132	0·4872	7·0824	6·8321	6·5935	5·2055
14°0	0·9401	0·8717	0·8083	0·4763	7·3059	7·0396	6·7861	5·3199
15°0	0·9391	0·8689	0·8039	0·4667	7·5069	7·2257	6·9586	5·4208
16°0	0·9382	0·8664	0·8001	0·4582	7·6885	7·3936	7·1137	5·5102
17°0	0·9375	0·8642	0·7967	0·4507	7·8533	7·5456	7·2540	5·5901
18°0	0·9368	0·8622	0·7936	0·4440	8·0033	7·6838	7·3813	5·6617
19°0	0·9363	0·8605	0·7908	0·4379	8·1404	7·8099	7·4973	5·7263
20°0	0·9359	0·8589	0·7883	0·4324	8·2663	7·9255	7·6034	5·7848
21°0	0·9355	0·8575	0·7861	0·4275	8·3822	8·0318	7·7009	5·8380
22°0	0·9352	0·8563	0·7840	0·4229	8·4893	8·1299	7·7908	5·8867
23°0	0·9350	0·8551	0·7821	0·4188	8·5885	8·2207	7·8739	5·9314
24°0	0·9348	0·8541	0·7804	0·4150	8·6808	8·3051	7·9510	5·9725
25°0	0·9346	0·8532	0·7789	0·4115	8·7667	8·3836	8·0227	6·0105
26°0	0·9345	0·8523	0·7774	0·4083	8·8471	8·4569	8·0897	6·0458
27°0	0·9344	0·8516	0·7761	0·4053	8·9224	8·5256	8·1523	6·0786
28°0	0·9343	0·8509	0·7749	0·4025	8·9932	8·5901	8·2110	6·1091
29°0	0·9343	0·8502	0·7737	0·3999	9·0598	8·6507	8·2662	6·1377
30°0	0·9342	0·8496	0·7727	0·3975	9·1226	8·7079	8·3182	6·1646
31°0	0·9342	0·8491	0·7717	0·3952	9·1821	8·7619	8·3673	6·1898
32°0	0·9342	0·8486	0·7708	0·3931	9·2384	8·8130	8·4138	6·2135
33°0	0·9343	0·8481	0·7699	0·3911	9·2918	8·8616	8·4578	6·2360
34°0	0·9343	0·8477	0·7691	0·3892	9·3426	8·9077	8·4997	6·2572
35°0	0·9344	0·8473	0·7683	0·3874	9·3910	8·9516	8·5395	6·2773
36°0	0·9344	0·8469	0·7676	0·3857	9·4372	8·9935	8·5775	6·2964
37°0	0·9345	0·8466	0·7670	0·3841	9·4814	9·0335	8·6137	6·3146
38°0	0·9346	0·8463	0·7663	0·3826	9·5236	9·0717	8·6484	6·3319
39°0	0·9347	0·8460	0·7657	0·3811	9·5641	9·1084	8·6816	6·3485
40°0	0·9348	0·8457	0·7652	0·3798	9·6030	9·1436	8·7134	6·3643
41°0	0·9349	0·8455	0·7647	0·3784	9·6403	9·1774	8·7440	6·3794
42°0	0·9350	0·8453	0·7642	0·3772	9·6763	9·2099	8·7734	6·3940
43°0	0·9351	0·8450	0·7637	0·3760	9·7110	9·2412	8·8017	6·4079
44°0	0·9352	0·8448	0·7632	0·3748	9·7444	9·2715	8·8290	6·4214

$\phi_c = 8°$ Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	-0.4446	-0.4436	-0.4426	-0.4358	0.0019	0.0019	0.0019	0.0019
1.0	-0.8838	-0.8799	-0.8761	-0.8495	0.0077	0.0076	0.0076	0.0073
1.5	-1.3146	-1.3060	-1.2974	-1.2395	0.0171	0.0169	0.0168	0.0158
2.0	-1.7340	-1.7190	-1.7041	-1.6048	0.0299	0.0295	0.0292	0.0269
2.5	-2.1398	-2.1169	-2.0943	-1.9451	0.0458	0.0452	0.0445	0.0403
3.0	-2.5300	-2.4980	-2.4665	-2.2605	0.0645	0.0634	0.0624	0.0554
3.5	-2.9032	-2.8610	-2.8197	-2.5518	0.0857	0.0840	0.0824	0.0719
4.0	-3.2585	-3.2054	-3.1535	-2.8199	0.1090	0.1066	0.1043	0.0895
4.5	-3.5955	-3.5309	-3.4678	-3.0662	0.1340	0.1308	0.1276	0.1078
5.0	-3.9141	-3.8375	-3.7629	-3.2919	0.1605	0.1562	0.1521	0.1265
6.0	-4.4972	-4.3961	-4.2980	-3.6880	0.2165	0.2099	0.2035	0.1646
7.0	-5.0121	-4.8865	-4.7651	-4.0202	0.2751	0.2657	0.2567	0.2023
8.0	-5.4653	-5.3159	-5.1720	-4.2994	0.3347	0.3222	0.3102	0.2390
9.0	-5.8638	-5.6918	-5.5266	-4.5351	0.3942	0.3783	0.3631	0.2742
10.0	-6.2146	-6.0215	-5.8363	-4.7353	0.4528	0.4334	0.4149	0.3076
11.0	-6.5242	-6.3113	-6.1077	-4.9064	0.5101	0.4870	0.4651	0.3393
12.0	-6.7984	-6.5672	-6.3465	-5.0536	0.5659	0.5390	0.5136	0.3692
13.0	-7.0419	-6.7939	-6.5574	-5.1812	0.6198	0.5893	0.5604	0.3975
14.0	-7.2592	-6.9956	-6.7447	-5.2925	0.6720	0.6377	0.6053	0.4242
15.0	-7.4539	-7.1759	-6.9117	-5.3902	0.7223	0.6842	0.6485	0.4494
16.0	-7.6289	-7.3376	-7.0612	-5.4764	0.7708	0.7291	0.6899	0.4733
17.0	-7.7868	-7.4834	-7.1957	-5.5530	0.8175	0.7722	0.7297	0.4960
18.0	-7.9299	-7.6151	-7.3171	-5.6212	0.8626	0.8138	0.7680	0.5175
19.0	-8.0600	-7.7348	-7.4271	-5.6825	0.9061	0.8538	0.8048	0.5380
20.0	-8.1786	-7.8437	-7.5272	-5.7376	0.9481	0.8923	0.8402	0.5575
21.0	-8.2872	-7.9433	-7.6185	-5.7875	0.9887	0.9296	0.8743	0.5761
22.0	-8.3868	-8.0346	-7.7021	-5.8328	1.0279	0.9655	0.9072	0.5940
23.0	-8.4785	-8.1185	-7.7789	-5.8741	1.0659	1.0002	0.9390	0.6111
24.0	-8.5631	-8.1958	-7.8496	-5.9118	1.1027	1.0339	0.9698	0.6275
25.0	-8.6413	-8.2673	-7.9149	-5.9464	1.1383	1.0664	0.9995	0.6432
26.0	-8.7139	-8.3335	-7.9753	-5.9782	1.1729	1.0980	1.0283	0.6584
27.0	-8.7813	-8.3950	-8.0313	-6.0076	1.2065	1.1286	1.0562	0.6730
28.0	-8.8440	-8.4521	-8.0834	-6.0347	1.2392	1.1584	1.0834	0.6871
29.0	-8.9026	-8.5054	-8.1319	-6.0598	1.2709	1.1873	1.1097	0.7008
30.0	-8.9573	-8.5552	-8.1772	-6.0832	1.3019	1.2155	1.1353	0.7140
31.0	-9.0085	-8.6017	-8.2195	-6.1049	1.3320	1.2429	1.1602	0.7268
32.0	-9.0565	-8.6453	-8.2591	-6.1252	1.3615	1.2696	1.1845	0.7392
33.0	-9.1016	-8.6863	-8.2963	-6.1441	1.3902	1.2957	1.2082	0.7512
34.0	-9.1439	-8.7247	-8.3312	-6.1618	1.4182	1.3211	1.2313	0.7630
35.0	-9.1838	-8.7609	-8.3640	-6.1784	1.4456	1.3460	1.2538	0.7744
36.0	-9.2214	-8.7950	-8.3949	-6.1939	1.4724	1.3703	1.2759	0.7854
37.0	-9.2569	-8.8272	-8.4241	-6.2085	1.4987	1.3941	1.2974	0.7963
38.0	-9.2904	-8.8575	-8.4516	-6.2223	1.5244	1.4174	1.3185	0.8068
39.0	-9.3221	-8.8862	-8.4775	-6.2352	1.5496	1.4402	1.3392	0.8171
40.0	-9.3521	-8.9134	-8.5021	-6.2474	1.5743	1.4626	1.3594	0.8272
41.0	-9.3806	-8.9391	-8.5254	-6.2590	1.5986	1.4845	1.3793	0.8370
42.0	-9.4075	-8.9634	-8.5474	-6.2699	1.6224	1.5061	1.3988	0.8466
43.0	-9.4331	-8.9865	-8.5683	-6.2801	1.6459	1.5272	1.4179	0.8561
44.0	-9.4573	-9.0085	-8.5881	-6.2899	1.6689	1.5480	1.4367	0.8653

ϕ_c = 8° (continued)

180° - ϕ°	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45•0	0•9353	0•8447	0•7628	0•3737	9•7767	9•3006	8•8554	6•4343
46•0	0•9354	0•8445	0•7624	0•3726	9•8080	9•3289	8•8809	6•4468
47•0	0•9356	0•8443	0•7620	0•3716	9•8383	9•3562	8•9055	6•4588
48•0	0•9357	0•8442	0•7616	0•3706	9•8676	9•3826	8•9294	6•4704
49•0	0•9358	0•8441	0•7613	0•3696	9•8960	9•4083	8•9526	6•4817
50•0	0•9360	0•8439	0•7609	0•3687	9•9237	9•4332	8•9751	6•4926
51•0	0•9361	0•8438	0•7606	0•3678	9•9506	9•4575	8•9969	6•5032
52•0	0•9362	0•8437	0•7603	0•3669	9•9767	9•4810	9•0182	6•5134
53•0	0•9364	0•8436	0•7600	0•3661	10•0022	9•5040	9•0388	6•5234
54•0	0•9365	0•8435	0•7597	0•3653	10•0271	9•5264	9•0590	6•5331
55•0	0•9367	0•8434	0•7594	0•3645	10•0513	9•5482	9•0787	6•5425
56•0	0•9368	0•8433	0•7592	0•3637	10•0750	9•5696	9•0979	6•5518
57•0	0•9370	0•8432	0•7589	0•3629	10•0981	9•5904	9•1166	6•5607
58•0	0•9371	0•8432	0•7587	0•3622	10•1208	9•6108	9•1350	6•5695
59•0	0•9373	0•8431	0•7584	0•3615	10•1430	9•6308	9•1529	6•5781
60•0	0•9374	0•8430	0•7582	0•3608	10•1647	9•6503	9•1705	6•5864
61•0	0•9376	0•8430	0•7580	0•3601	10•1861	9•6695	9•1878	6•5946
62•0	0•9377	0•8429	0•7577	0•3594	10•2070	9•6883	9•2047	6•6027
63•0	0•9379	0•8429	0•7575	0•3588	10•2276	9•7068	9•2213	6•6106
64•0	0•9380	0•8428	0•7573	0•3582	10•2478	9•7250	9•2376	6•6183
65•0	0•9382	0•8428	0•7571	0•3575	10•2677	9•7428	9•2537	6•6259
66•0	0•9383	0•8428	0•7569	0•3569	10•2873	9•7604	9•2695	6•6333
67•0	0•9385	0•8427	0•7568	0•3563	10•3066	9•7778	9•2851	6•6407
68•0	0•9386	0•8427	0•7566	0•3557	10•3256	9•7948	9•3004	6•6479
69•0	0•9388	0•8427	0•7564	0•3551	10•3444	9•8117	9•3155	6•6550
70•0	0•9389	0•8426	0•7562	0•3546	10•3629	9•8283	9•3305	6•6620
71•0	0•9391	0•8426	0•7561	0•3540	10•3812	9•8448	9•3452	6•6689
72•0	0•9392	0•8426	0•7559	0•3535	10•3993	9•8610	9•3598	6•6757
73•0	0•9394	0•8426	0•7557	0•3529	10•4172	9•8771	9•3742	6•6825
74•0	0•9395	0•8425	0•7556	0•3524	10•4349	9•8930	9•3884	6•6891
75•0	0•9397	0•8425	0•7554	0•3518	10•4525	9•9087	9•4026	6•6957
76•0	0•9399	0•8425	0•7552	0•3513	10•4699	9•9243	9•4166	6•7022
77•0	0•9400	0•8425	0•7551	0•3508	10•4872	9•9398	9•4304	6•7087
78•0	0•9402	0•8425	0•7549	0•3503	10•5043	9•9552	9•4442	6•7150
79•0	0•9403	0•8425	0•7548	0•3498	10•5213	9•9704	9•4579	6•7214
80•0	0•9405	0•8425	0•7547	0•3492	10•5383	9•9856	9•4714	6•7277
81•0	0•9406	0•8424	0•7545	0•3487	10•5551	10•0006	9•4849	6•7339
82•0	0•9408	0•8424	0•7544	0•3482	10•5718	10•0156	9•4984	6•7401
83•0	0•9409	0•8424	0•7542	0•3477	10•5885	10•0305	9•5117	6•7463
84•0	0•9411	0•8424	0•7541	0•3473	10•6051	10•0454	9•5250	6•7524
85•0	0•9413	0•8424	0•7539	0•3468	10•6216	10•0602	9•5383	6•7585
86•0	0•9414	0•8424	0•7538	0•3463	10•6381	10•0750	9•5515	6•7646
87•0	0•9416	0•8424	0•7537	0•3458	10•6546	10•0897	9•5647	6•7706
88•0	0•9417	0•8424	0•7535	0•3453	10•6711	10•1044	9•5778	6•7767
89•0	0•9419	0•8424	0•7534	0•3448	10•6875	10•1191	9•5910	6•7827
90•0	0•9420	0•8424	0•7533	0•3443	10•7039	10•1338	9•6041	6•7887

$\phi_c = 8°$ (continued)

Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	-9.4804	-9.0293	-8.6069	-6.2991	1.6915	1.5685	1.4552	0.8744
46.0	-9.5023	-9.0491	-8.6247	-6.3078	1.7138	1.5886	1.4733	0.8833
47.0	-9.5231	-9.0679	-8.6417	-6.3161	1.7358	1.6084	1.4912	0.8920
48.0	-9.5429	-9.0857	-8.6578	-6.3240	1.7574	1.6279	1.5088	0.9006
49.0	-9.5618	-9.1027	-8.6732	-6.3314	1.7787	1.6472	1.5262	0.9090
50.0	-9.5797	-9.1189	-8.6878	-6.3385	1.7997	1.6661	1.5433	0.9173
51.0	-9.5968	-9.1344	-8.7017	-6.3453	1.8205	1.6848	1.5601	0.9255
52.0	-9.6131	-9.1490	-8.7149	-6.3516	1.8409	1.7033	1.5768	0.9335
53.0	-9.6286	-9.1630	-8.7275	-6.3577	1.8612	1.7215	1.5932	0.9414
54.0	-9.6434	-9.1763	-8.7395	-6.3635	1.8811	1.7395	1.6094	0.9492
55.0	-9.6575	-9.1890	-8.7509	-6.3690	1.9009	1.7573	1.6254	0.9569
56.0	-9.6709	-9.2011	-8.7618	-6.3742	1.9204	1.7748	1.6412	0.9645
57.0	-9.6837	-9.2126	-8.7722	-6.3791	1.9397	1.7922	1.6569	0.9720
58.0	-9.6959	-9.2235	-8.7820	-6.3839	1.9588	1.8094	1.6723	0.9794
59.0	-9.7075	-9.2340	-8.7914	-6.3883	1.9777	1.8264	1.6876	0.9867
60.0	-9.7185	-9.2439	-8.8003	-6.3926	1.9965	1.8433	1.7028	0.9939
61.0	-9.7290	-9.2533	-8.8088	-6.3966	2.0150	1.8600	1.7178	1.0010
62.0	-9.7390	-9.2623	-8.8169	-6.4005	2.0334	1.8765	1.7327	1.0081
63.0	-9.7485	-9.2709	-8.8246	-6.4041	2.0517	1.8929	1.7474	1.0151
64.0	-9.7575	-9.2790	-8.8319	-6.4075	2.0698	1.9092	1.7620	1.0220
65.0	-9.7661	-9.2867	-8.8388	-6.4108	2.0877	1.9253	1.7765	1.0288
66.0	-9.7742	-9.2940	-8.8453	-6.4139	2.1055	1.9413	1.7909	1.0356
67.0	-9.7819	-9.3009	-8.8515	-6.4168	2.1232	1.9572	1.8052	1.0423
68.0	-9.7892	-9.3074	-8.8574	-6.4196	2.1408	1.9730	1.8194	1.0490
69.0	-9.7960	-9.3136	-8.8629	-6.4222	2.1583	1.9887	1.8334	1.0556
70.0	-9.8025	-9.3194	-8.8682	-6.4246	2.1756	2.0043	1.8474	1.0622
71.0	-9.8086	-9.3249	-8.8731	-6.4270	2.1929	2.0197	1.8613	1.0687
72.0	-9.8144	-9.3301	-8.8777	-6.4291	2.2101	2.0351	1.8751	1.0752
73.0	-9.8198	-9.3349	-8.8821	-6.4311	2.2271	2.0505	1.8889	1.0816
74.0	-9.8248	-9.3394	-8.8861	-6.4330	2.2441	2.0657	1.9025	1.0880
75.0	-9.8295	-9.3436	-8.8899	-6.4348	2.2611	2.0809	1.9161	1.0943
76.0	-9.8339	-9.3475	-8.8934	-6.4364	2.2779	2.0960	1.9297	1.1006
77.0	-9.8379	-9.3511	-8.8966	-6.4379	2.2947	2.1110	1.9432	1.1069
78.0	-9.8416	-9.3545	-8.8996	-6.4393	2.3114	2.1260	1.9566	1.1131
79.0	-9.8450	-9.3575	-8.9023	-6.4406	2.3281	2.1410	1.9700	1.1193
80.0	-9.8481	-9.3603	-8.9048	-6.4417	2.3447	2.1559	1.9834	1.1255
81.0	-9.8509	-9.3627	-8.9070	-6.4427	2.3613	2.1707	1.9967	1.1317
82.0	-9.8533	-9.3650	-8.9090	-6.4437	2.3779	2.1856	2.0099	1.1378
83.0	-9.8555	-9.3669	-8.9107	-6.4445	2.3944	2.2004	2.0232	1.1439
84.0	-9.8574	-9.3686	-8.9123	-6.4452	2.4109	2.2151	2.0364	1.1500
85.0	-9.8590	-9.3700	-8.9135	-6.4457	2.4274	2.2299	2.0496	1.1561
86.0	-9.8603	-9.3712	-8.9146	-6.4462	2.4438	2.2446	2.0628	1.1621
87.0	-9.8613	-9.3721	-8.9154	-6.4466	2.4603	2.2593	2.0759	1.1682
88.0	-9.8620	-9.3727	-8.9159	-6.4469	2.4767	2.2740	2.0891	1.1742
89.0	-9.8624	-9.3731	-8.9163	-6.4470	2.4931	2.2887	2.1022	1.1802
90.0	-9.8626	-9.3732	-8.9164	-6.4471	2.5096	2.3034	2.1154	1.1862

$\phi_c = 9°$

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0•0	1•0000	1•0000	1•0000	1•0000	0•0000	0•0000	0•0000	0•0000
0•5	0•9965	0•9930	0•9895	0•9655	0•3512	0•3506	0•3500	0•3457
1•0	0•9932	0•9862	0•9793	0•9324	0•6992	0•6967	0•6943	0•6776
1•5	0•9899	0•9796	0•9694	0•9009	1•0418	1•0364	1•0310	0•9943
2•0	0•9868	0•9732	0•9598	0•8710	1•3774	1•3679	1•3585	1•2951
2•5	0•9839	0•9671	0•9506	0•8429	1•7043	1•6898	1•6754	1•5794
3•0	0•9811	0•9613	0•9418	0•8164	2•0212	2•0008	1•9806	1•8470
3•5	0•9784	0•9557	0•9335	0•7917	2•3270	2•3000	2•2733	2•0979
4•0	0•9760	0•9504	0•9255	0•7686	2•6211	2•5867	2•5530	2•3327
4•5	0•9737	0•9454	0•9180	0•7471	2•9027	2•8606	2•8193	2•5516
5•0	0•9715	0•9408	0•9110	0•7271	3•1717	3•1215	3•0723	2•7555
6•0	0•9677	0•9322	0•8981	0•6914	3•6717	3•6044	3•5387	3•1211
7•0	0•9645	0•9248	0•8867	0•6608	4•1223	4•0374	3•9548	3•4364
8•0	0•9617	0•9183	0•8768	0•6345	4•5265	4•4242	4•3249	3•7082
9•0	0•9595	0•9127	0•8682	0•6119	4•8883	4•7690	4•6536	3•9429
10•0	0•9575	0•9078	0•8606	0•5924	5•2122	5•0766	4•9457	4•1464
11•0	0•9559	0•9035	0•8540	0•5755	5•5024	5•3513	5•2057	4•3235
12•0	0•9546	0•8998	0•8482	0•5607	5•7630	5•5972	5•4378	4•4784
13•0	0•9535	0•8966	0•8430	0•5478	5•9975	5•8180	5•6457	4•6146
14•0	0•9526	0•8938	0•8385	0•5365	6•2093	6•0169	5•8325	4•7351
15•0	0•9519	0•8913	0•8345	0•5264	6•4011	6•1968	6•0011	4•8422
16•0	0•9513	0•8891	0•8309	0•5175	6•5755	6•3599	6•1536	4•9378
17•0	0•9509	0•8872	0•8278	0•5095	6•7346	6•5084	6•2923	5•0237
18•0	0•9505	0•8855	0•8249	0•5024	6•8801	6•6441	6•4188	5•1011
19•0	0•9502	0•8840	0•8223	0•4959	7•0137	6•7685	6•5346	5•1713
20•0	0•9500	0•8826	0•8200	0•4900	7•1368	6•8829	6•6410	5•2352
21•0	0•9498	0•8814	0•8179	0•4847	7•2505	6•9885	6•7391	5•2935
22•0	0•9497	0•8804	0•8160	0•4798	7•3559	7•0862	6•8297	5•3470
23•0	0•9497	0•8794	0•8143	0•4754	7•4538	7•1769	6•9137	5•3963
24•0	0•9497	0•8785	0•8127	0•4713	7•5450	7•2614	6•9919	5•4417
25•0	0•9497	0•8778	0•8113	0•4675	7•6303	7•3402	7•0648	5•4839
26•0	0•9497	0•8771	0•8100	0•4640	7•7101	7•4139	7•1329	5•5230
27•0	0•9498	0•8765	0•8088	0•4608	7•7850	7•4831	7•1968	5•5595
28•0	0•9499	0•8759	0•8077	0•4577	7•8556	7•5482	7•2568	5•5936
29•0	0•9500	0•8754	0•8066	0•4549	7•9220	7•6094	7•3133	5•6255
30•0	0•9502	0•8750	0•8057	0•4523	7•9848	7•6673	7•3666	5•6555
31•0	0•9503	0•8746	0•8048	0•4498	8•0443	7•7220	7•4169	5•6837
32•0	0•9505	0•8742	0•8040	0•4475	8•1007	7•7739	7•4647	5•7104
33•0	0•9507	0•8739	0•8032	0•4453	8•1543	7•8232	7•5100	5•7355
34•0	0•9509	0•8736	0•8025	0•4433	8•2053	7•8701	7•5531	5•7594
35•0	0•9511	0•8733	0•8019	0•4413	8•2540	7•9148	7•5941	5•7820
36•0	0•9513	0•8731	0•8013	0•4395	8•3005	7•9574	7•6333	5•8035
37•0	0•9515	0•8728	0•8007	0•4377	8•3449	7•9982	7•6707	5•8240
38•0	0•9517	0•8726	0•8002	0•4361	8•3874	8•0372	7•7065	5•8436
39•0	0•9519	0•8725	0•7997	0•4345	8•4283	8•0747	7•7408	5•8622
40•0	0•9521	0•8723	0•7992	0•4330	8•4675	8•1106	7•7737	5•8801
41•0	0•9524	0•8722	0•7988	0•4316	8•5052	8•1452	7•8054	5•8972
42•0	0•9526	0•8721	0•7983	0•4302	8•5416	8•1784	7•8358	5•9137
43•0	0•9528	0•8720	0•7980	0•4289	8•5766	8•2105	7•8652	5•9294
44•0	0•9531	0•8719	0•7976	0•4276	8•6104	8•2414	7•8935	5•9446

$\phi_c = 9°$

Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	−0.3512	−0.3506	−0.3500	−0.3457	0.0015	0.0015	0.0015	0.0015
1.0	−0.6991	−0.6967	−0.6943	−0.6775	0.0061	0.0061	0.0060	0.0058
1.5	−1.0417	−1.0363	−1.0309	−0.9942	0.0136	0.0135	0.0134	0.0127
2.0	−1.3771	−1.3676	−1.3582	−1.2948	0.0238	0.0236	0.0234	0.0219
2.5	−1.7038	−1.6892	−1.6749	−1.5789	0.0366	0.0362	0.0358	0.0331
3.0	−2.0203	−1.9999	−1.9797	−1.8462	0.0518	0.0511	0.0504	0.0459
3.5	−2.3257	−2.2986	−2.2720	−2.0968	0.0691	0.0681	0.0670	0.0601
4.0	−2.6190	−2.5847	−2.5510	−2.3310	0.0884	0.0868	0.0853	0.0754
4.5	−2.8999	−2.8579	−2.8166	−2.5493	0.1092	0.1071	0.1050	0.0917
5.0	−3.1680	−3.1178	−3.0687	−2.7525	0.1315	0.1287	0.1260	0.1085
6.0	−3.6657	−3.5985	−3.5330	−3.1165	0.1794	0.1749	0.1706	0.1435
7.0	−4.1134	−4.0288	−3.9465	−3.4297	0.2303	0.2239	0.2176	0.1791
8.0	−4.5141	−4.4122	−4.3134	−3.6992	0.2830	0.2743	0.2659	0.2145
9.0	−4.8720	−4.7533	−4.6385	−3.9313	0.3364	0.3252	0.3144	0.2492
10.0	−5.1915	−5.0567	−4.9265	−4.1320	0.3898	0.3759	0.3625	0.2827
11.0	−5.4768	−5.3268	−5.1822	−4.3061	0.4426	0.4259	0.4099	0.3149
12.0	−5.7321	−5.5678	−5.4097	−4.4580	0.4946	0.4749	0.4561	0.3458
13.0	−5.9611	−5.7833	−5.6127	−4.5910	0.5453	0.5227	0.5011	0.3753
14.0	−6.1670	−5.9768	−5.7943	−4.7081	0.5947	0.5691	0.5447	0.4034
15.0	−6.3528	−6.1509	−5.9575	−4.8118	0.6427	0.6141	0.5868	0.4302
16.0	−6.5208	−6.3080	−6.1045	−4.9040	0.6893	0.6576	0.6276	0.4557
17.0	−6.6733	−6.4504	−6.2375	−4.9863	0.7344	0.6998	0.6670	0.4801
18.0	−6.8121	−6.5799	−6.3582	−5.0602	0.7782	0.7406	0.7050	0.5034
19.0	−6.9389	−6.6978	−6.4680	−5.1267	0.8206	0.7800	0.7417	0.5256
20.0	−7.0549	−6.8057	−6.5683	−5.1869	0.8616	0.8182	0.7772	0.5469
21.0	−7.1614	−6.9046	−6.6601	−5.2416	0.9014	0.8552	0.8116	0.5674
22.0	−7.2594	−6.9955	−6.7444	−5.2913	0.9400	0.8910	0.8448	0.5870
23.0	−7.3499	−7.0793	−6.8221	−5.3368	0.9775	0.9257	0.8769	0.6058
24.0	−7.4336	−7.1568	−6.8938	−5.3785	1.0139	0.9594	0.9081	0.6239
25.0	−7.5111	−7.2285	−6.9601	−5.4169	1.0492	0.9920	0.9383	0.6414
26.0	−7.5832	−7.2951	−7.0216	−5.4522	1.0836	1.0238	0.9676	0.6582
27.0	−7.6503	−7.3570	−7.0787	−5.4849	1.1170	1.0546	0.9961	0.6745
28.0	−7.7128	−7.4147	−7.1319	−5.5151	1.1496	1.0847	1.0238	0.6903
29.0	−7.7712	−7.4685	−7.1816	−5.5432	1.1813	1.1139	1.0507	0.7055
30.0	−7.8259	−7.5189	−7.2280	−5.5693	1.2122	1.1424	1.0770	0.7203
31.0	−7.8771	−7.5661	−7.2714	−5.5936	1.2424	1.1702	1.1026	0.7346
32.0	−7.9252	−7.6103	−7.3121	−5.6163	1.2718	1.1973	1.1275	0.7485
33.0	−7.9704	−7.6519	−7.3503	−5.6375	1.3006	1.2238	1.1518	0.7620
34.0	−8.0130	−7.6910	−7.3863	−5.6574	1.3288	1.2496	1.1756	0.7752
35.0	−8.0531	−7.7278	−7.4201	−5.6761	1.3563	1.2749	1.1989	0.7880
36.0	−8.0909	−7.7625	−7.4519	−5.6936	1.3833	1.2997	1.2216	0.8005
37.0	−8.1266	−7.7953	−7.4820	−5.7100	1.4098	1.3240	1.2438	0.8127
38.0	−8.1604	−7.8263	−7.5104	−5.7255	1.4357	1.3477	1.2656	0.8246
39.0	−8.1923	−7.8556	−7.5373	−5.7402	1.4611	1.3710	1.2870	0.8362
40.0	−8.2226	−7.8833	−7.5627	−5.7539	1.4860	1.3939	1.3079	0.8475
41.0	−8.2513	−7.9096	−7.5868	−5.7670	1.5105	1.4163	1.3285	0.8587
42.0	−8.2785	−7.9345	−7.6096	−5.7793	1.5346	1.4384	1.3487	0.8695
43.0	−8.3043	−7.9581	−7.6312	−5.7909	1.5583	1.4600	1.3685	0.8802
44.0	−8.3289	−7.9806	−7.6518	−5.8020	1.5815	1.4813	1.3880	0.8907

$\phi_c = 9°$ (continued)

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45·0	0·9533	0·8718	0·7972	0·4264	8·6431	8·2713	7·9209	5·9593
46·0	0·9536	0·8717	0·7969	0·4252	8·6747	8·3003	7·9473	5·9734
47·0	0·9538	0·8717	0·7966	0·4241	8·7054	8·3283	7·9729	5·9871
48·0	0·9541	0·8716	0·7963	0·4230	8·7351	8·3554	7·9977	6·0003
49·0	0·9543	0·8716	0·7960	0·4220	8·7639	8·3818	8·0218	6·0130
50·0	0·9545	0·8716	0·7958	0·4210	8·7920	8·4074	8·0452	6·0254
51·0	0·9548	0·8715	0·7955	0·4200	8·8192	8·4323	8·0679	6·0374
52·0	0·9550	0·8715	0·7953	0·4191	8·8458	8·4565	8·0900	6·0491
53·0	0·9553	0·8715	0·7951	0·4182	8·8717	8·4801	8·1115	6·0604
54·0	0·9555	0·8715	0·7949	0·4173	8·8969	8·5031	8·1325	6·0715
55·0	0·9558	0·8715	0·7947	0·4164	8·9215	8·5256	8·1530	6·0822
56·0	0·9560	0·8715	0·7945	0·4156	8·9456	8·5475	8·1730	6·0927
57·0	0·9563	0·8715	0·7943	0·4148	8·9691	8·5690	8·1926	6·1029
58·0	0·9566	0·8716	0·7941	0·4140	8·9922	8·5900	8·2117	6·1129
59·0	0·9568	0·8716	0·7939	0·4132	9·0147	8·6105	8·2304	6·1226
60·0	0·9571	0·8716	0·7938	0·4125	9·0368	8·6307	8·2488	6·1322
61·0	0·9573	0·8716	0·7936	0·4117	9·0586	8·6504	8·2668	6·1415
62·0	0·9576	0·8717	0·7935	0·4110	9·0799	8·6698	8·2844	6·1507
63·0	0·9578	0·8717	0·7934	0·4103	9·1008	8·6889	8·3018	6·1597
64·0	0·9581	0·8717	0·7932	0·4096	9·1214	8·7076	8·3188	6·1685
65·0	0·9583	0·8718	0·7931	0·4090	9·1417	8·7261	8·3356	6·1771
66·0	0·9586	0·8718	0·7930	0·4083	9·1616	8·7442	8·3521	6·1856
67·0	0·9588	0·8719	0·7928	0·4077	9·1813	8·7621	8·3684	6·1940
68·0	0·9591	0·8719	0·7927	0·4070	9·2007	8·7797	8·3844	6·2022
69·0	0·9593	0·8720	0·7926	0·4064	9·2198	8·7971	8·4002	6·2104
70·0	0·9596	0·8720	0·7925	0·4058	9·2387	8·8143	8·4159	6·2184
71·0	0·9598	0·8721	0·7924	0·4052	9·2574	8·8313	8·4313	6·2262
72·0	0·9601	0·8722	0·7923	0·4046	9·2759	8·8481	8·4465	6·2340
73·0	0·9603	0·8722	0·7922	0·4040	9·2941	8·8647	8·4616	6·2417
74·0	0·9606	0·8723	0·7921	0·4034	9·3122	8·8811	8·4765	6·2493
75·0	0·9608	0·8723	0·7920	0·4028	9·3302	8·8974	8·4913	6·2569
76·0	0·9611	0·8724	0·7919	0·4023	9·3479	8·9135	8·5060	6·2643
77·0	0·9613	0·8725	0·7919	0·4017	9·3656	8·9295	8·5205	6·2717
78·0	0·9615	0·8725	0·7918	0·4012	9·3831	8·9454	8·5349	6·2790
79·0	0·9618	0·8726	0·7917	0·4006	9·4005	8·9612	8·5492	6·2862
80·0	0·9620	0·8727	0·7916	0·4001	9·4178	8·9769	8·5635	6·2934
81·0	0·9623	0·8727	0·7915	0·3995	9·4349	8·9925	8·5776	6·3006
82·0	0·9625	0·8728	0·7915	0·3990	9·4521	9·0080	8·5917	6·3077
83·0	0·9628	0·8729	0·7914	0·3985	9·4691	9·0234	8·6057	6·3147
84·0	0·9630	0·8730	0·7913	0·3979	9·4861	9·0388	8·6196	6·3218
85·0	0·9633	0·8730	0·7912	0·3974	9·5030	9·0542	8·6335	6·3287
86·0	0·9635	0·8731	0·7912	0·3969	9·5199	9·0695	8·6474	6·3357
87·0	0·9638	0·8732	0·7911	0·3964	9·5367	9·0847	8·6612	6·3426
88·0	0·9640	0·8732	0·7910	0·3958	9·5536	9·1000	8·6751	6·3496
89·0	0·9643	0·8733	0·7909	0·3953	9·5704	9·1152	8·6889	6·3565
90·0	0·9645	0·8734	0·7909	0·3948	9·5872	9·1305	8·7027	6·3634

$\phi_c = 9°$ (continued) Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	−8.3522	−8.0019	−7.6713	−5.8124	1.6045	1.5023	1.4072	0.9009
46.0	−8.3744	−8.0222	−7.6898	−5.8223	1.6270	1.5229	1.4260	0.9110
47.0	−8.3955	−8.0415	−7.7074	−5.8317	1.6492	1.5432	1.4446	0.9209
48.0	−8.4155	−8.0598	−7.7242	−5.8406	1.6711	1.5632	1.4629	0.9306
49.0	−8.4347	−8.0773	−7.7401	−5.8491	1.6928	1.5830	1.4809	0.9402
50.0	−8.4529	−8.0939	−7.7553	−5.8571	1.7141	1.6024	1.4987	0.9496
51.0	−8.4702	−8.1097	−7.7698	−5.8648	1.7351	1.6216	1.5162	0.9589
52.0	−8.4867	−8.1248	−7.7835	−5.8720	1.7559	1.6406	1.5335	0.9680
53.0	−8.5025	−8.1392	−7.7966	−5.8789	1.7764	1.6593	1.5506	0.9770
54.0	−8.5175	−8.1529	−7.8091	−5.8855	1.7967	1.6778	1.5675	0.9859
55.0	−8.5318	−8.1659	−7.8210	−5.8917	1.8167	1.6961	1.5842	0.9946
56.0	−8.5454	−8.1783	−7.8324	−5.8976	1.8366	1.7142	1.6007	1.0033
57.0	−8.5584	−8.1902	−7.8432	−5.9033	1.8562	1.7321	1.6170	1.0118
58.0	−8.5708	−8.2015	−7.8534	−5.9087	1.8756	1.7498	1.6331	1.0202
59.0	−8.5826	−8.2122	−7.8632	−5.9137	1.8949	1.7673	1.6491	1.0285
60.0	−8.5938	−8.2224	−7.8725	−5.9186	1.9139	1.7847	1.6649	1.0367
61.0	−8.6045	−8.2322	−7.8814	−5.9232	1.9328	1.8019	1.6805	1.0449
62.0	−8.6147	−8.2414	−7.8898	−5.9276	1.9515	1.8189	1.6961	1.0529
63.0	−8.6243	−8.2502	−7.8978	−5.9317	1.9701	1.8358	1.7114	1.0609
64.0	−8.6335	−8.2586	−7.9055	−5.9356	1.9885	1.8526	1.7267	1.0688
65.0	−8.6423	−8.2665	−7.9127	−5.9394	2.0068	1.8692	1.7418	1.0766
66.0	−8.6505	−8.2741	−7.9195	−5.9429	2.0250	1.8858	1.7569	1.0843
67.0	−8.6584	−8.2812	−7.9260	−5.9462	2.0430	1.9022	1.7718	1.0920
68.0	−8.6658	−8.2879	−7.9321	−5.9494	2.0609	1.9185	1.7866	1.0996
69.0	−8.6728	−8.2943	−7.9379	−5.9524	2.0788	1.9346	1.8013	1.1072
70.0	−8.6794	−8.3003	−7.9434	−5.9552	2.0965	1.9507	1.8159	1.1147
71.0	−8.6857	−8.3060	−7.9486	−5.9578	2.1141	1.9667	1.8305	1.1221
72.0	−8.6915	−8.3113	−7.9534	−5.9603	2.1316	1.9826	1.8449	1.1295
73.0	−8.6970	−8.3163	−7.9579	−5.9626	2.1490	1.9985	1.8593	1.1368
74.0	−8.7022	−8.3210	−7.9622	−5.9647	2.1664	2.0142	1.8736	1.1441
75.0	−8.7069	−8.3253	−7.9661	−5.9668	2.1836	2.0299	1.8879	1.1514
76.0	−8.7114	−8.3294	−7.9698	−5.9686	2.2008	2.0455	1.9021	1.1586
77.0	−8.7155	−8.3331	−7.9732	−5.9703	2.2180	2.0611	1.9162	1.1657
78.0	−8.7193	−8.3365	−7.9763	−5.9719	2.2351	2.0766	1.9303	1.1729
79.0	−8.7228	−8.3397	−7.9792	−5.9734	2.2521	2.0921	1.9443	1.1800
80.0	−8.7259	−8.3425	−7.9817	−5.9747	2.2691	2.1075	1.9583	1.1871
81.0	−8.7288	−8.3451	−7.9841	−5.9759	2.2861	2.1229	1.9722	1.1941
82.0	−8.7313	−8.3474	−7.9862	−5.9769	2.3030	2.1382	1.9861	1.2011
83.0	−8.7335	−8.3494	−7.9880	−5.9778	2.3199	2.1535	2.0000	1.2081
84.0	−8.7354	−8.3512	−7.9896	−5.9786	2.3367	2.1688	2.0139	1.2151
85.0	−8.7371	−8.3526	−7.9909	−5.9793	2.3536	2.1841	2.0277	1.2220
86.0	−8.7384	−8.3538	−7.9920	−5.9798	2.3704	2.1994	2.0416	1.2290
87.0	−8.7394	−8.3548	−7.9928	−5.9803	2.3873	2.2146	2.0554	1.2359
88.0	−8.7401	−8.3554	−7.9934	−5.9806	2.4041	2.2298	2.0692	1.2428
89.0	−8.7406	−8.3558	−7.9938	−5.9807	2.4209	2.2451	2.0830	1.2497
90.0	−8.7407	−8.3560	−7.9939	−5.9808	2.4377	2.2603	2.0968	1.2566

$\phi_c = 10°$

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0°0	1·0000	1·0000	1·0000	1·0000	0·0000	0·0000	0·0000	0·0000
0°5	0·9972	0·9944	0·9915	0·9720	0·2844	0·2840	0·2836	0·2808
1°0	0·9945	0·9889	0·9832	0·9449	0·5666	0·5650	0·5634	0·5524
1°5	0·9919	0·9835	0·9752	0·9189	0·8453	0·8418	0·8382	0·8139
2°0	0·9894	0·9783	0·9674	0·8941	1·1194	1·1131	1·1069	1·0647
2°5	0·9870	0·9733	0·9598	0·8704	1·3877	1·3781	1·3685	1·3042
3°0	0·9848	0·9686	0·9526	0·8480	1·6493	1·6357	1·6223	1·5321
3°5	0·9827	0·9640	0·9457	0·8267	1·9034	1·8853	1·8674	1·7484
4°0	0·9807	0·9597	0·9391	0·8067	2·1493	2·1262	2·1035	1·9530
4°5	0·9789	0·9556	0·9328	0·7878	2·3866	2·3582	2·3302	2·1461
5°0	0·9772	0·9517	0·9268	0·7701	2·6150	2·5808	2·5473	2·3279
6°0	0·9742	0·9446	0·9158	0·7379	3·0443	2·9980	2·9526	2·6596
7°0	0·9716	0·9383	0·9061	0·7097	3·4371	3·3781	3·3204	2·9518
8°0	0·9694	0·9328	0·8974	0·6850	3·7945	3·7226	3·6525	3·2086
9°0	0·9677	0·9279	0·8898	0·6634	4·1189	4·0342	3·9518	3·4344
10°0	0·9662	0·9237	0·8831	0·6446	4·4128	4·3156	4·2213	3·6332
11°0	0·9650	0·9201	0·8772	0·6280	4·6791	4·5699	4·4640	3·8086
12°0	0·9641	0·9169	0·8719	0·6134	4·9206	4·7998	4·6829	3·9640
13°0	0·9634	0·9141	0·8673	0·6005	5·1399	5·0081	4·8808	4·1021
14°0	0·9628	0·9116	0·8632	0·5891	5·3394	5·1972	5·0601	4·2254
15°0	0·9624	0·9095	0·8596	0·5789	5·5214	5·3694	5·2230	4·3358
16°0	0·9621	0·9077	0·8563	0·5698	5·6879	5·5266	5·3714	4·4351
17°0	0·9619	0·9060	0·8534	0·5616	5·8406	5·6705	5·5071	4·5249
18°0	0·9617	0·9046	0·8509	0·5542	5·9810	5·8027	5·6314	4·6063
19°0	0·9617	0·9034	0·8485	0·5475	6·1104	5·9243	5·7458	4·6805
20°0	0·9617	0·9023	0·8464	0·5414	6·2301	6·0367	5·8513	4·7482
21°0	0·9618	0·9013	0·8446	0·5358	6·3411	6·1407	5·9488	4·8104
22°0	0·9619	0·9004	0·8429	0·5308	6·4442	6·2373	6·0393	4·8676
23°0	0·9621	0·8997	0·8413	0·5261	6·5403	6·3273	6·1234	4·9204
24°0	0·9623	0·8990	0·8399	0·5218	6·6301	6·4112	6·2019	4·9692
25°0	0·9625	0·8985	0·8387	0·5178	6·7142	6·4897	6·2752	5·0147
26°0	0·9628	0·8980	0·8375	0·5142	6·7931	6·5633	6·3439	5·0570
27°0	0·9631	0·8975	0·8365	0·5108	6·8673	6·6325	6·4084	5·0965
28°0	0·9633	0·8971	0·8355	0·5076	6·9373	6·6977	6·4691	5·1334
29°0	0·9636	0·8968	0·8346	0·5046	7·0033	6·7592	6·5264	5·1681
30°0	0·9640	0·8965	0·8338	0·5019	7·0659	6·8174	6·5805	5·2008
31°0	0·9643	0·8963	0·8331	0·4993	7·1251	6·8725	6·6317	5·2316
32°0	0·9646	0·8961	0·8324	0·4968	7·1814	6·9248	6·6803	5·2606
33°0	0·9650	0·8959	0·8318	0·4945	7·2350	6·9745	6·7265	5·2881
34°0	0·9653	0·8957	0·8312	0·4923	7·2860	7·0219	6·7705	5·3142
35°0	0·9657	0·8956	0·8307	0·4903	7·3347	7·0670	6·8124	5·3390
36°0	0·9660	0·8955	0·8302	0·4884	7·3813	7·1102	6·8524	5·3626
37°0	0·9664	0·8955	0·8297	0·4865	7·4258	7·1515	6·8907	5·3851
38°0	0·9668	0·8954	0·8293	0·4848	7·4685	7·1911	6·9274	5·4065
39°0	0·9672	0·8954	0·8289	0·4831	7·5096	7·2291	6·9625	5·4271
40°0	0·9675	0·8953	0·8286	0·4815	7·5490	7·2656	6·9963	5·4467
41°0	0·9679	0·8953	0·8282	0·4800	7·5870	7·3007	7·0288	5·4656
42°0	0·9683	0·8954	0·8279	0·4786	7·6235	7·3345	7·0601	5·4837
43°0	0·9687	0·8954	0·8276	0·4772	7·6588	7·3672	7·0903	5·5011
44°0	0·9690	0·8954	0·8274	0·4759	7·6929	7·3987	7·1194	5·5179

$\phi_c = 10°$

Table 3

$180° - \phi°$	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	-0.2844	-0.2840	-0.2836	-0.2808	0.0012	0.0012	0.0012	0.0012
1.0	-0.5666	-0.5650	-0.5634	-0.5523	0.0049	0.0049	0.0049	0.0048
1.5	-0.8452	-0.8417	-0.8381	-0.8138	0.0110	0.0109	0.0109	0.0105
2.0	-1.1192	-1.1129	-1.1067	-1.0645	0.0194	0.0192	0.0191	0.0181
2.5	-1.3873	-1.3777	-1.3681	-1.3038	0.0299	0.0296	0.0294	0.0275
3.0	-1.6486	-1.6350	-1.6215	-1.5315	0.0424	0.0420	0.0415	0.0384
3.5	-1.9022	-1.8841	-1.8663	-1.7474	0.0568	0.0561	0.0554	0.0507
4.0	-2.1477	-2.1246	-2.1019	-1.9515	0.0729	0.0719	0.0708	0.0641
4.5	-2.3843	-2.3559	-2.3279	-2.1441	0.0905	0.0891	0.0876	0.0784
5.0	-2.6119	-2.5778	-2.5443	-2.3253	0.1094	0.1075	0.1056	0.0934
6.0	-3.0392	-2.9930	-2.9478	-2.6555	0.1505	0.1474	0.1444	0.1251
7.0	-3.4295	-3.3706	-3.3132	-2.9458	0.1949	0.1904	0.1860	0.1582
8.0	-3.7839	-3.7123	-3.6425	-3.2004	0.2415	0.2353	0.2293	0.1916
9.0	-4.1047	-4.0204	-3.9385	-3.4237	0.2894	0.2813	0.2735	0.2250
10.0	-4.3946	-4.2980	-4.2042	-3.6198	0.3379	0.3277	0.3179	0.2577
11.0	-4.6564	-4.5480	-4.4429	-3.7923	0.3864	0.3740	0.3621	0.2897
12.0	-4.8930	-4.7733	-4.6574	-3.9446	0.4345	0.4198	0.4057	0.3206
13.0	-5.1071	-4.9766	-4.8506	-4.0794	0.4819	0.4649	0.4485	0.3505
14.0	-5.3012	-5.1606	-5.0249	-4.1992	0.5285	0.5090	0.4903	0.3793
15.0	-5.4774	-5.3273	-5.1827	-4.3062	0.5740	0.5521	0.5311	0.4069
16.0	-5.6378	-5.4788	-5.3257	-4.4019	0.6185	0.5941	0.5708	0.4334
17.0	-5.7842	-5.6168	-5.4558	-4.4880	0.6618	0.6349	0.6093	0.4589
18.0	-5.9181	-5.7428	-5.5744	-4.5656	0.7040	0.6747	0.6467	0.4834
19.0	-6.0408	-5.8582	-5.6829	-4.6359	0.7451	0.7133	0.6829	0.5069
20.0	-6.1537	-5.9641	-5.7823	-4.6998	0.7850	0.7508	0.7181	0.5295
21.0	-6.2576	-6.0615	-5.8737	-4.7580	0.8239	0.7872	0.7523	0.5513
22.0	-6.3536	-6.1514	-5.9578	-4.8112	0.8617	0.8226	0.7854	0.5722
23.0	-6.4424	-6.2345	-6.0356	-4.8600	0.8984	0.8570	0.8176	0.5924
24.0	-6.5247	-6.3115	-6.1075	-4.9049	0.9342	0.8904	0.8489	0.6119
25.0	-6.6012	-6.3829	-6.1743	-4.9462	0.9691	0.9230	0.8793	0.6307
26.0	-6.6725	-6.4494	-6.2363	-4.9844	1.0031	0.9547	0.9089	0.6489
27.0	-6.7389	-6.5113	-6.2940	-5.0197	1.0362	0.9855	0.9376	0.6666
28.0	-6.8009	-6.5691	-6.3478	-5.0525	1.0685	1.0156	0.9657	0.6836
29.0	-6.8590	-6.6232	-6.3982	-5.0830	1.1000	1.0450	0.9930	0.7002
30.0	-6.9134	-6.6738	-6.4453	-5.1114	1.1308	1.0736	1.0196	0.7163
31.0	-6.9645	-6.7213	-6.4894	-5.1379	1.1608	1.1016	1.0456	0.7319
32.0	-7.0125	-6.7659	-6.5309	-5.1627	1.1902	1.1289	1.0710	0.7471
33.0	-7.0576	-6.8078	-6.5698	-5.1859	1.2190	1.1556	1.0958	0.7618
34.0	-7.1002	-6.8473	-6.6065	-5.2077	1.2472	1.1818	1.1201	0.7762
35.0	-7.1403	-6.8845	-6.6410	-5.2281	1.2748	1.2073	1.1438	0.7903
36.0	-7.1782	-6.9197	-6.6736	-5.2473	1.3018	1.2324	1.1671	0.8040
37.0	-7.2141	-6.9529	-6.7044	-5.2654	1.3283	1.2570	1.1898	0.8173
38.0	-7.2480	-6.9843	-6.7335	-5.2824	1.3543	1.2811	1.2122	0.8304
39.0	-7.2801	-7.0140	-6.7610	-5.2985	1.3798	1.3047	1.2340	0.8432
40.0	-7.3105	-7.0422	-6.7871	-5.3136	1.4049	1.3279	1.2555	0.8557
41.0	-7.3394	-7.0689	-6.8118	-5.3280	1.4296	1.3507	1.2766	0.8679
42.0	-7.3668	-7.0942	-6.8352	-5.3415	1.4538	1.3731	1.2974	0.8799
43.0	-7.3928	-7.1183	-6.8574	-5.3544	1.4776	1.3952	1.3177	0.8917
44.0	-7.4175	-7.1411	-6.8786	-5.3666	1.5011	1.4169	1.3378	0.9032

$\phi_c = 10°$ (continued)

$180° - \phi°$	τ				σ			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45°0	0•9694	0•8955	0•8271	0•4746	7•7259	7•4291	7•1475	5•5340
46°0	0•9698	0•8955	0•8269	0•4734	7•7578	7•4586	7•1747	5•5496
47°0	0•9702	0•8956	0•8267	0•4722	7•7887	7•4872	7•2011	5•5647
48°0	0•9705	0•8956	0•8265	0•4711	7•8188	7•5149	7•2267	5•5793
49°0	0•9709	0•8957	0•8263	0•4700	7•8479	7•5418	7•2515	5•5934
50°0	0•9713	0•8958	0•8262	0•4689	7•8763	7•5679	7•2756	5•6071
51°0	0•9717	0•8959	0•8260	0•4679	7•9038	7•5933	7•2991	5•6204
52°0	0•9720	0•8960	0•8259	0•4669	7•9307	7•6181	7•3219	5•6334
53°0	0•9724	0•8961	0•8258	0•4660	7•9569	7•6422	7•3441	5•6459
54°0	0•9728	0•8962	0•8257	0•4651	7•9824	7•6658	7•3658	5•6582
55°0	0•9732	0•8963	0•8255	0•4642	8•0074	7•6888	7•3870	5•6701
56°0	0•9735	0•8964	0•8254	0•4633	8•0318	7•7112	7•4077	5•6817
57°0	0•9739	0•8966	0•8254	0•4625	8•0556	7•7332	7•4279	5•6930
58°0	0•9743	0•8967	0•8253	0•4616	8•0790	7•7547	7•4477	5•7041
59°0	0•9746	0•8968	0•8252	0•4608	8•1019	7•7758	7•4671	5•7150
60°0	0•9750	0•8969	0•8251	0•4601	8•1243	7•7964	7•4861	5•7256
61°0	0•9754	0•8971	0•8251	0•4593	8•1464	7•8167	7•5047	5•7359
62°0	0•9757	0•8972	0•8250	0•4585	8•1680	7•8366	7•5230	5•7461
63°0	0•9761	0•8974	0•8250	0•4578	8•1893	7•8561	7•5410	5•7561
64°0	0•9765	0•8975	0•8249	0•4571	8•2102	7•8754	7•5587	5•7659
65°0	0•9768	0•8976	0•8249	0•4564	8•2308	7•8943	7•5761	5•7755
66°0	0•9772	0•8978	0•8248	0•4557	8•2511	7•9129	7•5932	5•7850
67°0	0•9776	0•8979	0•8248	0•4551	8•2711	7•9313	7•6101	5•7943
68°0	0•9779	0•8981	0•8248	0•4544	8•2908	7•9494	7•6267	5•8035
69°0	0•9783	0•8982	0•8248	0•4538	8•3103	7•9673	7•6431	5•8125
70°0	0•9786	0•8984	0•8247	0•4531	8•3295	7•9849	7•6594	5•8214
71°0	0•9790	0•8986	0•8247	0•4525	8•3485	8•0024	7•6754	5•8302
72°0	0•9794	0•8987	0•8247	0•4519	8•3673	8•0196	7•6912	5•8389
73°0	0•9797	0•8989	0•8247	0•4513	8•3859	8•0367	7•7069	5•8475
74°0	0•9801	0•8990	0•8247	0•4507	8•4043	8•0536	7•7224	5•8560
75°0	0•9804	0•8992	0•8247	0•4501	8•4226	8•0704	7•7377	5•8644
76°0	0•9808	0•8993	0•8247	0•4495	8•4407	8•0870	7•7530	5•8727
77°0	0•9811	0•8995	0•8247	0•4489	8•4587	8•1035	7•7681	5•8809
78°0	0•9815	0•8997	0•8247	0•4483	8•4765	8•1198	7•7831	5•8891
79°0	0•9819	0•8998	0•8247	0•4478	8•4943	8•1361	7•7980	5•8972
80°0	0•9822	0•9000	0•8247	0•4472	8•5119	8•1522	7•8128	5•9052
81°0	0•9826	0•9002	0•8247	0•4467	8•5294	8•1683	7•8275	5•9132
82°0	0•9829	0•9003	0•8247	0•4461	8•5469	8•1843	7•8421	5•9211
83°0	0•9833	0•9005	0•8247	0•4456	8•5643	8•2002	7•8567	5•9290
84°0	0•9836	0•9006	0•8247	0•4450	8•5816	8•2161	7•8713	5•9368
85°0	0•9840	0•9008	0•8247	0•4445	8•5989	8•2319	7•8857	5•9446
86°0	0•9843	0•9010	0•8247	0•4439	8•6161	8•2477	7•9002	5•9524
87°0	0•9847	0•9011	0•8247	0•4434	8•6333	8•2634	7•9146	5•9602
88°0	0•9850	0•9013	0•8247	0•4429	8•6505	8•2792	7•9290	5•9679
89°0	0•9854	0•9015	0•8247	0•4423	8•6677	8•2949	7•9434	5•9756
90°0	0•9857	0•9016	0•8247	0•4418	8•6849	8•3106	7•9578	5•9834

$\phi_c = 10°$ (continued)

Table 3

180° - ϕ°	ξ				η			
	f = 0.01	f = 0.02	f = 0.03	f = 0.1	f = 0.01	f = 0.02	f = 0.03	f = 0.1
45.0	−7.4410	−7.1629	−6.8986	−5.3781	1.5242	1.4382	1.3575	0.9146
46.0	−7.4634	−7.1835	−6.9177	−5.3890	1.5470	1.4592	1.3769	0.9257
47.0	−7.4847	−7.2032	−6.9359	−5.3994	1.5694	1.4800	1.3960	0.9366
48.0	−7.5050	−7.2219	−6.9531	−5.4093	1.5916	1.5004	1.4149	0.9474
49.0	−7.5243	−7.2397	−6.9696	−5.4186	1.6134	1.5205	1.4335	0.9580
50.0	−7.5427	−7.2567	−6.9852	−5.4275	1.6349	1.5404	1.4518	0.9684
51.0	−7.5602	−7.2729	−7.0002	−5.4360	1.6562	1.5600	1.4699	0.9786
52.0	−7.5770	−7.2883	−7.0144	−5.4440	1.6772	1.5794	1.4878	0.9888
53.0	−7.5929	−7.3030	−7.0279	−5.4517	1.6980	1.5986	1.5054	0.9987
54.0	−7.6081	−7.3170	−7.0408	−5.4589	1.7185	1.6175	1.5229	1.0086
55.0	−7.6226	−7.3304	−7.0531	−5.4659	1.7389	1.6362	1.5401	1.0183
56.0	−7.6364	−7.3431	−7.0648	−5.4724	1.7590	1.6547	1.5571	1.0278
57.0	−7.6496	−7.3552	−7.0760	−5.4787	1.7789	1.6730	1.5740	1.0373
58.0	−7.6621	−7.3668	−7.0866	−5.4847	1.7986	1.6912	1.5907	1.0466
59.0	−7.6741	−7.3778	−7.0968	−5.4903	1.8181	1.7091	1.6072	1.0559
60.0	−7.6855	−7.3882	−7.1064	−5.4957	1.8374	1.7269	1.6236	1.0650
61.0	−7.6963	−7.3982	−7.1156	−5.5008	1.8566	1.7446	1.6398	1.0740
62.0	−7.7067	−7.4077	−7.1243	−5.5057	1.8756	1.7620	1.6559	1.0830
63.0	−7.7165	−7.4168	−7.1326	−5.5103	1.8945	1.7794	1.6719	1.0918
64.0	−7.7258	−7.4253	−7.1405	−5.5147	1.9132	1.7966	1.6877	1.1006
65.0	−7.7347	−7.4335	−7.1480	−5.5188	1.9318	1.8137	1.7034	1.1093
66.0	−7.7431	−7.4412	−7.1551	−5.5227	1.9502	1.8306	1.7190	1.1179
67.0	−7.7511	−7.4485	−7.1618	−5.5264	1.9686	1.8475	1.7344	1.1265
68.0	−7.7586	−7.4555	−7.1682	−5.5300	1.9868	1.8642	1.7498	1.1349
69.0	−7.7658	−7.4620	−7.1742	−5.5333	2.0049	1.8808	1.7651	1.1434
70.0	−7.7725	−7.4682	−7.1799	−5.5364	2.0229	1.8974	1.7803	1.1517
71.0	−7.7788	−7.4740	−7.1852	−5.5393	2.0408	1.9138	1.7954	1.1600
72.0	−7.7848	−7.4795	−7.1903	−5.5421	2.0587	1.9302	1.8104	1.1682
73.0	−7.7904	−7.4846	−7.1950	−5.5447	2.0764	1.9465	1.8253	1.1764
74.0	−7.7956	−7.4894	−7.1994	−5.5471	2.0941	1.9627	1.8402	1.1845
75.0	−7.8005	−7.4939	−7.2035	−5.5493	2.1117	1.9788	1.8550	1.1926
76.0	−7.8050	−7.4981	−7.2073	−5.5514	2.1292	1.9949	1.8697	1.2007
77.0	−7.8092	−7.5019	−7.2108	−5.5533	2.1467	2.0109	1.8844	1.2087
78.0	−7.8131	−7.5055	−7.2141	−5.5551	2.1641	2.0269	1.8991	1.2166
79.0	−7.8166	−7.5087	−7.2170	−5.5567	2.1815	2.0428	1.9137	1.2246
80.0	−7.8198	−7.5116	−7.2197	−5.5582	2.1988	2.0587	1.9282	1.2325
81.0	−7.8227	−7.5143	−7.2222	−5.5595	2.2161	2.0746	1.9427	1.2403
82.0	−7.8253	−7.5167	−7.2243	−5.5606	2.2334	2.0904	1.9572	1.2482
83.0	−7.8276	−7.5187	−7.2262	−5.5617	2.2506	2.1062	1.9717	1.2560
84.0	−7.8296	−7.5205	−7.2279	−5.5626	2.2678	2.1219	1.9861	1.2638
85.0	−7.8312	−7.5220	−7.2293	−5.5633	2.2850	2.1377	2.0005	1.2716
86.0	−7.8326	−7.5233	−7.2304	−5.5639	2.3022	2.1534	2.0149	1.2793
87.0	−7.8336	−7.5242	−7.2313	−5.5644	2.3194	2.1691	2.0293	1.2871
88.0	−7.8344	−7.5249	−7.2319	−5.5647	2.3366	2.1848	2.0437	1.2948
89.0	−7.8348	−7.5253	−7.2323	−5.5649	2.3538	2.2006	2.0581	1.3025
90.0	−7.8350	−7.5255	−7.2324	−5.5650	2.3710	2.2163	2.0725	1.3102

David W. Taylor Model Basin. Rept. 687, suppl.
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Supplementary tables of the cable functions used for determining the shape and tension of a flexible cable immersed in a uniform stream are presented. The tables cover the range of critical angles from 0 to 10 degrees in increments of one degree. In the neighborhood of the critical angle, values of the functions are given at intervals of 0.5 degree.

1. Functions - Tables
2. Cables - Stresses - Mathematical Analysis
3. Cables - Tensile properties

I. Pode, Leonard
II. Rosenthal, Louis
III. NS 830-100

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Supplementary tables of the cable functions used for determining the shape and tension of a flexible cable immersed in a uniform stream are presented. The tables cover the range of critical angles from 0 to 10 degrees in increments of one degree. In the neighborhood of the critical angle, values of the functions are given at intervals of 0.5 degree.

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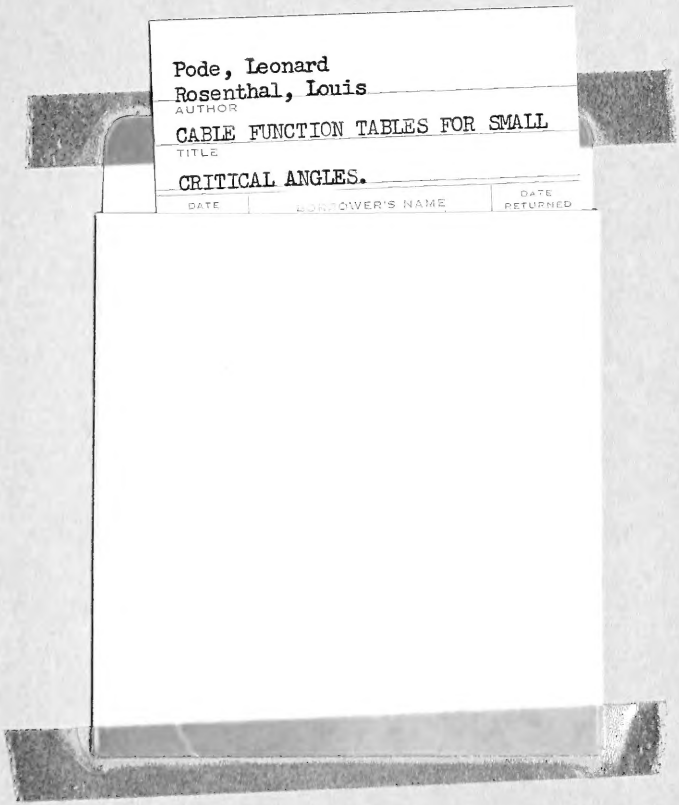
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