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TABLES OF SPHERICAL BESSEL FUNCTIONS FOR COMPLEX ARGUMENT

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*Radiation  
Laboratory*

TABLES OF SPHERICAL BESSEL FUNCTIONS  
FOR COMPLEX ARGUMENT

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TABLES OF SPHERICAL BESSEL FUNCTIONS  
FOR COMPLEX ARGUMENT

Kenneth R. Greider

August 12, 1958

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TABLES OF SPHERICAL BESSEL FUNCTIONS  
FOR COMPLEX ARGUMENT

Kenneth R. Greider

Radiation Laboratory  
University of California  
Berkeley, California

August 12, 1958

INTRODUCTION

The spherical Bessel functions for complex argument arise in many physics and engineering problems that involve the scattering of waves from absorbing media of spherical or cylindrical symmetry. Only tables of the functions of low order are presented here, and the zero-order function,  $j_0(z) = \sin(z)/z$ , is not given because it can be easily obtained from available compilations of the sin function for complex argument.

The tables give the real and imaginary part of  $j_1(z)/z$  and  $j_2(z)/z^2$  as functions of the argument  $z = \rho e^{i\theta}$ , where  $\rho$  has values from 0 to 10 in steps of 0.1, and  $\theta$  takes on values from  $0^\circ$  to  $90^\circ$  in steps of  $5^\circ$ . The functions  $j_n(z)/z^n$  were calculated rather than  $j_n(z)$ , because the former arise more naturally in many typical problems, and since for any value of  $n$  we can use the same power series:

$$j_n(z)/z^n = \sum_{k=0}^{\infty} (-1)^k C_k^n (z)^{2k} \quad (1)$$

The coefficients for  $n = 1$  and  $2$  are

$$C_k^1 = \frac{1}{(2k+2)!} - \frac{1}{(2k+3)!} = \frac{2(k+1)}{(2k+3)!} \quad (2)$$

and

$$C_k^2 = \frac{1}{(2k+3)!} - \frac{3}{(2k+4)!} + \frac{3}{(2k+5)!} = \frac{4(k+2)(k+1)}{(2k+5)!} \quad (3)$$

The computations, which were carried out on the IBM 650 computer at the Radiation Laboratory of the University of California at Berkeley, were spot checked by hand calculations to confirm the correctness of the coding, and the printed results from the machine were directly photographed to eliminate copying errors. For each value of  $z$ , the machine summed the series consisting of all terms such that

$$\left| C_k z^2 \right| \geq 10^{-5} ,$$

and the error involved by omitting the remainder of the series is  $\lesssim 10^{-5}$ .  
The accuracy of the tables is  $\pm 0.00001$  for phase angles  $< 45^\circ$  and  $\pm 0.00002$   
for angles  $> 45^\circ$ .

This work was performed under the auspices of the United States  
Atomic Energy Commission.

$\theta = 0^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333		0.06667	
0.1	0.33300		0.06662	
0.2	0.33200		0.06648	
0.3	0.33033		0.06624	
0.4	0.32803		0.06590	
0.5	0.32507		0.06548	
0.6	0.32149		0.06497	
0.7	0.31729		0.06437	
0.8	0.31249		0.06367	
0.9	0.30710		0.06290	
1.0	0.30117		0.06204	
1.1	0.29470		0.06110	
1.2	0.28774		0.06008	
1.3	0.28029		0.05900	
1.4	0.27241		0.05783	
1.5	0.26411		0.05660	
1.6	0.25544		0.05531	
1.7	0.24643		0.05396	
1.8	0.23711		0.05256	
1.9	0.22752		0.05111	
2.0	0.21770		0.04961	
2.1	0.20769		0.04807	
2.2	0.19753		0.04650	
2.3	0.18725		0.04490	
2.4	0.17688		0.04326	
2.5	0.16648		0.04161	
2.6	0.15609		0.03994	
2.7	0.14573		0.03826	
2.8	0.13544		0.03657	
2.9	0.12526		0.03488	
3.0	0.11522		0.03319	
3.1	0.10536		0.03150	
3.2	0.09571		0.02982	
3.3	0.08629		0.02816	
3.4	0.07713		0.02652	
3.5	0.06827		0.02490	
3.6	0.05971		0.02330	
3.7	0.05149		0.02174	
3.8	0.04363		0.02021	
3.9	0.03614		0.01871	
4.0	0.02903		0.01727	
4.1	0.02232		0.01586	
4.2	0.01603		0.01449	
4.3	0.01015		0.01317	
4.4	0.00470		0.01190	
4.5	-0.00032		0.01068	
4.6	-0.00491		0.00952	
4.7	-0.00908		0.00840	
4.8	-0.01280		0.00735	
4.9	-0.01612		0.00634	
5.0	-0.01902		0.00539	
5.1	-0.02151		0.00450	
5.2	-0.02361		0.00366	
5.3	-0.02532		0.00288	
5.4	-0.02667		0.00216	
5.5	-0.02766		0.00149	
5.6	-0.02833		0.00088	
5.7	-0.02867		0.00032	
5.8	-0.02871		-0.00018	
5.9	-0.02847		-0.00063	
6.0	-0.02797		-0.00104	
6.1	-0.02723		-0.00139	
6.2	-0.02628		-0.00170	
6.3	-0.02513		-0.00196	
6.4	-0.02380		-0.00218	
6.5	-0.02233		-0.00236	
6.6	-0.02073		-0.00250	
6.7	-0.01902		-0.00262	
6.8	-0.01723		-0.00269	
6.9	-0.01537		-0.00273	
7.0	-0.01346		-0.00274	
7.1	-0.01154		-0.00273	
7.2	-0.00961		-0.00269	
7.3	-0.00769		-0.00262	
7.4	-0.00579		-0.00254	
7.5	-0.00394		-0.00243	
7.6	-0.00215		-0.00232	
7.7	-0.00043		-0.00218	
7.8	0.00121		-0.00204	
7.9	0.00276		-0.00189	
8.0	0.00421		-0.00173	
8.1	0.00554		-0.00157	
8.2	0.00675		-0.00140	
8.3	0.00784		-0.00123	
8.4	0.00880		-0.00107	
8.5	0.00964		-0.00090	
8.6	0.01034		-0.00074	
8.7	0.01091		-0.00058	
8.8	0.01133		-0.00042	
8.9	0.01164		-0.00027	
9.0	0.01181		-0.00013	
9.1	0.01187		-0.00000	
9.2	0.01180		0.00013	
9.3	0.01162		0.00025	
9.4	0.01134		0.00036	
9.5	0.01095		0.00045	
9.6	0.01049		0.00054	
9.7	0.00993		0.00062	
9.8	0.00930		0.00069	
9.9	0.00861		0.00074	
10.0	0.00785		0.00078	



$\theta = 5^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33301	-0.00006	0.06662	-0.00001
0.2	0.33202	-0.00023	0.06648	-0.00003
0.3	0.33038	-0.00052	0.06624	-0.00007
0.4	0.32811	-0.00092	0.06592	-0.00013
0.5	0.32520	-0.00142	0.06549	-0.00021
0.6	0.32166	-0.00203	0.06499	-0.00029
0.7	0.31752	-0.00274	0.06440	-0.00039
0.8	0.31278	-0.00354	0.06372	-0.00051
0.9	0.30747	-0.00443	0.06295	-0.00064
1.0	0.30161	-0.00539	0.06210	-0.00078
1.1	0.29522	-0.00643	0.06117	-0.00093
1.2	0.28833	-0.00752	0.06017	-0.00110
1.3	0.28096	-0.00867	0.05910	-0.00127
1.4	0.27315	-0.00986	0.05794	-0.00145
1.5	0.26492	-0.01109	0.05672	-0.00164
1.6	0.25632	-0.01233	0.05545	-0.00184
1.7	0.24736	-0.01358	0.05411	-0.00204
1.8	0.23809	-0.01484	0.05272	-0.00224
1.9	0.22854	-0.01608	0.05128	-0.00244
2.0	0.21875	-0.01730	0.04979	-0.00265
2.1	0.20876	-0.01849	0.04825	-0.00285
2.2	0.19860	-0.01964	0.04669	-0.00305
2.3	0.18831	-0.02073	0.04509	-0.00325
2.4	0.17792	-0.02177	0.04346	-0.00344
2.5	0.16748	-0.02273	0.04181	-0.00363
2.6	0.15703	-0.02361	0.04014	-0.00381
2.7	0.14660	-0.02440	0.03845	-0.00398
2.8	0.13622	-0.02510	0.03676	-0.00414
2.9	0.12593	-0.02569	0.03506	-0.00429
3.0	0.11577	-0.02618	0.03336	-0.00443
3.1	0.10577	-0.02659	0.03166	-0.00456
3.2	0.09596	-0.02693	0.02997	-0.00467
3.3	0.08638	-0.02720	0.02829	-0.00477
3.4	0.07704	-0.02742	0.02663	-0.00486
3.5	0.06798	-0.02758	0.02499	-0.00493
3.6	0.05922	-0.02768	0.02338	-0.00499
3.7	0.05079	-0.02771	0.02179	-0.00502
3.8	0.04270	-0.02767	0.02023	-0.00505
3.9	0.03498	-0.02750	0.01871	-0.00505
4.0	0.02765	-0.02723	0.01723	-0.00504
4.1	0.02071	-0.02686	0.01579	-0.00501
4.2	0.01419	-0.02639	0.01439	-0.00496
4.3	0.00809	-0.02582	0.01304	-0.00490
4.4	0.00241	-0.02516	0.01174	-0.00482
4.5	-0.00282	-0.02440	0.01048	-0.00473
4.6	-0.00762	-0.02355	0.00928	-0.00462
4.7	-0.01197	-0.02260	0.00814	-0.00450
4.8	-0.01588	-0.02156	0.00704	-0.00436
4.9	-0.01935	-0.02043	0.00601	-0.00422
5.0	-0.02240	-0.01921	0.00503	-0.00406
5.1	-0.02501	-0.01790	0.00410	-0.00389
5.2	-0.02721	-0.01650	0.00324	-0.00370
5.3	-0.02900	-0.01501	0.00243	-0.00351
5.4	-0.03040	-0.01344	0.00169	-0.00331
5.5	-0.03142	-0.01180	0.00100	-0.00311
5.6	-0.03208	-0.01008	0.00036	-0.00290
5.7	-0.03239	-0.00828	-0.00022	-0.00268
5.8	-0.03237	-0.00640	-0.00074	-0.00245
5.9	-0.03205	-0.00445	-0.00120	-0.00223
6.0	-0.03144	-0.00244	-0.00162	-0.00200
6.1	-0.03056	-0.00039	-0.00198	-0.00178
6.2	-0.02944	0.00160	-0.00230	-0.00155
6.3	-0.02810	0.00348	-0.00256	-0.00133
6.4	-0.02656	0.00525	-0.00278	-0.00111
6.5	-0.02485	0.00692	-0.00296	-0.00090
6.6	-0.02299	0.00847	-0.00309	-0.00069
6.7	-0.02100	0.00992	-0.00319	-0.00049
6.8	-0.01890	0.01126	-0.00324	-0.00030
6.9	-0.01673	0.01249	-0.00327	-0.00011
7.0	-0.01450	0.01361	-0.00326	0.00006
7.1	-0.01223	0.01462	-0.00322	0.00023
7.2	-0.00995	0.01552	-0.00315	0.00039
7.3	-0.00767	0.01632	-0.00306	0.00053
7.4	-0.00542	0.01701	-0.00294	0.00066
7.5	-0.00322	0.01760	-0.00281	0.00079
7.6	-0.00107	0.01808	-0.00265	0.00090
7.7	0.00099	0.01845	-0.00249	0.00100
7.8	0.00296	0.01871	-0.00231	0.00109
7.9	0.00482	0.01887	-0.00212	0.00116
8.0	0.00656	0.01893	-0.00192	0.00122
8.1	0.00817	0.01891	-0.00171	0.00127
8.2	0.00965	0.01876	-0.00151	0.00131
8.3	0.01097	0.01848	-0.00130	0.00133
8.4	0.01214	0.01807	-0.00108	0.00133
8.5	0.01315	0.01754	-0.00088	0.00133
8.6	0.01400	0.01689	-0.00067	0.00132
8.7	0.01468	0.01613	-0.00047	0.00129
8.8	0.01521	0.01527	-0.00028	0.00126
8.9	0.01556	0.01432	-0.00009	0.00122
9.0	0.01579	0.01328	0.00008	0.00116
9.1	0.01579	0.01215	0.00025	0.00110
9.2	0.01567	0.01092	0.00040	0.00105
9.3	0.01540	0.00959	0.00054	0.00097
9.4	0.01500	0.00817	0.00067	0.00090
9.5	0.01446	0.00666	0.00079	0.00081
9.6	0.01379	0.00508	0.00089	0.00073
9.7	0.01301	0.00345	0.00098	0.00064
9.8	0.01212	0.00179	0.00106	0.00055
9.9	0.01115	0.00014	0.00112	0.00045
10.0	0.01009	-0.00144	0.00117	0.00035

$\theta = 10^\circ$

P	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33302	-0.00011	0.06662	-0.00002
0.2	0.33208	-0.00046	0.06649	-0.00007
0.3	0.33051	-0.00103	0.06626	-0.00015
0.4	0.32834	-0.00180	0.06595	-0.00026
0.5	0.32556	-0.00280	0.06555	-0.00041
0.6	0.32218	-0.00401	0.06507	-0.00058
0.7	0.31820	-0.00540	0.06450	-0.00078
0.8	0.31366	-0.00698	0.06384	-0.00101
0.9	0.30855	-0.00874	0.06311	-0.00126
1.0	0.30291	-0.01065	0.06229	-0.00154
1.1	0.29675	-0.01271	0.06140	-0.00185
1.2	0.29009	-0.01489	0.06043	-0.00217
1.3	0.28295	-0.01717	0.05939	-0.00251
1.4	0.27536	-0.01955	0.05828	-0.00288
1.5	0.26735	-0.02200	0.05710	-0.00325
1.6	0.25894	-0.02448	0.05586	-0.00364
1.7	0.25016	-0.02700	0.05456	-0.00404
1.8	0.24105	-0.02953	0.05320	-0.00444
1.9	0.23163	-0.03204	0.05179	-0.00485
2.0	0.22194	-0.03452	0.05032	-0.00527
2.1	0.21201	-0.03694	0.04882	-0.00568
2.2	0.20187	-0.03928	0.04727	-0.00608
2.3	0.19156	-0.04153	0.04569	-0.00648
2.4	0.18111	-0.04367	0.04407	-0.00687
2.5	0.17057	-0.04567	0.04242	-0.00725
2.6	0.15995	-0.04751	0.04075	-0.00762
2.7	0.14931	-0.04918	0.03905	-0.00797
2.8	0.13868	-0.05067	0.03734	-0.00831
2.9	0.12808	-0.05196	0.03562	-0.00862
3.0	0.11756	-0.05303	0.03389	-0.00891
3.1	0.10716	-0.05389	0.03216	-0.00919
3.2	0.09688	-0.05449	0.03043	-0.00943
3.3	0.08679	-0.05487	0.02871	-0.00965
3.4	0.07691	-0.05499	0.02700	-0.00983
3.5	0.06727	-0.05486	0.02530	-0.00999
3.6	0.05789	-0.05447	0.02361	-0.01012
3.7	0.04881	-0.05383	0.02196	-0.01021
3.8	0.04005	-0.05293	0.02032	-0.01027
3.9	0.03163	-0.05178	0.01872	-0.01030
4.0	0.02360	-0.05039	0.01714	-0.01028
4.1	0.01594	-0.04875	0.01561	-0.01024
4.2	0.00870	-0.04688	0.01412	-0.01016
4.3	0.00189	-0.04479	0.01266	-0.01005
4.4	-0.00448	-0.04249	0.01126	-0.00991
4.5	-0.01040	-0.03999	0.00990	-0.00973
4.6	-0.01585	-0.03731	0.00859	-0.00952
4.7	-0.02082	-0.03447	0.00734	-0.00928
4.8	-0.02532	-0.03148	0.00614	-0.00901
4.9	-0.02934	-0.02836	0.00501	-0.00872
5.0	-0.03286	-0.02513	0.00393	-0.00839
5.1	-0.03590	-0.02182	0.00291	-0.00805
5.2	-0.03846	-0.01845	0.00195	-0.00767
5.3	-0.04054	-0.01503	0.00106	-0.00728
5.4	-0.04216	-0.01158	0.00023	-0.00687
5.5	-0.04331	-0.00815	-0.00054	-0.00644
5.6	-0.04401	-0.00473	-0.00125	-0.00600
5.7	-0.04429	-0.00137	-0.00189	-0.00554
5.8	-0.04414	0.00193	-0.00247	-0.00507
5.9	-0.04361	0.00514	-0.00299	-0.00460
6.0	-0.04269	0.00823	-0.00345	-0.00412
6.1	-0.04142	0.01119	-0.00384	-0.00362
6.2	-0.03981	0.01400	-0.00418	-0.00316
6.3	-0.03790	0.01663	-0.00446	-0.00268
6.4	-0.03571	0.01908	-0.00468	-0.00220
6.5	-0.03326	0.02132	-0.00484	-0.00174
6.6	-0.03058	0.02335	-0.00496	-0.00128
6.7	-0.02771	0.02514	-0.00501	-0.00084
6.8	-0.02466	0.02669	-0.00503	-0.00041
6.9	-0.02148	0.02800	-0.00500	0.00001
7.0	-0.01818	0.02904	-0.00493	0.00040
7.1	-0.01481	0.02982	-0.00481	0.00078
7.2	-0.01138	0.03035	-0.00466	0.00113
7.3	-0.00794	0.03059	-0.00448	0.00147
7.4	-0.00451	0.03058	-0.00427	0.00177
7.5	-0.00111	0.03030	-0.00403	0.00205
7.6	0.00222	0.02976	-0.00377	0.00230
7.7	0.00546	0.02897	-0.00348	0.00253
7.8	0.00858	0.02794	-0.00318	0.00273
7.9	0.01156	0.02667	-0.00286	0.00289
8.0	0.01437	0.02517	-0.00252	0.00303
8.1	0.01700	0.02348	-0.00218	0.00314
8.2	0.01943	0.02160	-0.00184	0.00322
8.3	0.02163	0.01954	-0.00149	0.00327
8.4	0.02360	0.01733	-0.00113	0.00330
8.5	0.02532	0.01498	-0.00079	0.00330
8.6	0.02677	0.01252	-0.00045	0.00327
8.7	0.02796	0.00997	-0.00011	0.00321
8.8	0.02887	0.00735	0.00021	0.00313
8.9	0.02949	0.00468	0.00052	0.00303
9.0	0.02984	0.00199	0.00082	0.00290
9.1	0.02990	-0.00071	0.00109	0.00275
9.2	0.02969	-0.00338	0.00135	0.00258
9.3	0.02919	-0.00600	0.00159	0.00239
9.4	0.02843	-0.00856	0.00181	0.00219
9.5	0.02742	-0.01103	0.00200	0.00198
9.6	0.02615	-0.01339	0.00217	0.00175
9.7	0.02465	-0.01562	0.00232	0.00151
9.8	0.02294	-0.01769	0.00244	0.00127
9.9	0.02102	-0.01959	0.00254	0.00102
10.0	0.01892	-0.02132	0.00261	0.00078

$\theta = 15^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33304	-0.00017	0.06663	-0.00002
0.2	0.33218	-0.00067	0.06650	-0.00010
0.3	0.33074	-0.00150	0.06630	-0.00021
0.4	0.32873	-0.00264	0.06601	-0.00038
0.5	0.32615	-0.00410	0.06564	-0.00060
0.6	0.32302	-0.00587	0.06519	-0.00084
0.7	0.31933	-0.00792	0.06466	-0.00114
0.8	0.31510	-0.01024	0.06405	-0.00148
0.9	0.31034	-0.01284	0.06337	-0.00185
1.0	0.30506	-0.01566	0.06261	-0.00227
1.1	0.29928	-0.01870	0.06177	-0.00271
1.2	0.29300	-0.02193	0.06087	-0.00319
1.3	0.28625	-0.02533	0.05989	-0.00370
1.4	0.27904	-0.02887	0.05884	-0.00424
1.5	0.27139	-0.03253	0.05772	-0.00480
1.6	0.26333	-0.03627	0.05654	-0.00538
1.7	0.25487	-0.04007	0.05530	-0.00597
1.8	0.24604	-0.04390	0.05400	-0.00658
1.9	0.23686	-0.04773	0.05264	-0.00720
2.0	0.22736	-0.05153	0.05123	-0.00782
2.1	0.21756	-0.05526	0.04977	-0.00844
2.2	0.20749	-0.05890	0.04825	-0.00906
2.3	0.19718	-0.06241	0.04669	-0.00967
2.4	0.18668	-0.06577	0.04510	-0.01028
2.5	0.17599	-0.06895	0.04346	-0.01087
2.6	0.16515	-0.07192	0.04179	-0.01144
2.7	0.15420	-0.07466	0.04009	-0.01200
2.8	0.14317	-0.07713	0.03836	-0.01253
2.9	0.13210	-0.07932	0.03661	-0.01303
3.0	0.12102	-0.08120	0.03485	-0.01350
3.1	0.10996	-0.08275	0.03307	-0.01394
3.2	0.09894	-0.08395	0.03128	-0.01434
3.3	0.08803	-0.08480	0.02948	-0.01471
3.4	0.07725	-0.08527	0.02768	-0.01503
3.5	0.06663	-0.08536	0.02589	-0.01530
3.6	0.05621	-0.08506	0.02410	-0.01553
3.7	0.04603	-0.08435	0.02232	-0.01571
3.8	0.03611	-0.08324	0.02056	-0.01584
3.9	0.02649	-0.08173	0.01882	-0.01592
4.0	0.01721	-0.07982	0.01709	-0.01595
4.1	0.00828	-0.07752	0.01540	-0.01592
4.2	-0.00025	-0.07483	0.01374	-0.01585
4.3	-0.00836	-0.07176	0.01212	-0.01572
4.4	-0.01602	-0.06834	0.01053	-0.01553
4.5	-0.02321	-0.06456	0.00899	-0.01529
4.6	-0.02991	-0.06047	0.00750	-0.01500
4.7	-0.03608	-0.05607	0.00606	-0.01466
4.8	-0.04173	-0.05140	0.00467	-0.01427
4.9	-0.04682	-0.04647	0.00335	-0.01383
5.0	-0.05135	-0.04131	0.00209	-0.01334
5.1	-0.05530	-0.03596	0.00088	-0.01281
5.2	-0.05866	-0.03045	-0.00025	-0.01224
5.3	-0.06143	-0.02482	-0.00132	-0.01163
5.4	-0.06361	-0.01909	-0.00232	-0.01098
5.5	-0.06519	-0.01330	-0.00325	-0.01030
5.6	-0.06619	-0.00749	-0.00410	-0.00959
5.7	-0.06659	-0.00170	-0.00488	-0.00885
5.8	-0.06642	0.00403	-0.00558	-0.00810
5.9	-0.06569	0.00966	-0.00621	-0.00733
6.0	-0.06441	0.01517	-0.00676	-0.00654
6.1	-0.06259	0.02050	-0.00723	-0.00574
6.2	-0.06027	0.02562	-0.00762	-0.00493
6.3	-0.05747	0.03051	-0.00794	-0.00412
6.4	-0.05420	0.03510	-0.00819	-0.00331
6.5	-0.05052	0.03939	-0.00836	-0.00251
6.6	-0.04643	0.04334	-0.00846	-0.00172
6.7	-0.04199	0.04692	-0.00849	-0.00094
6.8	-0.03722	0.05010	-0.00845	-0.00017
6.9	-0.03217	0.05285	-0.00834	0.00057
7.0	-0.02687	0.05516	-0.00817	0.00128
7.1	-0.02138	0.05701	-0.00794	0.00196
7.2	-0.01574	0.05839	-0.00766	0.00261
7.3	-0.00998	0.05928	-0.00732	0.00322
7.4	-0.00416	0.05966	-0.00693	0.00380
7.5	0.00169	0.05954	-0.00649	0.00432
7.6	0.00750	0.05892	-0.00602	0.00480
7.7	0.01324	0.05780	-0.00550	0.00523
7.8	0.01886	0.05618	-0.00496	0.00562
7.9	0.02431	0.05408	-0.00439	0.00595
8.0	0.02956	0.05151	-0.00379	0.00623
8.1	0.03454	0.04848	-0.00317	0.00646
8.2	0.03923	0.04502	-0.00254	0.00663
8.3	0.04359	0.04115	-0.00190	0.00675
8.4	0.04757	0.03691	-0.00127	0.00681
8.5	0.05115	0.03232	-0.00063	0.00682
8.6	0.05429	0.02742	0.00000	0.00677
8.7	0.05696	0.02224	0.00063	0.00667
8.8	0.05912	0.01683	0.00124	0.00652
8.9	0.06078	0.01123	0.00183	0.00631
9.0	0.06191	0.00548	0.00239	0.00606
9.1	0.06249	-0.00037	0.00293	0.00576
9.2	0.06252	-0.00626	0.00345	0.00542
9.3	0.06198	-0.01216	0.00393	0.00504
9.4	0.06088	-0.01801	0.00436	0.00462
9.5	0.05922	-0.02376	0.00476	0.00417
9.6	0.05702	-0.02936	0.00511	0.00368
9.7	0.05427	-0.03476	0.00541	0.00317
9.8	0.05101	-0.03992	0.00567	0.00264
9.9	0.04725	-0.04478	0.00588	0.00209
10.0	0.04302	-0.04929	0.00603	0.00152

$\theta = 20^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33308	-0.00021	0.06663	-0.00003
0.2	0.33231	-0.00086	0.06652	-0.00012
0.3	0.33104	-0.00193	0.06634	-0.00028
0.4	0.32925	-0.00340	0.06608	-0.00049
0.5	0.32696	-0.00528	0.06575	-0.00077
0.6	0.32417	-0.00756	0.06536	-0.00109
0.7	0.32087	-0.01022	0.06488	-0.00147
0.8	0.31708	-0.01323	0.06434	-0.00191
0.9	0.31279	-0.01660	0.06373	-0.00239
1.0	0.30802	-0.02027	0.06304	-0.00293
1.1	0.30276	-0.02424	0.06229	-0.00351
1.2	0.29702	-0.02848	0.06146	-0.00414
1.3	0.29082	-0.03295	0.06057	-0.00480
1.4	0.28416	-0.03764	0.05961	-0.00551
1.5	0.27705	-0.04249	0.05859	-0.00625
1.6	0.26949	-0.04748	0.05750	-0.00701
1.7	0.26151	-0.05258	0.05634	-0.00780
1.8	0.25312	-0.05775	0.05512	-0.00861
1.9	0.24433	-0.06295	0.05384	-0.00943
2.0	0.23515	-0.06815	0.05251	-0.01027
2.1	0.22560	-0.07329	0.05111	-0.01111
2.2	0.21571	-0.07836	0.04965	-0.01196
2.3	0.20549	-0.08330	0.04815	-0.01280
2.4	0.19497	-0.08807	0.04659	-0.01363
2.5	0.18417	-0.09264	0.04498	-0.01446
2.6	0.17310	-0.09698	0.04333	-0.01528
2.7	0.16181	-0.10103	0.04163	-0.01604
2.8	0.15032	-0.10478	0.03989	-0.01680
2.9	0.13866	-0.10817	0.03812	-0.01753
3.0	0.12686	-0.11119	0.03631	-0.01822
3.1	0.11496	-0.11379	0.03448	-0.01887
3.2	0.10298	-0.11597	0.03261	-0.01947
3.3	0.09097	-0.11766	0.03072	-0.02003
3.4	0.07896	-0.11887	0.02882	-0.02053
3.5	0.06700	-0.11956	0.02690	-0.02098
3.6	0.05511	-0.11971	0.02496	-0.02137
3.7	0.04335	-0.11932	0.02303	-0.02169
3.8	0.03176	-0.11837	0.02109	-0.02195
3.9	0.02037	-0.11684	0.01915	-0.02214
4.0	0.00923	-0.11473	0.01722	-0.02227
4.1	-0.00162	-0.11204	0.01531	-0.02232
4.2	-0.01214	-0.10878	0.01341	-0.02229
4.3	-0.02227	-0.10494	0.01154	-0.02219
4.4	-0.03199	-0.10054	0.00969	-0.02201
4.5	-0.04124	-0.09559	0.00788	-0.02176
4.6	-0.05000	-0.09011	0.00611	-0.02143
4.7	-0.05821	-0.08411	0.00438	-0.02102
4.8	-0.06583	-0.07763	0.00270	-0.02054
4.9	-0.07285	-0.07070	0.00108	-0.01997
5.0	-0.07921	-0.06333	-0.00049	-0.01934
5.1	-0.08489	-0.05558	-0.00199	-0.01864
5.2	-0.08987	-0.04747	-0.00343	-0.01787
5.3	-0.09410	-0.03907	-0.00479	-0.01703
5.4	-0.09757	-0.03040	-0.00608	-0.01613
5.5	-0.10025	-0.02152	-0.00728	-0.01517
5.6	-0.10217	-0.01249	-0.00840	-0.01415
5.7	-0.10326	-0.00335	-0.00943	-0.01308
5.8	-0.10353	0.00583	-0.01036	-0.01198
5.9	-0.10298	0.01500	-0.01121	-0.01083
6.0	-0.10161	0.02409	-0.01195	-0.00964
6.1	-0.09943	0.03305	-0.01260	-0.00842
6.2	-0.09644	0.04182	-0.01314	-0.00718
6.3	-0.09267	0.05033	-0.01359	-0.00591
6.4	-0.08812	0.05852	-0.01393	-0.00464
6.5	-0.08283	0.06632	-0.01416	-0.00336
6.6	-0.07683	0.07369	-0.01429	-0.00209
6.7	-0.07015	0.08055	-0.01433	-0.00082
6.8	-0.06284	0.08685	-0.01426	0.00044
6.9	-0.05493	0.09254	-0.01408	0.00167
7.0	-0.04648	0.09756	-0.01381	0.00287
7.1	-0.03755	0.10187	-0.01344	0.00404
7.2	-0.02819	0.10540	-0.01298	0.00517
7.3	-0.01847	0.10815	-0.01243	0.00625
7.4	-0.00846	0.11005	-0.01179	0.00727
7.5	0.00178	0.11109	-0.01106	0.00824
7.6	0.01217	0.11124	-0.01026	0.00914
7.7	0.02263	0.11047	-0.00939	0.00997
7.8	0.03309	0.10877	-0.00845	0.01072
7.9	0.04345	0.10614	-0.00746	0.01138
8.0	0.05364	0.10258	-0.00641	0.01196
8.1	0.06358	0.09809	-0.00532	0.01245
8.2	0.07318	0.09268	-0.00419	0.01285
8.3	0.08235	0.08638	-0.00302	0.01315
8.4	0.09102	0.07921	-0.00184	0.01334
8.5	0.09910	0.07121	-0.00064	0.01344
8.6	0.10651	0.06243	0.00056	0.01343
8.7	0.11318	0.05291	0.00177	0.01333
8.8	0.11905	0.04271	0.00296	0.01312
8.9	0.12402	0.03189	0.00413	0.01280
9.0	0.12805	0.02054	0.00528	0.01239
9.1	0.13107	0.00872	0.00639	0.01188
9.2	0.13303	-0.00348	0.00745	0.01128
9.3	0.13389	-0.01597	0.00847	0.01059
9.4	0.13362	-0.02866	0.00942	0.00980
9.5	0.13217	-0.04144	0.01030	0.00894
9.6	0.12952	-0.05422	0.01111	0.00799
9.7	0.12567	-0.06688	0.01184	0.00698
9.8	0.12061	-0.07932	0.01248	0.00590
9.9	0.11436	-0.09143	0.01302	0.00476
10.0	0.10691	-0.10308	0.01348	0.00357

$\theta = 25^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33312	-0.00026	0.06664	-0.00004
0.2	0.33248	-0.00102	0.06654	-0.00015
0.3	0.33140	-0.00230	0.06639	-0.00033
0.4	0.32990	-0.00406	0.06618	-0.00058
0.5	0.32796	-0.00631	0.06590	-0.00091
0.6	0.32559	-0.00904	0.06556	-0.00130
0.7	0.32278	-0.01223	0.06516	-0.00176
0.8	0.31954	-0.01586	0.06470	-0.00228
0.9	0.31585	-0.01992	0.06417	-0.00287
1.0	0.31172	-0.02437	0.06358	-0.00352
1.1	0.30714	-0.02920	0.06293	-0.00422
1.2	0.30211	-0.03437	0.06221	-0.00498
1.3	0.29662	-0.03986	0.06143	-0.00579
1.4	0.29069	-0.04563	0.06059	-0.00666
1.5	0.28430	-0.05164	0.05968	-0.00756
1.6	0.27744	-0.05787	0.05871	-0.00850
1.7	0.27013	-0.06428	0.05767	-0.00948
1.8	0.26237	-0.07081	0.05657	-0.01049
1.9	0.25415	-0.07744	0.05540	-0.01152
2.0	0.24548	-0.08411	0.05417	-0.01257
2.1	0.23637	-0.09079	0.05287	-0.01364
2.2	0.22682	-0.09742	0.05150	-0.01472
2.3	0.21685	-0.10397	0.05007	-0.01581
2.4	0.20645	-0.11037	0.04859	-0.01689
2.5	0.19565	-0.11660	0.04703	-0.01797
2.6	0.18446	-0.12260	0.04542	-0.01903
2.7	0.17290	-0.12832	0.04375	-0.02008
2.8	0.16098	-0.13371	0.04203	-0.02110
2.9	0.14872	-0.13874	0.04024	-0.02209
3.0	0.13617	-0.14334	0.03840	-0.02305
3.1	0.12333	-0.14748	0.03652	-0.02396
3.2	0.11024	-0.15113	0.03458	-0.02483
3.3	0.09694	-0.15422	0.03260	-0.02564
3.4	0.08346	-0.15672	0.03058	-0.02640
3.5	0.06984	-0.15859	0.02852	-0.02710
3.6	0.05611	-0.15981	0.02642	-0.02772
3.7	0.04233	-0.16033	0.02430	-0.02827
3.8	0.02855	-0.16013	0.02214	-0.02874
3.9	0.01480	-0.15917	0.01997	-0.02913
4.0	0.00113	-0.15745	0.01779	-0.02944
4.1	-0.01238	-0.15493	0.01559	-0.02965
4.2	-0.02568	-0.15161	0.01338	-0.02976
4.3	-0.03873	-0.14747	0.01118	-0.02978
4.4	-0.05146	-0.14251	0.00899	-0.02969
4.5	-0.06381	-0.13673	0.00680	-0.02951
4.6	-0.07572	-0.13013	0.00464	-0.02921
4.7	-0.08713	-0.12273	0.00251	-0.02881
4.8	-0.09796	-0.11453	0.00041	-0.02831
4.9	-0.10816	-0.10556	-0.00166	-0.02769
5.0	-0.11768	-0.09585	-0.00367	-0.02696
5.1	-0.12644	-0.08542	-0.00563	-0.02613
5.2	-0.13438	-0.07433	-0.00753	-0.02519
5.3	-0.14146	-0.06260	-0.00935	-0.02415
5.4	-0.14760	-0.05030	-0.01110	-0.02300
5.5	-0.15276	-0.03747	-0.01276	-0.02175
5.6	-0.15689	-0.02420	-0.01433	-0.02041
5.7	-0.15994	-0.01052	-0.01581	-0.01898
5.8	-0.16187	0.00348	-0.01717	-0.01745
5.9	-0.16263	0.01772	-0.01842	-0.01584
6.0	-0.16221	0.03212	-0.01956	-0.01416
6.1	-0.16056	0.04659	-0.02057	-0.01241
6.2	-0.15767	0.06104	-0.02145	-0.01060
6.3	-0.15353	0.07538	-0.02219	-0.00874
6.4	-0.14814	0.08951	-0.02280	-0.00682
6.5	-0.14148	0.10332	-0.02326	-0.00487
6.6	-0.13357	0.11671	-0.02357	-0.00289
6.7	-0.12442	0.12958	-0.02373	-0.00091
6.8	-0.11407	0.14182	-0.02374	0.00110
6.9	-0.10254	0.15332	-0.02359	0.00310
7.0	-0.08988	0.16398	-0.02329	0.00509
7.1	-0.07614	0.17369	-0.02283	0.00705
7.2	-0.06137	0.18235	-0.02222	0.00898
7.3	-0.04567	0.18985	-0.02145	0.01086
7.4	-0.02911	0.19611	-0.02053	0.01269
7.5	-0.01178	0.20103	-0.01947	0.01445
7.6	0.00623	0.20452	-0.01826	0.01612
7.7	0.02480	0.20651	-0.01691	0.01771
7.8	0.04381	0.20697	-0.01542	0.01918
7.9	0.06314	0.20568	-0.01381	0.02055
8.0	0.08265	0.20273	-0.01208	0.02179
8.1	0.10221	0.19805	-0.01024	0.02289
8.2	0.12167	0.19159	-0.00830	0.02385
8.3	0.14086	0.18332	-0.00627	0.02465
8.4	0.15964	0.17324	-0.00415	0.02529
8.5	0.17784	0.16135	-0.00197	0.02576
8.6	0.19529	0.14766	0.00027	0.02606
8.7	0.21182	0.13220	0.00254	0.02617
8.8	0.22727	0.11503	0.00484	0.02609
8.9	0.24146	0.09620	0.00715	0.02582
9.0	0.25423	0.07578	0.00946	0.02535
9.1	0.26541	0.05386	0.01175	0.02469
9.2	0.27495	0.03057	0.01399	0.02382
9.3	0.28299	0.00602	0.01619	0.02276
9.4	0.28787	-0.01966	0.01832	0.02150
9.5	0.29117	-0.04629	0.02036	0.02005
9.6	0.29215	-0.07373	0.02230	0.01841
9.7	0.29071	-0.10176	0.02412	0.01660
9.8	0.28672	-0.13020	0.02580	0.01461
9.9	0.28011	-0.15884	0.02733	0.01245
10.0	0.27081	-0.18744	0.02869	0.01015

$\theta = 30^\circ$

$\rho$	$\frac{I_1(Z)}{Z}$		$\frac{I_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33317	-0.00029	0.06664	-0.00004
0.2	0.33267	-0.00115	0.06657	-0.00016
0.3	0.33183	-0.00260	0.06645	-0.00037
0.4	0.33065	-0.00459	0.06629	-0.00066
0.5	0.32913	-0.00715	0.06607	-0.00103
0.6	0.32726	-0.01026	0.06580	-0.00147
0.7	0.32502	-0.01390	0.06548	-0.00199
0.8	0.32242	-0.01805	0.06512	-0.00259
0.9	0.31945	-0.02271	0.06469	-0.00327
1.0	0.31609	-0.02784	0.06422	-0.00401
1.1	0.31233	-0.03342	0.06369	-0.00482
1.2	0.30816	-0.03943	0.06310	-0.00570
1.3	0.30357	-0.04584	0.06245	-0.00664
1.4	0.29855	-0.05262	0.06176	-0.00764
1.5	0.29307	-0.05973	0.06100	-0.00870
1.6	0.28713	-0.06715	0.06017	-0.00981
1.7	0.28072	-0.07483	0.05928	-0.01096
1.8	0.27382	-0.08273	0.05833	-0.01216
1.9	0.26643	-0.09081	0.05730	-0.01339
2.0	0.25852	-0.09903	0.05621	-0.01466
2.1	0.25010	-0.10734	0.05505	-0.01596
2.2	0.24115	-0.11569	0.05382	-0.01729
2.3	0.23167	-0.12403	0.05251	-0.01862
2.4	0.22165	-0.13230	0.05113	-0.01997
2.5	0.21110	-0.14046	0.04968	-0.02133
2.6	0.20000	-0.14846	0.04815	-0.02268
2.7	0.18837	-0.15623	0.04654	-0.02402
2.8	0.17620	-0.16372	0.04486	-0.02535
2.9	0.16351	-0.17087	0.04311	-0.02666
3.0	0.15031	-0.17762	0.04128	-0.02795
3.1	0.13661	-0.18392	0.03937	-0.02918
3.2	0.12245	-0.18969	0.03739	-0.03039
3.3	0.10782	-0.19490	0.03534	-0.03154
3.4	0.09277	-0.19946	0.03322	-0.03264
3.5	0.07732	-0.20334	0.03102	-0.03367
3.6	0.06151	-0.20647	0.02877	-0.03464
3.7	0.04538	-0.20879	0.02645	-0.03552
3.8	0.02898	-0.21026	0.02407	-0.03632
3.9	0.01235	-0.21082	0.02164	-0.03703
4.0	-0.00446	-0.21043	0.01916	-0.03763
4.1	-0.02138	-0.20903	0.01663	-0.03814
4.2	-0.03834	-0.20659	0.01406	-0.03853
4.3	-0.05529	-0.20307	0.01146	-0.03880
4.4	-0.07214	-0.19843	0.00883	-0.03895
4.5	-0.08882	-0.19265	0.00618	-0.03896
4.6	-0.10526	-0.18571	0.00351	-0.03885
4.7	-0.12136	-0.17758	0.00084	-0.03859
4.8	-0.13705	-0.16824	-0.00182	-0.03819
4.9	-0.15221	-0.15772	-0.00449	-0.03765
5.0	-0.16676	-0.14599	-0.00712	-0.03695
5.1	-0.18061	-0.13308	-0.00973	-0.03610
5.2	-0.19366	-0.11900	-0.01229	-0.03509
5.3	-0.20579	-0.10377	-0.01481	-0.03393
5.4	-0.21692	-0.08744	-0.01726	-0.03261
5.5	-0.22693	-0.07004	-0.01964	-0.03113
5.6	-0.23572	-0.05162	-0.02194	-0.02950
5.7	-0.24321	-0.03226	-0.02414	-0.02771
5.8	-0.24928	-0.01203	-0.02623	-0.02576
5.9	-0.25384	0.00900	-0.02821	-0.02368
6.0	-0.25680	0.03074	-0.03006	-0.02145
6.1	-0.25807	0.05307	-0.03176	-0.01908
6.2	-0.25756	0.07589	-0.03331	-0.01658
6.3	-0.25520	0.09908	-0.03469	-0.01396
6.4	-0.25092	0.12249	-0.03590	-0.01122
6.5	-0.24465	0.14600	-0.03692	-0.00838
6.6	-0.23634	0.16945	-0.03775	-0.00544
6.7	-0.22595	0.19268	-0.03836	-0.00243
6.8	-0.21345	0.21553	-0.03876	0.00067
6.9	-0.19881	0.23782	-0.03893	0.00381
7.0	-0.18203	0.25937	-0.03887	0.00700
7.1	-0.16311	0.27999	-0.03858	0.01022
7.2	-0.14209	0.29950	-0.03803	0.01345
7.3	-0.11898	0.31768	-0.03724	0.01667
7.4	-0.09386	0.33435	-0.03619	0.01986
7.5	-0.06678	0.34931	-0.03489	0.02301
7.6	-0.03784	0.36235	-0.03332	0.02610
7.7	-0.00714	0.37327	-0.03150	0.02910
7.8	0.02518	0.38188	-0.02942	0.03200
7.9	0.05899	0.38799	-0.02708	0.03478
8.0	0.09412	0.39140	-0.02450	0.03742
8.1	0.13038	0.39194	-0.02167	0.03988
8.2	0.16756	0.38944	-0.01860	0.04216
8.3	0.20545	0.38374	-0.01531	0.04423
8.4	0.24379	0.37470	-0.01182	0.04608
8.5	0.28232	0.36218	-0.00811	0.04766
8.6	0.32076	0.34609	-0.00422	0.04888
8.7	0.35881	0.32633	-0.00017	0.05001
8.8	0.39615	0.30281	0.00403	0.05073
8.9	0.43246	0.27551	0.00837	0.05112
9.0	0.46739	0.24440	0.01280	0.05117
9.1	0.50059	0.20949	0.01732	0.05086
9.2	0.53167	0.17082	0.02190	0.05018
9.3	0.56028	0.12846	0.02649	0.04912
9.4	0.58603	0.08251	0.03109	0.04766
9.5	0.60853	0.03309	0.03565	0.04580
9.6	0.62740	-0.01959	0.04014	0.04354
9.7	0.64226	-0.07535	0.04453	0.04086
9.8	0.65273	-0.13393	0.04878	0.03777
9.9	0.65845	-0.19505	0.05286	0.03428
10.0	0.65905	-0.25838	0.05673	0.03037

$\theta = 35^\circ$

P	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33322	-0.00031	0.06665	-0.00004
0.2	0.33288	-0.00125	0.06660	-0.00018
0.3	0.33231	-0.00282	0.06652	-0.00040
0.4	0.33149	-0.00499	0.06641	-0.00072
0.5	0.33043	-0.00778	0.06626	-0.00112
0.6	0.32911	-0.01118	0.06607	-0.00160
0.7	0.32753	-0.01516	0.06584	-0.00217
0.8	0.32566	-0.01973	0.06558	-0.00283
0.9	0.32351	-0.02486	0.06528	-0.00357
1.0	0.32104	-0.03055	0.06494	-0.00439
1.1	0.31824	-0.03676	0.06455	-0.00529
1.2	0.31508	-0.04349	0.06411	-0.00627
1.3	0.31155	-0.05070	0.06362	-0.00732
1.4	0.30763	-0.05837	0.06310	-0.00844
1.5	0.30328	-0.06648	0.06251	-0.00963
1.6	0.29849	-0.07500	0.06186	-0.01088
1.7	0.29323	-0.08388	0.06116	-0.01220
1.8	0.28748	-0.09311	0.06039	-0.01357
1.9	0.28120	-0.10263	0.05955	-0.01500
2.0	0.27437	-0.11241	0.05864	-0.01647
2.1	0.26697	-0.12240	0.05766	-0.01799
2.2	0.25898	-0.13256	0.05661	-0.01956
2.3	0.25036	-0.14285	0.05547	-0.02116
2.4	0.24109	-0.15320	0.05426	-0.02278
2.5	0.23117	-0.16356	0.05296	-0.02443
2.6	0.22055	-0.17388	0.05157	-0.02609
2.7	0.20924	-0.18410	0.05009	-0.02777
2.8	0.19721	-0.19415	0.04852	-0.02944
2.9	0.18445	-0.20397	0.04685	-0.03112
3.0	0.17095	-0.21349	0.04509	-0.03278
3.1	0.15671	-0.22264	0.04322	-0.03442
3.2	0.14174	-0.23134	0.04125	-0.03604
3.3	0.12602	-0.23953	0.03918	-0.03762
3.4	0.10957	-0.24712	0.03701	-0.03915
3.5	0.09240	-0.25405	0.03474	-0.04064
3.6	0.07453	-0.26022	0.03237	-0.04206
3.7	0.05598	-0.26556	0.02989	-0.04341
3.8	0.03679	-0.26999	0.02731	-0.04468
3.9	0.01698	-0.27342	0.02464	-0.04586
4.0	-0.00338	-0.27579	0.02187	-0.04694
4.1	-0.02426	-0.27700	0.01900	-0.04791
4.2	-0.04560	-0.27698	0.01605	-0.04876
4.3	-0.06734	-0.27564	0.01301	-0.04948
4.4	-0.08939	-0.27291	0.00989	-0.05007
4.5	-0.11169	-0.26873	0.00670	-0.05050
4.6	-0.13414	-0.26301	0.00344	-0.05078
4.7	-0.15664	-0.25570	0.00012	-0.05089
4.8	-0.17911	-0.24674	-0.00325	-0.05083
4.9	-0.20140	-0.23607	-0.00666	-0.05059
5.0	-0.22342	-0.22364	-0.01010	-0.05014
5.1	-0.24502	-0.20941	-0.01357	-0.04950
5.2	-0.26608	-0.19335	-0.01705	-0.04865
5.3	-0.28645	-0.17544	-0.02052	-0.04758
5.4	-0.30598	-0.15566	-0.02398	-0.04629
5.5	-0.32452	-0.13401	-0.02740	-0.04477
5.6	-0.34189	-0.11049	-0.03079	-0.04302
5.7	-0.35794	-0.08513	-0.03411	-0.04103
5.8	-0.37249	-0.05795	-0.03736	-0.03881
5.9	-0.38536	-0.02902	-0.04051	-0.03634
6.0	-0.39638	0.00161	-0.04355	-0.03363
6.1	-0.40535	0.03386	-0.04646	-0.03068
6.2	-0.41211	0.06764	-0.04922	-0.02750
6.3	-0.41646	0.10284	-0.05181	-0.02407
6.4	-0.41821	0.13931	-0.05421	-0.02041
6.5	-0.41721	0.17692	-0.05640	-0.01653
6.6	-0.41327	0.21550	-0.05836	-0.01244
6.7	-0.40622	0.25486	-0.06008	-0.00812
6.8	-0.39590	0.29479	-0.06152	-0.00361
6.9	-0.38217	0.33508	-0.06267	0.00108
7.0	-0.36488	0.37546	-0.06351	0.00594
7.1	-0.34390	0.41569	-0.06402	0.01095
7.2	-0.31914	0.45546	-0.06417	0.01610
7.3	-0.29049	0.49448	-0.06396	0.02136
7.4	-0.25788	0.53243	-0.06337	0.02672
7.5	-0.22125	0.56896	-0.06236	0.03213
7.6	-0.18059	0.60372	-0.06094	0.03759
7.7	-0.13588	0.63633	-0.05909	0.04306
7.8	-0.08716	0.66641	-0.05679	0.04852
7.9	-0.03448	0.69356	-0.05404	0.05392
8.0	0.02206	0.71738	-0.05082	0.05924
8.1	0.08235	0.73742	-0.04713	0.06444
8.2	0.14621	0.75328	-0.04296	0.06948
8.3	0.21345	0.76453	-0.03832	0.07433
8.4	0.28382	0.77073	-0.03321	0.07893
8.5	0.35703	0.77146	-0.02762	0.08326
8.6	0.43277	0.76630	-0.02156	0.08727
8.7	0.51064	0.75483	-0.01505	0.09092
8.8	0.59025	0.73667	-0.00810	0.09416
8.9	0.67109	0.71143	-0.00072	0.09695
9.0	0.75267	0.67874	0.00706	0.09924
9.1	0.83441	0.63829	0.01521	0.10098
9.2	0.91571	0.58977	0.02371	0.10216
9.3	0.99589	0.53292	0.03253	0.10269
9.4	1.07426	0.46753	0.04162	0.10256
9.5	1.15006	0.39341	0.05094	0.10172
9.6	1.22249	0.31044	0.06045	0.10012
9.7	1.29072	0.21857	0.07009	0.09774
9.8	1.35387	0.11781	0.07981	0.09454
9.9	1.41104	0.00822	0.08955	0.09049
10.0	1.46127	-0.11004	0.09926	0.08556

$\theta = 40^\circ$

P	$\frac{J_1(Z)}{Z}$		$\frac{J_0(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33328	-0.00033	0.06666	-0.00005
0.2	0.33310	-0.00121	0.06663	-0.00019
0.3	0.33281	-0.00295	0.06659	-0.00042
0.4	0.33238	-0.00524	0.06653	-0.00075
0.5	0.33182	-0.00818	0.06646	-0.00117
0.6	0.33110	-0.01176	0.06635	-0.00168
0.7	0.33023	-0.01599	0.06623	-0.00229
0.8	0.32917	-0.02084	0.06609	-0.00298
0.9	0.32792	-0.02631	0.06592	-0.00377
1.0	0.32644	-0.03240	0.06572	-0.00464
1.1	0.32471	-0.03909	0.06548	-0.00561
1.2	0.32271	-0.04637	0.06522	-0.00666
1.3	0.32041	-0.05422	0.06491	-0.00780
1.4	0.31777	-0.06263	0.06458	-0.00900
1.5	0.31477	-0.07158	0.06419	-0.01030
1.6	0.31138	-0.08106	0.06375	-0.01168
1.7	0.30754	-0.09102	0.06326	-0.01313
1.8	0.30323	-0.10145	0.06272	-0.01466
1.9	0.29841	-0.11233	0.06211	-0.01626
2.0	0.29304	-0.12361	0.06143	-0.01792
2.1	0.28707	-0.13527	0.06069	-0.01965
2.2	0.28047	-0.14727	0.05987	-0.02145
2.3	0.27319	-0.15956	0.05897	-0.02329
2.4	0.26519	-0.17211	0.05799	-0.02519
2.5	0.25643	-0.18486	0.05691	-0.02714
2.6	0.24687	-0.19776	0.05574	-0.02912
2.7	0.23647	-0.21075	0.05446	-0.03115
2.8	0.22519	-0.22378	0.05308	-0.03320
2.9	0.21299	-0.23678	0.05159	-0.03527
3.0	0.19983	-0.24967	0.04998	-0.03736
3.1	0.18569	-0.26239	0.04825	-0.03946
3.2	0.17053	-0.27485	0.04639	-0.04156
3.3	0.15433	-0.28698	0.04441	-0.04365
3.4	0.13707	-0.29868	0.04229	-0.04572
3.5	0.11871	-0.30987	0.04003	-0.04777
3.6	0.09927	-0.32044	0.03763	-0.04978
3.7	0.07871	-0.33030	0.03509	-0.05174
3.8	0.05705	-0.33933	0.03241	-0.05365
3.9	0.03428	-0.34743	0.02957	-0.05548
4.0	0.01044	-0.35449	0.02658	-0.05723
4.1	-0.01448	-0.36038	0.02344	-0.05889
4.2	-0.04044	-0.36499	0.02015	-0.06044
4.3	-0.06741	-0.36820	0.01672	-0.06188
4.4	-0.09533	-0.36987	0.01313	-0.06317
4.5	-0.12414	-0.36988	0.00940	-0.06433
4.6	-0.15379	-0.36810	0.00552	-0.06532
4.7	-0.18417	-0.36441	0.00151	-0.06613
4.8	-0.21521	-0.35867	-0.00264	-0.06675
4.9	-0.24680	-0.35076	-0.00690	-0.06716
5.0	-0.27881	-0.34054	-0.01129	-0.06735
5.1	-0.31112	-0.32790	-0.01579	-0.06730
5.2	-0.34357	-0.31272	-0.02039	-0.06701
5.3	-0.37601	-0.29488	-0.02508	-0.06644
5.4	-0.40825	-0.27427	-0.02985	-0.06559
5.5	-0.44011	-0.25080	-0.03467	-0.06444
5.6	-0.47138	-0.22437	-0.03954	-0.06299
5.7	-0.50183	-0.19491	-0.04444	-0.06120
5.8	-0.53122	-0.16235	-0.04934	-0.05909
5.9	-0.55930	-0.12663	-0.05424	-0.05662
6.0	-0.58580	-0.08771	-0.05910	-0.05378
6.1	-0.61044	-0.04557	-0.06391	-0.05057
6.2	-0.63292	-0.00021	-0.06863	-0.04698
6.3	-0.65293	0.04834	-0.07324	-0.04300
6.4	-0.67014	0.10007	-0.07772	-0.03862
6.5	-0.68422	0.15489	-0.08203	-0.03384
6.6	-0.69483	0.21270	-0.08614	-0.02865
6.7	-0.70160	0.27339	-0.09003	-0.02305
6.8	-0.70418	0.33681	-0.09364	-0.01705
6.9	-0.70219	0.40277	-0.09695	-0.01064
7.0	-0.69528	0.47105	-0.09993	-0.00383
7.1	-0.68306	0.54139	-0.10253	0.00336
7.2	-0.66517	0.61349	-0.10472	0.01094
7.3	-0.64124	0.68703	-0.10645	0.01887
7.4	-0.61091	0.76163	-0.10769	0.02716
7.5	-0.57385	0.83686	-0.10840	0.03579
7.6	-0.52971	0.91227	-0.10853	0.04471
7.7	-0.47818	0.98734	-0.10804	0.05390
7.8	-0.41897	1.06152	-0.10690	0.06334
7.9	-0.35183	1.13421	-0.10507	0.07299
8.0	-0.27651	1.20475	-0.10250	0.08280
8.1	-0.19282	1.27246	-0.09916	0.09274
8.2	-0.10062	1.33660	-0.09501	0.10276
8.3	0.00021	1.39637	-0.09002	0.11279
8.4	0.10973	1.45095	-0.08414	0.12279
8.5	0.22791	1.49946	-0.07737	0.13270
8.6	0.35469	1.54100	-0.06967	0.14244
8.7	0.48993	1.57461	-0.06101	0.15195
8.8	0.63341	1.59931	-0.05139	0.16115
8.9	0.78482	1.61409	-0.04077	0.16996
9.0	0.94379	1.61791	-0.02917	0.17830
9.1	1.10981	1.60972	-0.01656	0.18608
9.2	1.28231	1.58843	-0.00296	0.19319
9.3	1.46056	1.55299	0.01163	0.19957
9.4	1.64382	1.50231	0.02720	0.20510
9.5	1.83110	1.43533	0.04371	0.20968
9.6	2.02137	1.35102	0.06113	0.21321
9.7	2.21345	1.24833	0.07944	0.21558
9.8	2.40603	1.12632	0.09857	0.21668
9.9	2.59766	0.98404	0.11846	0.21641
10.0	2.78675	0.82065	0.13905	0.21467



$\theta = 45^\circ$

$\rho$	$\frac{I_1(Z)}{Z}$		$\frac{I_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33333	-0.00033	0.06667	-0.00005
0.2	0.33333	-0.00133	0.06667	-0.00019
0.3	0.33333	-0.00300	0.06667	-0.00043
0.4	0.33330	-0.00533	0.06667	-0.00076
0.5	0.33326	-0.00833	0.06667	-0.00119
0.6	0.33318	-0.01200	0.06665	-0.00171
0.7	0.33305	-0.01633	0.06663	-0.00233
0.8	0.33285	-0.02133	0.06661	-0.00305
0.9	0.33255	-0.02699	0.06658	-0.00386
1.0	0.33214	-0.03331	0.06653	-0.00476
1.1	0.33159	-0.04029	0.06647	-0.00576
1.2	0.33086	-0.04793	0.06639	-0.00686
1.3	0.32993	-0.05623	0.06629	-0.00805
1.4	0.32876	-0.06517	0.06616	-0.00932
1.5	0.32731	-0.07475	0.06600	-0.01069
1.6	0.32554	-0.08496	0.06580	-0.01216
1.7	0.32341	-0.09580	0.06556	-0.01371
1.8	0.32086	-0.10725	0.06528	-0.01536
1.9	0.31786	-0.11930	0.06494	-0.01710
2.0	0.31435	-0.13192	0.06455	-0.01892
2.1	0.31028	-0.14511	0.06409	-0.02083
2.2	0.30558	-0.15883	0.06358	-0.02282
2.3	0.30022	-0.17307	0.06298	-0.02489
2.4	0.29411	-0.18780	0.06230	-0.02705
2.5	0.28721	-0.20297	0.06153	-0.02927
2.6	0.27945	-0.21855	0.06066	-0.03157
2.7	0.27077	-0.23450	0.05969	-0.03394
2.8	0.26111	-0.25077	0.05861	-0.03637
2.9	0.25039	-0.26730	0.05741	-0.03886
3.0	0.23855	-0.28404	0.05608	-0.04140
3.1	0.22553	-0.30093	0.05462	-0.04399
3.2	0.21125	-0.31788	0.05301	-0.04662
3.3	0.19566	-0.33482	0.05125	-0.04929
3.4	0.17869	-0.35167	0.04933	-0.05198
3.5	0.16029	-0.36834	0.04725	-0.05468
3.6	0.14040	-0.38472	0.04499	-0.05740
3.7	0.11895	-0.40070	0.04255	-0.06011
3.8	0.09590	-0.41616	0.03992	-0.06281
3.9	0.07120	-0.43100	0.03710	-0.06548
4.0	0.04481	-0.44504	0.03406	-0.06812
4.1	0.01670	-0.45818	0.03081	-0.07070
4.2	-0.01317	-0.47026	0.02735	-0.07322
4.3	-0.04481	-0.48111	0.02367	-0.07566
4.4	-0.07824	-0.49056	0.01976	-0.07800
4.5	-0.11345	-0.49844	0.01562	-0.08022
4.6	-0.15043	-0.50455	0.01125	-0.08232
4.7	-0.18917	-0.50872	0.00664	-0.08426
4.8	-0.22962	-0.51072	0.00179	-0.08604
4.9	-0.27173	-0.51036	-0.00330	-0.08761
5.0	-0.31545	-0.50741	-0.00863	-0.08897
5.1	-0.36067	-0.50165	-0.01420	-0.09010
5.2	-0.40731	-0.49285	-0.01999	-0.09097
5.3	-0.45524	-0.48078	-0.02602	-0.09155
5.4	-0.50431	-0.46520	-0.03226	-0.09183
5.5	-0.55435	-0.44586	-0.03872	-0.09177
5.6	-0.60519	-0.42254	-0.04538	-0.09135
5.7	-0.65659	-0.39497	-0.05223	-0.09054
5.8	-0.70832	-0.36292	-0.05924	-0.08931
5.9	-0.76010	-0.32617	-0.06643	-0.08764
6.0	-0.81163	-0.28447	-0.07375	-0.08550
6.1	-0.86259	-0.23760	-0.08118	-0.08287
6.2	-0.91260	-0.18536	-0.08871	-0.07970
6.3	-0.96128	-0.12754	-0.09630	-0.07598
6.4	-1.00820	-0.06396	-0.10393	-0.07168
6.5	-1.05288	0.00554	-0.11156	-0.06677
6.6	-1.09483	0.08111	-0.11915	-0.06122
6.7	-1.13352	0.16286	-0.12667	-0.05503
6.8	-1.16837	0.25087	-0.13407	-0.04815
6.9	-1.19879	0.34520	-0.14130	-0.04056
7.0	-1.22413	0.44586	-0.14832	-0.03226
7.1	-1.24372	0.55282	-0.15506	-0.02321
7.2	-1.25685	0.66603	-0.16149	-0.01341
7.3	-1.26278	0.78533	-0.16752	-0.00284
7.4	-1.26074	0.91055	-0.17311	0.00850
7.5	-1.24994	1.04145	-0.17819	0.02062
7.6	-1.22954	1.17772	-0.18267	0.03352
7.7	-1.19870	1.31896	-0.18648	0.04720
7.8	-1.15656	1.46473	-0.18956	0.06164
7.9	-1.10224	1.61448	-0.19181	0.07684
8.0	-1.03484	1.76756	-0.19315	0.09278
8.1	-0.95349	1.92327	-0.19351	0.10942
8.2	-0.85727	2.08075	-0.19278	0.12674
8.3	-0.74533	2.23909	-0.19088	0.14470
8.4	-0.61678	2.39724	-0.18771	0.16325
8.5	-0.47079	2.55404	-0.18318	0.18233
8.6	-0.30656	2.70821	-0.17721	0.20187
8.7	-0.12332	2.85834	-0.16968	0.22181
8.8	0.07962	3.00290	-0.16051	0.24206
8.9	0.30290	3.14025	-0.14960	0.26252
9.0	0.54707	3.26856	-0.13687	0.28309
9.1	0.81260	3.38592	-0.12221	0.30366
9.2	1.09983	3.49026	-0.10554	0.32409
9.3	1.40898	3.57936	-0.08679	0.34426
9.4	1.74015	3.65089	-0.06598	0.36400
9.5	2.09325	3.70238	-0.04274	0.38316
9.6	2.46802	3.73121	-0.01730	0.40156
9.7	2.86404	3.73466	0.01050	0.41900
9.8	3.28062	3.70988	0.04069	0.43530
9.9	3.71686	3.65391	0.07331	0.45023
10.0	4.17161	3.56370	0.10838	0.46355

$\theta = 50^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33339	-0.00033	0.06667	-0.00005
0.2	0.33356	-0.00131	0.06670	-0.00019
0.3	0.33385	-0.00295	0.06674	-0.00042
0.4	0.33423	-0.00526	0.06680	-0.00075
0.5	0.33471	-0.00823	0.06687	-0.00117
0.6	0.33527	-0.01187	0.06695	-0.00169
0.7	0.33590	-0.01618	0.06704	-0.00231
0.8	0.33658	-0.02118	0.06714	-0.00302
0.9	0.33728	-0.02685	0.06725	-0.00383
1.0	0.33799	-0.03322	0.06737	-0.00473
1.1	0.33868	-0.04028	0.06749	-0.00574
1.2	0.33932	-0.04806	0.06760	-0.00685
1.3	0.33987	-0.05655	0.06771	-0.00805
1.4	0.34030	-0.06576	0.06780	-0.00935
1.5	0.34057	-0.07570	0.06789	-0.01076
1.6	0.34064	-0.08638	0.06795	-0.01227
1.7	0.34047	-0.09780	0.06799	-0.01389
1.8	0.33999	-0.10997	0.06801	-0.01561
1.9	0.33916	-0.12289	0.06798	-0.01744
2.0	0.33793	-0.13656	0.06792	-0.01937
2.1	0.33623	-0.15099	0.06781	-0.02141
2.2	0.33400	-0.16617	0.06765	-0.02355
2.3	0.33117	-0.18210	0.06743	-0.02581
2.4	0.32767	-0.19877	0.06713	-0.02817
2.5	0.32343	-0.21618	0.06676	-0.03063
2.6	0.31836	-0.23430	0.06630	-0.03321
2.7	0.31238	-0.25312	0.06574	-0.03588
2.8	0.30541	-0.27262	0.06508	-0.03866
2.9	0.29736	-0.29276	0.06431	-0.04154
3.0	0.28813	-0.31352	0.06341	-0.04452
3.1	0.27762	-0.33485	0.06238	-0.04761
3.2	0.26574	-0.35672	0.06120	-0.05077
3.3	0.25238	-0.37906	0.05986	-0.05403
3.4	0.23744	-0.40180	0.05835	-0.05737
3.5	0.22082	-0.42488	0.05666	-0.06079
3.6	0.20239	-0.44822	0.05478	-0.06428
3.7	0.18205	-0.47173	0.05269	-0.06783
3.8	0.15969	-0.49530	0.05038	-0.07144
3.9	0.13519	-0.51882	0.04783	-0.07509
4.0	0.10844	-0.54216	0.04504	-0.07879
4.1	0.07933	-0.56519	0.04199	-0.08250
4.2	0.04775	-0.58776	0.03866	-0.08623
4.3	0.01360	-0.60970	0.03505	-0.08996
4.4	-0.02323	-0.63082	0.03114	-0.09367
4.5	-0.06285	-0.65093	0.02692	-0.09734
4.6	-0.10593	-0.66981	0.02236	-0.10096
4.7	-0.15077	-0.68724	0.01747	-0.10451
4.8	-0.19925	-0.70295	0.01223	-0.10796
4.9	-0.25082	-0.71669	0.00662	-0.11130
5.0	-0.30555	-0.72818	0.00063	-0.11449
5.1	-0.36347	-0.73709	-0.00574	-0.11752
5.2	-0.42462	-0.74312	-0.01250	-0.12035
5.3	-0.48899	-0.74591	-0.01967	-0.12295
5.4	-0.55657	-0.74509	-0.02724	-0.12529
5.5	-0.62733	-0.74029	-0.03524	-0.12733
5.6	-0.70120	-0.73110	-0.04365	-0.12905
5.7	-0.77811	-0.71710	-0.05249	-0.13039
5.8	-0.85793	-0.69784	-0.06174	-0.13131
5.9	-0.94050	-0.67286	-0.07142	-0.13179
6.0	-1.02564	-0.64168	-0.08152	-0.13177
6.1	-1.11312	-0.60381	-0.09202	-0.13120
6.2	-1.20267	-0.55874	-0.10293	-0.13004
6.3	-1.29397	-0.50595	-0.11422	-0.12823
6.4	-1.38665	-0.44491	-0.12587	-0.12573
6.5	-1.48029	-0.37506	-0.13788	-0.12247
6.6	-1.57440	-0.29586	-0.15020	-0.11841
6.7	-1.66845	-0.20677	-0.16281	-0.11348
6.8	-1.76182	-0.10723	-0.17569	-0.10762
6.9	-1.85385	0.00330	-0.18878	-0.10078
7.0	-1.94377	0.12535	-0.20205	-0.09290
7.1	-2.03076	0.25945	-0.21543	-0.08391
7.2	-2.11392	0.40609	-0.22889	-0.07375
7.3	-2.19225	0.56575	-0.24234	-0.06236
7.4	-2.26466	0.73886	-0.25573	-0.04968
7.5	-2.32999	0.92583	-0.26896	-0.03566
7.6	-2.38696	1.12699	-0.28197	-0.02023
7.7	-2.43422	1.34265	-0.29464	-0.00333
7.8	-2.47030	1.57302	-0.30689	0.01510
7.9	-2.49362	1.81825	-0.31860	0.03509
8.0	-2.50254	2.07840	-0.32965	0.05670
8.1	-2.49527	2.35341	-0.33991	0.07998
8.2	-2.46993	2.64312	-0.34924	0.10495
8.3	-2.42455	2.94725	-0.35751	0.13165
8.4	-2.35706	3.26536	-0.36455	0.16011
8.5	-2.26526	3.59687	-0.37018	0.19034
8.6	-2.14690	3.94101	-0.37423	0.22235
8.7	-1.99960	4.29683	-0.37653	0.25614
8.8	-1.82093	4.66318	-0.37686	0.29168
8.9	-1.60836	5.03867	-0.37502	0.32896
9.0	-1.35932	5.42166	-0.37079	0.36793
9.1	-1.07116	5.81028	-0.36395	0.40854
9.2	-0.74120	6.20232	-0.35426	0.45071
9.3	-0.36674	6.59533	-0.34147	0.49435
9.4	0.05493	6.98649	-0.32534	0.53935
9.5	0.52651	7.37265	-0.30561	0.58558
9.6	1.05067	7.75027	-0.28200	0.63287
9.7	1.62999	8.11548	-0.25425	0.68105
9.8	2.26699	8.46395	-0.22209	0.72991
9.9	2.96406	8.79093	-0.18524	0.77922
10.0	3.72343	9.09124	-0.14340	0.82871

$\theta = 55^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33345	-0.00031	0.06668	-0.00004
0.2	0.33379	-0.00125	0.06673	-0.00018
0.3	0.33436	-0.00282	0.06681	-0.00040
0.4	0.33513	-0.00503	0.06693	-0.00072
0.5	0.33613	-0.00788	0.06707	-0.00112
0.6	0.33732	-0.01138	0.06724	-0.00162
0.7	0.33870	-0.01553	0.06744	-0.00221
0.8	0.34026	-0.02036	0.06767	-0.00290
0.9	0.34196	-0.02587	0.06792	-0.00368
1.0	0.34380	-0.03208	0.06819	-0.00456
1.1	0.34576	-0.03900	0.06849	-0.00554
1.2	0.34780	-0.04666	0.06880	-0.00662
1.3	0.34990	-0.05507	0.06913	-0.00781
1.4	0.35203	-0.06425	0.06946	-0.00909
1.5	0.35415	-0.07423	0.06980	-0.01049
1.6	0.35622	-0.08501	0.07014	-0.01200
1.7	0.35821	-0.09663	0.07049	-0.01362
1.8	0.36005	-0.10912	0.07082	-0.01536
1.9	0.36171	-0.12249	0.07114	-0.01721
2.0	0.36313	-0.13677	0.07145	-0.01920
2.1	0.36425	-0.15198	0.07173	-0.02130
2.2	0.36501	-0.16814	0.07198	-0.02353
2.3	0.36533	-0.18529	0.07219	-0.02589
2.4	0.36516	-0.20343	0.07236	-0.02838
2.5	0.36439	-0.22259	0.07247	-0.03101
2.6	0.36295	-0.24279	0.07252	-0.03379
2.7	0.36074	-0.26404	0.07249	-0.03670
2.8	0.35768	-0.28635	0.07238	-0.03975
2.9	0.35365	-0.30975	0.07218	-0.04296
3.0	0.34855	-0.33422	0.07187	-0.04630
3.1	0.34225	-0.35977	0.07146	-0.04980
3.2	0.33465	-0.38641	0.07091	-0.05345
3.3	0.32559	-0.41412	0.07021	-0.05725
3.4	0.31494	-0.44287	0.06936	-0.06120
3.5	0.30257	-0.47266	0.06833	-0.06530
3.6	0.28830	-0.50344	0.06712	-0.06955
3.7	0.27198	-0.53518	0.06570	-0.07395
3.8	0.25345	-0.56782	0.06406	-0.07849
3.9	0.23252	-0.60131	0.06217	-0.08317
4.0	0.20900	-0.63556	0.06003	-0.08800
4.1	0.18272	-0.67049	0.05761	-0.09295
4.2	0.15347	-0.70599	0.05489	-0.09803
4.3	0.12104	-0.74193	0.05184	-0.10323
4.4	0.08523	-0.77820	0.04846	-0.10853
4.5	0.04581	-0.81461	0.04470	-0.11393
4.6	0.00256	-0.85101	0.04055	-0.11941
4.7	-0.04474	-0.88717	0.03599	-0.12496
4.8	-0.09634	-0.92289	0.03099	-0.13057
4.9	-0.15245	-0.95790	0.02551	-0.13621
5.0	-0.21330	-0.99193	0.01954	-0.14186
5.1	-0.27915	-1.02468	0.01306	-0.14751
5.2	-0.35021	-1.05579	0.00603	-0.15312
5.3	-0.42672	-1.08490	-0.00158	-0.15866
5.4	-0.50889	-1.11160	-0.00978	-0.16411
5.5	-0.59695	-1.13544	-0.01862	-0.16943
5.6	-0.69110	-1.15591	-0.02811	-0.17458
5.7	-0.79152	-1.17253	-0.03829	-0.17952
5.8	-0.89839	-1.18469	-0.04918	-0.18421
5.9	-1.01187	-1.19179	-0.06080	-0.18860
6.0	-1.13209	-1.19315	-0.07318	-0.19263
6.1	-1.25915	-1.18808	-0.08635	-0.19625
6.2	-1.39312	-1.17578	-0.10032	-0.19939
6.3	-1.53403	-1.15546	-0.11511	-0.20199
6.4	-1.68187	-1.12623	-0.13075	-0.20399
6.5	-1.83659	-1.08717	-0.14725	-0.20529
6.6	-1.99807	-1.03729	-0.16461	-0.20583
6.7	-2.16614	-0.97555	-0.18286	-0.20550
6.8	-2.34055	-0.90085	-0.20198	-0.20424
6.9	-2.52099	-0.81203	-0.22199	-0.20193
7.0	-2.70704	-0.70787	-0.24288	-0.19848
7.1	-2.89821	-0.58710	-0.26464	-0.19377
7.2	-3.09389	-0.44841	-0.28724	-0.18769
7.3	-3.29338	-0.29039	-0.31068	-0.18011
7.4	-3.49583	-0.11164	-0.33491	-0.17093
7.5	-3.70027	0.08935	-0.35988	-0.15999
7.6	-3.90557	0.31407	-0.38557	-0.14716
7.7	-4.11045	0.56409	-0.41191	-0.13231
7.8	-4.31348	0.84099	-0.43982	-0.11528
7.9	-4.51299	1.14639	-0.46822	-0.09591
8.0	-4.70718	1.48190	-0.49402	-0.07406
8.1	-4.89397	1.84916	-0.52211	-0.04955
8.2	-5.07110	2.24979	-0.55036	-0.02222
8.3	-5.23605	2.68537	-0.57863	0.00809
8.4	-5.38603	3.15748	-0.60676	0.04156
8.5	-5.51801	3.66762	-0.63457	0.07838
8.6	-5.62863	4.21723	-0.66187	0.11870
8.7	-5.71425	4.80763	-0.68843	0.16271
8.8	-5.77091	5.44007	-0.71401	0.21058
8.9	-5.79431	6.11560	-0.73835	0.26248
9.0	-5.77979	6.83514	-0.76116	0.31857
9.1	-5.72234	7.59938	-0.78211	0.37903
9.2	-5.61656	8.40878	-0.80086	0.44398
9.3	-5.45667	9.26351	-0.81703	0.51361
9.4	-5.23649	10.16343	-0.83021	0.58802
9.5	-4.94943	11.10803	-0.83997	0.66733
9.6	-4.58847	12.09641	-0.84583	0.75165
9.7	-4.14618	13.12715	-0.84728	0.84107
9.8	-3.61470	14.19834	-0.84378	0.93562
9.9	-2.98576	15.30749	-0.83474	1.03536
10.0	-2.25064	16.45146	-0.81957	1.14028

$\theta = 60^\circ$

$\rho$	$\frac{I_1(Z)}{Z}$		$\frac{I_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33350	-0.00029	0.06669	-0.00004
0.2	0.33400	-0.00115	0.06676	-0.00016
0.3	0.33483	-0.00260	0.06688	-0.00037
0.4	0.33598	-0.00465	0.06705	-0.00066
0.5	0.33746	-0.00728	0.06726	-0.00103
0.6	0.33926	-0.01053	0.06752	-0.00150
0.7	0.34136	-0.01439	0.06782	-0.00205
0.8	0.34376	-0.01890	0.06816	-0.00269
0.9	0.34643	-0.02406	0.06855	-0.00342
1.0	0.34938	-0.02990	0.06898	-0.00424
1.1	0.35259	-0.03644	0.06945	-0.00516
1.2	0.35603	-0.04371	0.06996	-0.00618
1.3	0.35969	-0.05173	0.07050	-0.00730
1.4	0.36355	-0.06054	0.07106	-0.00852
1.5	0.36757	-0.07017	0.07167	-0.00986
1.6	0.37172	-0.08065	0.07229	-0.01131
1.7	0.37599	-0.09202	0.07295	-0.01287
1.8	0.38032	-0.10433	0.07362	-0.01456
1.9	0.38468	-0.11761	0.07431	-0.01638
2.0	0.38903	-0.13191	0.07500	-0.01833
2.1	0.39332	-0.14727	0.07571	-0.02041
2.2	0.39749	-0.16375	0.07641	-0.02263
2.3	0.40148	-0.18139	0.07711	-0.02501
2.4	0.40524	-0.20023	0.07779	-0.02754
2.5	0.40868	-0.22025	0.07846	-0.03022
2.6	0.41174	-0.24178	0.07910	-0.03308
2.7	0.41433	-0.26459	0.07971	-0.03610
2.8	0.41634	-0.28882	0.08027	-0.03931
2.9	0.41770	-0.31454	0.08077	-0.04270
3.0	0.41828	-0.34180	0.08121	-0.04628
3.1	0.41797	-0.37064	0.08158	-0.05006
3.2	0.41666	-0.40114	0.08186	-0.05404
3.3	0.41418	-0.43333	0.08204	-0.05824
3.4	0.41039	-0.46726	0.08210	-0.06266
3.5	0.40513	-0.50299	0.08203	-0.06730
3.6	0.39824	-0.54056	0.08180	-0.07218
3.7	0.38951	-0.58000	0.08142	-0.07729
3.8	0.37876	-0.62134	0.08084	-0.08264
3.9	0.36577	-0.66462	0.08006	-0.08824
4.0	0.35031	-0.70985	0.07907	-0.09410
4.1	0.33212	-0.75704	0.07781	-0.10021
4.2	0.31095	-0.80620	0.07628	-0.10659
4.3	0.28653	-0.85730	0.07445	-0.11322
4.4	0.25854	-0.91032	0.07228	-0.12013
4.5	0.22667	-0.96522	0.06976	-0.12730
4.6	0.19060	-1.02195	0.06684	-0.13474
4.7	0.14995	-1.08043	0.06350	-0.14244
4.8	0.10435	-1.14057	0.05970	-0.15040
4.9	0.05342	-1.20223	0.05540	-0.15863
5.0	-0.00327	-1.26526	0.05056	-0.16710
5.1	-0.06616	-1.32950	0.04515	-0.17582
5.2	-0.13571	-1.39473	0.03910	-0.18476
5.3	-0.21240	-1.46071	0.03239	-0.19392
5.4	-0.29673	-1.52714	0.02496	-0.20328
5.5	-0.38923	-1.59371	0.01676	-0.21283
5.6	-0.49045	-1.66003	0.00774	-0.22253
5.7	-0.60094	-1.72569	0.00215	-0.23236
5.8	-0.72129	-1.79018	0.01299	-0.24231
5.9	-0.85210	-1.85299	0.0248	-0.25231
6.0	-0.99398	-1.91348	0.03769	-0.26234
6.1	-1.14755	-1.97099	0.05168	-0.27235
6.2	-1.31347	-2.02475	0.06686	-0.28230
6.3	-1.49238	-2.07392	0.08329	-0.29212
6.4	-1.68492	-2.11756	0.10104	-0.30175
6.5	-1.89175	-2.15467	0.12017	-0.31112
6.6	-2.11352	-2.18409	0.14077	-0.32015
6.7	-2.35087	-2.20460	0.16292	-0.32877
6.8	-2.60441	-2.21329	0.18667	-0.33686
6.9	-2.87475	-2.19838	0.21209	-0.34433
7.0	-3.16246	-2.16832	0.23928	-0.35107
7.1	-3.46806	-2.12121	0.26829	-0.35695
7.2	-3.79205	-2.05498	0.29920	-0.36183
7.3	-4.13485	-1.96740	0.33209	-0.36557
7.4	-4.49680	-1.85605	0.36702	-0.36800
7.5	-4.87818	-1.71833	0.40405	-0.36895
7.6	-5.27916	-1.55146	0.44325	-0.36823
7.7	-5.69977	-1.35245	0.48467	-0.36565
7.8	-6.13996	-1.11809	0.52837	-0.36097
7.9	-6.59947	-0.84496	0.57438	-0.35397
8.0	-7.07788	-0.52944	0.62275	-0.34438
8.1	-7.57460	-0.16763	0.67350	-0.33195
8.2	-8.08880	0.24457	0.72663	-0.31638
8.3	-8.61937	0.71151	0.78217	-0.29735
8.4	-9.16495	1.23779	0.84008	-0.27454
8.5	-9.72386	1.82825	0.90036	-0.24760
8.6	-10.29405	2.48799	0.96294	-0.21616
8.7	-10.87309	3.22233	1.02776	-0.17981
8.8	-11.45812	4.03689	1.09473	-0.13815
8.9	-12.04582	4.93748	1.16373	-0.09073
9.0	-12.63232	5.93014	1.23461	-0.03708
9.1	-13.21319	7.02115	1.30721	0.02328
9.2	-13.78338	8.21698	1.38128	0.09087
9.3	-14.33714	9.52429	1.45661	0.16622
9.4	-14.86798	10.94990	1.53288	0.24990
9.5	-15.36860	12.50074	1.60975	0.34248
9.6	-15.83084	14.18387	1.68684	0.44458
9.7	-16.24554	16.00638	1.76369	0.55682
9.8	-16.60256	17.97536	1.83980	0.67985
9.9	-16.89062	20.09788	1.91458	0.81433
10.0	-17.09728		1.98740	0.96096

$\theta = 65^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33355	-0.00026	0.06670	-0.00004
0.2	0.33419	-0.00102	0.06679	-0.00015
0.3	0.33526	-0.00230	0.06694	-0.00033
0.4	0.33676	-0.00412	0.06716	-0.00058
0.5	0.33868	-0.00646	0.06743	-0.00091
0.6	0.34102	-0.00934	0.06777	-0.00133
0.7	0.34378	-0.01279	0.06816	-0.00182
0.8	0.34696	-0.01682	0.06862	-0.00239
0.9	0.35054	-0.02146	0.06913	-0.00304
1.0	0.35453	-0.02672	0.06970	-0.00378
1.1	0.35892	-0.03263	0.07034	-0.00460
1.2	0.36370	-0.03923	0.07103	-0.00552
1.3	0.36886	-0.04656	0.07177	-0.00654
1.4	0.37439	-0.05464	0.07256	-0.00766
1.5	0.38028	-0.06351	0.07342	-0.00888
1.6	0.38650	-0.07323	0.07432	-0.01021
1.7	0.39305	-0.08385	0.07528	-0.01165
1.8	0.39991	-0.09541	0.07628	-0.01322
1.9	0.40705	-0.10796	0.07734	-0.01491
2.0	0.41445	-0.12158	0.07843	-0.01674
2.1	0.42208	-0.13632	0.07957	-0.01871
2.2	0.42990	-0.15226	0.08074	-0.02082
2.3	0.43788	-0.16945	0.08194	-0.02309
2.4	0.44598	-0.18798	0.08318	-0.02552
2.5	0.45415	-0.20793	0.08445	-0.02812
2.6	0.46233	-0.22939	0.08573	-0.03091
2.7	0.47047	-0.25245	0.08704	-0.03389
2.8	0.47850	-0.27719	0.08835	-0.03706
2.9	0.48635	-0.30372	0.08966	-0.04045
3.0	0.49392	-0.33214	0.09097	-0.04407
3.1	0.50114	-0.36257	0.09226	-0.04791
3.2	0.50791	-0.39509	0.09353	-0.05200
3.3	0.51409	-0.42985	0.09477	-0.05636
3.4	0.51957	-0.46696	0.09597	-0.06098
3.5	0.52422	-0.50654	0.09711	-0.06589
3.6	0.52788	-0.54872	0.09817	-0.07111
3.7	0.53038	-0.59364	0.09916	-0.07663
3.8	0.53154	-0.64143	0.10004	-0.08249
3.9	0.53115	-0.69222	0.10080	-0.08869
4.0	0.52901	-0.74617	0.10142	-0.09525
4.1	0.52486	-0.80341	0.10189	-0.10219
4.2	0.51843	-0.86408	0.10217	-0.10952
4.3	0.50945	-0.92833	0.10224	-0.11727
4.4	0.49759	-0.99630	0.10208	-0.12544
4.5	0.48251	-1.06814	0.10165	-0.13405
4.6	0.46384	-1.14398	0.10092	-0.14313
4.7	0.44118	-1.22395	0.09986	-0.15268
4.8	0.41409	-1.30818	0.09843	-0.16273
4.9	0.38209	-1.39680	0.09660	-0.17329
5.0	0.34467	-1.48990	0.09430	-0.18438
5.1	0.30127	-1.58758	0.09151	-0.19601
5.2	0.25130	-1.68994	0.08816	-0.20821
5.3	0.19410	-1.79702	0.08420	-0.22098
5.4	0.12899	-1.90888	0.07957	-0.23433
5.5	0.05522	-2.02553	0.07422	-0.24828
5.6	-0.02802	-2.14697	0.06806	-0.26284
5.7	-0.12159	-2.27314	0.06103	-0.27802
5.8	-0.22641	-2.40397	0.05306	-0.29383
5.9	-0.34347	-2.53934	0.04405	-0.31026
6.0	-0.47382	-2.67906	0.03392	-0.32732
6.1	-0.61858	-2.82291	0.02257	-0.34501
6.2	-0.77896	-2.97060	0.00991	-0.36331
6.3	-0.95624	-3.12177	-0.00419	-0.38223
6.4	-1.15176	-3.27598	-0.01983	-0.40174
6.5	-1.36697	-3.43268	-0.03713	-0.42182
6.6	-1.60339	-3.59127	-0.05622	-0.44245
6.7	-1.86263	-3.75099	-0.07724	-0.46360
6.8	-2.14639	-3.91099	-0.10034	-0.48522
6.9	-2.45647	-4.07027	-0.12567	-0.50726
7.0	-2.79475	-4.22769	-0.15338	-0.52966
7.1	-3.16321	-4.38195	-0.18366	-0.55236
7.2	-3.56395	-4.53154	-0.21668	-0.57527
7.3	-3.99911	-4.67480	-0.25263	-0.59830
7.4	-4.47096	-4.80981	-0.29170	-0.62134
7.5	-4.98187	-4.93443	-0.33412	-0.64429
7.6	-5.53427	-5.04625	-0.38008	-0.66698
7.7	-6.13070	-5.14258	-0.42928	-0.68927
7.8	-6.77377	-5.22043	-0.48358	-0.71098
7.9	-7.46615	-5.27645	-0.54159	-0.73190
8.0	-8.21060	-5.30693	-0.60412	-0.75183
8.1	-9.00991	-5.30777	-0.67143	-0.77051
8.2	-9.86693	-5.27444	-0.74379	-0.78767
8.3	-10.78451	-5.20192	-0.82147	-0.80299
8.4	-11.76554	-5.08471	-0.90478	-0.81615
8.5	-12.81287	-4.91674	-0.99400	-0.82677
8.6	-13.92933	-4.69137	-1.08942	-0.83443
8.7	-15.11768	-4.40133	-1.19136	-0.83868
8.8	-16.38057	-4.03863	-1.30012	-0.83904
8.9	-17.72054	-3.59463	-1.41601	-0.83494
9.0	-19.13995	-3.05983	-1.53933	-0.82580
9.1	-20.64092	-2.42394	-1.67040	-0.81096
9.2	-22.22531	-1.67577	-1.80952	-0.78970
9.3	-23.89464	-0.80318	-1.95697	-0.76128
9.4	-25.65003	0.20700	-2.11305	-0.72483
9.5	-27.49213	1.36897	-2.27801	-0.67945
9.6	-29.42100	2.69813	-2.45212	-0.62414
9.7	-31.43609	4.21101	-2.63560	-0.55785
9.8	-33.53606	5.92548	-2.82864	-0.47941
9.9	-35.71870	7.86070	-3.03142	-0.38758
10.0	-37.98081	10.03727	-3.24406	-0.28099

$\theta = 70^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33359	-0.00021	0.06670	-0.00003
0.2	0.33435	-0.00086	0.06681	-0.00012
0.3	0.33563	-0.00193	0.06699	-0.00028
0.4	0.33742	-0.00346	0.06725	-0.00049
0.5	0.33975	-0.00543	0.06758	-0.00077
0.6	0.34255	-0.00787	0.06798	-0.00112
0.7	0.34590	-0.01078	0.06846	-0.00153
0.8	0.34976	-0.01419	0.06901	-0.00201
0.9	0.35415	-0.01813	0.06964	-0.00256
1.0	0.35906	-0.02262	0.07034	-0.00319
1.1	0.36451	-0.02768	0.07111	-0.00389
1.2	0.37050	-0.03334	0.07197	-0.00468
1.3	0.37702	-0.03965	0.07290	-0.00554
1.4	0.38409	-0.04664	0.07390	-0.00651
1.5	0.39171	-0.05436	0.07498	-0.00757
1.6	0.39986	-0.06286	0.07614	-0.00872
1.7	0.40857	-0.07216	0.07738	-0.00998
1.8	0.41784	-0.08239	0.07869	-0.01134
1.9	0.42765	-0.09354	0.08009	-0.01283
2.0	0.43801	-0.10571	0.08156	-0.01444
2.1	0.44893	-0.11896	0.08311	-0.01618
2.2	0.46039	-0.13338	0.08474	-0.01807
2.3	0.47238	-0.14905	0.08644	-0.02010
2.4	0.48490	-0.16605	0.08823	-0.02229
2.5	0.49793	-0.18450	0.09009	-0.02465
2.6	0.51147	-0.20448	0.09203	-0.02719
2.7	0.52550	-0.22613	0.09404	-0.02993
2.8	0.53998	-0.24955	0.09613	-0.03287
2.9	0.55489	-0.27487	0.09828	-0.03602
3.0	0.57020	-0.30224	0.10051	-0.03941
3.1	0.58588	-0.33180	0.10279	-0.04304
3.2	0.60185	-0.36370	0.10514	-0.04693
3.3	0.61809	-0.39811	0.10755	-0.05111
3.4	0.63452	-0.43522	0.11001	-0.05558
3.5	0.65107	-0.47522	0.11252	-0.06037
3.6	0.66766	-0.51829	0.11506	-0.06550
3.7	0.68419	-0.56467	0.11765	-0.07098
3.8	0.70055	-0.61457	0.12025	-0.07685
3.9	0.71662	-0.66823	0.12287	-0.08312
4.0	0.73225	-0.72591	0.12549	-0.08981
4.1	0.74728	-0.78789	0.12810	-0.09696
4.2	0.76154	-0.85444	0.13069	-0.10460
4.3	0.77483	-0.92586	0.13324	-0.11276
4.4	0.78691	-1.00249	0.13574	-0.12146
4.5	0.79754	-1.08463	0.13816	-0.13073
4.6	0.80663	-1.17266	0.14047	-0.14062
4.7	0.81327	-1.26694	0.14267	-0.15116
4.8	0.81772	-1.36784	0.14472	-0.16239
4.9	0.81936	-1.47579	0.14658	-0.17434
5.0	0.81779	-1.59120	0.14823	-0.18706
5.1	0.81251	-1.71452	0.14963	-0.20059
5.2	0.80301	-1.84620	0.15074	-0.21498
5.3	0.78869	-1.98672	0.15151	-0.23027
5.4	0.76892	-2.13658	0.15190	-0.24652
5.5	0.74298	-2.29629	0.15184	-0.26377
5.6	0.71010	-2.46639	0.15128	-0.28208
5.7	0.66941	-2.64741	0.15016	-0.30151
5.8	0.61998	-2.83991	0.14841	-0.32209
5.9	0.56076	-3.04447	0.14605	-0.34392
6.0	0.49064	-3.26167	0.14265	-0.36703
6.1	0.40836	-3.49209	0.13847	-0.39149
6.2	0.31257	-3.73634	0.13330	-0.41736
6.3	0.20180	-3.99499	0.12702	-0.44472
6.4	0.07443	-4.26866	0.11950	-0.47362
6.5	-0.07131	-4.55792	0.11062	-0.50413
6.6	-0.23733	-4.86334	0.10023	-0.53633
6.7	-0.42573	-5.18548	0.08819	-0.57027
6.8	-0.63878	-5.52485	0.07431	-0.60603
6.9	-0.87895	-5.88196	0.05841	-0.64366
7.0	-1.14892	-6.25725	0.04030	-0.68325
7.1	-1.45160	-6.65111	0.01975	-0.72486
7.2	-1.79015	-7.06388	-0.00346	-0.76854
7.3	-2.16797	-7.49577	-0.02958	-0.81435
7.4	-2.58875	-7.94694	-0.05890	-0.86236
7.5	-3.05651	-8.41743	-0.09169	-0.91262
7.6	-3.57553	-8.90714	-0.12828	-0.96516
7.7	-4.15048	-9.41580	-0.16902	-1.02003
7.8	-4.78638	-9.94299	-0.21426	-1.07726
7.9	-5.48863	-10.48806	-0.26441	-1.13687
8.0	-6.26304	-11.05014	-0.31989	-1.19887
8.1	-7.11588	-11.62807	-0.38116	-1.26326
8.2	-8.05384	-12.22039	-0.44871	-1.33002
8.3	-9.08415	-12.82531	-0.52306	-1.39910
8.4	-10.21454	-13.44406	-0.60478	-1.47048
8.5	-11.45327	-14.06370	-0.69467	-1.54404
8.6	-12.80921	-14.69138	-0.79279	-1.61969
8.7	-14.29183	-15.33197	-0.90041	-1.69731
8.8	-15.91124	-15.99453	-1.01809	-1.77672
8.9	-17.67819	-16.56184	-1.14661	-1.85772
9.0	-19.60419	-17.16427	-1.28681	-1.94007
9.1	-21.70146	-17.74572	-1.43959	-2.02348
9.2	-23.98295	-18.29855	-1.60590	-2.10761
9.3	-26.46246	-18.81400	-1.78675	-2.19205
9.4	-29.15458	-19.28214	-1.98323	-2.27634
9.5	-32.07476	-19.69171	-2.19647	-2.35995
9.6	-35.23931	-20.02997	-2.42769	-2.44227
9.7	-38.66545	-20.28259	-2.67818	-2.52259
9.8	-42.37132	-20.43345	-2.94928	-2.60012
9.9	-46.37596	-20.46447	-3.24244	-2.67396
10.0	-50.69938	-20.35539	-3.55917	-2.74309

$\theta = 75^\circ$

$\rho$	$\frac{I_1(Z)}{Z}$		$\frac{I_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33362	-0.00017	0.06671	-0.00002
0.2	0.33449	-0.00067	0.06683	-0.00010
0.3	0.33593	-0.00150	0.06704	-0.00021
0.4	0.33797	-0.00269	0.06733	-0.00038
0.5	0.34059	-0.00423	0.06770	-0.00060
0.6	0.34380	-0.00613	0.06816	-0.00087
0.7	0.34762	-0.00841	0.06870	-0.00119
0.8	0.35205	-0.01109	0.06933	-0.00157
0.9	0.35711	-0.01419	0.07005	-0.00200
1.0	0.36280	-0.01772	0.07086	-0.00250
1.1	0.36913	-0.02172	0.07175	-0.00305
1.2	0.37614	-0.02620	0.07274	-0.00367
1.3	0.38382	-0.03122	0.07383	-0.00435
1.4	0.39220	-0.03679	0.07500	-0.00512
1.5	0.40130	-0.04297	0.07628	-0.00596
1.6	0.41113	-0.04980	0.07766	-0.00688
1.7	0.42172	-0.05732	0.07914	-0.00789
1.8	0.43310	-0.06560	0.08072	-0.00898
1.9	0.44528	-0.07468	0.08242	-0.01018
2.0	0.45830	-0.08463	0.08422	-0.01148
2.1	0.47217	-0.09552	0.08614	-0.01290
2.2	0.48693	-0.10744	0.08817	-0.01444
2.3	0.50260	-0.12045	0.09035	-0.01611
2.4	0.51921	-0.13466	0.09260	-0.01792
2.5	0.53680	-0.15016	0.09501	-0.01987
2.6	0.55539	-0.16706	0.09755	-0.02198
2.7	0.57502	-0.18546	0.10022	-0.02427
2.8	0.59572	-0.20551	0.10303	-0.02674
2.9	0.61751	-0.22733	0.10598	-0.02940
3.0	0.64043	-0.25106	0.10908	-0.03228
3.1	0.66452	-0.27688	0.11231	-0.03539
3.2	0.68977	-0.30494	0.11571	-0.03874
3.3	0.71626	-0.33544	0.11927	-0.04235
3.4	0.74398	-0.36857	0.12298	-0.04624
3.5	0.77297	-0.40456	0.12686	-0.05043
3.6	0.80324	-0.44363	0.13091	-0.05495
3.7	0.83481	-0.48604	0.13513	-0.05982
3.8	0.86770	-0.53206	0.13952	-0.06507
3.9	0.90192	-0.58198	0.14409	-0.07071
4.0	0.93745	-0.63612	0.14882	-0.07679
4.1	0.97430	-0.69483	0.15375	-0.08333
4.2	1.01245	-0.75846	0.15885	-0.09037
4.3	1.05189	-0.82742	0.16414	-0.09795
4.4	1.09257	-0.90214	0.16961	-0.10609
4.5	1.13445	-0.98306	0.17525	-0.11486
4.6	1.17746	-1.07069	0.18108	-0.12428
4.7	1.22153	-1.16556	0.18708	-0.13441
4.8	1.26654	-1.26823	0.19326	-0.14530
4.9	1.31240	-1.37932	0.19959	-0.15700
5.0	1.35895	-1.49950	0.20608	-0.16957
5.1	1.40603	-1.62946	0.21273	-0.18309
5.2	1.45342	-1.76998	0.21951	-0.19760
5.3	1.50089	-1.92186	0.22641	-0.21319
5.4	1.54817	-2.08598	0.23342	-0.22993
5.5	1.59494	-2.26329	0.24052	-0.24790
5.6	1.64082	-2.45476	0.24768	-0.26719
5.7	1.68540	-2.66150	0.25488	-0.28789
5.8	1.72819	-2.88466	0.26209	-0.31010
5.9	1.76864	-3.12546	0.26927	-0.33393
6.0	1.80613	-3.38523	0.27639	-0.35949
6.1	1.83993	-3.66537	0.28340	-0.38690
6.2	1.86926	-3.96739	0.29024	-0.41628
6.3	1.89319	-4.29291	0.29686	-0.44778
6.4	1.91073	-4.64362	0.30320	-0.48154
6.5	1.92071	-5.02136	0.30917	-0.51771
6.6	1.92184	-5.42810	0.31470	-0.55646
6.7	1.91269	-5.86589	0.31969	-0.59794
6.8	1.89165	-6.33695	0.32404	-0.64237
6.9	1.85690	-6.84362	0.32763	-0.68993
7.0	1.80645	-7.38841	0.33034	-0.74082
7.1	1.73806	-7.97397	0.33200	-0.79527
7.2	1.64923	-8.60308	0.33248	-0.85351
7.3	1.53719	-9.27876	0.33157	-0.91579
7.4	1.39808	-10.00413	0.32910	-0.98237
7.5	1.23087	-10.78254	0.32483	-1.05351
7.6	1.02939	-11.61751	0.31853	-1.12953
7.7	0.79026	-12.51275	0.30992	-1.21072
7.8	0.50885	-13.47219	0.29870	-1.29741
7.9	0.18004	-14.49995	0.28455	-1.38994
8.0	-0.20181	-15.60035	0.26711	-1.48868
8.1	-0.64295	-16.77796	0.24598	-1.59400
8.2	-1.15025	-18.03754	0.22071	-1.70630
8.3	-1.73128	-19.38407	0.19083	-1.82600
8.4	-2.39438	-20.82276	0.15582	-1.95353
8.5	-3.14874	-22.35903	0.11508	-2.08937
8.6	-4.00445	-23.99854	0.06797	-2.23398
8.7	-4.97259	-25.74713	0.01380	-2.38788
8.8	-6.06534	-27.61086	-0.04820	-2.55158
8.9	-7.29609	-29.59597	-0.11887	-2.72563
9.0	-8.67950	-31.70887	-0.19912	-2.91060
9.1	-10.23163	-33.95615	-0.28997	-3.10707
9.2	-11.97010	-36.34452	-0.39251	-3.31566
9.3	-13.91421	-38.88079	-0.50794	-3.53698
9.4	-16.08504	-41.57184	-0.63758	-3.77170
9.5	-18.50570	-44.42458	-0.78285	-4.02047
9.6	-21.20141	-47.44591	-0.94531	-4.28398
9.7	-24.19974	-50.64261	-1.12667	-4.56291
9.8	-27.53080	-54.02133	-1.32877	-4.85799
9.9	-31.22746	-57.58850	-1.55363	-5.16991
10.0	-35.32554	-61.35022	-1.80345	-5.49942

$\theta = 80^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33365	-0.00011	0.06671	-0.00002
0.2	0.33459	-0.00046	0.06685	-0.00007
0.3	0.33615	-0.00103	0.06707	-0.00015
0.4	0.33837	-0.00184	0.06738	-0.00026
0.5	0.34122	-0.00290	0.06779	-0.00041
0.6	0.34473	-0.00420	0.06829	-0.00060
0.7	0.34890	-0.00577	0.06888	-0.00082
0.8	0.35375	-0.00761	0.06957	-0.00108
0.9	0.35931	-0.00975	0.07036	-0.00138
1.0	0.36558	-0.01218	0.07124	-0.00171
1.1	0.37259	-0.01495	0.07223	-0.00210
1.2	0.38036	-0.01806	0.07332	-0.00252
1.3	0.38893	-0.02154	0.07452	-0.00300
1.4	0.39831	-0.02543	0.07583	-0.00353
1.5	0.40855	-0.02974	0.07726	-0.00411
1.6	0.41968	-0.03453	0.07880	-0.00476
1.7	0.43174	-0.03982	0.08047	-0.00546
1.8	0.44477	-0.04565	0.08226	-0.00623
1.9	0.45882	-0.05207	0.08419	-0.00707
2.0	0.47393	-0.05913	0.08625	-0.00799
2.1	0.49017	-0.06689	0.08846	-0.00898
2.2	0.50757	-0.07541	0.09081	-0.01008
2.3	0.52622	-0.08474	0.09332	-0.01127
2.4	0.54616	-0.09499	0.09600	-0.01255
2.5	0.56748	-0.10620	0.09884	-0.01395
2.6	0.59024	-0.11848	0.10186	-0.01547
2.7	0.61453	-0.13191	0.10507	-0.01712
2.8	0.64043	-0.14660	0.10847	-0.01890
2.9	0.66802	-0.16267	0.11208	-0.02084
3.0	0.69741	-0.18024	0.11590	-0.02293
3.1	0.72870	-0.19943	0.11994	-0.02522
3.2	0.76198	-0.22042	0.12422	-0.02768
3.3	0.79738	-0.24334	0.12875	-0.03035
3.4	0.83502	-0.26836	0.13354	-0.03324
3.5	0.87502	-0.29570	0.13860	-0.03636
3.6	0.91753	-0.32554	0.14395	-0.03975
3.7	0.96268	-0.35812	0.14959	-0.04341
3.8	1.01062	-0.39367	0.15556	-0.04738
3.9	1.06151	-0.43248	0.16186	-0.05167
4.0	1.11551	-0.47483	0.16850	-0.05632
4.1	1.17282	-0.52104	0.17551	-0.06135
4.2	1.23361	-0.57144	0.18291	-0.06678
4.3	1.29808	-0.62643	0.19071	-0.07267
4.4	1.36643	-0.68641	0.19894	-0.07903
4.5	1.43888	-0.75182	0.20762	-0.08592
4.6	1.51565	-0.82315	0.21676	-0.09337
4.7	1.59697	-0.90092	0.22640	-0.10142
4.8	1.68310	-0.98573	0.23656	-0.11014
4.9	1.77429	-1.07818	0.24725	-0.11957
5.0	1.87080	-1.17895	0.25852	-0.12977
5.1	1.97293	-1.28880	0.27039	-0.14080
5.2	2.08095	-1.40851	0.28289	-0.15272
5.3	2.19517	-1.53898	0.29604	-0.16563
5.4	2.31589	-1.68115	0.30988	-0.17958
5.5	2.44343	-1.83605	0.32444	-0.19466
5.6	2.57811	-2.00481	0.33976	-0.21098
5.7	2.72029	-2.18867	0.35586	-0.22862
5.8	2.87029	-2.38894	0.37278	-0.24770
5.9	3.02848	-2.60708	0.39057	-0.26833
6.0	3.19520	-2.84465	0.40926	-0.29064
6.1	3.37080	-3.10338	0.42888	-0.31476
6.2	3.55566	-3.38511	0.44948	-0.34084
6.3	3.75011	-3.69186	0.47110	-0.36904
6.4	3.95451	-4.02583	0.49377	-0.39953
6.5	4.16922	-4.38940	0.51754	-0.43249
6.6	4.39455	-4.78516	0.54245	-0.46812
6.7	4.63082	-5.21593	0.56853	-0.50664
6.8	4.87833	-5.68474	0.59584	-0.54828
6.9	5.13734	-6.19492	0.62440	-0.59329
7.0	5.40808	-6.75007	0.65427	-0.64195
7.1	5.69074	-7.35409	0.68547	-0.69455
7.2	5.98545	-8.01122	0.71804	-0.75140
7.3	6.29230	-8.72608	0.75202	-0.81284
7.4	6.61127	-9.50365	0.78743	-0.87925
7.5	6.94229	-10.34935	0.82429	-0.95102
7.6	7.28516	-11.26907	0.86265	-1.02858
7.7	7.63959	-12.26918	0.90251	-1.11239
7.8	8.00512	-13.35660	0.94387	-1.20296
7.9	8.38116	-14.53884	0.98676	-1.30083
8.0	8.76691	-15.82401	1.03115	-1.40658
8.1	9.16140	-17.22096	1.07703	-1.52083
8.2	9.56537	-18.73923	1.12438	-1.64427
8.3	9.97133	-20.38919	1.17315	-1.77762
8.4	10.38344	-22.18207	1.22328	-1.92167
8.5	10.79754	-24.13001	1.27471	-2.07728
8.6	11.21103	-26.24621	1.32734	-2.24537
8.7	11.62090	-28.54492	1.38105	-2.42691
8.8	12.02357	-31.04160	1.43570	-2.62299
8.9	12.41493	-33.75299	1.49110	-2.83474
9.0	12.79018	-36.69718	1.54707	-3.06340
9.1	13.14380	-39.89378	1.60335	-3.31032
9.2	13.46943	-43.36400	1.65965	-3.57691
9.3	13.75978	-47.13078	1.71564	-3.86475
9.4	14.00652	-51.21893	1.77094	-4.17549
9.5	14.20015	-55.65530	1.82510	-4.51093
9.6	14.32986	-60.46889	1.87759	-4.87302
9.7	14.38337	-65.69107	1.92784	-5.26382
9.8	14.34675	-71.35574	1.97517	-5.68559
9.9	14.20428	-77.49952	2.01881	-6.14074
10.0	13.93814	-84.16196	2.05790	-6.63185



$\theta = 85^\circ$

P	$\frac{I_1(Z)}{Z}$		$\frac{I_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333	0.00000	0.06667	0.00000
0.1	0.33366	-0.00006	0.06671	-0.00001
0.2	0.33465	-0.00023	0.06685	-0.00003
0.3	0.33629	-0.00052	0.06709	-0.00007
0.4	0.33861	-0.00094	0.06742	-0.00013
0.5	0.34161	-0.00147	0.06784	-0.00021
0.6	0.34530	-0.00214	0.06837	-0.00030
0.7	0.34969	-0.00293	0.06899	-0.00042
0.8	0.35480	-0.00387	0.06972	-0.00055
0.9	0.36067	-0.00496	0.07055	-0.00070
1.0	0.36730	-0.00621	0.07148	-0.00087
1.1	0.37473	-0.00762	0.07252	-0.00107
1.2	0.38298	-0.00921	0.07368	-0.00128
1.3	0.39210	-0.01100	0.07495	-0.00153
1.4	0.40212	-0.01299	0.07635	-0.00180
1.5	0.41307	-0.01521	0.07787	-0.00210
1.6	0.42503	-0.01768	0.07952	-0.00243
1.7	0.43802	-0.02041	0.08130	-0.00279
1.8	0.45211	-0.02342	0.08322	-0.00319
1.9	0.46735	-0.02675	0.08530	-0.00362
2.0	0.48381	-0.03041	0.08752	-0.00410
2.1	0.50157	-0.03445	0.08991	-0.00461
2.2	0.52069	-0.03889	0.09248	-0.00518
2.3	0.54127	-0.04377	0.09522	-0.00580
2.4	0.56340	-0.04914	0.09815	-0.00647
2.5	0.58717	-0.05503	0.10128	-0.00720
2.6	0.61268	-0.06150	0.10462	-0.00799
2.7	0.64006	-0.06859	0.10817	-0.00886
2.8	0.66942	-0.07637	0.11197	-0.00979
2.9	0.70090	-0.08490	0.11600	-0.01081
3.0	0.73464	-0.09425	0.12030	-0.01192
3.1	0.77080	-0.10451	0.12489	-0.01313
3.2	0.80954	-0.11575	0.12976	-0.01443
3.3	0.85104	-0.12806	0.13494	-0.01585
3.4	0.89550	-0.14155	0.14045	-0.01739
3.5	0.94311	-0.15633	0.14631	-0.01907
3.6	0.99412	-0.17253	0.15255	-0.02088
3.7	1.04875	-0.19026	0.15917	-0.02285
3.8	1.10727	-0.20968	0.16622	-0.02499
3.9	1.16996	-0.23096	0.17372	-0.02731
4.0	1.23712	-0.25427	0.18169	-0.02984
4.1	1.30907	-0.27978	0.19016	-0.03258
4.2	1.38617	-0.30772	0.19918	-0.03555
4.3	1.46878	-0.33832	0.20876	-0.03877
4.4	1.55732	-0.37183	0.21895	-0.04227
4.5	1.65222	-0.40851	0.22980	-0.04607
4.6	1.75396	-0.44868	0.24133	-0.05020
4.7	1.86303	-0.49266	0.25361	-0.05467
4.8	1.98000	-0.54083	0.26667	-0.05953
4.9	2.10543	-0.59355	0.28057	-0.06482
5.0	2.23997	-0.65128	0.29537	-0.07055
5.1	2.38429	-0.71449	0.31112	-0.07677
5.2	2.53914	-0.78369	0.32789	-0.08353
5.3	2.70530	-0.85945	0.34574	-0.09087
5.4	2.88363	-0.94240	0.36476	-0.09883
5.5	3.07504	-1.03322	0.38502	-0.10748
5.6	3.28053	-1.13265	0.40661	-0.11688
5.7	3.50116	-1.24151	0.42961	-0.12708
5.8	3.73808	-1.36069	0.45412	-0.13817
5.9	3.99254	-1.49118	0.48025	-0.15021
6.0	4.26585	-1.63403	0.50810	-0.16329
6.1	4.55946	-1.79043	0.53780	-0.17750
6.2	4.87493	-1.96167	0.56947	-0.19293
6.3	5.21392	-2.14914	0.60325	-0.20969
6.4	5.57822	-2.35440	0.63929	-0.22791
6.5	5.96979	-2.57913	0.67774	-0.24770
6.6	6.39070	-2.82517	0.71877	-0.26920
6.7	6.84321	-3.09454	0.76255	-0.29258
6.8	7.32976	-3.38948	0.80929	-0.31797
6.9	7.85294	-3.71239	0.85919	-0.34557
7.0	8.41559	-4.06593	0.91247	-0.37556
7.1	9.02074	-4.45302	0.96937	-0.40816
7.2	9.67167	-4.87686	1.03013	-0.44359
7.3	10.37190	-5.34090	1.09504	-0.48210
7.4	11.12523	-5.84899	1.16439	-0.52356
7.5	11.93577	-6.40530	1.23848	-0.56896
7.6	12.80792	-7.01442	1.31766	-0.61896
7.7	13.74646	-7.68137	1.40228	-0.67275
7.8	14.75650	-8.41163	1.49273	-0.73123
7.9	15.84357	-9.21123	1.58942	-0.79483
8.0	17.01361	-10.08676	1.69279	-0.86397
8.1	18.27306	-11.04543	1.80333	-0.93917
8.2	19.62881	-12.09515	1.92153	-1.02093
8.3	21.08831	-13.24457	2.04794	-1.10986
8.4	22.65958	-14.50318	2.18314	-1.20659
8.5	24.35125	-15.88135	2.32777	-1.31178
8.6	26.17264	-17.39045	2.48249	-1.42620
8.7	28.13375	-19.04294	2.64802	-1.55066
8.8	30.24539	-20.85246	2.82514	-1.68604
8.9	32.51917	-22.83392	3.01466	-1.83331
9.0	34.96762	-25.00370	3.21748	-1.99353
9.1	37.60420	-27.37970	3.43455	-2.16784
9.2	40.44342	-29.98154	3.66688	-2.35750
9.3	43.50090	-32.83069	3.91556	-2.56384
9.4	46.79344	-35.95071	4.18176	-2.78837
9.5	50.33913	-39.36734	4.46673	-3.03268
9.6	54.15743	-43.10881	4.77181	-3.29853
9.7	58.26929	-47.20603	5.09844	-3.58784
9.8	62.69725	-51.69283	5.44816	-3.90269
9.9	67.46554	-56.60631	5.82261	-4.24535
10.0	72.60022	-61.98704	6.22356	-4.61829

$\theta = 90^\circ$

$\rho$	$\frac{J_1(Z)}{Z}$		$\frac{J_2(Z)}{Z^2}$	
	REAL	IMAGINARY	REAL	IMAGINARY
0.0	0.33333		0.06667	
0.1	0.33367		0.06671	
0.2	0.33467		0.06686	
0.3	0.33633		0.06710	
0.4	0.33870		0.06743	
0.5	0.34174		0.06786	
0.6	0.34549		0.06840	
0.7	0.34995		0.06903	
0.8	0.35515		0.06977	
0.9	0.36113		0.07061	
1.0	0.36788		0.07156	
1.1	0.37545		0.07262	
1.2	0.38387		0.07380	
1.3	0.39317		0.07509	
1.4	0.40341		0.07652	
1.5	0.41461		0.07807	
1.6	0.42685		0.07976	
1.7	0.44016		0.08158	
1.8	0.45461		0.08355	
1.9	0.47026		0.08568	
2.0	0.48719		0.08796	
2.1	0.50547		0.09041	
2.2	0.52519		0.09305	
2.3	0.54644		0.09587	
2.4	0.56933		0.09889	
2.5	0.59395		0.10211	
2.6	0.62043		0.10556	
2.7	0.64889		0.10924	
2.8	0.67947		0.11317	
2.9	0.71231		0.11736	
3.0	0.74759		0.12183	
3.1	0.78547		0.12660	
3.2	0.82615		0.13168	
3.3	0.86982		0.13709	
3.4	0.91671		0.14286	
3.5	0.96705		0.14900	
3.6	1.02110		0.15555	
3.7	1.07914		0.16253	
3.8	1.14147		0.16996	
3.9	1.20843		0.17788	
4.0	1.28036		0.18634	
4.1	1.35764		0.19534	
4.2	1.44068		0.20493	
4.3	1.52993		0.21516	
4.4	1.62588		0.22607	
4.5	1.72905		0.23770	
4.6	1.84001		0.25011	
4.7	1.95937		0.26334	
4.8	2.08780		0.27747	
4.9	2.22600		0.29256	
5.0	2.37477		0.30865	
5.1	2.53495		0.32584	
5.2	2.70744		0.34420	
5.3	2.89326		0.36381	
5.4	3.09345		0.38476	
5.5	3.30920		0.40716	
5.6	3.54178		0.43110	
5.7	3.79253		0.45670	
5.8	4.06294		0.48410	
5.9	4.35464		0.51339	
6.0	4.66935		0.54474	
6.1	5.00898		0.57830	
6.2	5.37559		0.61422	
6.3	5.77140		0.65269	
6.4	6.19884		0.69390	
6.5	6.66052		0.73805	
6.6	7.15930		0.78537	
6.7	7.69829		0.83609	
6.8	8.28084		0.89047	
6.9	8.91060		0.94879	
7.0	9.59155		1.01135	
7.1	10.32799		1.07847	
7.2	11.12461		1.15050	
7.3	11.98649		1.22782	
7.4	12.91916		1.31084	
7.5	13.92863		1.40000	
7.6	15.02143		1.49577	
7.7	16.20467		1.59867	
7.8	17.48606		1.70924	
7.9	18.87401		1.82810	
8.0	20.37764		1.95588	
8.1	22.00689		2.09330	
8.2	23.77255		2.24109	
8.3	25.68637		2.40009	
8.4	27.76115		2.57118	
8.5	30.01080		2.75531	
8.6	32.45045		2.95352	
8.7	35.09659		3.16693	
8.8	37.96715		3.39674	
8.9	41.08166		3.64428	
9.0	44.46136		3.91095	
9.1	48.12942		4.19829	
9.2	52.11102		4.50797	
9.3	56.43362		4.84177	
9.4	61.12710		5.20165	
9.5	66.22403		5.58971	
9.6	71.75989		6.00824	
9.7	77.77330		6.45970	
9.8	84.30637		6.94679	
9.9	91.40497		7.47239	
10.0	99.11909		8.03966	

