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Office of Naval Research

Contract Nonr. 736(000) Project Nr. 330-027

Technical Report No. 9

August 15, 1954

Tables of Scattering Functions for Spherical Colloidal Particles III.

(ρ = 8.0(1.0) 15.0; m = 1.05, 1.10, 1.30)

Computation Laboratory

Wayne University

Submitted by

W. Heller, Project Director

Chemistry Department, Wayne University

Detroit, Michigan

1954

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Research on the Size and Shape of
Large Molecules and Colloidal
Particles

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Introductory Remarks

With the present set of primary scattering functions, the entire field of light scattering by spherical particles in a liquid medium is covered within the range of particle sizes where light scattering is of interest as a tool. Light scattering by spherical particles in a gaseous medium is completely covered by a parallel investigation under the direction of Dr. Sliepcevich at the University of Michigan. The application of the Mie equations in the form of practically useful quantities, which had been due for 45 years, has therefore been completed, by two independant projects, which, curiously, were not aware of each others existence until very recently, inspite of their proximity.

Later this year, the present material will be integrated with that brought in the Technical Reports 2 and 3 to form a single revised Report under suitable change of page numbers and under elimination of textual material not needed or duplicated.

The machine computation was carried out by Mr. James McCarty and Mr. Lyle Langdon of the Computation Laboratory. Proof reading and supervision of the assembly of the mimeographed material was carried out by Mr. R. Tabibian and Mr. T. Pugh.

W. Holler

m = 1.05

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n\rvert^2/2n+1$	$\lvert b_n\rvert^2/2n+1$
			$\alpha = 8$			
1	.555727	−.246242	−.505669	.196037	.492485	.392062
2	−.274985	.103534	.303492	−.131087	.621192	.786505
3	.197619	−.077124	−.185674	.066724	.925468	.800682
4	−.142594	.050923	.136482	−.046113	1.018441	.922257
5	.100273	−.029835	−.115504	.040933	.895053	1.227984
6	−.068650	.016048	.071832	−.017670	.674029	.742177
7	.035071	−.004670	−.026873	.002723	.261527	.152486
8	−.012008	.000611	.006670	−.000188	.044058	.013565
9	.002957	−.000041	−.001258	.000007	.003728	.000674
10	−.000563	.000001	.000188	−.000000	.000182	.000020
11	.000085	.000000	−.000022	.000000	.000005	.000000
12	−.000009		.000001		.000000	
13	.000000		.000000			
			$\alpha = 9$			
1	.577038	−.270596	−.589035	.285434	.541185	.570854
2	−.325846	.156842	.309120	−.137255	.941056	.823532
3	.208004	−.087149	−.226572	.107980	1.045774	1.295738
4	−.163406	.070254	.150891	−.058084	1.405075	1.161660
5	.122908	−.047255	−.120868	.045460	1.417648	1.363822
6	−.091086	.029619	.103610	−.039781	1.244012	1.670801
7	.063286	−.015879	−.065685	.017202	.889277	.963365
8	−.032710	.004617	.025629	−.002815	.332462	.202701
9	.011589	−.000638	−.006772	.000217	.057425	.019567
10	−.003029	.000048	.001382	−.000010	.005287	.001100
11	.000622	−.000002	−.000229	.000000	.000293	.000039
12	−.000104	.000000	.000030	.000000	.000010	.000000
13	.000013		−.000002		.000000	
14	−.000001		.000000			
			$\alpha = 10$			
1	.612539	−.317172	−.641298	.361089	.634345	.722144
2	−.348165	.187647	.338759	−.174064	1.125883	1.044367
3	.237203	−.121823	−.234482	.118195	1.461852	1.418309
4	−.171759	.079653	.182910	−.093900	1.593048	1.878007
5	.140340	−.065317	−.129264	.053272	1.959510	1.598172
6	−.109119	.044970	.109322	−.045176	1.888736	1.897407
7	.083934	−.029536	−.094432	.038918	1.654055	2.179423
8	−.058926	.015750	.060884	−.016892	1.134023	1.216285
9	.030799	−.004592	−.024645	.002914	.413292	.262308
10	−.011256	.000665	.006860	−.000246	.073226	.027140
11	.003091	−.000054	−.001496	.000012	.007237	.001696
12	−.000677	.000002	.000269	−.000000	.000447	.000070
13	.000121	.000000	−.000040	.000000	.000018	.000001
14	−.000017		.000004		.000000	.000000
15	.000002		.000000			
16	.000000					

m = 1.05

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n\rvert^{2/2n+1}$	$\lvert b_n\rvert^{2/2n+1}$
			$\alpha = 11$			
1	-.720815	-.541743	.700190	.481114	1.083481	.962201
2	.393450	.279389	-.401534	-.304724	1.676336	1.828346
3	-.281051	-.213407	.279549	.208320	2.560874	2.499846
4	.219556	.175680	-.216824	-.164754	3.513580	3.295060
5	-.178634	-.141943	.181737	.158987	4.258295	4.769627
6	.153712	.136258	-.152376	-.127298	5.722841	5.346491
7	-.133893	-.128973	.133234	.120019	7.222475	6.721057
8	.117894	.125032	-.117061	-.133660	9.002341	9.623544
9	-.104094	-.123184	.102915	.129238	11.086589	11.631467
10	.092754	.118026	-.093517	-.114754	12.982881	12.623008
11	-.080571	-.120339	.084354	.109037	15.884801	14.392994
12	.035832	.151803	-.062671	-.130069	23.681312	20.290759
13	.072126	-.056808	-.057021	.121620	10.339068	22.134877
14	-.019272	.002743	.036298	-.010304	.576112	2.163927
15	.003791	-.000111	-.008430	.000552	.026702	.132587
16	-.000632	.000003	.001691	-.000023	.000895	.006412
17	.000088	.000000	-.000281	.000000	.000020	.000211
18	-.000009		.000036	.000000	.000000	.000000
			$\alpha = 12$			
1	.694140	-.465449	-.700105	.480671	.930889	.961338
2	-.388709	.266168	.380510	-.246719	1.596988	1.480292
3	.261771	-.162814	-.271554	.185197	1.953730	2.222356
4	-.206299	.134961	.196531	-.115444	2.699228	2.308848
5	.159306	-.092539	-.164447	.102221	2.776150	3.066654
6	-.130765	.071928	.133517	-.076485	3.020978	3.212359
7	.110754	-.058618	-.103185	.048534	3.282611	2.717918
8	-.090686	.042459	.092726	-.044936	3.057088	3.235447
9	.073258	-.029540	-.080854	.037655	2.658576	3.388955
10	-.052353	.015634	.053749	-.016555	1.719826	1.821088
11	.027965	-.004609	-.023087	.003114	.608442	.411083
12	-.010740	.000722	.007005	-.000306	.112744	.047825
13	.003192	-.000068	-.001700	.000019	.012503	.003545
14	-.000777	.000004	.000346	-.000000	.000918	.000182
15	.000158	-.000000	-.000060	.000000	.000046	.000006
16	-.000027	.000000	.000008		.000001	.000000
17	.000004		-.000001		.000000	
18	.000000		.000000			

m = 1.05

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n\rvert^2/2n+1$	$\lvert b_n\rvert^2/2n+1$
			$\alpha = 13$			
1	-.017313	-1.499800	-.044305	1.498691	2.999599	2.997381
2	-.032516	.832063	-.006657	-.833280	4.992379	4.999680
3	.003274	-.583314	-.031188	.581661	6.999778	6.979930
4	-.026310	.448457	.010478	-.449755	8.969137	8.995117
5	.022915	-.365229	-.023787	.365117	10.956877	10.953534
6	-.022804	.307835	.033700	-.305812	12.929096	12.844134
7	.034491	-.263341	-.022368	.265976	14.747141	14.894682
8	-.036843	.230214	.036045	-.230474	16.575443	16.594177
9	.040534	-.203026	-.049269	.198918	18.272348	17.902607
10	-.044583	.179863	.043967	-.180181	19.784952	19.819926
11	.048719	-.159357	-.040722	.164147	21.035130	21.667425
12	-.060569	.132594	.054021	-.139310	20.684765	21.732373
13	.073004	-.087443	-.071625	.093541	15.914628	17.024557
14	-.061221	.037102	.063805	-.042629	7.791408	8.952073
15	.034322	-.009867	-.039963	.013835	2.368317	3.320553
16	-.013860	.001604	.019401	-.003183	.436300	.865813
17	.004039	-.000142	-.007156	.000449	.043691	.137446
18	-.000866	.000006	.001940	-.000034	.002373	.011906
19	.000145	-.000000	-.000399	.000001	.000078	.000590
20	-.000020	.000000	.000065	.000000	.000001	.000018
			$\alpha = 14$			
1	.743764	-.652028	-.731360	.583383	1.304016	1.166763
2	-.405081	.318402	.412663	-.358225	1.910412	2.149352
3	.287501	-.242303	-.281967	.216573	2.907625	2.598855
4	-.217112	.165715	.220203	-.178550	3.314290	3.570974
5	.176269	-.132700	-.176484	.133620	3.981009	4.008596
6	-.148248	.110198	.144496	-.099294	4.628345	4.170370
7	.123115	-.081089	-.127471	.092814	4.541007	5.197634
8	-.106579	.067256	.106165	-.066353	4.842473	4.777428
9	.092323	-.054384	-.087552	.046585	4.894616	4.192728
10	-.078636	.041298	.080880	-.044751	4.542786	4.922632
11	.065497	-.029642	-.071132	.036792	3.912824	4.856626
12	-.047570	.015646	.048660	-.016460	2.440776	2.567769
13	.025951	-.004685	-.021982	.003329	.852671	.605878
14	-.010368	.000782	.007118	-.000367	.164307	.077206
15	.003276	-.000083	-.001876	.000027	.019950	.006544
16	-.000865	.000006	.000422	-.000001	.001676	.000399
17	.000195	-.000000	-.000082	.000000	.000102	.000018
18	-.000037	.000000	.000014		.000004	.000000
19	.000006		-.000002		.000000	
20	-.000000		.000000			
21	.000000					

m = 1.05

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n \rvert^2/2n+1$	$\lvert b_n \rvert^2/2n+1$
			$\alpha = 15$			
1	.727238	−.566249	−.728137	.569418	1.132455	1.138807
2	−.404528	.316159	.401507	−.304684	1.896933	1.828081
3	.278097	−.203642	−.283074	.221024	2.443665	2.652293
4	−.217426	.166720	.211215	−.147318	3.334401	2.946360
5	.170464	−.115704	−.176053	.132038	3.471113	3.961118
6	−.144767	.100007	.141950	−.093092	4.200283	3.909865
7	.122641	−.080073	−.120579	.075613	4.484108	4.234343
8	−.102609	.059664	.107873	−.070083	4.295794	5.045985
9	.089684	−.049872	−.087308	.046161	4.488525	4.156331
10	−.077092	.039162	.072863	−.033760	4.307904	3.713628
11	.065082	−.029171	−.068579	.033389	3.850583	4.407413
12	−.052556	.019632	.058252	−.025091	3.062601	3.914281
13	.034569	−.008547	−.034514	.008511	1.555538	1.549083
14	−.014758	.001594	.010507	−.000803	.334880	.168736
15	.002226	−.000038	.000767	.000004	.009213	.001093
16	.002621	.000056	−.003821	−.000120	.015410	.032744
17	−.003763	−.000123	.004038	.000142	.037938	.043668
18	.003940	.000143	−.003711	−.000127	.049135	.043585
19	−.005948	−.000345	.003879	.000146	.131386	.055784
20	−.002319	.000055	−.030639	−.010809	.023144	4.539911
21	.000245	−.000000	−.000743	.000005	.000299	.002744
22	−.000036	.000000	.000105	−.000000	.000007	.000063

m = 1.10

			$\alpha = 8$			
1	.747653	−.812392	−.7480318	.690859	1.624751	1.381714
2	−.415288	.380387	.4166789	−.422733	2.282325	2.536374
3	.289271	−.254333	−.2902797	.282465	3.051979	3.149552
4	−.222199	.189151	.2136183	−.154238	3.783016	3.084743
5	.170608	−.116138	−.1786752	.142007	3.484146	4.260186
6	−.128055	.067813	.1393501	−.087329	2.848122	3.667802
7	.074275	−.022470	−.0641599	.016367	1.258341	.916563
8	−.026011	.002900	.0155565	−.001029	.208801	.074089
9	.006204	−.000182	−.0027993	.000037	.016411	.003340
10	−.001149	.000006	.0004123	−.000000	.000760	.000097
11	.000172	−.000000	−.0000505	.000000	.000022	.000001
12	−.000020	.000000	.0000048		.000000	.000000
13	.000001		.0000000			
14	.000000					

m = 1.10

n	R(A_n)	I(A_n)	R(B_n)	I(B_n)	$\lvert a_n \rvert^{2/2n+1}$	$\lvert b_n \rvert^{2/2n+1}$
			$\alpha = 9$			
1	.744196	−.843666	−.716669	.971416	1.687292	1.942794
2	−.403153	.522119	.415919	−.444443	3.132695	2.666658
3	.291593	−.302306	−.286278	.347725	3.627640	4.172668
4	−.225028	.228771	.225013	−.223451	4.575385	4.469020
5	.183082	−.172685	−.179695	.146803	5.180564	4.404085
6	−.149210	.113647	.153825	−.137223	4.773149	5.763368
7	.116789	−.068336	−.125343	.086632	3.826846	4.851409
8	−.069922	.022922	.062040	−.017605	1.650433	1.267603
9	.025447	−.003110	−.016071	.001229	.279935	.110661
10	−.006408	.000215	.003113	−.000050	.023684	.005586
11	.001278	−.000009	−.000501	.000001	.001238	.000190
12	−.000209	.000000	.000067	.000000	.000042	.000004
13	.000028	.000000	−.000007	.000000	.000000	.000000
14	−.000002		.000000			
15	.000000					
			$\alpha = 10$			
1	.681848	−1.062489	−.692755	1.037886	2.124956	2.075773
2	−.394590	.550623	.378930	−.589975	3.303717	3.539833
3	.269348	−.403579	−.284351	.356921	4.842925	4.283020
4	−.221963	.262214	.211386	−.302163	5.244261	6.043247
5	.181404	−.210189	−.182731	.198706	6.305653	5.961174
6	−.154703	.160986	.154186	−.141324	6.761415	5.935602
7	.132155	−.111887	−.133959	.133119	6.265728	7.454675
8	−.107430	.069019	.113775	−.086404	4.969419	6.221109
9	.066454	−.023533	−.060314	.018920	2.117980	1.702865
10	−.025013	.003333	.016546	−.001444	.366627	.158854
11	.006604	−.000250	−.003413	.000066	.033073	.008825
12	−.001402	.000012	.000592	−.000002	.001913	.000342
13	.000249	−.000000	−.000087	.000000	.000076	.000009
14	−.000037	.000000	.000011		.000002	.000000
15	.000003		−.000001		.000000	
16	.000000		.000000			

m = 1.10

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n \rvert^{2/2n+1}$	$\lvert b_n \rvert^{2/2n+1}$
			α = 11			
1	.585373	-1.218964	-.642205	1.137749	2.437926	2.275461
2	-.357547	.630813	.339140	-.658766	3.784878	3.952598
3	.253033	-.436731	-.251065	.440120	5.240750	5.281410
4	-.196020	.335485	.208356	-.310157	6.709707	6.203137
5	.175408	-.236719	-.161896	.269420	7.101560	8.082585
6	-.149342	.195418	.152511	-.181479	3.207537	7.622120
7	.132753	-.152050	-.133912	.136842	8.514817	7.663200
8	-.117820	.110354	.117515	-.129436	7.945486	9.319386
9	.099301	-.069736	-.103857	.086449	6.276261	7.780485
10	-.063626	.024280	.058879	-.020320	2.670870	2.235261
11	.024706	-.003573	-.017009	.001675	.471663	.221161
12	-.006788	.000287	.003698	-.000085	.044899	.013317
13	.001519	-.000015	-.000683	.000003	.002830	.000573
14	-.000287	.000000	.000109	.000000	.000125	.000018
15	.000046	.000000	-.000014		.000003	.000000
16	-.000006		.000001		.000000	
17	.000001		.000000			
18	.000000					
			α = 12			
1	.563076	-1.245604	-.460359	1.342228	2.491200	2.684448
2	-.267785	.735991	.322713	-.680350	4.415949	4.082100
3	.229877	-.471243	-.199170	.504791	5.654902	6.057461
4	-.172569	.369472	.181480	-.358115	7.389418	7.162316
5	.148772	-.290528	-.156544	.278767	8.715841	8.362997
6	-.141147	.218326	.126461	-.244029	9.169714	10.249231
7	.124595	-.183143	-.129388	.168566	10.256041	9.439696
8	-.115023	.144848	.117138	-.132848	10.429098	9.565106
9	.105535	-.108996	-.103592	.126065	9.809700	11.345904
10	-.092181	.070549	.095043	-.086590	7.760446	9.524908
11	.061226	-.025128	-.057666	.021813	3.316952	2.879428
12	-.024476	.003828	.017450	-.001923	.597191	.300000
13	.006958	-.000327	-.003974	.000106	.059523	.019377
14	-.001630	.000019	.000777	-.000004	.004043	.000918
15	.000326	-.000000	-.000131	.000000	.000198	.000032
16	-.000055	.000000	.000019	.000000	.000006	.000000
17	.000008		-.000002		.000000	
18	-.000001		.000000			
19	.000000					

m= 1.10

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n\rvert^{2/2n+1}$	$\lvert b_n\rvert^{2/2n+1}$
			$\alpha = 13$			
1	.367058	−1.404087	−.421592	1.370378	2.808169	2.740746
2	−.250433	.749742	.205156	−.779376	4.498453	4.676246
3	.150902	−.541284	−.191899	.511346	6.495411	6.136152
4	−.156483	.386678	.125433	−.413130	7.733558	8.262613
5	.120249	−.321759	−.136179	.306142	9.652777	9.184259
6	−.115094	.258236	.118205	−.254691	10.845950	10.697023
7	.114422	−.203578	−.099758	.223328	11.400400	12.506385
8	−.104753	.172562	.110964	−.158482	12.424510	11.410754
9	.100231	−.138766	−.102919	.129149	12.488959	11.623445
10	−.094695	.107610	.091485	−.122796	11.837156	13.507611
11	.085720	−.061353	−.087128	.086830	9.418714	11.461570
12	−.059156	.026073	.056629	−.023412	4.067413	3.652406
13	.024330	−.004102	−.017914	.002193	.746596	.399242
14	−.007130	.000368	.004242	−.000130	.077475	.027365
15	.001738	−.000023	−.000870	.000005	.005615	.001407
16	−.000365	.000001	.000156	−.000000	.000298	.000054
17	.000066	.000000	−.000025	.000000	.000011	.000001
18	−.000010		.000003		.000000	.000000
19	.000001		.000000			
20	.000000					
			$\alpha = 14$			
1	.230523	−1.463713	−.293135	1.440393	2.927413	2.880783
2	−.163141	.800080	.146618	−.806700	4.800481	4.840192
3	.123086	−.556113	−.114516	.559936	6.673359	6.719221
4	−.091251	.430678	.115244	−.418271	8.613556	8.365411
5	.106868	−.332313	−.077181	.349641	9.969393	10.489218
6	−.083789	.284885	.103544	−.269967	11.965154	11.338630
7	.089456	−.233628	−.088443	.234531	13.083197	13.133789
8	−.092832	.191001	.078069	−.205913	13.752089	14.825789
9	.088423	−.163254	−.095697	.150137	14.692878	13.532358
10	−.087592	.135426	.090616	−.125594	14.676689	13.815382
11	.035022	−.106206	−.080844	.119620	14.019186	15.789865
12	−.079756	.072121	.079835	−.087065	11.250995	13.582158
13	.057354	−.027119	−.055605	.025073	4.935680	4.563261
14	−.024257	.004397	.018251	−.002482	.923456	.521332
15	.007295	−.000413	−.004499	.000156	.099185	.037653
16	−.001842	.000027	.000964	−.000007	.007613	.002085
17	.000404	−.000001	−.000183	.000000	.000638	.000089
18	−.000077	.000000	.000031	−.000000	.000019	.000003
19	.000013		−.000005		.000000	.000000
20	−.000001		.000000			
21	.000000		.000000			

m= 1.10

n	R(A_n)	I(A_n)	R(B_n)	I(B_n)	$\lvert a_n \rvert^{2/2n+1}$	$\lvert b_n \rvert^{2/2n+1}$
			α = 15			
1	.184031	−1.477075	−.044408	1.498684	2.954144	2.997367
2	−.038900	.831513	.111330	−.818184	4.989080	4.969101
3	.081649	−.571671	−.041722	.580336	6.860059	6.964035
4	−.063207	.443619	.066920	−.439824	8.872386	8.796481
5	.055063	−.358220	−.063848	.355199	10.746607	10.655974
6	−.070568	.292504	.046913	−.302248	12.285178	12.694446
7	.057195	−.255041	−.077895	.242880	14.282305	13.601322
8	−.069011	.213850	.064700	−.216813	15.397212	15.610593
9	.074185	−.179861	−.062064	.190944	16.187470	17.185043
10	−.074702	.154923	.082769	−.143036	17.041580	15.734007
11	.076615	−.128016	−.079807	.122090	16.977284	16.115952
12	−.076291	.104744	.071400	−.116527	16.340056	18.178332
13	.074172	−.072834	−.073028	.087178	13.255910	15.866389
14	−.055728	.028246	.054639	−.026829	5.931755	5.634068
15	.024224	−.004711	−.018798	.002796	1.130647	.671061
16	−.007464	.000460	.004755	−.000186	.125290	.050761
17	.001944	−.000033	−.001058	.000009	.010115	.002994
18	−.000443	.000001	.000209	−.000000	.000621	.000139
19	.000089	.000000	−.000036	.000000	.000079	.000005
20	−.000015		.000005		.000001	.000000
21	.000002		−.000000		.000000	
22	−.000000		.000000			

m= 1.30

			α = 8			
1	−.735342	−.898692	.729096	.572690	1.797374	1.145362
2	.416524	.402850	−.401484	−.258639	2.417075	3.171811
3	−.280977	−.370018	.282219	.365377	4.440226	4.334523
4	.176828	.364239	−.216796	−.285555	7.284764	5.711097
5	−.131462	−.311179	.056277	.357817	9.335362	10.734527
6	.046316	.302434	−.057443	−.298471	12.702255	12.535773
7	.051381	−.257653	.038752	.262128	14.428574	14.679196
8	−.107101	.068306	.109259	−.073310	4.917995	5.278345
9	.023076	−.002735	−.015248	.001106	.246195	.099618
10	−.003806	.000075	.001828	−.000017	.008348	.001926
11	.000529	−.000001	−.000202	.000000	.000212	.000030
12	−.000062	.000000	.000019	.000000	.000003	.000000
13	.000005		−.000001		.000000	
14	.000000		.000000			

m= 1.30

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\|a_n\|^2/2n+1$	$\|b_n\|^2/2n+1$
			$\alpha = 9$			
1	-.472293	-.167295	.699208	.477811	.334572	.955585
2	.399141	.296897	-.296514	-.123863	1.781384	.743160
3	-.256036	-.151937	.288176	.246290	1.823230	2.955458
4	.222164	.189392	-.221851	-.197490	3.787855	3.749819
5	-.175863	-.235417	.181150	.154829	7.062513	4.644874
6	.138403	.224093	-.091809	-.279372	9.411880	11.733661
7	-.079318	-.241858	.076365	.243952	13.544065	13.661326
8.	.000550	.236109	-.069794	-.213286	16.999906	15.356633
9	.104383	-.089701	-.104520	.120313	8.073143	10.828212
10	-.026476	.003745	.018941	-.001898	.411981	.208793
11	.004410	-.000111	-.002362	.000032	.014732	.004228
12	-.000661	.000002	.000285	-.000000	.000426	.000079
13	.000086	.000000	-.000031	.000000	.000009	.000001
14	-.000009		.000002		.000000	.000000
15	.000001					
			$\alpha = 10$			
1	-.382416	-.104709	.066038	.002910	.209411	.005820
2	.073121	.006461	-.261291	-.092086	.033766	.552506
3	-.209762	-.088930	.084874	.012620	1.067163	.151449
4	.134484	.044572	-.188707	-.102400	.891424	2.047983
5	-.153886	-.083637	.156855	.088305	2.509123	2.649124
6	.154309	.142088	-.130021	-.070730	5.967701	2.970647
7	-.132074	-.156164	.110212	.210096	8.745223	11.765384
8	.095176	.187951	-.085973	-.198974	13.532503	14.326154
9	-.039923	-.203274	.033588	.170324	18.294714	15.329201
10	-.093122	.116602	.062031	-.168020	12.826215	18.482234
11	.029572	-.005169	-.023612	.003260	.682369	.430396
12	-.005056	.000159	.002987	-.000055	.024883	.008686
13	.000804	-.000004	-.000382	.000000	.000792	.000179
14	-.000113	.000000	.000045	.000000	.000019	.000003
15	.000014		-.000005		.000000	.000000
16	-.000001		.000000			

m = 1.3 0

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n\rvert^2/2n+1$	$\lvert b_n\rvert^2/2n+1$
			$\alpha = 11$			
1	.495897	−.060821	−.126300	.010709	121633	.021412
2	−.013674	.000284	.159624	−.031768	.001345	.190610
3	.083523	−.012210	.052939	.004842	.146519	.058109
4	.075642	.013083	.038265	−.003276	.261673	.065527
5	−.043240	−.005170	.100973	.030280	.155112	.908399
6	.085900	.016009	−.095786	−.033199	1.092366	1.394384
7	−.120698	−.075871	.074985	.022943	4.248795	1.284864
8	.117133	.103260	−.114261	−.147803	7.434720	10.641807
9	−.099079	−.142011	.089550	.161479	12.780957	14.533121
10	.064404	.165929	−.086738	−.135371	18.252220	14.890840
11	.066397	−.143534	.007923	.173831	18.946513	22.952346
12	−.033317	.007252	.029781	−.005739	1.131322	.895293
13	.005757	−.000223	−.003723	.000093	.040709	.017010
14	−.000958	.000006	.000499	−.000001	.001396	.000379
15	.000144	−.000000	−.000063	.000000	.000038	.000007
16	−.000019	.000000	.000007		.000000	.000000
17	.000002		−.000001			
18	.000000		.000000			
			$\alpha = 12$			
1	.586534	−.282556	−.564448	.255943	.565106	.511879
2	−.313164	.141694	.287571	−.115115	.850166	.690690
3	.155744	−.045033	−.218616	.078563	.540387	1.182741
4	−.150867	.058065	.063494	−.009138	1.161511	.182750
5	.018366	−.000921	−.105779	.033568	.077649	1.007035
6	−.022473	.001639	−.026836	−.002343	.068874	.098407
7	−.025657	−.002479	.043540	.007268	.138863	.407044
8	.031115	.032270	−.024311	−.001635	2.323457	.189781
9	−.096530	−.062765	.104753	.092474	5.648325	8.322655
10	.095073	.104020	−.089039	−.129795	11.442239	14.277484
11	−.075804	−.130102	.084683	.107793	17.175415	14.228670
12	−.023114	.156851	−.055267	−.138165	24.468773	21.553817
13	.038008	−.010468	−.020168	.010691	1.905214	1.934963
14	−.006542	.000310	.004606	−.000153	.065216	.032299
15	.001145	−.000009	−.000638	.000003	.002351	.000756
16	−.000179	.000000	.000083	.000000	.000074	.000016
17	.000026	.000000	−.000010		.000001	.000000
18	−.000003		.000001		.000000	
19	.000000		.000000			

m= 1.30

n	$R(A_n)$	$I(A_n)$	$R(B_n)$	$I(B_n)$	$\lvert a_n\rvert^2/2n+1$	$\lvert b_n\rvert^2/2n+1$
			α = 13			
1	.724908	—.556671	—.749245	.789615	1.113314	1.579216
2	—.415637	.386210	.400431	—.301128	2.317264	1.806746
3	.260260	—.210728	—.282148	.217533	2.528738	2.610386
4	—.196445	.115171	.216138	—.162466	2.303429	3.249322
5	.168520	—.110989	—.122280	.046692	3.329680	1.400772
6	—.078205	.021202	.133536	—.076449	.890494	3.210875
7	.065844	—.017302	—.031122	.003663	.968942	.205132
8	—.022221	.00 .110	—.001454	—.000008	.151926	.000644
9	—.040328	—.008004	—.015423	.001133	.720392	.101989
10	.072229	.033011	—.081882	—.046358	3.631273	5.099428
11	—.086037	—.073284	.085747	.102581	9.673490	13.540772
12	.077866	.099086	—.079905	—.086098	15.457522	13.431354
13	—.028325	—.144915	.070081	.098558	26.374635	17.937613
14	—.043883	.015749	.050039	—.021450	3.303269	4.504622
15	.007440	—.000429	—.005699	.000251	.103180	.060417
16	—.001506	.000014	.000799	—.000005	.003827	.001432
17	.000218	—.000000	—.00011[illegible]	.000000	.000127	.000033
18	—.000033	.000000	.000014	.000000	.000003	.000000
19	.000004		—.000002		.000000	
20	—.000000		.000000			

m= 1.30

n	R(A_n)	I(A_n)	R(B_n)	I(B_n)	$\lvert a_n\rvert^{2/2n}/1$	$\lvert b_n\rvert^{2/2n}/1$
			α = 14.			
1	.553371	— 1.256319	—.725348	.941422	2.512639	1.882810
2	—.406519	..508266	.331478	—.669287	3.049575	4.015725
3	.258964	— .476959	—.287877	.338975	5.112674	4.067704
4	— .222163	.260614	.217496	—.282986	5.212271	5.659683
5	.183226	— .175794	—.181205	.211518	5.273821	6.345520
6	— .154752	.156755	.141370	— .091752	6.583710	3.853561
7	.108777	— .055793	— .132992	.117667	3.124405	6.589351
8	— .090158	.041955	.071166	— .023852	3.020771	1.717384
9	.055014	— .016008	— .030378	.004463	1.440767	.401677
10	.002535	.000033	.044062	— .010769	.003702	1.184663
11	— .045396	— .013056	.047394	.014013	1.723474	1.849746
12	.073796	.048832	—.080149	—.078847	7.617838	12.300250
13	— .074198	— .073812	.074016	.068983	13.438851	12.555057
14.	.051539	.115008	— .069045	—.059664	24.151682	14.629614
15	.051033	— .025002	— .062453	.048103	6.000532	11.544795
16	— .008502	.000598	.007078	—.000414	.162711	.112669
17	.001507	— .000019	— .000990	.000008	.006079	.002624
18	— .000260	.000000	.000143	—.000000	.000214	.000065
19	.000042	.000000	— .000019	.000000	.000006	.000001
20	— .000006		.000002		.000000	.000000
21	.000000		—.000000			
			α = 15			
1.	.485745	—1.321471	— .143350	1.486181	2.642942	2.972360
2	— .109188	.818780	.294003	— .711974	4.912676	4.271827
3	.220222	— .482957	— .104766	.463380	5.795454	6.766552
4	— .123024	.413423	.184587	— .353673	8.268467	7.073440
5	.151415	— .286748	— .134331	.308125	8.602415	9.243735
6	— .142324	.215635	.128894	— .240517	9.056711	10.101731
7	.122208	— .188791	— .133974	.131809	10.572344	7.381350
8	— .115424	.093158	.113794	— .149668	6.707436	10.776085
9	.099085	— .069061	— .092448	.054573	6.215554	4.911571
10	— .075552	.037075	.052738	— .015879	4.078322	1.746797
11	.028814	— .004898	— .061713	.025617	.646595	3.381471
12	.019150	.002320	— .007125	— .000317	.361980	.049476
13	—.059447	— .029800	.072357	.057737	5.423777	10.508260
14	.067365	.053828	— .067652	— .055415	11.303972	11.595345
15	— .061800	— .083354	.063019	.050425	20.005144	12.102073
16	— .057905	.042506	.044303	— .102101	11.561635	27.771485
17	.009778	— .000841	—.008907	.000697	.257594	.213519
18	— .001729	.000027	.001419	— .000013	.0009459	.004698
19	.000307	— .000000	— .000181	.000000	.000351	.000122
20	— .000051	.000000	.000026	.000000	.000011	.000002
21	.000008		— .000003		.000000	.000000
22	— .000001		.000000			