

Table I. Absorption correction  $A^*$  for successive values of  $\theta$  ; cylinders.

$\mu$ R	0°	5°	10°	15°	20°	25°	30°	35°	40°	$\mu$ R
0.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0
0.1	1.18432	1.18428	1.18419	1.18403	1.18381	1.18352	1.18316	1.18275	1.18229	0.1
0.2	1.40086	1.40071	1.40025	1.39947	1.39838	1.39698	1.39530	1.39336	1.39121	0.2
0.3	1.65484	1.65442	1.65315	1.65103	1.64807	1.64430	1.63979	1.63466	1.62902	0.3
0.4	1.95218	1.95126	1.94852	1.94394	1.93760	1.92960	1.92013	1.90945	1.89787	0.4
0.5	2.29961	2.29787	2.29266	2.28401	2.27210	2.25722	2.23983	2.22044	2.19964	0.5
0.6	2.70478	2.70173	2.69261	2.67757	2.65704	2.63168	2.60237	2.57011	2.53597	0.6
0.7	3.17628	3.17123	3.15618	3.13154	3.09820	3.05752	3.01111	2.96072	2.90812	0.7
0.8	3.72375	3.71575	3.69197	3.65333	3.60161	3.53927	3.46915	3.39415	3.31697	0.8
0.9	4.35799	4.34572	4.30940	4.25085	4.17340	4.08132	3.97931	3.87186	3.76299	0.9
1.0	5.09098	5.07265	5.01864	4.93243	4.81977	4.68784	4.54397	4.39489	4.24618	1.0
1.1	5.93595	5.90920	5.83073	5.70669	5.54684	5.36256	5.16502	4.96372	4.76615	1.1
1.2	6.90750	6.86915	6.75735	6.58250	6.36047	6.10885	5.84382	5.57837	5.32204	1.2
1.3	8.02154	7.96748	7.81085	7.56876	7.26618	6.92934	6.58103	6.23830	5.91272	1.3
1.4	9.29541	9.22029	9.00414	8.67431	8.26897	7.82614	7.37681	6.94252	6.53663	1.4
1.5	10.7478	10.6448	10.3505	9.90766	9.37313	8.80049	8.23059	7.68965	7.19212	1.5
1.6	12.3988	12.2592	11.8634	11.2768	10.5821	9.85290	9.14127	8.47781	7.87724	1.6
1.7	14.2699	14.0826	13.5566	12.7894	11.8987	10.9831	10.1071	9.30492	8.58989	1.7
1.8	16.3838	16.1351	15.4435	14.4518	13.3244	12.1899	11.1260	10.1687	9.32801	1.8
1.9	18.7643	18.4373	17.5372	16.2698	14.8598	13.4717	12.1955	11.0667	10.0896	1.9
2.0	21.4363	21.0101	19.8501	18.2476	16.5045	14.8258	13.3126	11.9963	10.8725	2.0
2.1	24.4257	23.8751	22.3938	20.3885	18.2570	16.2494	14.4744	12.9551	11.6747	2.1
2.2	27.7593	27.0535	25.1789	22.6943	20.1151	17.7390	15.6777	13.9404	12.4945	2.2
2.3	31.4641	30.5666	28.2147	25.1653	22.0753	19.2907	16.9192	14.9500	13.3301	2.3
2.4	35.5677	34.4352	31.5092	27.8008	24.1339	20.9007	18.1959	15.9814	14.1798	2.4
2.5	40.0981	38.6794	35.0684	30.5985	26.2862	22.5648	19.5048	17.0327	15.0423	2.5
2.6	45.0830	43.3184	38.8969	33.5550	28.5273	24.2788	20.8428	18.1019	15.9162	2.6
2.7	50.5501	48.3704	42.9976	36.6659	30.8518	26.0387	22.2072	19.1871	16.8003	2.7
2.8	56.5266	53.8523	47.3716	39.9257	33.2544	27.8407	23.5956	20.2868	17.6936	2.8
2.9	63.0394	59.7796	52.0184	43.3284	35.7296	29.6811	25.0057	21.3994	18.5952	2.9
3.0	70.1148	66.1663	56.9359	46.8672	38.2721	31.5565	26.4352	22.5238	19.5042	3.0
3.2	86.0538	80.3655	67.5676	54.3251	43.5379	35.3996	29.3457	24.8033	21.3418	3.2
3.4	104.537	96.5292	79.2224	62.2417	49.0136	39.3478	32.3144	27.1177	23.2016	3.4
3.6	125.743	114.711	91.8425	70.5597	54.6660	43.3834	35.3313	29.4611	25.0800	3.6
3.8	149.836	134.941	105.360	79.2274	60.4675	47.4924	38.3889	31.8291	26.9741	3.8
4.0	176.970	157.228	119.704	88.1974	66.3953	51.6641	41.4816	34.2182	28.8817	4.0
4.2	207.287	181.568	134.805	97.4317	72.4328	55.8897	44.6044	36.6257	30.8012	4.2
4.4	240.923	207.942	150.597	106.897	78.5657	60.1634	47.7544	39.0497	32.7310	4.4
4.6	278.008	236.322	167.017	116.566	84.7838	64.4799	50.9287	41.4883	34.6701	4.6
4.8	318.672	266.677	184.014	126.419	91.0797	68.8359	54.1249	43.9398	36.6174	4.8
5.0	363.044	298.970	201.538	136.439	97.4450	73.2273	57.3411	46.4037	38.5724	5.0
5.2	411.255	333.162	219.550	146.611	103.877	77.6524	60.5760	48.8782	40.5341	5.2
5.4	463.436	369.216	238.012	156.925	110.369	82.1085	63.8280	51.3632	42.5020	5.4
5.6	519.723	407.090	256.895	167.371	116.919	86.5936	67.0961	53.8573	44.4759	5.6
5.8	580.254	446.746	276.173	177.943	123.523	91.1062	70.3789	56.3599	46.4548	5.8
6.0	645.168	488.144	295.820	188.633	130.179	95.6444	73.6757	58.8706	48.4383	6.0
6.2	714.609	531.244	315.819	199.435	136.884	100.206	76.9853	61.3889	50.4266	6.2
6.4	788.721	576.005	336.149	210.345	143.634	104.791	80.3071	63.9137	52.4191	6.4
6.6	867.651	622.389	356.796	221.357	150.429	109.397	83.6407	66.4452	54.4153	6.6
6.8	951.547	670.356	377.745	232.467	157.266	114.024	86.9845	68.9826	56.4149	6.8
7.0	1040.56	719.866	398.980	243.671	164.142	118.669	90.3375	71.5256	58.4180	7.0
7.2	1134.83	770.880	420.491	254.965	171.056	123.332	93.7005	74.0735	60.4241	7.2
7.4	1234.52	823.358	442.268	266.345	178.006	128.013	97.0723	76.6266	62.4333	7.4
7.6	1339.78	877.261	464.298	277.807	184.990	132.709	100.453	79.1847	64.4450	7.6
7.8	1450.76	932.551	486.571	289.349	192.006	137.420	103.840	81.7461	66.4593	7.8
8.0	1567.60	989.189	509.079	300.966	199.053	142.146	107.235	84.3121	68.4758	8.0
8.2	1690.46	1047.14	531.813	312.654	206.129	146.885	110.637	86.8817	70.4945	8.2
8.4	1819.50	1106.36	554.767	324.413	213.232	151.636	114.046	89.4550	72.5158	8.4
8.6	1954.86	1166.82	577.928	336.237	220.362	156.400	117.460	92.0319	74.5384	8.6
8.8	2096.70	1228.48	601.290	348.126	227.518	161.175	120.881	94.6119	76.5632	8.8
9.0	2245.17	1291.32	624.852	360.075	234.697	165.962	124.306	97.1950	78.5898	9.0
9.2	2400.41	1355.28	648.597	372.083	241.899	170.758	127.737	99.7805	80.6179	9.2
9.4	2562.58	1420.35	672.527	384.147	249.127	175.564	131.173	102.369	82.6474	9.4
9.6	2731.84	1486.49	696.636	396.264	256.366	180.379	134.614	104.960	84.6783	9.6
9.8	2908.33	1553.67	720.908	408.433	263.630	185.204	138.058	107.553	86.7115	9.8
10.0	3092.20	1621.85	745.351	420.652	270.913	190.036	141.508	110.148	88.7453	10.0
11.0	4127.63	1976.99	869.838	482.418	307.581	214.312	158.809	123.157	98.9315	11.0
12.0	5370.34	2353.50	997.705	545.155	344.609	238.746	176.190	136.207	109.143	12.0
13.0	6839.20	2748.76	1128.46	608.695	381.929	263.308	193.633	149.291	119.374	13.0
14.0	8553.07	3160.56	1261.70	672.902	419.489	287.974	211.127	162.403	129.620	14.0
15.0	10530.8	3587.09	1397.08	737.670	457.249	312.726	228.663	175.537	139.879	15.0
16.0	12791.3	4026.84	1534.31	802.910	495.177	337.549	246.234	188.690	150.149	16.0
17.0	15353.3	4478.51	1673.16	868.561	533.245	362.433	263.835	201.858	160.427	17.0
18.0	18235.8	4940.99	1813.42	934.553	571.435	387.369	281.459	215.039	170.713	18.0
19.0	21457.6	5413.32	1954.92	1000.86	609.730	412.347	299.107	228.232	181.005	19.0
20.0	25037.5	5894.65	2097.52	1067.42	648.118	437.365	316.770	241.434	191.303	20.0
21.0	28994.4	6384.22	2241.09	1134.22	686.582	462.415	334.452	254.645	201.606	21.0
22.0	33347.1	6881.36	2385.53	1201.22	725.116	487.496	352.146	267.863	211.912	22.0
23.0	38114.5	7385.47	2530.74	1268.41	763.709	512.600	369.853	281.088	222.222	23.0
24.0	43315.5	7896.00	2676.65	1335.75	802.362	537.727	387.570	294.318	232.536	24.0
25.0	48968.8	8412.47	2823.19	1403.24	841.057	562.876	405.298	307.552	242.852	25.0
26.0	55093.3	8934.41	2970.29	1470.86	879.802	588.042	423.033	320.972	253.171	26.0
27.0	61708.0	9461.43	3117.92	1538.60	918.577	613.226	440.777	334.036	263.492	27.0
28.0	68831.6	9993.17	3266.00	1606.44	957.396	638.423	458.528	347.283	273.815	28.0
29.0	76483.0	10529.3	3414.51	1674.38	996.244	663.632	476.283	360.533	284.140	29.0
30.0	84681.0	11069.4	3563.41	1742.41	1035.12	688.852	494.047	373.787	294.467	30.0



30.0	239.511	199.984	170.733	148.626	131.684	118.631	108.646	101.250	96.2946	94.2543	30.0
------	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	------

Table I I. Absorption correction  $A^*$  for successive values of  $\theta$  ; spheres.

$\mu$ R	0°	5°	10°	15°	20°	25°	30°	35°	40°	$\mu$ R
0.0	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.0
0.1	1.16095	1.16093	1.16085	1.16073	1.16056	1.16033	1.16006	1.15974	1.15938	0.1
0.2	1.34573	1.34560	1.34526	1.34468	1.34385	1.34279	1.34152	1.34004	1.33841	0.2
0.3	1.55741	1.55710	1.55617	1.55462	1.55244	1.54967	1.54634	1.54254	1.53836	0.3
0.4	1.79942	1.79876	1.79681	1.79355	1.78903	1.78330	1.77649	1.76878	1.76037	0.4
0.5	2.07551	2.07431	2.07071	2.06474	2.05649	2.04612	2.03393	2.02026	2.00550	0.5
0.6	2.38979	2.38774	2.38165	2.37158	2.35776	2.34057	2.32054	2.29830	2.27457	0.6
0.7	2.74671	2.74344	2.73371	2.71771	2.69590	2.66904	2.63808	2.60410	2.56823	0.7
0.8	3.15114	3.14612	3.13124	3.10690	3.07401	3.03391	2.98821	2.93864	2.88693	0.8
0.9	3.60830	3.60088	3.57887	3.54310	3.49521	3.43744	3.37240	3.30273	3.23094	0.9
1.0	4.12384	4.11312	4.08146	4.03035	3.96258	3.88179	3.79194	3.69694	3.60027	1.0
1.1	4.70377	4.68865	4.64412	4.57277	4.47915	4.36888	4.24786	4.12159	3.99477	1.1
1.2	5.35451	5.33357	5.27215	5.17453	5.04781	4.90047	4.74098	4.57680	4.41405	1.2
1.3	6.08288	6.05436	5.97104	5.83974	5.67130	5.47806	5.27181	5.06244	4.85759	1.3
1.4	6.89604	6.85771	6.74637	6.57251	6.35215	6.10287	5.84063	5.57816	5.32469	1.4
1.5	7.80153	7.75072	7.60369	7.37674	7.09265	6.77584	6.44746	6.12339	5.81453	1.5
1.6	8.80724	8.74067	8.54913	8.25642	7.89473	7.49755	7.09202	6.69743	6.32620	1.6
1.7	9.92134	9.83501	9.58842	9.21485	8.76010	8.26841	7.77379	7.29938	6.85867	1.7
1.8	11.1523	11.0415	10.7269	10.2554	9.69001	9.08828	8.49208	7.92821	7.41089	1.8
1.9	12.5089	12.3679	11.9699	11.3811	10.6862	9.95691	9.24598	8.58284	7.98178	1.9
2.0	14.0001	13.8222	13.3233	12.5947	11.7478	10.8738	10.0344	9.26207	8.57026	2.0
2.1	15.6351	15.4122	14.7921	13.8984	12.8755	11.8380	10.8561	9.96468	9.17523	2.1
2.2	17.4231	17.1461	16.3812	15.2940	14.0697	12.8485	11.7098	10.6894	9.79562	2.2
2.3	19.3736	19.0317	18.0953	16.7830	15.3299	13.9040	12.5940	11.4349	10.4304	2.3
2.4	21.4960	21.0769	19.9385	18.3665	16.6553	15.0032	13.5074	12.2001	11.0786	2.4
2.5	23.8000	23.2894	21.9147	20.0451	18.0446	16.1444	14.4484	12.9837	11.7393	2.5
2.6	26.2952	25.6769	24.0274	21.8191	19.4965	17.3260	15.4156	13.7845	12.4115	2.6
2.7	28.9911	28.2466	26.2797	23.6882	21.0098	18.5463	16.4075	14.6014	13.0945	2.7
2.8	31.8973	31.0058	28.6741	25.6518	22.5825	19.8037	17.4228	15.4334	13.7875	2.8
2.9	35.0232	33.9613	31.2129	27.7091	24.2127	21.0963	18.4600	16.2794	14.4897	2.9
3.0	38.3783	37.1199	33.8977	29.8590	25.8988	22.4225	19.5178	17.1386	15.2006	3.0
3.2	45.8129	44.0713	39.7105	34.4302	29.4304	25.1685	21.6905	18.8927	16.6458	3.2
3.4	54.2744	51.9071	46.1181	39.3512	33.1583	28.0287	23.9315	20.6896	18.1186	3.4
3.6	63.8341	60.6694	53.1202	44.6052	37.0710	30.9913	26.2328	22.5237	19.6155	3.6
3.8	74.5612	70.3959	60.7116	50.1741	41.1484	34.0453	28.5874	24.3907	21.1334	3.8
4.0	86.5234	81.1188	68.8827	56.0387	45.3773	37.1816	30.9895	26.2865	22.6699	4.0
4.2	99.7866	92.8668	77.6211	62.1806	49.7441	40.3911	33.4336	28.2079	24.2226	4.2
4.4	114.415	105.663	86.9111	68.5822	54.2367	43.6673	35.9156	30.1522	25.7898	4.4
4.6	130.474	119.530	96.7364	75.2198	58.8446	47.0037	38.4315	32.1169	27.3700	4.6
4.8	148.024	134.482	107.079	82.0884	63.5584	50.3946	40.9782	34.1001	28.9617	4.8
5.0	167.130	150.535	117.921	89.1668	68.3690	53.8355	43.5527	36.0999	30.5639	5.0
5.2	187.852	167.700	129.243	96.4416	73.2706	57.3221	46.1528	38.1149	32.1757	5.2
5.4	210.253	185.987	141.027	103.902	78.2540	60.8509	48.7762	40.1436	33.7960	5.4
5.6	234.395	205.401	153.255	111.534	83.3146	64.4185	51.4210	42.1850	35.4243	5.6
5.8	260.340	225.947	165.910	119.329	88.4470	68.0223	54.0856	44.2382	37.0597	5.8
6.0	288.151	247.629	178.975	127.276	93.6463	71.6591	56.7684	46.3018	38.7016	6.0
6.2	317.889	270.448	192.430	135.367	98.9083	75.3273	59.4682	48.3755	40.3497	6.2
6.4	349.618	294.402	206.268	143.595	104.226	79.0244	62.1837	50.4582	42.0034	6.4
6.6	383.400	319.491	220.466	151.951	109.602	82.7486	64.9139	52.5493	43.6622	6.6
6.8	419.298	345.710	235.014	160.429	115.030	86.4983	67.6578	54.6484	45.3259	6.8
7.0	457.376	373.055	249.895	169.022	120.507	90.2716	70.4143	56.7549	46.9939	7.0
7.2	497.697	401.518	265.096	177.725	126.030	94.0673	73.1825	58.8680	48.6662	7.2
7.4	540.324	431.093	280.607	186.533	131.597	97.8842	75.9621	60.9876	50.3423	7.4
7.6	585.321	461.772	296.412	195.439	137.205	101.721	78.7522	63.1132	52.0220	7.6
7.8	632.751	493.545	312.505	204.440	142.852	105.576	81.5520	65.2443	53.7052	7.8
8.0	682.678	526.403	328.871	213.531	148.536	109.449	84.3611	67.3806	55.3914	8.0
8.2	735.166	560.331	345.500	222.708	154.255	113.338	87.1790	69.5218	57.0805	8.2
8.4	790.278	595.322	362.386	231.967	160.008	117.243	90.0051	71.6678	58.7726	8.4
8.6	848.079	631.362	379.515	241.304	165.792	121.163	92.8386	73.8181	60.4672	8.6
8.8	908.633	668.437	396.881	250.715	171.606	125.097	95.6798	75.9724	62.1642	8.8
9.0	972.003	706.534	414.475	260.199	177.449	129.044	98.5277	78.1308	63.8635	9.0
9.2	1038.25	745.638	432.288	269.751	183.319	133.004	101.382	80.2928	65.5651	9.2
9.4	1107.45	785.737	450.312	279.368	189.215	136.976	104.243	82.4582	67.2687	9.4
9.6	1179.65	826.814	468.541	289.049	195.135	140.960	107.109	84.6268	68.9742	9.6
9.8	1254.92	868.854	486.967	298.789	201.080	144.954	109.982	86.7988	70.6817	9.8
10.0	1333.33	911.844	505.583	308.588	207.047	148.958	112.859	88.9734	72.3909	10.0
11.0	1774.67	1140.50	601.305	358.367	237.187	169.120	127.317	99.8868	80.9595	11.0
12.0	2304.00	1390.62	700.901	409.286	267.762	189.478	141.875	110.855	89.5612	12.0
13.0	2929.33	1660.29	803.841	461.149	298.690	209.994	156.512	121.867	98.1883	13.0
14.0	3658.67	1947.78	909.630	513.800	329.909	230.639	171.214	132.914	106.836	14.0
15.0	4500.00	2251.46	1017.88	567.115	361.370	251.390	185.969	143.990	115.501	15.0
16.0	5461.33	2569.86	1128.27	620.995	393.036	272.230	200.768	155.090	124.180	16.0
17.0	6550.67	2901.67	1240.53	675.359	424.874	293.146	215.604	166.210	132.870	17.0
18.0	7776.00	3245.71	1354.43	730.144	456.861	314.125	230.471	177.347	141.570	18.0
19.0	9145.33	3600.90	1469.77	785.289	488.975	335.160	245.367	188.499	150.279	19.0
20.0	10666.7	3966.29	1586.40	840.756	521.201	356.242	260.284	199.663	158.995	20.0
21.0	12348.0	4341.05	1704.17	896.500	553.524	377.364	275.223	210.838	167.717	21.0
22.0	14197.3	4724.40	1822.96	952.492	585.932	398.524	290.178	222.023	176.445	22.0
23.0	16222.7	5115.71	1942.66	1008.70	618.415	419.716	305.149	233.216	185.177	23.0
24.0	18432.0	5514.31	2063.19	1065.11	650.966	440.936	320.134	244.416	193.914	24.0
25.0	20833.3	5919.65	2184.46	1121.69	683.576	462.180	335.131	255.623	202.654	25.0
26.0	23434.7	6331.22	2306.40	1178.43	716.239	483.447	350.139	266.836	211.398	26.0
27.0	26244.0	6748.56	2428.95	1235.31	748.949	504.735	365.157	278.054	220.145	27.0
28.0	29269.3	7171.30	2552.07	1292.32	781.702	526.041	380.184	289.276	228.894	28.0



28.0	186.836	156.459	133.904	116.812	103.686	93.5577	85.8043	80.0637	76.2315	74.6786	28.0
29.0	193.893	162.308	138.867	121.108	107.475	96.9560	88.9048	82.9433	78.9617	77.3448	29.0
30.0	200.951	168.159	143.829	125.405	111.263	100.355	92.0057	85.8232	81.6921	80.0111	30.0

### Bivariate Chebyshev polynomial fitting program

Note : The following bivariate Chebyshev polynomial fitting program runAstarSp is used for calculating the  $A^*$  values of spherical crystals at several  $\theta$  values for a given  $\mu R$  in the regions:  $0^\circ \leq \theta \leq 90^\circ$ ;  $0 \leq \mu R \leq 30$ .

1. In the program all the  $\theta$  values are labeled by the symbol "theta" and  $\mu R$  values are labeled by "rmu".
2. The files coef-sp1.dat and coef-sp2.dat are the two sets of coefficients separately used as the input data for the  $0 \leq \mu R \leq 10$  and  $10 \leq \mu R \leq 30$  ranges respectively. In the case  $\mu R \leq 10$ , only the first dataset is required and all arrays and lines labelled c31 and c32 can be deleted.
3. For the cylindrical crystals all the "Sp" symbols in the program should be replaced by "Cy".

```
program runAstarSp
implicit none
double precision theta, rmu, astar, thetas
double precision getAstarSp
```

! The total number of the data points in the thetas array is set to 4.

```
Dimension thetas(4)
```

```
double precision c11, c12, c21, c22, c31, c32
integer Kc11,Kc12,Kc21,Kc22,Kc31,Kc32,it
common / cpara / c11(25), c12(56), c21(56), c22(100), c31(77), c32(119)
```

```
open(80,file='coef-sp1.dat',STATUS='OLD')
open(90,file='coef-sp2.dat',STATUS='OLD')
open(10,file='out-sp.dat')
```

```
read (80,*)
read (80,'(8(x,e14.7))')(c11(Kc11),Kc11=1,8),(c11(Kc11),Kc11=9,16),
(c11(Kc11),Kc11=17,24),c11(25)
read (80,*)
read (80,'(8(x,e14.7))')(c12(Kc12),Kc12=1,8),(c12(Kc12),Kc12=9,16),(c12(Kc12),Kc12=17,24),
&
(c12(Kc12),Kc12=25,32),(c12(Kc12),Kc12=33,40),(c12(Kc12),Kc12=41,48),
(c12(Kc12),Kc12=49,56)
read (80,*)
read (80,'(8(x,e14.7))')(c21(Kc21),Kc21=1,8),(c21(Kc21),Kc21=9,16),(c21(Kc21),Kc21=17,24),
&
(c21(Kc21),Kc21=25,32),(c21(Kc21),Kc21=33,40),(c21(Kc21),Kc21=41,48),
(c21(Kc21),Kc21=49,56)
read (80,*)
read (80,'(8(x,e14.7))')(c22(Kc22),Kc22=1,8),(c22(Kc22),Kc22=9,16),(c22(Kc22),Kc22=17,24),
```

```

&
(c22(Kc22),Kc22=25,32),(c22(Kc22),Kc22=33,40),(c22(Kc22),Kc22=41,48),
(c22(Kc22),Kc22=49,56), &
(c22(Kc22),Kc22=57,64),(c22(Kc22),Kc22=65,72),(c22(Kc22),Kc22=73,80),
(c22(Kc22),Kc22=81,88), &
(c22(Kc22),Kc22=89,96),(c22(Kc22),Kc22=97,100)

```

```

read (90,*)
read (90,'(8(x,e14.7))')(c31(Kc31),Kc31=1,8),(c31(Kc31),Kc31=9,16),(c31(Kc31),Kc31=17,24),
&
(c31(Kc31),Kc31=25,32),(c31(Kc31),Kc31=33,40),(c31(Kc31),Kc31=41,48),
(c31(Kc31),Kc31=49,56), &
(c31(Kc31),Kc31=57,64),(c31(Kc31),Kc31=65,72),(c31(Kc31),Kc31=73,77)
read (90,*)
read (90,'(8(x,e14.7))')(c32(Kc32),Kc32=1,8),(c32(Kc32),Kc32=9,16),(c32(Kc32),Kc32=17,24),
&
(c32(Kc32),Kc32=25,32),(c32(Kc32),Kc32=33,40),(c32(Kc32),Kc32=41,48),
(c32(Kc32),Kc32=49,56), &
(c32(Kc32),Kc32=57,64),(c32(Kc32),Kc32=65,72),(c32(Kc32),Kc32=73,80),
(c32(Kc32),Kc32=81,88), &
(c32(Kc32),Kc32=89,96),(c32(Kc32),Kc32=97,104),(c32(Kc32),Kc32=105,112),
(c32(Kc32),Kc32=113,119)

```

```

! case1: for only one theta
! write(6,*) 'enter theta (between 0 and 90 degrees)'
! read(5,*) theta
! write(6,*) 'enter rmu (between 0.0001 and 30.0)'
! read(*,*) rmu

```

```

! astar = getAstarSp(theta, rmu)
!write(6,100) theta, rmu
!write(6,200) astar
!100 format(1x, 'theta = ', 1pe8.2, ' rmu = ', 1pe11.3)
!200 format(1x, 'Astar = ', 1pe12.6)

```

```

! case2: for several thetas with different span:
write(6,*) 'enter rmu (between 0.00001 and 30.0)'
read(*,*) rmu
write(10,*)'rmu=',rmu
!write(10,'(F7.4)') 'rmu',rmu
write(10,*)
!enter the angles of thetas(it) in degree. For example:
DATA thetas/ 4.2587, 7.6234, 12.837, 38.765/
do it=1,4
theta=thetas(it)
astar = getAstarSp(theta, rmu)

```

```
theta=theta*180/ 3.14159265389793
write(10,'(x,F8.4,e20.8)')theta,astar
enddo
```

```
100 format(1x, 'theta = ', 1pe8.2, ' rmu = ', 1pe11.3)
200 format(1x, ' Astar = ', 1pe12.6)
end program
```

```
module SpCoef
implicit none
```

```
double precision, parameter :: pi = 3.14159265389793d0
```

```
double precision, parameter :: xlb1 = 0.0d0
double precision, parameter :: xub1 = 1.736481776669303d-1 ! sin(10*pi/180)
double precision, parameter :: xlb2 = 1.736481776669303d-1 ! sin(10*pi/180)
double precision, parameter :: xub2 = 1.0d0
```

```
double precision, parameter :: ylb1 = 0.00000001d0
double precision, parameter :: yub1 = 3.0d0
double precision, parameter :: ylb2 = 3.0d0
double precision, parameter :: yub2 = 10.0d0;
double precision, parameter :: ylb3 = 10.0d0
double precision, parameter :: yub3 = 30.0d0;
```

```
integer, parameter :: pdegx11 = 4
integer, parameter :: pdegy11 = 4
integer, parameter :: pdegx12 = 7
integer, parameter :: pdegy12 = 6
integer, parameter :: pdegx21 = 7
integer, parameter :: pdegy21 = 6
```

```
integer, parameter :: pdegx22 = 9
integer, parameter :: pdegy22 = 9
integer, parameter :: pdegx31 = 10
integer, parameter :: pdegy31 = 6
integer, parameter :: pdegx32 = 16
integer, parameter :: pdegy32 = 6
```

```
integer, parameter :: ncoef11 = (pdegx11+1)*(pdegy11+1)
integer, parameter :: ncoef12 = (pdegx12+1)*(pdegy12+1)
integer, parameter :: ncoef21 = (pdegx21+1)*(pdegy21+1)
integer, parameter :: ncoef22 = (pdegx22+1)*(pdegy22+1)
integer, parameter :: ncoef31 = (pdegx31+1)*(pdegy31+1)
integer, parameter :: ncoef32 = (pdegx32+1)*(pdegy32+1)
```

```

end module

double precision function getAstarSp(theta,rmu)
use SpCoef
implicit none
double precision theta, rmu
integer pdegx, pdegy, ncoef, i, j
double precision sinth, xlb, xub, ylb, yub, px, py
double precision coef(228)
double precision scheby

theta = theta/180.0d0*pi;
sinth = sin(theta)
if (sinth .lt. 0.0 .or. sinth .gt. 1.0) then
    write(6,*) 'invalid angle'
    stop
endif

if (sinth .ge. xlb1 .and. sinth .le. xub1 .and. rmu .ge. ylb1 .and. rmu .le. yub1) then
    pdegx = pdegx11
    pdegy = pdegy11
    xlb = xlb1
    xub = xub1
    ylb = ylb1
    yub = yub1
    do i = 1, ncoef11
        coef(i) = c11(i)
    end do
elseif (sinth .ge. xlb2 .and. sinth .le. xub2 .and. rmu .ge. ylb1 .and. rmu .le. yub1) then
    pdegx = pdegx12
    pdegy = pdegy12
    xlb = xlb2
    xub = xub2
    ylb = ylb1
    yub = yub1
    do i = 1, ncoef12
        coef(i) = c12(i)
    end do
elseif (sinth .ge. xlb1 .and. sinth .le. xub1 .and. rmu .ge. ylb2 .and. rmu .le. yub2) then
    pdegx = pdegx21
    pdegy = pdegy21
    xlb = xlb1
    xub = xub1
    ylb = ylb2
    yub = yub2
    do i = 1, ncoef21

```



```

    coef(i) = c21(i)
end do
elseif (sinth .ge. xlb2 .and. sinth .le. xub2 .and. rmu .ge. ylb2 .and. rmu .le. yub2) then
    pdegx = pdegx22
    pdegy = pdegy22
    xlb = xlb2
    xub = xub2
    ylb = ylb2
    yub = yub2
    do i = 1, ncoef22
        coef(i) = c22(i)
    end do
elseif (sinth .ge. xlb1 .and. sinth .le. xub1 .and. rmu .ge. ylb3 .and. rmu .le. yub3) then
    pdegx = pdegx31
    pdegy = pdegy31
    xlb = xlb1
    xub = xub1
    ylb = ylb3
    yub = yub3
    do i = 1, ncoef31
        coef(i) = c31(i)
    end do
elseif (sinth .ge. xlb2 .and. sinth .le. xub2 .and. rmu .ge. ylb3 .and. rmu .le. yub3) then
    pdegx = pdegx32
    pdegy = pdegy32
    xlb = xlb2
    xub = xub2
    ylb = ylb3
    yub = yub3
    do i = 1, ncoef32
        coef(i) = c32(i)
    end do
else
    write(0,111) rmu
    111  format(1x,'rmu out of range: rmu = ',1pe11.3)
    stop
endif

getAstarSp = 0.0
ncoef = 1
do j = 0,pdegy
    py = scheby(rmu,ylb,yub,j)
    do i = 0,pdegx
        px = scheby(sinth,xlb,xub,i)
        getAstarSp = getAstarSp + coef(ncoef)*px*py
        ncoef = ncoef + 1
    end do
end do

```

```

end do
enddo
getAstarSp = dexp(getAstarSp)

end function getAstarSp

double precision function scheby(x,lb,ub,pdeg)
double precision x, lb, ub, sx
integer pdeg

sx = 1+2*(x-ub)/(ub-lb)
scheby = dcos(pdeg*dacos(sx))

end function scheby

```

### Fitting coefficients

#### coef-sp1.dat

c11-sp:

```

0.1921237E+01 -0.2224785E-01 -0.5259580E-02 0.1708385E-03 0.1901818E-04 0.1802941E+01 -0.3089305E-01 -0.7220519E-02
0.2839408E-03 0.3028528E-04 -0.1223511E+00 -0.9253348E-02 -0.2034552E-02 0.1551322E-03 0.1539991E-04 -0.3124910E-02
-0.4955997E-03 -0.3231522E-04 0.4783387E-04 0.4158644E-05 0.1058234E-02 0.1411849E-03 0.4907437E-04 0.6235172E-05
-0.7654292E-06

```

c12-sp:

```

0.1590921E+01 -0.3229799E+00 -0.1530982E-01 0.1726235E-02 -0.2956648E-02 -0.1858599E-03 -0.2840808E-03 -0.1385271E-03
0.1395524E+01 -0.3810249E+00 -0.5102537E-02 0.2104395E-02 -0.3999989E-02 -0.3830822E-04 -0.3613288E-03 -0.1748808E-03
-0.1801889E+00 -0.3175801E-01 0.1560168E-01 -0.6622753E-03 -0.9933261E-03 0.1957635E-03 -0.1484997E-03 -0.4103352E-04
0.1511217E-01 0.2290524E-01 0.2722333E-02 -0.1375427E-02 0.2622444E-03 0.9870350E-04 -0.2975291E-04 0.1349833E-04
-0.2768443E-03 -0.3578227E-02 -0.2350832E-02 -0.9364688E-04 0.1815810E-03 -0.1843537E-04 0.1060608E-04 0.8416107E-05
-0.1219037E-03 -0.5838816E-04 0.3924977E-03 0.2238356E-03 -0.3864946E-04 -0.4211414E-04 -0.1269885E-04 -0.4219179E-05
0.2825596E-04 0.1019439E-03 0.3346999E-04 -0.3546938E-04 -0.1358913E-05 0.2872614E-04 0.2043038E-04 0.4056323E-05

```

c21-sp:

```

0.5439258E+01 -0.2829954E+00 -0.4039745E-01 0.1227808E-01 -0.1368644E-02 -0.2190086E-03 0.1330672E-03 -0.2541415E-04
0.1540273E+01 -0.2285738E+00 -0.2033182E-01 0.1379832E-01 -0.2287146E-02 -0.1970747E-03 0.1935774E-03 -0.4541841E-04
-0.2482246E+00 -0.3366736E-02 0.6507628E-02 0.1719922E-02 -0.9831053E-03 0.7216814E-04 0.6688410E-04 -0.2577180E-04
0.4369258E-01 0.3922008E-02 0.5258234E-03 -0.5056489E-03 -0.9621870E-04 0.6776380E-04 0.2917427E-06 -0.8357191E-05
-0.6812223E-02 -0.8925954E-03 -0.3385297E-03 -0.1560253E-04 0.3929964E-04 0.7067787E-05 -0.5673600E-05 -0.7171079E-06
0.6349639E-03 0.1365461E-03 0.6937035E-04 0.2311217E-04 0.1249318E-05 -0.2977692E-05 -0.6931578E-06 -0.7058189E-07
0.1052008E-03 -0.3207808E-05 -0.5557570E-05 -0.4562201E-05 -0.1745662E-05 0.2196414E-06 0.2111450E-06 -0.5035474E-06

```

c22-sp:

```

0.3868030E+01 -0.1142072E+01 0.8970268E-01 -0.3008784E-01 -0.3961310E-02 -0.2060363E-02 -0.1763401E-02 -0.6516616E-03
-0.5350243E-03 -0.3655552E-03 0.8577151E+00 -0.3283987E+00 0.7894801E-01 -0.2974184E-01 0.5276347E-02 -0.2828695E-02
-0.4086901E-03 -0.4496189E-03 -0.3215436E-03 -0.2390222E-03 -0.1505289E+00 0.7751063E-01 -0.1428029E-01 0.3486328E-02
0.6375066E-03 -0.3463445E-03 0.4204219E-03 -0.8859214E-04 0.7990963E-04 0.3219536E-05 0.3108788E-01 -0.1676991E-01
0.1438535E-02 0.4943960E-03 -0.7279194E-03 0.3214664E-03 -0.1294785E-03 0.2818822E-04 0.8845303E-06 0.1690949E-06
-0.6364986E-02 0.2935882E-02 0.4202359E-03 -0.5159086E-03 0.2817712E-03 -0.8492033E-04 0.3165566E-05 0.1013077E-04
-0.1082001E-04 0.2348883E-05 0.1169024E-02 -0.2410467E-03 -0.3398833E-03 0.2020135E-03 -0.5892880E-04 -0.1783775E-05
0.1543860E-04 -0.8686613E-05 0.4445571E-05 -0.1113971E-05 -0.1637620E-03 -0.9641489E-04 0.1365674E-03 -0.4971228E-04

```

-0.1589105E-05 0.1111139E-04 -0.7739175E-05 0.2548251E-05 -0.6449115E-06 0.1663483E-06 0.6755315E-05 0.6280246E-04  
-0.3888358E-04 0.4826950E-05 0.7353787E-05 -0.5526939E-05 0.2139091E-05 -0.2462209E-06 -0.3385054E-06 0.1963832E-06  
0.5244264E-05 -0.2165803E-04 0.7026540E-05 0.3073456E-05 -0.4384955E-05 0.2429853E-05 -0.7355859E-06 0.1451025E-07  
0.3595374E-06 -0.3691024E-06 -0.2173633E-05 0.5131709E-05 0.6105842E-06 -0.2886163E-05 0.2316033E-05 -0.1035616E-05  
-0.1439752E-06 0.6294526E-06 -0.5279323E-06 0.3765800E-06

### coef-sp2.dat

c31-sp:

0.8153053E+01 -0.9692894E+00 0.2365250E-01 0.4249308E-01 -0.2491544E-01 0.9670628E-02 -0.2615466E-02 0.1824802E-03  
0.3420078E-03 -0.2653946E-03 0.1381257E-03 0.1149550E+01 -0.4098036E+00 0.8859065E-01 0.5492271E-02 -0.1864612E-01  
0.1157221E-01 -0.4472327E-02 0.8913028E-03 0.2616922E-03 -0.3420328E-03 0.2099716E-03 -0.1874310E+00 0.4310044E-01  
0.7108610E-02 -0.8845049E-02 0.2404664E-02 0.1006337E-02 -0.1392431E-02 0.7405167E-03 -0.1866112E-03 -0.2776795E-04  
0.7446224E-04 0.3703069E-01 -0.4443650E-02 -0.3046878E-02 0.1005902E-02 0.5680804E-03 -0.5862405E-03 0.1492999E-03  
0.9036957E-04 -0.1072369E-03 0.4975588E-04 -0.9637580E-05 -0.7901754E-02 0.2637468E-03 0.6829561E-03 0.5430332E-04  
-0.2246299E-03 0.5731777E-04 0.5230937E-04 -0.4469400E-04 0.8162636E-05 0.8424871E-05 -0.8648265E-05 0.1732612E-02  
0.5678383E-04 -0.1169616E-03 -0.6148965E-04 0.3968192E-04 0.1397346E-04 -0.1911772E-04 0.2044511E-05 0.5860158E-05  
-0.4139001E-05 0.2862852E-06 -0.3959974E-03 -0.3224297E-04 0.1415549E-04 0.1921800E-04 -0.1922797E-05 -0.5912232E-05  
0.1890740E-05 0.1349026E-05 -0.1066791E-05 0.1125803E-08 -0.5233652E-06

c32-sp:

0.5361559E+01 -0.1572980E+01 0.2049520E+00 -0.7846556E-01 0.8299016E-02 -0.8824511E-02 -0.1138673E-02 -0.1838537E-02  
-0.1109448E-02 -0.4294349E-03 -0.8785443E-03 0.5735448E-04 -0.7058740E-03 0.1780410E-03 -0.4873530E-03 0.1017623E-03  
-0.2501966E-03 0.6378542E+00 -0.1236950E+00 0.3685695E-01 -0.1680451E-01 0.5141880E-02 -0.2874706E-02 0.5305458E-03  
-0.5831946E-03 -0.1476457E-03 -0.8704800E-04 -0.2575462E-03 0.6282047E-04 -0.2497614E-03 0.8644907E-04 -0.1842338E-03  
0.4458050E-04 -0.9942537E-04 -0.9763038E-01 0.3121899E-01 -0.8864656E-02 0.3929481E-02 -0.1113665E-02 0.6278243E-03  
-0.9369600E-04 0.1262634E-03 0.3255974E-04 0.2672842E-04 0.4546609E-04 -0.2602992E-05 0.4056463E-04 -0.9273851E-05  
0.2863479E-04 -0.5153390E-05 0.1572205E-04 0.1936582E-01 -0.7881006E-02 0.2130305E-02 -0.9160710E-03 0.2393815E-03  
-0.1362771E-03 0.1551045E-04 -0.2722004E-04 -0.6425400E-05 -0.8006137E-05 -0.6416262E-05 -0.2205261E-05 -0.4605256E-05  
-0.5714894E-06 -0.2889693E-05 0.8022469E-07 -0.1787854E-05 -0.4236667E-02 0.1994853E-02 -0.5142731E-03 0.2145507E-03  
-0.5175129E-04 0.2984091E-04 -0.2383784E-05 0.5485950E-05 0.1211381E-05 0.1645864E-05 0.8519503E-06 0.1011081E-05  
0.2161406E-07 0.9496493E-06 -0.4052148E-06 0.2309701E-06 -0.3489082E-06 0.9590679E-03 -0.4973860E-03 0.1226586E-03  
-0.4939326E-04 0.1097955E-04 -0.6444647E-05 0.1839192E-06 -0.8219640E-06 -0.3695460E-06 -0.3792480E-06 0.3107347E-07  
-0.3318896E-06 0.5757659E-06 -0.7347979E-06 0.5654071E-06 -0.2408616E-06 0.3803314E-06 -0.2276725E-03 0.1278134E-03  
-0.3087027E-04 0.1236620E-04 -0.3020995E-05 0.1729090E-05 -0.2222395E-06 -0.8845622E-07 0.4406536E-06 -0.3411239E-06  
0.3576948E-06 -0.4512682E-06 0.3493358E-06 -0.2358218E-06 0.2932537E-06 -0.1251779E-06 -0.5353752E-07

### coef-cy1.dat

c11-cy:

0.2221465E+01 -0.3620520E-01 -0.8268046E-02 0.4317581E-03 0.3887309E-04 0.2094211E+01 -0.5147108E-01 -0.1155563E-01  
0.7197846E-03 0.6196894E-04 -0.1379512E+00 -0.1700072E-01 -0.3498577E-02 0.4047523E-03 0.2956446E-04 -0.1005294E-01  
-0.1549879E-02 -0.1169163E-03 0.1403271E-03 0.6123741E-05 0.1079341E-02 0.3156461E-03 0.1295162E-03 0.2315716E-04  
-0.1533262E-05

c12-cy:

0.1779071E+01 -0.4083462E+00 -0.5310906E-02 0.4661407E-03 -0.3828506E-02 0.3044415E-04 -0.4400292E-03 -0.1543930E-03  
0.1546612E+01 -0.4773467E+00 0.1312410E-01 -0.7237401E-03 -0.5009603E-02 0.2734262E-03 -0.6469485E-03 -0.1920165E-03  
-0.2167926E+00 -0.3234134E-01 0.2456476E-01 -0.3234687E-02 -0.7561391E-03 0.3630689E-03 -0.2525374E-03 -0.1540720E-04  
0.1625954E-01 0.3260610E-01 0.1932405E-02 -0.2353415E-02 0.7363011E-03 0.5075528E-04 -0.4548158E-04 0.3188090E-04  
0.2929007E-03 -0.4788284E-02 -0.3772377E-02 0.1635358E-03 0.2827518E-03 -0.1122075E-03 0.1238141E-04 0.7693055E-05  
-0.1973980E-03 -0.4388771E-03 0.6380722E-03 0.4237246E-03 -0.8696982E-04 -0.3229158E-04 0.1713618E-04 -0.4227520E-05

0.7404201E-04 0.2506271E-03 0.1384222E-03 -0.8910549E-04 -0.4664386E-04 0.1821546E-04 0.2141363E-05 -0.2493326E-05

c21-cy:

0.6069302E+01 -0.4427507E+00 -0.4291985E-01 0.2304129E-01 -0.4912500E-02 0.1452130E-03 0.3209221E-03 -0.1325414E-03  
0.1539549E+01 -0.3305709E+00 -0.5228985E-02 0.2289330E-01 -0.7166288E-02 0.6050437E-03 0.4039737E-03 -0.2090237E-03  
-0.2858872E+00 0.1330333E-01 0.1407467E-01 0.1439918E-03 -0.2098477E-02 0.6234431E-03 0.3995320E-04 -0.9021057E-04  
0.6147437E-01 0.4047941E-02 -0.1059811E-02 -0.1243650E-02 0.1445252E-03 0.1751690E-03 -0.6073727E-04 -0.8831524E-05  
-0.1215622E-01 -0.2083113E-02 -0.4298075E-03 0.2092936E-03 0.9912381E-04 -0.2616140E-04 -0.1524532E-04 0.7066107E-05  
0.1575968E-02 0.6625034E-03 0.2220722E-03 0.7455580E-05 -0.2481770E-04 -0.7548795E-05 0.4021174E-05 0.1268487E-05  
0.1815510E-03 -0.1424580E-03 -0.6497648E-04 -0.1606153E-04 0.8943345E-06 0.2980442E-05 0.3937065E-06 -0.5097722E-06

c22-cy:

0.4141958E+01 -0.1281638E+01 0.1303598E+00 -0.4547505E-01 -0.1233707E-03 -0.3710517E-02 -0.1605116E-02 -0.8905901E-03  
-0.5954816E-03 -0.4497418E-03 0.8204121E+00 -0.2821429E+00 0.7298907E-01 -0.3148335E-01 0.7854317E-02 -0.4351285E-02  
0.2896072E-03 -0.7659392E-03 -0.2416948E-03 -0.2962601E-03 -0.1507396E+00 0.7958060E-01 -0.2021227E-01 0.7783793E-02  
-0.1437900E-02 0.5003984E-03 0.2199421E-03 -0.4045299E-04 0.1067167E-03 0.2301351E-05 0.3489782E-01 -0.2260172E-01  
0.5337763E-02 -0.1406527E-02 -0.1653942E-03 0.2546939E-03 -0.2145826E-03 0.9197832E-04 -0.3690739E-04 0.1137596E-04  
-0.8409436E-02 0.5814733E-02 -0.9458856E-03 -0.1217615E-03 0.3320849E-03 -0.2054671E-03 0.8851664E-04 -0.2749325E-04  
0.1015184E-05 0.3618983E-06 0.1871213E-02 -0.1129171E-02 -0.9204703E-04 0.2581500E-03 -0.1776202E-03 0.7363953E-04  
-0.1382882E-04 -0.3042875E-05 0.6229453E-05 -0.2427385E-05 -0.3248878E-03 0.5558354E-04 0.1744945E-03 -0.1357741E-03  
0.5718425E-04 -0.1048763E-04 -0.6275038E-05 0.6113165E-05 -0.3418150E-05 0.1044148E-05 0.2057896E-04 0.7899012E-04  
-0.9015300E-04 0.4494877E-04 -0.8500560E-05 -0.4691093E-05 0.5692392E-05 -0.2910127E-05 0.1066257E-05 -0.1592674E-06  
0.1304076E-04 -0.4492022E-04 0.3009984E-04 -0.8580586E-05 -0.2626810E-05 0.4148022E-05 -0.2459265E-05 0.7508024E-06  
-0.2005674E-07 -0.1015299E-06 -0.6930790E-05 0.1513148E-04 -0.6395625E-05 -0.8878271E-06 0.2857908E-05 -0.1872264E-05  
0.5384441E-06 0.2035627E-07 -0.1097403E-08 -0.2122988E-07

## coef-cy2.dat

c31-cy:

0.8661880E+01 -0.1251079E+01 0.1042082E+00 0.3506539E-01 -0.3504225E-01 0.1907671E-01 -0.7975185E-02 0.2426163E-02  
-0.2426890E-03 -0.2789034E-03 0.3087350E-03 0.1069119E+01 -0.4283679E+00 0.1406468E+00 -0.2275302E-01 -0.1432527E-01  
0.1712217E-01 -0.1055052E-01 0.4476051E-02 -0.1112609E-02 -0.7585917E-04 0.3560128E-03 -0.1741681E+00 0.5555186E-01  
-0.2195060E-02 -0.9982502E-02 0.6735539E-02 -0.1440408E-02 -0.1232394E-02 0.1536624E-02 -0.9277769E-03 0.3523594E-03  
-0.4291567E-04 0.3485038E-01 -0.8216216E-02 -0.2145840E-02 0.2441298E-02 -0.3292730E-03 -0.7381942E-03 0.6230017E-03  
-0.1725154E-03 -0.9835438E-04 0.1311984E-03 -0.8839650E-04 -0.7603182E-02 0.1243426E-02 0.7934863E-03 -0.3573677E-03  
-0.2071395E-03 0.2403551E-03 -0.4581298E-04 -0.6553959E-04 0.6219189E-04 -0.2451676E-04 -0.3407652E-05 0.1717315E-02  
-0.1702199E-03 -0.2127112E-03 0.1704113E-04 0.8432034E-04 -0.3318513E-04 -0.2163293E-04 0.2385415E-04 -0.5041536E-05  
-0.5330820E-05 0.6680470E-05 -0.4087847E-03 0.1536982E-04 0.4926969E-04 0.1229200E-04 -0.2042285E-04 -0.2147187E-05  
0.9263935E-05 -0.2905789E-05 -0.2448338E-05 0.2715506E-05 -0.1076381E-05

c32-cy:

0.5569782E+01 -0.1628615E+01 0.2234288E+00 -0.8704859E-01 0.1127192E-01 -0.1038043E-01 -0.7312936E-03 -0.2148789E-02  
-0.1122070E-02 -0.4823148E-03 -0.9600688E-03 0.7136471E-04 -0.7890586E-03 0.2038466E-03 -0.5491340E-03 0.1157078E-03  
-0.2841894E-03 0.6150463E+00 -0.9449085E-01 0.2709423E-01 -0.1241907E-01 0.3644683E-02 -0.2137900E-02 0.3335064E-03  
-0.4481754E-03 -0.1592669E-03 -0.5457445E-04 -0.2515783E-03 0.7524327E-04 -0.2463427E-03 0.9374492E-04 -0.1835643E-03  
0.4759606E-04 -0.9904367E-04 -0.9182461E-01 0.2365048E-01 -0.6336013E-02 0.2841646E-02 -0.7531819E-03 0.4664985E-03  
-0.5220227E-04 0.1028818E-03 0.3791709E-04 0.1873354E-04 0.5217925E-04 -0.1054867E-04 0.4884724E-04 -0.1660419E-04  
0.3606757E-04 -0.8279994E-05 0.1930485E-04 0.1790440E-01 -0.5943164E-02 0.1487447E-02 -0.6558659E-03 0.1585925E-03  
-0.1065284E-03 0.1045824E-04 -0.2639409E-04 -0.7020818E-05 -0.6855493E-05 -0.9680352E-05 0.2913759E-06 -0.8631066E-05  
0.2736813E-05 -0.6072235E-05 0.1341702E-05 -0.3568657E-05 -0.3873724E-02 0.1506038E-02 -0.3557948E-03 0.1564885E-03  
-0.3694517E-04 0.2772754E-04 -0.4220261E-05 0.7875135E-05 0.4462447E-06 0.2626483E-05 0.1395920E-05 0.4466662E-06  
0.1035373E-05 -0.6644044E-06 0.8845096E-06 -0.1854536E-06 0.5948992E-06 0.8719204E-03 -0.3786348E-03 0.8586940E-04  
-0.3842902E-04 0.9553148E-05 -0.7777480E-05 0.1937663E-05 -0.2555415E-05 0.6555719E-06 -0.1143682E-05 0.8442331E-07  
-0.5991665E-06 0.4527707E-06 -0.3897601E-06 0.4395470E-06 -0.2507070E-06 0.8356345E-07 -0.2066515E-03 0.9850748E-04  
-0.2219065E-04 0.1041386E-04 -0.3353124E-05 0.2716640E-05 -0.1128776E-05 0.1011414E-05 -0.2412439E-06 0.4899352E-06  
-0.3650501E-06 0.3306478E-06 -0.4348494E-06 0.3741659E-06 -0.1206584E-06 0.2622518E-06 -0.2902766E-06