

Appendix II from:

*"An investigation of the microwave spectra of R2O...HX type hydrogen bonded dimers in the gas phase",*  
Zbigniew.KISIEL, PhD Thesis, University of London, 1980.

## APPENDIX II

Tables of eigenvalues and expectation values of  $z^2$  and  $z^4$  for the quartic quadratic oscillator

The tabulated eigenvalues are for the potential  $V(z) = z^4 + Bz^2$  and are to be multiplied by A to give the eigenvalues of the reduced potential  $V(z) = A(z^4 + Bz^2)$ . The eigenvalues and the expectation values are tabulated for values of B from 0 to -10 changing in steps of 0.1. All calculations were carried out with the computer program ANHARM (Johan Mjöberg, University College London 1976) using a basis set of 50 harmonic wavefunctions.

$$V_0 = AB^2/4$$

$$z_{\min}^2 = -B/2$$

TABLE II.1 Eigenvalues of the potential  $V(z)=z^4+Bz^2$  for values of B from 0.0 to -10.0 in steps of 0.1

B	E(0)	E(1)	E(2)	E(3)	E(4)	E(5)
0.0	1.06036	3.79967	7.45570	11.64475	16.26183	21.23837
-0.1	1.02631	3.71143	7.33326	11.49098	16.07970	21.02990
-0.2	0.99653	3.62701	7.21488	11.34127	15.90162	20.82549
-0.3	0.97100	3.54637	7.10057	11.19560	15.72760	20.62513
-0.4	0.94968	3.46947	6.99031	11.05397	15.55762	20.42882
-0.5	0.93252	3.39628	6.88410	10.91637	15.39168	20.23655
-0.6	0.91948	3.32676	6.78194	10.78280	15.22977	20.04832
-0.7	0.91053	3.26087	6.68384	10.65324	15.07189	19.86413
-0.8	0.90561	3.19856	6.58980	10.52770	14.91804	19.68397
-0.9	0.90467	3.13980	6.49981	10.40617	14.76822	19.50783
-1.0	0.90765	3.08454	6.41390	10.28865	14.62241	19.33571
-1.1	0.91450	3.03272	6.33207	10.17512	14.48061	19.16762
-1.2	0.92515	2.88431	6.25433	10.06559	14.34283	19.00354
-1.3	0.93954	2.93925	6.18069	9.96005	14.20905	18.84348
-1.4	0.95758	2.89749	6.11119	9.85851	14.07928	18.68742
-1.5	0.97921	2.85897	6.04583	9.76094	13.95351	18.53537
-1.6	1.00462	2.82364	5.98465	9.66737	13.83175	18.38733
-1.7	1.03284	2.79145	5.92769	9.57777	13.71399	18.24329
-1.8	1.06467	2.76232	5.87469	9.49216	13.60023	18.10325
-1.9	1.09968	2.73620	5.82653	9.41052	13.49048	17.96722
-2.0	1.13779	2.71303	5.78243	9.33287	13.38472	17.83518
-2.1	1.17885	2.69273	5.74272	9.25919	13.28298	17.70715
-2.2	1.22273	2.67525	5.70747	9.18949	13.18524	17.58311
-2.3	1.26931	2.66050	5.67673	9.12376	13.09151	17.46307
-2.4	1.31841	2.64842	5.65059	9.06201	13.00180	17.34704
-2.5	1.36989	2.63893	5.62912	9.00424	12.91611	17.23501
-2.6	1.42357	2.63197	5.61242	8.95044	12.83445	17.12689
-2.7	1.47927	2.62743	5.60058	8.90062	12.75683	17.02295
-2.8	1.53680	2.62526	5.59372	8.85477	12.68324	16.92294
-2.9	1.59595	2.62536	5.59193	8.81289	12.61372	16.82694
-3.0	1.65651	2.62766	5.59534	8.77499	12.54826	16.73495
-3.1	1.71826	2.63207	5.60406	8.74105	12.48688	16.64698
-3.2	1.78098	2.63850	5.61828	8.71107	12.42959	16.56305
-3.3	1.84443	2.64686	5.63796	8.68506	12.37642	16.48314
-3.4	1.90838	2.65707	5.66339	8.66299	12.32739	16.40727
-3.5	1.97259	2.66903	5.69463	8.64487	12.28251	16.33544
-3.6	2.03682	2.68267	5.73179	8.63068	12.24181	16.26767
-3.7	2.10086	2.69788	5.77497	8.62041	12.20532	16.20396
-3.8	2.16448	2.71458	5.82427	8.61405	12.17307	16.14432
-3.9	2.22747	2.73267	5.87974	8.61156	12.14510	16.08876
-4.0	2.28965	2.75208	5.94144	8.61294	12.12144	16.03729

TABLE II.1 (Continued)

B	E(0)	E(1)	E(2)	E(3)	E(4)	E(5)
-4.1	2.35084	2.77270	6.00937	8.61816	12.10215	15.98992
-4.2	2.41089	2.79446	6.08354	8.62718	12.08727	15.94667
-4.3	2.46966	2.81726	6.16390	8.63998	12.07686	15.90754
-4.4	2.52707	2.84102	6.25037	8.65650	12.07097	15.87255
-4.5	2.58303	2.86566	6.34284	8.67672	12.06969	15.84171
-4.6	2.63747	2.89110	6.44117	8.70058	12.07309	15.81504
-4.7	2.69038	2.91726	6.54517	8.72802	12.08124	15.79255
-4.8	2.74174	2.94406	6.65464	8.75898	12.09426	15.77426
-4.9	2.79156	2.97144	6.76931	8.79341	12.11224	15.76018
-5.0	2.83986	2.99932	6.88862	8.83122	12.13529	15.75033
-5.1	2.88668	3.02765	7.01315	8.87233	12.16356	15.74472
-5.2	2.93208	3.05634	7.14166	8.91667	12.19717	15.74336
-5.3	2.97611	3.08536	7.27409	8.96414	12.23629	15.74628
-5.4	3.01884	3.11464	7.41006	9.01465	12.28107	15.75107
-5.5	3.06034	3.14413	7.54916	9.06809	12.33170	15.76499
-5.6	3.10067	3.17378	7.69095	9.12435	12.38836	15.78080
-5.7	3.13992	3.20355	7.83500	9.18332	12.45126	15.80094
-5.8	3.17814	3.23341	7.98085	9.24488	12.52060	15.82540
-5.9	3.21542	3.26330	8.12803	9.30891	12.59661	15.85420
-6.0	3.25181	3.29321	8.27606	9.37529	12.67950	15.88734
-6.1	3.28738	3.32309	8.42447	9.44387	12.76948	15.92482
-6.2	3.32218	3.35293	8.57279	9.51452	12.86677	15.96663
-6.3	3.35627	3.38269	8.72056	9.58712	12.97155	16.01277
-6.4	3.38971	3.41236	8.86733	9.66152	13.08399	16.06323
-6.5	3.42254	3.44192	9.01268	9.73758	13.20424	16.11798
-6.6	3.45479	3.47135	9.15624	9.81516	13.33237	16.17700
-6.7	3.48653	3.50064	9.29765	9.89414	13.46845	16.24026
-6.8	3.51776	3.52978	9.43662	9.97435	13.61247	16.30772
-6.9	3.54854	3.55875	9.57290	10.05569	13.76434	16.37934
-7.0	3.57889	3.58755	9.70630	10.13800	13.92395	16.45506
-7.1	3.60884	3.61617	9.83666	10.22117	14.09108	16.53483
-7.2	3.63842	3.64460	9.96392	10.30506	14.26546	16.61856
-7.3	3.66763	3.67285	10.08803	10.38956	14.44674	16.70618
-7.4	3.69651	3.70091	10.20899	10.47454	14.63452	16.79761
-7.5	3.72508	3.72877	10.32687	10.55991	14.82833	16.89273
-7.6	3.75334	3.75644	10.44173	10.64556	15.02766	16.99144
-7.7	3.78132	3.78392	10.55368	10.73139	15.23191	17.09362
-7.8	3.80903	3.81120	10.66286	10.81731	15.44049	17.19915
-7.9	3.83647	3.83829	10.76940	10.90323	15.65274	17.30788
-8.0	3.86367	3.86519	10.87345	10.98909	15.86798	17.41967
-8.1	3.89063	3.89189	10.97516	11.07480	16.08551	17.53437
-8.2	3.91736	3.91841	11.07467	11.16030	16.30460	17.65181
-8.3	3.94386	3.94474	11.17214	11.24554	16.52453	17.77183
-8.4	3.97016	3.97088	11.26770	11.33047	16.74459	17.89425
-8.5	3.99625	3.99685	11.36148	11.41504	16.96405	18.01890

TABLE II.1 (Continued)

B	E(0)	E(1)	E(2)	E(3)	E(4)	E(5)
-8.6	4.02214	4.02263	11.45363	11.49921	17.18224	18.14560
-8.7	4.04783	4.04824	11.54423	11.58293	17.39852	18.27417
-8.8	4.07334	4.07368	11.63341	11.66622	17.61228	18.40441
-8.9	4.09867	4.09894	11.72127	11.74900	17.82299	18.53615
-9.0	4.12381	4.12404	11.80788	11.83129	18.03020	18.66920
-9.1	4.14879	4.14898	11.89333	11.91305	18.23353	18.80338
-9.2	4.17359	4.17375	11.97770	11.99428	18.43268	18.93853
-9.3	4.19824	4.19836	12.06106	12.07496	18.62745	19.07446
-9.4	4.22272	4.22282	12.14346	12.15510	18.81773	19.21102
-9.5	4.24704	4.27713	12.22495	12.23468	19.00348	19.34804
-9.6	4.27121	4.27128	12.30560	12.31372	19.18472	19.48537
-9.7	4.29523	4.29529	12.38543	12.39219	19.36156	19.62288
-9.8	4.31911	4.31915	12.46450	12.47012	19.53412	19.76043
-9.9	4.34284	4.34287	12.54283	12.54749	19.70261	19.89789
-10.0	4.36642	4.36645	12.62046	12.62433	19.86720	20.03516

TABLE II.2 Expectation values of  $z^2$  and  $z^4$  for the reduced potential  $V(z)=A(z^4+Bz^2)$ , for values of B from 0.0 to -10.0 in steps of 0.1

B	$\langle z^2 \rangle_{0,0}$	$\langle z^2 \rangle_{1,1}$	$\langle z^2 \rangle_{2,2}$	$\langle z^2 \rangle_{3,3}$	$\langle z^2 \rangle_{4,4}$	$\langle z^4 \rangle_{0,0}$	$\langle z^4 \rangle_{1,1}$	$\langle z^4 \rangle_{2,2}$	$\langle z^4 \rangle_{3,3}$	$\langle z^4 \rangle_{4,4}$
0.0	0.36202	0.90160	1.24471	1.55791	1.84161	0.3534	1.2665	2.4852	3.8815	5.4206
-0.1	0.36908	0.91326	1.25406	1.56737	1.85102	0.3658	1.2972	2.5271	3.9339	5.4824
-0.2	0.37647	0.92527	1.26346	1.57689	1.86049	0.3790	1.3290	2.5700	3.9873	5.5452
-0.3	0.38422	0.93763	1.27289	1.58648	1.87001	0.3930	1.3621	2.6139	4.0416	5.6090
-0.4	0.39235	0.95036	1.28235	1.59614	1.87959	0.4078	1.3965	2.6587	4.0969	5.6737
-0.5	0.40088	0.96347	1.29182	1.60586	1.88922	0.4236	1.4324	2.7044	4.1532	5.7394
-0.6	0.40985	0.97698	1.30129	1.61563	1.89890	0.4404	1.4697	2.7511	4.2105	5.8061
-0.7	0.41929	0.99091	1.31073	1.62546	1.90862	0.4583	1.5085	2.7987	4.2688	5.8738
-0.8	0.42922	1.00526	1.32014	1.63535	1.91838	0.4774	1.5489	2.8473	4.3280	5.9424
-0.9	0.43968	1.02006	1.32949	1.64528	1.92819	0.4978	1.5911	2.8968	4.3883	6.0121
-1.0	0.45072	1.03531	1.33875	1.65526	1.93803	0.5197	1.6350	2.9471	4.4497	6.0828
-1.1	0.46238	1.05105	1.34789	1.66527	1.94790	0.5430	1.6808	2.9983	4.5120	6.1545
-1.2	0.47470	1.06728	1.35690	1.67533	1.95780	0.5681	1.7285	3.0503	4.5754	6.2271
-1.3	0.48773	1.08402	1.36578	1.68542	1.96773	0.5950	1.7784	3.1030	4.6398	6.3008
-1.4	0.50152	1.10130	1.37435	1.69554	1.97768	0.6239	1.8303	3.1564	4.7053	6.3755
-1.5	0.51614	1.11913	1.38272	1.70568	1.98764	0.6550	1.8846	3.2105	4.7718	6.4513
-1.6	0.53165	1.13753	1.39079	1.71585	1.99761	0.6885	1.9412	3.2650	4.8393	6.5280
-1.7	0.54811	1.15652	1.39852	1.72604	2.00759	0.7246	2.0003	3.3200	4.9079	6.6057
-1.8	0.56560	1.17612	1.40586	1.73624	2.01757	0.7636	2.0621	3.3753	4.9775	6.6844
-1.9	0.58420	1.19635	1.41275	1.74645	2.02754	0.8057	2.1266	3.4308	5.0481	6.7642
-2.0	0.60398	1.21724	1.41913	1.75668	2.03750	0.8512	2.1939	3.4863	5.1198	6.8449
-2.1	0.62503	1.23879	1.42493	1.76691	2.04743	0.9005	2.2643	3.5416	5.1925	6.9265
-2.2	0.64745	1.26104	1.43009	1.77714	2.05733	0.9538	2.3379	3.5966	5.2663	7.0091
-2.3	0.67134	1.28400	1.43453	1.78738	2.06720	1.0116	2.4148	3.6510	5.3410	7.0927
-2.4	0.69679	1.30770	1.43819	1.79761	2.07701	1.0743	2.4951	3.7046	5.4168	7.1771
-2.5	0.72390	1.33215	1.44099	1.80786	2.08677	1.1423	2.5790	3.7571	5.4936	7.2624
-2.6	0.75278	1.35737	1.44285	1.81810	2.09645	1.2160	2.6667	3.8084	5.5715	7.3486
-2.7	0.78354	1.38339	1.44370	1.82836	2.10606	1.2959	2.7584	3.8580	5.6504	7.4356
-2.8	0.81628	1.41021	1.44347	1.83862	2.11556	1.3826	2.8541	3.9057	5.7303	7.5234
-2.9	0.85109	1.43785	1.44210	1.84890	2.12496	1.4765	2.9541	3.9512	5.8113	7.6119
-3.0	0.88805	1.46634	1.43953	1.85921	2.13422	1.5782	3.0585	3.9941	5.8934	7.7012

TABLE II.2 (Continued)

B	$\langle z^2 \rangle_{0,0}$	$\langle z^2 \rangle_{1,1}$	$\langle z^2 \rangle_{2,2}$	$\langle z^2 \rangle_{3,3}$	$\langle z^2 \rangle_{4,4}$	$\langle z^4 \rangle_{0,0}$	$\langle z^4 \rangle_{1,1}$	$\langle z^4 \rangle_{2,2}$	$\langle z^4 \rangle_{3,3}$	$\langle z^4 \rangle_{4,4}$
-3.1	0.92726	1.49569	1.43574	1.86955	2.14335	1.6882	3.1676	4.0343	5.3765	7.7910
-3.2	0.96876	1.52590	1.43059	1.87994	2.15230	1.8070	3.2814	4.0715	6.0609	7.8814
-3.3	1.01261	1.55699	1.42439	1.89039	2.16107	1.9350	3.4001	4.1054	6.1463	7.9723
-3.4	1.05882	1.58897	1.41687	1.90091	2.16963	2.0727	3.5240	4.1360	6.2330	8.0636
-3.5	1.10738	1.62185	1.40819	1.91153	2.17795	2.2205	3.6531	4.1631	6.3210	8.1552
-3.6	1.15825	1.65562	1.39843	1.92227	2.18600	2.3787	3.7877	4.1868	6.4103	8.2470
-3.7	1.21136	1.69030	1.38773	1.93316	2.19375	2.5474	3.9278	4.2072	6.5010	8.3388
-3.8	1.26661	1.72588	1.37626	1.94421	2.20116	2.7268	4.0737	4.2246	6.5933	8.4306
-3.9	1.32384	1.76235	1.36421	1.95547	2.20820	2.9169	4.2255	4.2393	6.6872	8.5221
-4.0	1.38290	1.79971	1.35185	1.96698	2.21481	3.1176	4.3832	4.2520	6.7829	8.6133
-4.1	1.44359	1.83796	1.33943	1.97876	2.22055	3.3285	4.5471	4.2634	6.8804	8.7038
-4.2	1.50567	1.87707	1.32728	1.99086	2.22656	3.5495	4.7173	4.2742	6.9801	8.7934
-4.3	1.56892	1.91704	1.31571	2.00332	2.23158	3.7799	4.8937	4.2855	7.0820	8.8819
-4.4	1.63308	1.95785	1.30507	2.01620	2.23595	4.0194	5.0767	4.2983	7.1863	8.9691
-4.5	1.69792	1.99947	1.29572	2.02955	2.23958	4.2672	5.2661	4.3139	7.2933	9.0544
-4.6	1.76319	2.04188	1.28800	2.04342	2.24240	4.5229	5.4621	4.3336	7.4033	9.1377
-4.7	1.82867	2.08506	1.28227	2.05786	2.24431	4.7857	5.6647	4.3586	7.5164	9.2184
-4.8	1.89415	2.12897	1.27886	2.07294	2.24522	5.0552	5.8740	4.3905	7.5330	9.2961
-4.9	1.95947	2.17359	1.27810	2.08871	2.24502	5.3306	6.0900	4.4307	7.7534	9.3703
-5.0	2.02445	2.21888	1.28029	2.10523	2.24360	5.6114	6.3127	4.4806	7.8778	9.4404
-5.1	2.08898	2.26481	1.28572	2.12257	2.24085	5.8972	6.5420	4.5416	8.0066	9.5058
-5.2	2.15296	2.31134	1.29465	2.14079	2.23662	6.1876	6.7781	4.6153	8.1403	9.5660
-5.3	2.21631	2.35844	1.30733	2.15995	2.23080	6.4821	7.0207	4.7030	8.2790	9.6201
-5.4	2.27898	2.40608	1.32399	2.18011	2.22327	6.7806	7.2700	4.8063	8.4232	9.6674
-5.5	2.34096	2.45421	1.34483	2.20132	2.21388	7.0827	7.5259	4.9265	8.5733	9.7073
-5.6	2.40221	2.50279	1.37002	2.22364	2.20254	7.3884	7.7883	5.0650	8.7297	9.7389
-5.7	2.46276	2.55180	1.39974	2.24713	2.18914	7.6976	8.0572	5.2231	8.8926	9.7616
-5.8	2.52261	2.60120	1.43409	2.27182	2.17360	8.0101	8.3324	5.4020	9.0626	9.7747
-5.9	2.58178	2.65094	1.47316	2.29777	2.15588	8.3259	8.6139	5.6029	9.2400	9.7778
-6.0	2.64032	2.70101	1.51699	2.32502	2.13599	8.6452	8.9017	5.8266	9.4251	9.7704
-6.1	2.69824	2.75135	1.56557	2.35359	2.11398	8.9678	9.1957	6.0739	9.6183	9.7525
-6.2	2.75560	2.80196	1.61882	2.38350	2.08996	9.2938	9.4957	6.3453	9.8199	9.7241
-6.3	2.81243	2.85279	1.67660	2.41479	2.06413	9.6234	9.8017	6.6410	10.0303	9.6857
-6.4	2.86876	2.90382	1.73870	2.44747	2.03677	9.9566	10.1138	6.9609	10.2497	9.6382
-6.5	2.92465	2.95502	1.80483	2.48153	2.00823	10.2935	10.4316	7.3043	10.4783	9.5829

TABLE II.2 (Continued)

B	$\langle z^2 \rangle_{0,0}$	$\langle z^2 \rangle_{1,1}$	$\langle z^2 \rangle_{2,2}$	$\langle z^2 \rangle_{3,3}$	$\langle z^2 \rangle_{4,4}$	$\langle z^4 \rangle_{0,0}$	$\langle z^4 \rangle_{1,1}$	$\langle z^4 \rangle_{2,2}$	$\langle z^4 \rangle_{3,3}$	$\langle z^4 \rangle_{4,4}$
-6.6	2.98012	3.00638	1.87461	2.51699	1.97896	10.6341	10.7552	7.6703	10.7165	9.5215
-6.7	3.03521	3.05786	1.94762	2.55382	1.94947	10.9786	11.0845	8.0577	10.9643	9.4563
-6.8	3.08996	3.10945	2.02338	2.59202	1.92037	11.3271	11.4194	8.4648	11.2219	9.3898
-6.9	3.14439	3.16114	2.10135	2.63155	1.89229	11.6796	11.7600	8.8896	11.4895	9.3251
-7.0	3.19854	3.21289	2.18100	2.67240	1.86592	12.0362	12.1060	9.3301	11.7672	9.2656
-7.1	3.25244	3.26471	2.26178	2.71451	1.84195	12.3970	12.4575	9.7838	12.0549	9.2147
-7.2	3.30609	3.31657	2.34317	2.75786	1.82107	12.7621	12.8144	10.2485	12.3527	9.1763
-7.3	3.35954	3.36847	2.42469	2.80238	1.80394	13.1315	13.1767	10.7220	12.6606	9.1539
-7.4	3.41280	3.42039	2.50591	2.84803	1.79120	13.5053	13.5442	11.2022	12.9784	9.1514
-7.5	3.46588	3.47233	2.58648	2.89474	1.78342	13.8836	13.9171	11.6872	13.3062	9.1723
-7.6	3.51881	3.52427	2.66610	2.94246	1.78112	14.2664	14.2951	12.1755	13.6436	9.2202
-7.7	3.57160	3.57622	2.74454	2.99112	1.78476	14.6538	14.6784	12.6657	13.9907	9.2982
-7.8	3.62426	3.62815	2.82165	3.04065	1.79474	15.0458	15.0668	13.1569	14.3472	9.4095
-7.9	3.67380	3.68008	2.89731	3.09099	1.81140	15.4425	15.4604	13.6481	14.7128	9.5567
-8.0	3.72924	3.73200	2.97148	3.14207	1.83499	15.8438	15.8591	14.1391	15.0874	9.7426
-8.1	3.78158	3.78390	3.04414	3.19382	1.86571	16.2499	16.2628	14.6293	15.4707	9.9691
-8.2	3.83383	3.83577	3.11533	3.24618	1.90366	16.6607	16.6717	15.1187	15.8626	10.2382
-8.3	3.88600	3.88763	3.18508	3.29908	1.94887	17.0763	17.0856	15.6073	16.2600	10.5511
-8.4	3.93810	3.93946	3.25346	3.35246	2.00125	17.4967	17.5046	16.0953	16.1706	10.9085
-8.5	3.99012	3.99126	3.32056	3.40626	2.06061	17.9219	17.9286	16.5828	17.0863	11.3106
-8.6	4.04209	4.04303	3.38646	3.46043	2.12663	18.3520	18.3576	17.0702	17.5095	11.7568
-8.7	4.09399	4.09478	3.45124	3.51491	2.19889	18.7869	18.7916	17.5578	17.9400	12.2455
-8.8	4.14584	4.14650	3.51500	3.56965	2.27680	19.2267	19.2307	18.0458	18.3774	12.7746
-8.9	4.19764	4.19818	3.57782	3.62461	2.35968	19.6714	19.6747	18.5347	18.8216	13.3409
-9.0	4.24939	4.24984	3.63979	3.67975	2.44676	20.1210	20.1237	19.0247	19.2723	13.9407
-9.1	4.30110	4.30147	3.70098	3.73503	2.53720	20.5754	20.5778	19.5163	19.7294	14.5694
-9.2	4.35277	4.35307	3.76148	3.79042	2.63010	21.0348	21.0368	20.0096	20.1927	15.2222
-9.3	4.40439	4.40464	3.82133	3.84588	2.72461	21.4991	21.5007	20.5051	20.6620	15.8943
-9.4	4.45598	4.45619	3.88062	3.90139	2.81988	21.9684	21.9697	21.0030	21.1371	16.5806
-9.5	4.50753	4.50770	3.93939	3.95693	2.91516	22.4425	22.4437	21.5036	21.6179	17.2765
-9.6	4.55905	4.55919	3.99769	4.01247	3.00980	22.9217	22.9226	22.0071	22.1044	17.9778
-9.7	4.61054	4.61065	4.05556	4.06799	3.10324	23.4057	23.4065	22.5136	22.5963	18.6809
-9.8	4.66199	4.66209	4.11306	4.12349	3.19597	23.8947	23.8953	23.0235	23.0935	19.3828
-9.9	4.71342	4.71350	4.17021	4.17895	3.28498	24.3887	24.3892	23.5369	23.5961	20.0812
-10.0	4.76482	4.76488	4.22705	4.23436	3.37276	24.8876	24.8880	24.0539	24.1039	20.7745