DIFFERENTIAL UBV PHOTOMETRY OF β LYRAE, V

by

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Abstract

New observations are tabulated.

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This is the fifth in a series of papers which, as was explained in Papers I, II, III, and IV (Lovell and Hall, 1970, 1971; Landis, Lovell, and Hall 1973; Landis, Lovell, Frazier, and Hall 1973), should be helpful in understanding the changes in the light curve of β Lyrae. Between April and November of 1973 Landis obtained 118 differential UBV observations; between March and October Lovell obtained 83.

The equipment, observing techniques, and data reduction procedures were essentially the same as those described in Paper IV. Lovell re-determined his transformation coefficients by making 31 measures of seven different standard stars on two nights in March 1973, finding $\varepsilon = + 0.035$, $\mu = 0.935$, and $\psi = 1.047$. The values actually used in the present analysis were $\varepsilon = + 0.03$, $\mu = 0.94$, and $\psi = 1.05$. Lovell used a smaller diaphragm this year, 55 arc seconds in diameter, which excluded the light from β^2 Lyrae.

The standard deviation of observations made on the same night was on the average $\pm 0^m.007$, $\pm 0^m.007$, $\pm 0^m.009$ in V, B, U for Landis and $\pm 0^m.018$, $\pm 0^m.013$, $\pm 0^m.022$ in V, B, U, for Lovell. As explained in Paper IV, the actual uncertainty of each differential measure could be somewhat larger. In this connection, we draw attention to an erratum (JAAVSO 3, 35, 1974).

The observations are listed in Tables I and II, which give differential magnitudes in the sense β Lyrae minus γ Lyrae. As in the previous papers of this series, phases are computed from

$$JD(hel.) = 2{,}436{,}379.532 + 12^d.93016\ E.$$

The differential V magnitudes are plotted in Figure 1.

REFERENCES

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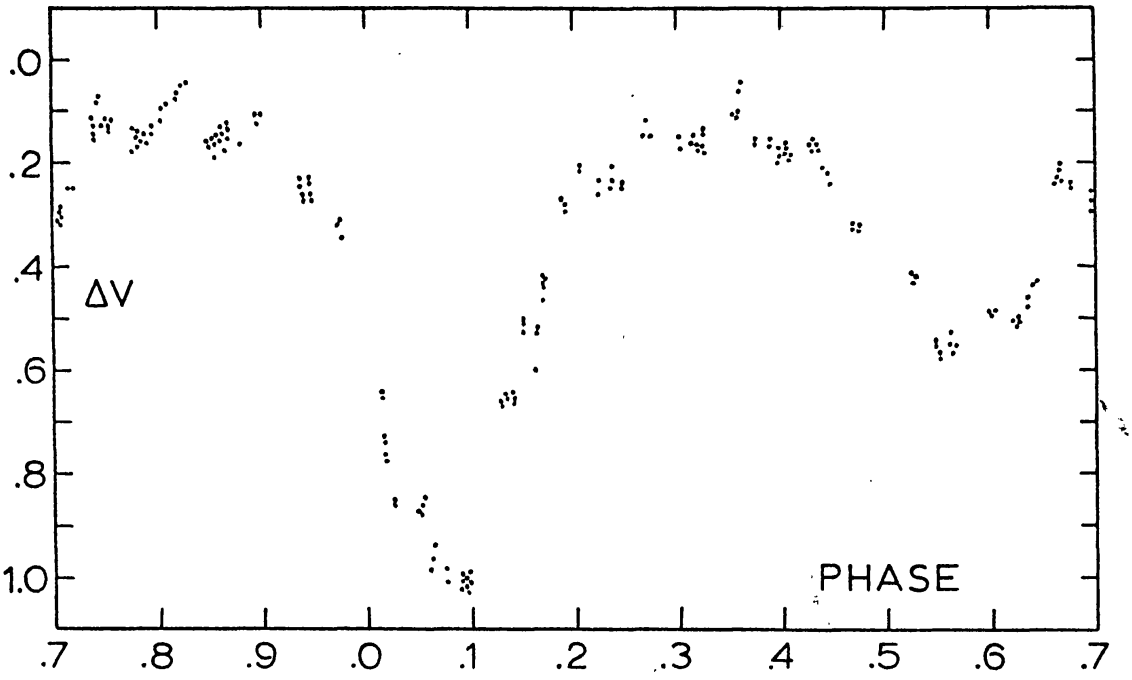

Figure 1. Differential V observations of β Lyrae in the sense β Lyrae minus γ Lyrae.

Table I

Differential UBV Observations (Landis)

JD(hel.) 2441000+	Phase	ΔV	ΔB	ΔU	JD(hel.) 2441000+	Phase	ΔV	ΔB	ΔU
793.896	0.7391	+0.146	+0.193	-0.290	958.544	0.4728	+0.330	+0.400	-0.056
.901	.7395	+0.154	+0.198	-0.298	959.537	.5496	+0.580	+0.616	+0.166
801.878	.3564	+0.111	+0.162	-0.336	.542	.5500	+0.568	+0.611	+0.167
.883	.3568	+0.109	+0.164	-0.335	960.519	.6255	+0.501	+0.534	+0.087
802.838	.4307	+0.174	+0.236	-0.236	.525	.6260	+0.500	+0.541	+0.086
.843	.4311	+0.170	+0.242	-0.243	961.522	.7031	+0.293	+0.364	-0.138
806.850	.7410	+0.116	+0.188	-0.310	.527	.7035	+0.291	+0.365	-0.117
.855	.7413	+0.130	+0.187	-0.313	963.515	.8573	+0.162	+0.213	-0.277
807.838	.8174	+0.078	+0.136	-0.373	.525	.8580	+0.156	+0.205	-0.276
.844	.8179	+0.069	+0.133	-0.371	964.550	.9373	+0.228	+0.287	-0.173
812.838	.2041	+0.211	+0.283	-0.211	.555	.9377	+0.243	+0.315	-0.151
.843	.2045	+0.207	+0.270	-0.217	965.516	.0119	+0.645	+0.724	+0.311
818.829	.6674	+0.202	+0.274	-0.216	.521	.0123	+0.643	+0.747	+0.316
.834	.6679	+0.213	+0.269	-0.224	966.554	.0923	+0.995	+1.101	+0.700
819.800	.7426	+0.083	+0.162	-0.341	.559	.0926	+1.009	+1.106	+0.685
.806	.7430	+0.078	+0.143	-0.351	.566	.0932	+1.022	+1.109	+0.698
820.793	.8193	+0.033	+0.090	-0.408	967.513	.1664	+0.534	+0.610	+0.200
.798	.8197	+0.040	+0.098	-0.402	.518	.1668	+0.522	+0.591	+0.177
823.811	.0527	+0.881	+0.986	+0.550	973.505	.6298	+0.462	+0.505	+0.054
.817	.0532	+0.880	+0.982	+0.562	.510	.6302	+0.469	+0.502	+0.040
824.804	.1295	+0.662	+0.733	+0.272	974.510	.7076	+0.270	+0.329	-0.157
.810	.1300	+0.667	+0.747	+0.294	.516	.7080	+0.268	+0.327	-0.162
832.792	.7473	+0.134	+0.185	-0.319	975.501	.7842	+0.160	+0.205	-0.293
.800	.7477	+0.135	+0.180	-0.352	.506	.7846	+0.152	+0.209	-0.286
833.767	.8227	+0.052	+0.111	-0.386	976.507	.8620	+0.154	+0.205	-0.288
.773	.8232	+0.054	+0.108	-0.379	.513	.8625	+0.155	+0.189	-0.291
836.748	.0532	+0.862	+0.972	+0.549	977.498	.9386	+0.261	+0.317	-0.154
.755	.0537	+0.850	+0.962	+0.546	.504	.9391	+0.268	+0.323	-0.155
850.705	.1326	+0.650	+0.742	+0.300	978.498	.0160	+0.740	+0.843	+0.457
.711	.1331	+0.654	+0.743	+0.296	.506	.0166	+0.778	+0.860	+0.464
857.742	.6769	+0.242	+0.279	-0.193	979.504	.0938	+1.010	+1.103	+0.651
.746	.6772	+0.242	+0.287	-0.187	.510	.0942	+0.992	+1.116	+0.657
876.645	.1389	+0.647	+0.801	+0.363	980.505	.1712	+0.429	+0.511	+0.070
.650	.1392	+0.667	+0.752	+0.305	.510	.1716	+0.424	+0.505	+0.062
.655	.1396	+0.654	+0.779	+0.356	981.503	.2484	+0.242	+0.282	-0.205
885.644	.8348	+0.051	+0.129	-0.374	.508	.2488	+0.223	+0.271	-0.214
.649	.8352	+0.058	+0.110	-0.388	982.505	.3257	+0.141	+0.198	-0.304
892.636	.3756	+0.158	+0.197	-0.334	.510	.3263	+0.139	+0.194	-0.310
.641	.3759	+0.160	+0.206	-0.316	983.488	.4019	+0.185	+0.264	-0.173
914.619	.0757	+1.009	+1.108	+0.681	.492	.4023	+0.176	+0.260	-0.170
.624	.0760	+0.982	+1.093	+0.658	985.501	.5576	+0.529	+0.590	+0.151
916.565	.2262	+0.267	+0.324	-0.195	.505	.5579	+0.549	+0.638	+0.178
.570	.2266	+0.238	+0.317	-0.174	986.514	.6359	+0.461	+0.520	+0.070
917.564	.3035	+0.174	+0.219	-0.299	.518	.6363	+0.478	+0.518	+0.088
.569	.3038	+0.151	+0.208	-0.333	988.527	.7916	+0.130	+0.189	-0.286
944.546	.3902	+0.157	+0.218	-0.277	.532	.7920	+0.143	+0.184	-0.299
.552	.3907	+0.167	+0.223	-0.278	989.503	.8671	+0.142	+0.198	-0.274
945.554	.4681	+0.327	+0.388	-0.100	.509	.8675	+0.146	+0.196	-0.360
.560	.4686	+0.328	+0.385	-0.104	990.526	.9462	+0.242	+0.313	-0.139
946.582	.5476	+0.545	+0.573	+0.159	.531	.9466	+0.235	+0.302	-0.145
.586	.5480	+0.554	+0.590	+0.144	998.490	.5621	+0.571	+0.606	+0.161
947.542	.6218	+0.507	+0.540	+0.048	.495	.5625	+0.558	+0.592	+0.156
.585	.6224	+0.511	+0.535	+0.061	999.485	.6391	+0.437	+0.487	+0.043
950.579	.8567	+0.164	+0.205	-0.290	.490	.6395	+0.437	+0.480	+0.039
.583	.8571	+0.158	+0.203	-0.280	1000.485	.7164	+0.252	+0.306	-0.163
954.517	.1613	+0.531	+0.609	+0.148	.490	.7168	+0.252	+0.314	-0.172
.522	.1617	+0.508	+0.571	+0.123	1003.484	.9484	+0.263	+0.319	-0.136
.528	.1622	+0.504	+0.578	+0.144	.489	0.9489	+0.270	+0.321	-0.131
958.533	.4720	+0.345	+0.412	-0.049					
.539	0.4724	+0.330	+0.381	-0.066					

Table II

Differential UBV Observations (Lovell)

JD(hel.) 2441000+	Phase	ΔV	ΔB	ΔU	JD(hel.) 2441000+	Phase	ΔV	ΔB	ΔU
769.847	0.8792	+0.166	+0.172	-0.299	917.733	0.3164	+0.149	+0.192	-0.326
781.796	.8033	+0.119	+0.146	-0.382	.741	.3171	+0.165	+0.199	-0.308
.804	.8038	+0.094	+0.119	-0.346	.748	.3176	+0.166	+0.178	-0.312
.812	.8044	+0.089	+0.131	-0.324	923.690	.7771	+0.180	+0.215	-0.294
786.792	.1896	+0.274	+0.327	-0.116	.699	.7778	+0.135	+0.180	-0.224
.799	.1902	+0.284	+0.340	-0.139	.706	.7783	+0.139	+0.159	-0.280
.808	.1908	+0.296	+0.319	-0.147	928.670	.1623	+0.602	+0.594	+0.159
787.818	.2689	+0.147	+0.223	-0.324	929.638	.2371	+0.249	+0.279	-0.193
.824	.2695	+0.122	+0.212	-0.335	.647	.2378	+0.210	+0.293	-0.210
.832	.2701	+0.149	+0.193	-0.326	.656	.2385	+0.240	+0.298	-0.182
818.767	.6625	+0.241	+0.257	-0.242	935.644	.7016	+0.301	+0.325	-0.162
.775	.6631	+0.228	+0.238	-0.266	.652	.7022	+0.258	+0.300	-0.198
.782	.6637	+0.237	+0.239	-0.211	.660	.7029	+0.281	+0.303	-0.197
834.722	.8964	+0.106	+0.168	-0.372	936.644	.7790	+0.151	+0.204	-0.303
.735	.8975	+0.122	+0.163	-0.364	.652	.7796	+0.172	+0.196	-0.330
.740	.8978	+0.107	+0.154	-0.396	.661	.7802	+0.161	+0.192	-0.295
840.711	.3596	+0.116	+0.141	-0.380	937.641	.8560	+0.158	+0.194	-0.345
.720	.3603	+0.063	+0.121	-0.418	.649	.8567	+0.190	+0.194	-0.309
.728	.3610	+0.046	+0.150	-0.382	944.633	.3968	+0.203	+0.232	-0.244
841.661	.4331	+0.171	+0.247	-0.242	.642	.3975	+0.178	+0.193	-0.290
.669	.4337	+0.160	+0.236	-0.311	.650	.3981	+0.191	+0.193	-0.254
.677	.4343	+0.174	+0.220	-0.257	950.624	.8601	+0.138	+0.188	-0.321
848.664	.9747	+0.318	+0.357	-0.067	.632	.8607	+0.146	+0.171	-0.287
.670	.9752	+0.317	+0.352	-0.089	.641	.8614	+0.178	+0.165	-0.341
.677	.9757	+0.343	+0.382	-0.084	952.653	.0171	+0.743	+0.837	+0.460
858.707	.7514	+0.117	+0.165	-0.288	.664	.0179	+0.763	+0.839	+0.482
.715	.7521	+0.143	+0.231	-0.259	956.582	.3209	+0.174	+0.223	-0.353
.725	.7528	+0.116	+0.148	-0.362	.591	.3216	+0.167	+0.202	-0.336
869.657	.5983	+0.487	+0.563	+0.065	.600	.3223	+0.175	+0.200	-0.327
.666	.5990	+0.487	+0.519	-0.006	961.591	.7083	+0.312	+0.331	-0.167
.675	.5997	+0.493	+0.519	+0.027	.600	.7090	+0.303	+0.330	-0.173
875.652	.0619	+0.986	+1.058	+0.643	.609	.7097	+0.320	+0.323	-0.168
.660	.0625	+0.965	+1.067	+0.635	970.552	.4013	+0.178	+0.222	-0.235
.669	.0632	+0.938	+1.059	+0.647	.560	.4020	+0.197	+0.214	-0.268
880.640	.4477	+0.215	+0.284	-0.276	.570	.4027	+0.195	+0.210	-0.284
.648	.4483	+0.220	+0.304	-0.230	978.618	.0251	+0.857	+0.964	+0.594
.656	.4489	+0.247	+0.306	-0.220	.627	.0259	+0.860	+0.948	+0.518
881.625	.5239	+0.418	+0.464	-0.032	979.517	.0947	+1.020	+1.117	+0.693
.634	.5246	+0.434	+0.455	-0.013	.534	.0960	+1.026	+1.136	+0.746
.642	0.5252	+0.426	+0.469	-0.041	.542	.0966	+1.015	+1.155	+0.689
					980.514	.1718	+0.466	+0.508	+0.016
					.521	.1723	+0.442	+0.494	+0.050
					.529	0.1729	+0.430	+0.481	+0.038