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CCD TIMES OF MINIMA OF FAINT ECLIPSING BINARIES II

ŠAFÁŘ, JAN; ZEJDA, MILOSLAV

N. Copernicus Observatory and Planetarium, Kraví hora 2, Brno, Czech Republic
e-mail: safarplanetar@email.cz, zejda@sci.muni.cz

The list given below contains 152 times of minima of 99 individual eclipsing binaries. All minima have been obtained in 1998 by means of a SBIG ST 7 CCD camera attached to the 400-mm $f/1750$ Newton reflector at the N. Copernicus Observatory and Planetarium Brno.

The camera was used without any filter so that only magnitudes in the instrumental, red sensitive (close to R-band) system could be obtained. The exposures ran mostly 60 s. The MUNIDOS software packet (Hroch & Novák, 1997) was used for observation processing. The results are given in Table 1. The following data are given: The name of the star, the heliocentric JD of minimum (-2400000), the error of the determination of minimum obtained by the Gaspani's (1995) method having the meaning of a standard deviation of the determination, the abbreviation of the name of the observer(s), the total number of images used, the number of images (points) on the descending branch, the epoch and the $O - C$ value relative to the linear light elements taken from the 4th edition of the GCVS (Kholopov, 1985) or to another light elements. The cases of missing or wrong light elements in GCVS are marked by (*) at the name of the star. The others than GCVS's elements are given in Table 2. The majority of minima given in Table 1 are primary ones. Secondary minima are marked in the column *Notes*. The times of minima obtained by superposition of two or more parts of light curve from different nights are denoted as "normal min." in Table 1.

References:

- Gaspani, A., 3rd GEOS workshop on variable star data acquisition and processing techniques, 13-14 May 1995, S. Pellegrino Terme, Italy
Hroch, F., Novák, R., 1997, MUNIDOS, <http://ian.cz/munipack/>
Kholopov, P. N. et al., 1985, General Catalogue of Variable Stars, 4th edition, Moscow

Table 1: Times of minima of observed systems

Starname	JDhel	Error	Observer	TotN	DescN	Epoch	$O - C$	Notes
GK And	51129.3858	0.0031	JŠ	17	7	6214.0	-0.2383	
EX Aqr	51036.5451	0.0025	JŠ	28	14	14790.0	0.0307	
	51045.4347	0.0130	MZ	19	10	14800.0	0.0264	
GK Aqr*	51036.3908	0.0018	JŠ	13	4	17724.0	0.0893	
LT Aql	50947.5578	0.0055	MZ	12	8	13594.0	0.0642	
	51045.4011	0.0024	MZ	18	9	13647.0	0.0590	
V631 Aql	51081.3870	0.0020	MZ	13	7	18975.0	-0.4359	
V770 Aql	51081.4175	0.0028	MZ	14	9	14022.0	-0.4941	sec. min.
V873 Aql	51040.4507	0.0020	MZ	15	8	34648.0	0.0196	
V919 Aql	50961.4510	0.0022	JŠ	18	8	19561.0	-0.0192	
V1045 Aql	50927.5605	0.0019	JŠ	17	11	10582.0	-0.0090	
V1075 Aql	51040.4643	0.0027	MZ	18	9	26567.0	-0.0149	
V1299 Aql	51016.4547	0.0035	JŠ	24	15	6574.0	-0.0359	
FR Aur	50899.3803	0.0034	JŠ	21	14	6521.5	-0.1293	sec. min.
HU Aur	51129.2836	0.0025	JŠ	15	5	17345.0	-0.0199	
LV Aur*	50849.4144	0.0035	JŠ	45	16	3403.0	-0.2355	
V379 Aur*	50841.3046	0.0028	JŠ	10	7	8745.0	-0.0692	
	50849.4139	0.0021	JŠ	10	6	8751.0	-0.0661	
	50895.3481	0.0021	JŠ	17	8	8785.0	-0.0672	
	50899.4026	0.0028	JŠ	20	12	8788.0	-0.0658	
TU Boo	50895.4495	0.0025	JŠ	18	10	54979.0	0.0815	
TY Boo	50849.5976	0.0021	JŠ	24	13	51614.0	-0.0888	
	50919.5274	0.0063	MZ	11	5	51834.0	0.0685	
AR Boo	50919.4714	0.0081	MZ	10	4	34215.0	-0.0660	
RY Cnc	50888.4525	0.0018	JŠ	45	17	7713.0	0.0361	
EH Cnc*	50895.4231	0.0022	JŠ	19	11	12264.0	0.0301	
	50899.3922	0.0035	JŠ	25	14	12273.5	0.0279	sec. min.
	50927.4049	0.0026	JŠ	27	21	12340.5	0.0323	sec. min.
AP CMi*	50864.3328	0.0021	JŠ	17	10	1738.0	-0.0144	
CV Cas	50849.3713	0.0021	JŠ	21	11	4843.0	0.4792	
GH Cas	50849.3490	0.0028	JŠ	16	8	6614.0	-0.2714	
MM Cas	51045.5200	0.0036	MZ	22	13	13504.0	0.0581	
MS Cas	50961.4358	0.0024	JŠ	22	15	13546.0	0.0309	
IM Cep	50943.4194	0.0028	MZ	17	7	22800.0	-0.0748	
LL Cep	50947.4753	0.0040	MZ	18	11	30387.0	0.0067	normal min.
	51045.4856	0.0067	MZ	20	11	30512.0	-0.0019	
V357 Cep*	50829.2556	0.0014	JŠ	24	12	3301.0	-0.1209	
V358 Cep*	50839.3165	0.0021	JŠ	16	8	11839.0	0.0242	
	50864.3757	0.0021	JŠ	36	17	11892.0	0.0234	normal min.
CC Com	50849.5945	0.0014	JŠ	23	6	51276.5	-0.0085	sec. min.
	50919.5497	0.0024	MZ	17	9	51593.5	-0.0109	sec. + normal min.
	50925.3987	0.0006	JŠ	18	6	51620.0	-0.0101	
	50937.4264	0.0013	MZ	9	6	51674.5	-0.0098	sec. min.
	50946.3646	0.0012	JŠ	26	18	51715.0	-0.0094	
CN Com	50895.4597	0.0030	JŠ	17	8	17985.0	0.0513	
GM Cyg	51016.5516	0.0015	JŠ	53	32	3921.0	-0.2600	
PW Cyg	51081.4063	0.0030	MZ	17	10	9311.0	-0.0438	
V370 Cyg	50947.5392	0.0021	MZ	12	7	21068.0	-0.0133	
V443 Cyg	50947.5353	0.0017	MZ	12	7	28455.0	0.0274	
V500 Cyg	51016.4602	0.0031	JŠ	26	14	23973.0	0.0632	
V680 Cyg	51016.4255	0.0042	JŠ	26	11	6001.0	0.0494	
V706 Cyg	50947.5299	0.0066	MZ	10	6	23230.0	-0.0241	
	50961.5147	0.0020	JŠ	20	8	23260.0	-0.0270	
	51040.3400	0.0014	MZ	21	9	23429.0	0.0011	normal min.
	51040.5547	0.0017	MZ	16	11	23429.5	-0.0174	sec. min.
	51045.4416	0.0071	MZ	25	14	23440.0	-0.0262	
	51081.3424	0.0018	MZ	11	4	23517.0	-0.0271	

Table 1 (cont.)

Starname	JDhel	Error	Observer	TotN	DescN	Epoch	$O - C$	Notes
V963 Cyg	50899.5948	0.0015	JŠ	33	12	23332.0	0.0016	
	50943.5272	0.0016	MZ	12	6	23395.0	0.0020	
	51040.4569	0.0026	MZ	20	10	23534.0	0.0023	
V995 Cyg	51036.5781	0.0015	JŠ	45	33	6941.0	0.2233	
V1048 Cyg	50943.4402	0.0033	MZ	16	10	31326.0	0.0152	
	51142.3596	0.0014	MZ	12	8	31594.0	0.0185	normal min.
V1130 Cyg	51036.3792	0.0030	JŠ	15	8	32378.0	-0.0308	
V1321 Cyg	50943.5031	0.0104	MZ	13	7	38823.0	0.0551	
	51142.2998	0.0051	MZ	11	5	39369.0	0.0587	
V1414 Cyg	51120.2623	0.0022	JŠ	19	9	31300.0	0.0385	
V1723 Cyg	51045.3752	0.0017	MZ	19	10	9390.0	0.0386	
V1787 Cyg*	50943.3969	0.0015	MZ	14	6	7428.0	0.0481	
	51045.4499	0.0037	MZ	21	9	7566.0	0.0363	
V1870 Cyg*	50927.4893	0.0017	JŠ	17	8	12259.0	-0.0171	
	51040.4300	0.0017	MZ	15	7	12402.0	-0.0174	
	51142.3090	0.0013	MZ	11	5	12531.0	-0.0222	
V1908 Cyg*	50961.4567	0.0034	JŠ	19	8	3251.0	-0.1716	
EQ Del	51016.3853	0.0026	JŠ	25	7	10418.0	-0.0552	
WX Dra	50899.5695	0.0026	JŠ	44	23	3179.0	0.0146	
	51045.5211	0.0030	MZ	16	8	3260.0	0.0152	
XY Dra	50888.5629	0.0015	JŠ	83	36	10867.0	0.5272	
	50895.5095	0.0045	JŠ	43	21	10870.0	0.5311	
	50961.4891	0.0031	JŠ	32	21	10898.5	-0.6017	sec. min.
AR Dra	50919.4903	0.0083	MZ	10	7	11912.0	0.0026	
CM Dra	50895.5706	0.0025	JŠ	24	5	6308.5	0.0020	sec. min.
GM Gem	50841.2817	0.0028	JŠ	13	6	15052.0	-0.0061	
	50864.3955	0.0021	JŠ	20	13	15069.0	-0.0067	normal min.
	51129.5252	0.0016	JŠ	15	9	15264.0	-0.0127	
HR Gem	50899.3809	0.0032	JŠ	21	14	19252.0	0.0172	
KV Gem*	50839.3303	0.0028	JŠ	17	9			
	50849.3680	0.0028	JŠ	12	5			
V502 Her	51016.4443	0.0027	JŠ	18	11	54371.0	0.0024	
V643 Her	51036.3199	0.0040	JŠ	20	4	12237.0	-0.2632	
V719 Her	50946.3488	0.0014	JŠ	11	7	27832.0	0.1370	
	51045.3824	0.0024	MZ	13	5	28127.0	0.0889	
V732 Her	50899.5045	0.0028	JŠ	16	8	17770.0	-0.1645	
	51120.2815	0.0024	JŠ	19	11	18190.0	-0.1022	
AG Lac	51036.3339	0.0015	JŠ	13	4	34898.5	0.0402	sec. min.
	51081.4630	0.0045	MZ	17	9	34958.5	0.0385	sec. min.
EL Lac	50943.4750	0.0076	MZ	14	6	9064.0	0.1343	normal min.
EX Lac	51043.3925	0.0018	JŠ	22	13	15091.0	0.1918	
IP Lac	50943.5457	0.0017	MZ	11	6	20049.0	0.0622	
	50961.4353	0.0028	JŠ	21	14	20070.0	0.0596	
	51081.5712	0.0011	MZ	13	5	20211.0	0.0620	
UX Leo	50895.4403	0.0035	JŠ	25	14	13423.0	-0.2595	
VZ Leo	50888.3005	0.0016	JŠ	17	8	18097.0	-0.0444	
CE Leo	50888.2880	0.0013	JŠ	19	7	19249.5	-0.0010	sec. min.
	50895.4150	0.0028	JŠ	15	6	19273.0	-0.0046	
SX Lyn	50921.3604	0.0049	MZ	10	5	19358.5	-0.0024	sec. min.
	50849.5293	0.0028	JŠ	19	5	2675.0	-0.0060	
AH Lyn*	50925.4266	0.0023	JŠ	20	11	13064.0	-0.0018	
RVLyr	51036.4858	0.0040	JŠ	38	17	1531.0	-0.0908	
ET Lyr	51142.2704	0.0076	MZ	22	14	6545.0	-0.0555	normal min.
GZ Lyr	50943.4196	0.0059	MZ	12	6	9313.0	-0.0055	
V401 Lyr	50927.4432	0.0025	JŠ	21	9	15158.0	-0.0658	
UU Mon	50849.3013	0.0021	JŠ	20	12	17060.0	0.0046	
AY Mon	50841.2829	0.0035	JŠ	19	6	10537.0	0.0147	
NN Mon	50888.3940	0.0027	JŠ	22	16	22751.5	0.0602	sec. min.

Table 1 (cont.)

Starname	JDhel	Error	Observer	TotN	DescN	Epoch	$O - C$	Notes
V396 Mon	50841.3736	0.0035	JŠ	18	7	40550.5	-0.0310	sec. min.
	51129.5117	0.0023	JŠ	24	14	41277.5	-0.0357	sec. min.
V752 Oph	50927.5368	0.0024	JŠ	40	14	4371.0	-0.0667	
V396 Mon	50832.2573	0.0028	JŠ	18	6	40527.5	-0.0314	sec. min.
GU Ori*	50839.4256	0.0021	JŠ	32	7	16507.0	-0.0087	
	50888.3750	0.0024	JŠ	19	10	16611.0	-0.0101	
OS Ori	50849.3661	0.0028	JŠ	21	13	2292.0	-0.0222	
V645 Ori	50839.3591	0.0035	JŠ	24	8	21710.0	0.0353	
BX Peg	50829.2453	0.0021	JŠ	21	8	23657.0	-0.0467	
CE Peg	51043.5017	0.0005	JŠ	25	17	40893.0	-0.2222	
PS Per	50839.2981	0.0021	JŠ	18	7	37472.0	0.0528	
	50841.4035	0.0021	JŠ	14	11	37475.0	0.0517	
QU Per	51129.2428	0.0024	JŠ	23	11	6267.0	-0.0051	
DK Sge	51081.4724	0.0032	MZ	19	12	24848.0	0.1189	normal min.
	51129.3503	0.0020	JŠ	18	15	24925.0	0.1167	
DK Sct	51036.3865	0.0030	JŠ	17	7	18297.0	0.0285	
BI Ser	50921.4635	0.0069	MZ, JŠ	22	12	3865.0	0.1806	normal min.
	50927.4877	0.0042	JŠ	23	11	3870.0	0.1804	
CX Ser	50849.6004	0.0021	JŠ	25	8	19689.5	-0.0665	sec. min.
	50921.4009	0.0054	MZ	9	5	19761.5	-0.0710	sec. min.
	50927.3844	0.0020	JŠ	19	13	19767.5	-0.0713	sec. min.
AC Tau	50849.2598	0.0021	JŠ	15	7	2551.0	0.0686	
AQ Tau	50841.2828	0.0056	JŠ	16	5	17427.0	-0.0502	
	51129.4363	0.0027	JŠ	19	10	17664.0	-0.0660	
V407 Tau	50839.4669	0.0042	JŠ	48	21	6980.0	0.2916	
BT Vul	51043.4686	0.0010	JŠ	29	14	13706.0	0.0014	
DN Vul	51043.4620	0.0010	JŠ	29	20	6197.0	0.8983	
FF Vul	50961.4966	0.0018	JŠ	17	5	34327.0	0.0122	
	51043.3771	0.0013	JŠ	19	7	34511.0	0.0153	
	51129.2541	0.0022	JŠ	16	6	34704.0	0.0100	
FM Vul	50899.5818	0.0024	JŠ	30	14	9105.0	0.0192	
GI Vul	50947.4901	0.0025	MZ	12	5	32984.0	-0.0148	
	51081.3425	0.0021	MZ	11	6	33262.0	-0.0147	
NO Vul	50895.5939	0.0017	JŠ	19	9	12270.0	-0.0466	
	50937.4815	0.0016	MZ	9	5	12383.0	-0.0558	
	50947.4989	0.0026	MZ	13	6	12410.0	-0.0492	
	51081.3473	0.0023	MZ	12	7	12771.0	-0.0482	

Observers: JŠ: J. Šafář, MZ: M. Zejda

Table 2: Other published light elements used

Starname	Basic epoch	Period	Reference
GK Aqr	2445233.292	0.3274097	Kurochkin, N. E., 1986, VS 22, No. 3, 327
LV Aur	2439026.590	3.474305	Splittgerber, E., 1985, MVS 10, No. 7, 153
V379 Aur	2439026.564	1.351036	Splittgerber, E., 1985, MVS 10, No. 7, 153
EH Cnc	2445768.624	0.418034	Figer, A., le Borgne, J. F., Dumont, M., 1985, IBVS No. 2755
AP CMi	2447105.34	2.162835	Borovička, J., 1990, BBSAG Bull. 95
V357 Cep	2446507.463	1.309274	Borovička, J., 1988, Brno Contribution 28, 34
V358 Cep	2445241.471	0.4728289	Diethelm, R., 1990, BBSAG Bull 96
V1787 Cyg	2445449.6	0.7396	Locher, K., 1983, BBSAG Bull. 67
V1870 Cyg	2441245.385	0.789797	Margoni, R., et al., 1989, AsApSuppl 81, 393
V1908 Cyg	2442950.490	2.4642074	Zemljannikova, S. V., 1986, VS 22, No. 3, 359
KV Gem			light elements given in GCVS are wrong
AH Lyn	2437647.022	1.016412	Kinman, T.D., Mahaffey, C.T., Wirtanen, C.A., 1982, AJ 87, 314
GU Ori	2443069.903	0.470681	Samolyk, G., 1985, JAAVSO 14, No. 1, 12