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Visual Minima Timings of Eclipsing Binaries Observed in the Years 1992-1996

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Abstract: This paper contains a list of 283 new times of minima and 77 revised times of minima for 63 eclipsing binaries derived by the author from his visual observations.

In this paper I present results of my visual observations of eclipsing binary stars carried out in the years 1992-1996. In the years 1992-1993 I observed eclipsing binaries at my home at the town of Soběslav (South Bohemia) and in 1994-1996 at the Petřín Hill Observatory in Prague. All these observations were done visually by the Argelander step method and its Nijland-Blazhko modification.

At the Soběslav observing site I used two prismatic binoculars, 8 x 30 and 16 x 50, and a prismatic monocular Sport 25 x 70 (the first number means magnifying power and the second one the diameter of object lens in millimetres). At the Petřín Hill Observatory the observations were mostly done with the use of the 0.20 m refractor in the observation room with sliding roof, sometimes with the 0.35 m Maksutov-Cassegrain telescope in the western dome, and only on single nights with the 0.18 m refractor in the main dome and the 0.30 m refractor at the Kleť subsidiary station. For details see http://www.geocities.com/sunhillobserv/pmvisobs/pmvisobs.htm.

Altogether 76 eclipsing binaries were observed by me. For 63 of these stars I was able to determine at least one time of minimum light. The times of minima were determined with the use of a computer version of the tracing paper method. Almost in all cases of superposition (folding) of observations from two or more nights the instant light elements valid for given observing season were used. Total number of derived minimum timings amounted to 360. Most of them are published here for the first time. These new times minima are given in Table 1.

Minor part of the minima timings was published earlier in the Contributions of the Nicholas Copernicus Observatory and Planetarium in Brno (Zejda, 1995; Zejda, 2002). The editors of the Contributions, in accordance with their policy of helping beginner observers, checked the source data and re-determined times of minima sent to them. However, my later experience put in question the reliability of their determinations. Therefore during preparation of this paper I made further revision of these minima timings and I present here the revised values beside the values that appeared in the Brno Contributions. They are given in Table 2.

In both the tables the 1st column contains star names, the 2nd column contains heliocentric Julian Dates of minima times, the 3rd column contains O-C residuals in fractions of a day calculated with respect to the light elements presented in Table 3, the 4th column contains numbers of estimates used for determination of respective minima times, the 5th column contains abbreviations of instruments used for observation (B8x30 = binocular 8 x 30, B16x50 = binocular 16 x 50, M25x70 = monocular Sport 25 x 70, RF200 = 0.20 m refractor, RF300 = 0.30 m refractor, MC350 = 0.35 m Maksutov-Cassegrain telescope), the 6th column contains remarks about accuracy, superposition of data or averaging of minimum times from more than one night, and about secondary minima (Min.II), in Table 2 it contains also the values of minima times published in the Brno Contributions No. 31 (BRNO31) and No. 32 (BRNO32). In the notes below Table 3 calendar dates of relevant nights are given for superposed or averaged observations.

Table 1. New times of minima of 54 eclipsing binaries.

Star name	Heliocentric Julian Date (-2400000)	O-C	No.of esti-mates	Instrum.	Remark
RT And	49537.471	0.002	14	RF200	
RT And	49547.535	0.003	23	RF200	
RT And	49559.479	-0.003	16	RF200	

RT And	49564.512	-0.001	23	RF200	
RT And	49569.539	-0.005	18	RF200	
RT And	49574.576	0.000	14	RF200	
RT And	49581.488	-0.006	14	RF200	
RT And	49591.559	0.002	17	RF200	
RT And	49605.391	-0.002	17	RF200	
RT And	49612.306	-0.006	14	RF200	
RT And	49615.456	0.000	14	RF200	
RT And	49618.599	-0.002	14	RF200	
RT And	49620.489	0.001	16	RF200	
RT And	49623.635	0.003	16	RF200	
RT And	49624.261	0.000	15	RF200	superposition 1)
RT And	49625.517	-0.002	16	RF200	
RT And	49630.551	0.000	17	RF200	
RT And	49632.441	0.004	16	RF200	
RT And	49639.353	-0.003	24	RF200	
RT And	49644.379	-0.008	18	RF200	
RT And	49646.273	-0.001	19	RF200	
RT And	49652.559	-0.004	17	RF200	
RT And	49661.366	-0.002	15	RF200	
RT And	49673.314	-0.004	8	RF200	
RT And	49688.412	0.000	16	RF200	
RT And	49830.546	-0.004	16	RF200	
RT And	49898.475	0.000	22	RF200	
RT And	49920.487	0.000	22	RF200	
RT And	49925.520	0.001	23	RF200	
RT And	49932.435	-0.002	20	RF200	
RT And	49935.579	-0.002	30	RF200	
RT And	49939.352	-0.003	27	RF200	
RT And	49942.496	-0.004	20	RF200	
RT And	49952.564	0.001	31	RF200	
RT And	49978.353	0.004	20	RF200	
RT And	50017.344	0.002	25	RF200	low accuracy
RT And	50191.555	-0.001	17	RF200	
RT And	50242.502	0.003	22	RF200	
TW And	49632.410	-0.021	55	RF200	superposition 2)
CO And	49639.409	0.016	15	RF200	
CO And	49659.503	0.006	16	RF200	superposition 3)
CO And	49661.330	0.005	17	RF200	
CO And	49977.514	0.003	20	MC350	superposition 4)
HV Aqr	49934.625	0.005	13	RF200	Min.II, superposition 5)
HV Aqr	49935.550	-0.006	20	RF200	
HV Aqr	49983.481	-0.006	12	RF200	
HV Aqr	49989.490	0.012	15	RF200	
HV Aqr	49999.386	-0.015	20	RF200	Min.II
HV Aqr	50000.341	0.004	23	RF200	
HV Aqr	50015.325	0.009	24	RF200	
HV Aqr	50017.379	0.004	36	RF200	Min.II, superposition 6)
V346 Aql	49565.562	-0.003	29	RF200	
V346 Aql	49574.415	-0.001	20	RF200	
V346 Aql	49594.328	-0.002	17	RF200	
V346 Aql	49605.393	-0.001	23	RF200	
V346 Aql	49636.371	-0.001	23	RF200	
V346 Aql	49646.327	-0.003	23	RF200	
V346 Aql	49866.493	-0.003	24	RF200	
V346 Aql	49897.471	-0.003	28	RF200	

V346 Aql	49907.427	-0.004	30	RF200	
V346 Aql	49918.490	-0.005	19	RF200	
V346 Aql	49939.513	-0.003	33	RF200	
TT Aur	49605.512	-0.011	15	RF200	
TT Aur	49625.506	-0.008	17	RF200	
TT Aur	49645.499	-0.006	19	RF200	
TT Aur	49661.499	0.001	24	RF200	
TT Aur	49785.432	-0.010	16	RF200	superposition 7)
WW Aur	48985.711	-0.013	10	B16x50	Min.II, superposition 8)
UW Boo	49811.450	0.009	20	RF200	
UW Boo	49830.531	0.000	18	RF200	
CV Boo	49866.413	0.003	16	RF200	
SV Cam	49536.521	0.022	22	RF200	
SV Cam	49539.497	0.033	22	RF200	superposition 9)
SV Cam	49545.429	0.034	30	RF200	superposition 10)
SV Cam	49558.472	0.029	14	RF200	
SV Cam	49564.409	0.036	24	RF200	
SV Cam	49580.411	0.025	22	RF200	
SV Cam	49661.663	0.026	17	RF200	
SV Cam	49673.536	0.038	17	RF200	
SV Cam	49692.506	0.030	18	RF200	
SV Cam	49693.685	0.023	14	RF200	
SV Cam	49778.491	0.020	22	RF200	
SV Cam	49842.556	0.033	27	RF200	
SV Cam	49896.527	0.035	17	RF200	
SV Cam	49899.489	0.031	25	RF200	
SV Cam	49915.505	0.034	22	RF200	
SV Cam	49918.470	0.034	24	RF200	
SV Cam	49924.405	0.038	18	RF200	
SV Cam	49989.638	0.034	32	RF200	superposition 11)
SV Cam	50189.504	0.035	27	RF200	
SV Cam	50195.434	0.034	44	RF200	
TW Cas	49221.453	0.029	16	M25x70	
TW Cas	49568.506	0.000	16	RF200	
TW Cas	49628.453	-0.043	14	RF200	low accuracy
TW Cas	49658.492	0.001	17	RF200	low accuracy
TW Cas	49661.341	-0.006	13	RF200	low accuracy
TW Cas	49688.487	0.002	17	RF200	low accuracy
TW Cas	49778.461	-0.009	16	RF200	low accuracy
BZ Cas	49630.547	0.176	14	RF200	low accuracy
MM Cas	49693.575	0.048	33	MC350	superposition 12)
U Cep	48934.409	0.056	11	M25x70	superposition 13)
XX Cep	49923.481	-0.007	18	RF200	
XZ Cep	49623.485	0.016	36	RF200	superposition 14)
ZZ Cep	49605.611	0.002	26	RF200	superposition 15)
ZZ Cep	49618.458	-0.002	21	RF200	
ZZ Cep	49920.459	0.006	28	RF200	

EK Cep	49567.445	0.008	20	RF200	
EK Cep	49620.582	0.011	16	RF200	low accuracy
SS Cet	49612.641	-0.022	16	RF200	superposition 16)
SS Cet	49630.488	-0.019	17	RF200	
U CrB	49122.778	0.062	27	B16x50	superposition 17)
MY Cyg	49207.483	-0.017	12	M25x70	
MY Cyg	49221.520	0.002	18	M25x70	Min.II
MY Cyg	49918.442	0.021	19	RF200	Min.II
MY Cyg	49920.421	-0.003	21	RF200	
MY Cyg	49924.437	0.008	18	RF200	
MY Cyg	49942.452	0.000	28	RF200	Min.II
V477 Cyg	49568.564	-0.002	15	RF200	
V477 Cyg	49594.378	-0.005	13	RF200	
V477 Cyg	49615.501	-0.005	15	RF200	
V477 Cyg	49688.265	0.002	22	RF200	
V477 Cyg	49906.525	-0.008	18	RF200	
V477 Cyg	50197.546	-0.014	21	RF200	
V477 Cyg	50244.491	-0.009	26	RF200	
V1034 Cyg	49923.498	-0.018	16	RF200	
V1034 Cyg	49924.483	-0.010	18	RF200	
V1034 Cyg	49925.463	-0.007	24	RF200	
W Del	49600.498	-0.012	39	RF200	superposition 18)
DM Del	49547.424	-0.061	24	RF200	low accuracy
DM Del	49563.486	-0.047	43	RF200	superposition 19)
DM Del	49568.543	-0.058	24	RF200	
DM Del	49569.402	-0.044	26	RF200	
DM Del	49574.463	-0.051	24	RF200	
DM Del	49612.455	-0.070	28	RF200	
DM Del	49618.390	-0.047	19	RF200	
DM Del	49623.459	-0.046	44	RF200	superposition 20)
DM Del	49634.422	-0.064	26	RF200	
DM Del	49645.414	-0.053	39	RF200	superposition 21)
DM Del	49673.298	-0.043	16	RF200	
DM Del	49977.371	-0.054	31	RF200	
BH Dra	49618.452	0.000	21	RF200	
BH Dra	49658.427	-0.005	22	RF200	
BH Dra	49896.486	-0.004	19	RF200	
EF Dra	49995.376	0.006	84	RF200	Min.II, mean 22)
EF Dra	49999.405	0.007	77	RF200	mean 23)
EF Dra	50180.457	-0.001	45	RF200	mean 24)
EF Dra	50189.573	-0.001	45	RF200	Min.II, superposition 25)
EF Dra	50195.505	-0.006	31	RF200	Min.II
S Equ	49630.485	0.051	40	RF200	superposition 26)
WX Eri	49673.549	0.005	14	RF200	WX Eri = V1241 Tau
WX Eri	49688.367	0.004	20	RF200	WX Eri = V1241 Tau
WX Eri	49692.490	0.011	17	RF200	WX Eri = V1241 Tau
SX Gem	49702.580	-0.043	21	MC350	
SX Gem	49989.620	-0.047	18	RF200	superposition 27)

TX Her	49481.438	0.010	17	RF200	
TX Her	49484.499	-0.019	16	RF200	Min.II
TX Her	49897.509	0.000	23	RF200	
TX Her	49932.526	0.000	19	RF200	
UX Her	49580.387	0.028	22	RF200	
AK Her	49872.497	0.005	14	RF200	low accuracy
AK Her	49896.518	-0.001	22	RF200	
AK Her	49906.427	0.002	14	RF200	Min.II
AK Her	49907.491	0.012	21	RF200	
AK Her	49918.447	0.009	17	RF200	
AK Her	49923.507	0.011	20	RF200	
AK Her	49942.475	0.010	26	RF200	
AK Her	49978.305	0.011	20	RF200	
AK Her	50013.284	0.003	18	RF200	
AK Her	50191.588	0.004	14	RF200	
AK Her	50197.489	0.003	26	RF200	
MX Her	49480.486	-0.311	29	RF200	superposition 28)
UV Leo	49785.347	0.018	18	RF200	
UV Leo	49811.446	0.013	26	RF200	Min.II
UV Leo	49830.350	0.015	24	RF200	
UV Leo	50180.508	0.023	20	RF200	Min.II
UV Leo	50181.402	0.017	26	RF200	
UV Leo	50189.507	0.021	19	RF200	Min.II
XY Leo	50191.487	-0.015	25	RF200	Min.II
BO Mon	49693.633	-0.074	26	MC350	
BO Mon	49702.534	-0.074	19	MC350	
BO Mon	49722.560	-0.075	24	MC350	
IL Mon	49678.718	-0.108	20	MC350	superposition 29)
IL Mon	49783.402	-0.108	39	RF200	
SX Oph	49889.484	0.003	16	RF200	
V839 Oph	49486.518	0.127	19	RF200	
V839 Oph	49536.393	0.104	17	RF200	superposition 30)
V839 Oph	49539.464	0.108	22	RF200	Min.II, superposition 31)
V839 Oph	49576.480	0.110	21	RF200	superposition 32)
V839 Oph	49600.399	0.102	29	RF200	Min.II, superposition 33)
V839 Oph	49612.266	0.108	17	RF200	Min.II, superposition 34)
V839 Oph	49624.325	0.102	19	RF200	superposition 35)
V839 Oph	49783.632	0.105	41	RF200	Min.II
V839 Oph	49830.469	0.112	26	RF200	
V839 Oph	49840.486	0.109	28	RF200	Min.II
V839 Oph	49842.531	0.109	38	RF200	Min.II
V839 Oph	49843.549	0.105	48	RF200	
V839 Oph	49853.572	0.107	31	RF200	Min.II
V839 Oph	49866.457	0.109	32	RF200	
V839 Oph	49872.382	0.103	23	RF200	Min.II
V839 Oph	49889.563	0.107	30	RF200	Min.II
V839 Oph	49896.520	0.111	32	RF200	Min.II
V839 Oph	49897.544	0.112	27	RF200	
V839 Oph	49898.369	0.119	39	RF200	superposition 36)
V839 Oph	49898.561	0.107	20	RF200	Min.II

V839 Oph	49899.389	0.117	31	RF200	Min.II
V839 Oph	49900.404	0.109	44	RF200	
V839 Oph	49906.540	0.110	25	RF200	
V839 Oph	49907.560	0.108	21	RF200	Min.II
V839 Oph	49909.409	0.116	37	RF200	
V839 Oph	49915.542	0.114	23	RF200	
V839 Oph	49918.411	0.120	24	RF200	
V839 Oph	49920.451	0.115	35	RF200	
V839 Oph	49923.515	0.112	24	RF200	Min.II
V839 Oph	49924.538	0.113	24	RF200	
V839 Oph	49925.359	0.116	31	RF200	
V839 Oph	49925.569	0.121	19	RF200	Min.II
V839 Oph	49932.522	0.121	24	RF200	Min.II
V839 Oph	49934.356	0.115	31	RF200	
V839 Oph	49935.375	0.111	42	RF200	Min.II
V839 Oph	49936.400	0.114	42	RF200	
V839 Oph	49939.463	0.109	40	RF200	Min.II
V839 Oph	49941.505	0.106	41	RF200	Min.II
V839 Oph	49942.528	0.107	21	RF200	
V839 Oph	49948.455	0.103	38	RF200	Min.II
V839 Oph	49953.361	0.101	40	RF200	Min.II
V839 Oph	49977.297	0.111	35	RF200	
V839 Oph	49978.322	0.114	38	RF200	Min.II
V839 Oph	49995.296	0.114	32	RF200	
V839 Oph	50002.247	0.112	46	RF200	
V839 Oph	50013.290	0.113	21	RF200	
V839 Oph	50180.569	0.112	34	RF200	
V839 Oph	50181.591	0.112	45	RF200	Min.II
V839 Oph	50189.564	0.110	40	RF200	
V839 Oph	50191.613	0.114	30	RF200	
V839 Oph	50195.501	0.116	38	RF200	Min.II
V839 Oph	50197.541	0.111	37	RF200	Min.II
V839 Oph	50242.536	0.117	30	RF200	Min.II
V839 Oph	50243.555	0.113	46	RF200	
V839 Oph	50244.377	0.117	36	RF200	
V839 Oph	50245.400	0.118	46	RF200	Min.II
V839 Oph	50246.421	0.116	70	RF200	
V839 Oph	50248.469	0.119	49	RF200	
V839 Oph	50249.488	0.116	45	RF200	Min.II

BM Ori	49673.463	-0.023	13	RF200	superposition 37)

EQ Ori	49632.633	-0.024	17	MC350	

ET Ori	49644.629	0.006	9	MC350	

AT Peg	49618.497	0.000	14	RF200	
AT Peg	49625.369	-0.005	16	RF200	
AT Peg	49679.230	-0.009	12	RF200	low accuracy
AT Peg	49932.514	-0.008	21	RF200	
AT Peg	49978.356	-0.009	21	RF200	
AT Peg	50017.329	-0.003	27	RF200	

Z Per	49632.353	-0.091	22	RF200	superposition 38)

RV Per	49658.677	-0.005	18	MC350	superposition 39)

AO Ser	49840.388	0.020	23	RF200	

EG Ser	49898.401	0.047	25	RF200	superposition 40)

AM Tau	49678.511	-0.006	22	MC350	
V726 Tau	49688.607	0.034	23	MC350	Min.II, superposition 41)
V726 Tau	49702.454	-0.011	19	MC350	Min.II, superposition 42)
V781 Tau	50105.370	-0.038	12	RF200	low accuracy
V781 Tau	50180.399	-0.027	21	RF200	Min.II
V781 Tau	50181.274	-0.014	20	RF200	low accuracy, superposition 43)
TW UMa	49837.427	-0.095	23	RF300	
W UMi	49545.522	-0.096	18	RF200	superposition 44)
W UMi	49567.638	-0.095	18	RF200	superposition 45)
W UMi	49574.446	-0.091	16	RF200	
W UMi	49591.454	-0.095	20	RF200	
W UMi	49620.367	-0.102	22	RF200	superposition 46)
W UMi	49625.476	-0.096	20	RF200	
W UMi	49630.580	-0.095	17	RF200	
W UMi	49659.497	-0.098	21	RF200	superposition 47)
W UMi	49688.417	-0.098	29	RF200	
W UMi	49778.576	-0.100	28	RF200	superposition 48)
W UMi	49785.369	-0.112	19	RF200	superposition 49)
W UMi	49843.237	-0.083	21	RF200	superposition 50)
W UMi	49853.421	-0.106	24	RF200	
W UMi	49909.568	-0.097	38	RF200	superposition 51)
W UMi	49989.535	-0.085	27	RF200	
W UMi	50013.335	-0.101	17	RF200	
RS UMi	49543.641	0.056	20	RF200	superposition 52)
RS UMi	49574.474	0.046	13	RF200	
RS UMi	49580.657	0.060	19	RF200	superposition 53)
RS UMi	49679.284	-0.011	9	RF200	low accuracy

Table 2. Revised times of minima of 16 eclipsing binaries.

Star name	Heliocentric Julian Date (-2400000)	O-C	No.of esti-mates	Instrum.	Remark
WW Aur	49018.542	-0.007	17	B16x50	BRNO31: 49018.537, Min.II
AR Aur	49005.536	-0.073	10	B16x50	BRNO31: 49005.532, Min.II
AR Aur	49061.368	-0.059	10	B16x50	BRNO31: 49061.368
SV Cam	49102.395	0.023	16	M25x70	BRNO31: 49102.396
SV Cam	49109.497	0.008	22	M25x70	BRNO31: 49109.498
SV Cam	49214.493	0.031	18	M25x70	BRNO31: 49214.495
RZ Cas	48985.319	0.017	24	B8x30	BRNO31: 48985.319, superposition 54)
RZ Cas	48991.294	0.016	12	B8x30	BRNO31: 48991.291
RZ Cas	49004.439	0.013	15	B16x50	BRNO31: 49004.440, superposition 55)
RZ Cas	49059.420	0.013	14	B16x50	BRNO31: 49059.421
RZ Cas	49060.618	0.016	19	B16x50	BRNO31: 49060.619
RZ Cas	49066.593	0.014	21	B16x50	BRNO31: 49066.594
RZ Cas	49102.451	0.015	16	B16x50	BRNO31: 49102.455
RZ Cas	49108.423	0.011	23	B16x50	BRNO31: 49108.426
RZ Cas	49157.432	0.015	22	B16x50	BRNO31: 49157.432, superposition 56)
RZ Cas	49194.485	0.015	26	B16x50	BRNO31: 49194.485, superposition 57)

RZ Cas	49200.457	0.011	29	B16x50	BRNO31: 49200.459
RZ Cas	49206.436	0.014	31	B16x50	BRNO31: 49206.437
RZ Cas	49213.614	0.020	18	B16x50	BRNO31: 49213.614, superposition 58)
TV Cas	49206.453	0.007	20	B16x50	BRNO31: 49206.453
TV Cas	49215.511	0.002	18	B16x50	BRNO31: 49215.511, superposition 59)
U Cep	48989.259	0.059	21	M25x70	BRNO31: 48989.259, superposition 60)
U Cep	49066.535	0.051	31	M25x70	BRNO31: 49066.536
U Cep	49101.444	0.057	22	M25x70	BRNO31: 49101.446
MY Cyg	49201.472	-0.021	14	M25x70	BRNO31: 49201.472, Min.II, superposition 61)
MY Cyg	49213.496	-0.012	16	M25x70	BRNO31: 49213.492, Min.II
MY Cyg	49215.497	-0.014	16	M25x70	BRNO31: 49215.497, superposition 62)
V367 Cyg	49117.140	0.416	17	B16x50	BRNO31: 49117.140, Min.II, superposition 63)
V367 Cyg	49200.378	-0.036	21	B16x50	BRNO31: 49200.379, superposition 64)
DM Del	49199.431	-0.047	23	M25x70	BRNO31: 49199.431, superposition 65)
DM Del	49221.402	-0.038	21	M25x70	BRNO31: 49221.402, superposition 66)
AI Dra	49109.482	0.008	20	B16x50	BRNO31: 49109.481
AI Dra	49193.412	0.021	17	B16x50	BRNO31: 49193.411
AI Dra	49199.393	0.008	16	B16x50	BRNO31: 49199.393
AI Dra	49206.580	0.002	13	B16x50	BRNO31: 49206.579
TX Her	49171.434	0.007	14	M25x70	BRNO31: 49171.434, Min.II, superposition 67)
TX Her	49206.460	0.017	19	M25x70	BRNO31: 49206.458, Min.II
TX Her	49207.485	0.012	13	M25x70	BRNO31: 49207.484
beta Lyr	49081.128	-0.365	14	B8x30	BRNO31: 49081.128, superposition 68)
beta Lyr	49171.679	-0.211	26	B8x30	BRNO31: 49171.679, superposition 69)
U Oph	49178.378	0.006	21	B8x30	BRNO31: 49178.378, superposition 70)
U Oph	49193.478	0.010	17	B8x30	BRNO31: 49193.478, superposition 71)
U Oph	49214.444	0.009	28	B8x30	BRNO31: 49214.444, Min.II, superposition 72)
V566 Oph	49200.489	0.017	14	M25x70	BRNO31: 49200.485
V566 Oph	49207.451	0.015	14	M25x70	BRNO31: 49207.447
V566 Oph	49214.428	0.028	22	M25x70	BRNO31: 49214.425
V839 Oph	49537.416	0.105	21	RF200	BRNO32: 49537.4159, Min.II
V839 Oph	49543.563	0.117	21	RF200	BRNO32: 49543.5630, Min.II
V839 Oph	49545.393	0.106	13	RF200	BRNO32: 49545.3922
V839 Oph	49547.437	0.105	22	RF200	BRNO32: 49547.4373
V839 Oph	49548.469	0.115	25	RF200	BRNO32: 49548.4685, Min.II
V839 Oph	49550.500	0.101	20	RF200	BRNO32: 49550.4997, Min.II
V839 Oph	49558.485	0.110	21	RF200	BRNO32: 49558.4848
V839 Oph	49559.502	0.105	24	RF200	BRNO32: 49559.5008, Min.II
V839 Oph	49562.371	0.111	22	RF200	BRNO32: 49562.3694, Min.II
V839 Oph	49563.396	0.113	24	RF200	BRNO32: 49563.3964
V839 Oph	49564.418	0.113	24	RF200	BRNO32: 49564.4172, Min.II
V839 Oph	49565.436	0.108	27	RF200	BRNO32: 49565.4359
V839 Oph	49567.476	0.103	24	RF200	BRNO32: 49567.4768
V839 Oph	49568.496	0.101	20	RF200	BRNO32: 49568.4962, Min.II
V839 Oph	49569.518	0.100	19	RF200	BRNO32: 49569.5170
V839 Oph	49574.430	0.105	24	RF200	BRNO32: 49574.4299
V839 Oph	49580.368	0.112	18	RF200	BRNO32: 49580.3678, Min.II
V839 Oph	49581.386	0.108	18	RF200	BRNO32: 49581.3879
V839 Oph	49587.318	0.109	16	RF200	BRNO32: 49587.3166, Min.II

V839 Oph	49591.403	0.104	26	RF200	BRNO32: 49591.4039, Min.II
V839 Oph	49592.435	0.114	26	RF200	BRNO32: 49592.4357
V839 Oph	49594.480	0.114	13	RF200	BRNO32: 49594.4800
V839 Oph	49599.377	0.103	20	RF200	BRNO32: 49599.3776
V839 Oph	49605.309	0.104	18	RF200	BRNO32: 49605.3098, Min.II
V839 Oph	49618.390	0.098	17	RF200	BRNO32: 49618.3900, Min.II
V839 Oph	49619.417	0.102	16	RF200	BRNO32: 49619.4170
V839 Oph	49623.309	0.109	22	RF200	BRNO32: 49623.3097, Min.II
V839 Oph	49625.352	0.107	17	RF200	BRNO32: 49625.3526, Min.II
V839 Oph	49639.249	0.098	17	RF200	BRNO32: 49639.2493, Min.II
Z Vul	49158.454	-0.007	11	M25x70	BRNO31: 49158.451
Z Vul	49207.537	-0.022	11	M25x70	BRNO31: 49207.533

Table 3. Light elements used for calculation of O-C residuals in the two previous tables (taken from electronic version of the 4th edition of General Catalogue of Variable Stars except three cases).

Star name	Epoch (JDhel) (-2400000)	Period (days)	Source
RT And	41141.88902	0.628929513	GCVS4e
TW And	39020.4104	4.122774	GCVS4e
CO And	26985.510	1.827663	GCVS4e
HV Aqr	48835.77422	0.37445764	P.Molík, M.Wolf, 2000
V346 Aql	41918.384	1.106363	GCVS4e
TT Aur	21242.2564	1.332735	GCVS4e
WW Aur	32945.53930	2.52501922	GCVS4e
AR Aur	38402.1832	4.134695	GCVS4e
UW Boo	42404.713	1.0047108	GCVS4e
CV Boo	38883.454	0.8469928	J.M.Kreiner et al., 2001
SV Cam	42594.61518	0.59306995	GCVS4e
RZ Cas	43200.3063	1.195247	GCVS4e
TV Cas	44602.4534	1.8125956	GCVS4e
TW Cas	42008.3873	1.4283240	GCVS4e
BZ Cas	29497.316	2.1264317	GCVS4e
MM Cas	35401.483	1.15847	GCVS4e
U Cep	44541.6031	2.4930475	GCVS4e
XX Cep	44839.8022	2.3373266	GCVS4e
XZ Cep	43297.811	5.0972267	GCVS4e
ZZ Cep	27928.451	2.141800	GCVS4e
EK Cep	39002.7240	4.4277926	GCVS4e
SS Cet	42451.329	2.973976	GCVS4e
U CrB	16747.9718	3.45220133	GCVS4e
MY Cyg	33847.607	4.0051873	GCVS4e
V367 Cyg	37390.855	18.59773	GCVS4e
V477 Cyg	44189.2639	2.3469906	GCVS4e
V1034 Cyg	42938.459	0.976931	GCVS4e
W Del	43328.5495	4.806100	GCVS4e
DM Del	44501.3913	0.8446758	GCVS4e
AI Dra	43291.627	1.1988146	GCVS4e
BH Dra	40019.7982	1.81723857	GCVS4e
EF Dra	47700.750	0.4240266	P.Molík, 2004
S Equ	42596.74348	3.4360969	GCVS4e
WX Eri	27531.687	0.82327038	GCVS4e (WX Eri = V1241 Tau)
SX Gem	19031.270	1.366877	GCVS4e
TX Her	40008.3643	2.05980944	GCVS4e
UX Her	39672.37853	1.5488479	GCVS4e
AK Her	42186.460	0.42152201	GCVS4e
MX Her	31657.411	2.3476536	GCVS4e
UV Leo	38440.72633	0.60008478	GCVS4e

XY Leo	45074.4906	0.2840969	GCVS4e
beta Lyr	08247.950	12.913834	GCVS4e
BO Mon	43507.5970	2.2252193	GCVS4e
IL Mon	32232.825	4.02631	GCVS4e
U Oph	44416.3864	1.67734617	GCVS4e
SX Oph	33399.557	2.0633038	GCVS4e
V566 Oph	41835.8617	0.40964569	GCVS4e
V839 Oph	40448.4129	0.40899532	GCVS4e
BM Ori	40265.343	6.470525	GCVS4e
EQ Ori	31438.743	1.746057	GCVS4e
ET Ori	26684.283	0.9509356	GCVS4e
AT Peg	45219.8562	1.1460764	GCVS4e
Z Per	45659.245	3.0563066	GCVS4e
RV Per	42046.921	1.9734926	GCVS4e
AO Ser	34133.464	0.87934745	GCVS4e
EG Ser	26487.525	4.97362	GCVS4e
AM Tau	45253.417	2.043926	GCVS4e
V726 Tau	37016.357	1.98453	GCVS4e
V781 Tau	43874.954	0.3449100	GCVS4e
TW Uma	45447.535	2.1668246	GCVS4e
W Umi	33682.323	1.7011576	GCVS4e
RS Umi	44756.734	6.16862258	GCVS4e
Z Vul	42947.4777	2.454934	GCVS4e

Notes on minima timings obtained by superposition or averaging of observations from two or more nights:

1) August 11-12, September 28-29, October 19-20, 1994
2) September 3-4, October 6-7, October 10-11, 1994
3) July 28-29, November 2-3, 1994
4) November 15-16, 1994, September 16-17, 1995
5) August 4-5, September 17-18, 1995
6) October 4-5, October 26-27, 1995
7) August 16-17, 1994, March 8-9, 1995
8) December 23-24, December 28-29, 1992
9) July 5-6, November 15-16, 1994
10) July 11-12, July 14-15, 1994
11) June 29-30, September 28-29, 1995
12) December 6-7, 1994, January 4-5, 1995
13) October 18-19, November 7-8, 1992
14) September 27-28, October 2-3, 1994
15) July 24-25, September 9-10, 1994
16) September 16-17, October 13-14, 1994
17) March 27-28, May 14-15, May 28-29, June 18-19, 1993
18) August 16-17, September 4-5, September 9-10, 1994
19) July 24-25, July 29-30, 1994
20) September 27-28, September 28-29, 1994, July 7-8, 1995
21) October 19-20, October 20-21, 1994
22) August 11-12, September 28-29, October 4-5, October 10-11, October 24-25, 1995
23) August 18-19, October 8-9, October 9-10, October 26-27, 1995
24) April 6-7, April 17-18, 1996
25) April 7-8, April 15-16, 1996
26) September 3-4, October 4-5, October 18-19, 1994
27) October 5-6, 1994, September 28-29, 1995
28) May 7-8, July 14-15, 1994
29) November 1-2, November 21-22, 1994
30) July 2-3, 1994, two minima
31) July 5-6, July 11-12, 1994
32) August 11-12, August 12-13, 1994
33) August 24-25, September 4-5, 1994

34) September 16-17, 1994, two minima
35) September 28-29, November 16-17, 1994
36) June 29-30, June 30-July 1, 1995
37) November 16-17, December 5-6, 1994
38) September 30-October 1, October 6-7, October 18-19, 1994
39) September 3-4, November 1-2, November 15-16, 1994
40) May 15-16, June 29-30, 1995
41) November 1-2, November 21-22, December 1-2, December 5-6, 1994, January 4-5, 1995
42) October 20-21, October 26-27, December 15-16, 1994
43) April 7-8, April 21-22, 1996
44) July 11-12, July 13-14, 1994
45) August 2-3, October 6-7, 1994
46) September 24-25, September 27-28, 1994
47) October 26-27, November 2-3, 1994
48) November 4-5, 1994, March 1-2, 1995
49) March 8-9, March 20-21, 1995
50) December 18-19, 1994, May 5-6, 1995
51) June 30-July 1, July 10-11, 1995
52) July 9-10, July 28-29, September 3-4, 1994
53) August 3-4, August 15-16, 1994
54) December 23-24, December 28-29, 1992
55) January 16-17, January 17-18, 1993
56) May 1-2, June 18-19, 1993
57) July 25-26, August 7-8, 1993
58) July 24-25, August 13-14, 1993
59) June 18-19, August 15-16, 1993
60) November 27-28, 1992, January 1-2, 1993
61) July 24-25, August 1-2, 1993
62) July 30-31, August 15-16, 1993
63) 17 nights, November 20, 1992 - August 14, 1993
64) 19 nights, November 27, 1992 - August 21, 1993
65) July 9-10, July 17-18, July 24-25, July 25-26, July 30-31, August 1-2, August 13-14, August 14-15, 1993
66) August 15-16, August 21-22, 1993
67) July 2-3, July 9-10, 1993
68) 14 nights, October 18, 1992 - May 9, 1993
69) 19 nights, June 5 - August 22, 1993
70) July 2-3, July 9-10, 1993
71) July 24-25, August 15-16, 1993
72) July 30-31, August 14-15, 1993

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