PERIOD OF THE ECLIPSING BINARY V382 Cyg

Several years ago it was shown (Mayer, 1980) that the measured minima times of the massive O-type binary V382 Cyg fit an ephemeris with a parabolic term, and, except for the two earliest minima, also a linear ephemeris. Some new minima were obtained recently, and they are listed together with the older photoelectric data in Table I. The 65 cm telescope of the Charles University at the Ondrejov Observatory and the 62 cm telescope at the Sarajevo Observatory were used.

All the new minima occurred sooner than predicted by the quadratic ephemeris, so that a linear ephemeris is to be preferred. The column $O-C_1$ in Table I was calculated using the linear ephemeris by Landolt (1975):

$$\text{Pri.Min.} = \text{J.D.hel.}\ 2436814.7735 + 1^{d}.8855121\ E\ . \qquad (1)$$

The up-to-date linear ephemeris presents a little longer period:

$$\text{Pri.Min.} = \text{J.D.hel.}\ 2436814.7703 + 1^{d}.8855152\ E\ ; \qquad (2)$$

the corresponding O-C differences are given in the column $O-C_2$ and plotted in Fig. 1.

Generally, the $O-C_2$ differences are larger than would correspond to the accuracy of the data, so there should be an unknown factor affecting the minima times. Perhaps a periodic term due to the light-time effect is present. When the ephemeris is changed to

$$\text{Pri.Min.} = \text{J.D.hel.}\ 2436814.7703 + 1^{d}.8855160\ E\ . \qquad (3)$$

(the resulting differences are shown in the column $O-C_3$), a term with a period of 1375 P - i.e., 7.10 years - and amplitude of about $0^{d}.0050$ is observed. The value E/1375 (fraction only) is given in the column Phase, and the differences are plotted in Fig. 2.

In an abstract published by Bloomer et al. (1979), 18 new minima were mentioned and the following ephemeris was given:

$$\text{Pri.Min.} = \text{J.D.hel.}\ 2442940.8071 + 1^{d}.8855143\ E\ . \qquad (4)$$

The zero point of this ephemeris corresponds to the epoch E = 3249 according to the other ephemeris presented here.

Very probably, the measurements by Bloomer et al. began at the time of this
zero point (June 1976) and had to end not later than in about November
1978. Hence, the O-C differences given in Table I were calculated for E =
3475, the expected arithmetical mean of the mentioned time interval, with
the "observed" time of minimum following from eq. (4). The time interval
June 1976 to November 1978 also corresponds to a limited phase interval of
the period 1375 P, see Table I. Therefore, in both graphs the O-C differences
could be represented by a horizontal abscissa. As follows from Fig. 2, the
minima times by Bloomer et al. lend strong support to the suggested periodic

Table I

Photoelectric minima times of V382 Cyg

J.D.hel. 2400000+	m.e.	Epoch	$O-C_1$	$O-C_2$	$O-C_3$	Phase	Note
36814.77247	.001	0	-.0010	+.0022	+.0022	.000	1
38987.8298	.001	1152.5	+.0036	+.0036	+.0023	.838	1
40385.931	.003	1894	-.0024	-.0045	-.0066	.378	1
40386.87609	.0004	1894.5	-.0001	-.0022	-.0043	.378	1
40387.81731	.0011	1895	-.0016	-.0037	-.0058	.378	1
41129.76980	.00022	2288.5	+.0019	-.0013	-.0039	.664	1
42651.3844	.0014	3095.5	+.0082	+.0027	-.0007	.251	2
43366.9333		3475	+.0053	-.0023	-.0051	.36-.69	3
45598.4426	.0007	4658.5	+.0110	+.0011	-.0040	.388	4
46274.3971	.0020	5017	+.0094	-.0015	-.0070	.649	5
46325.3087	.0009	5044	+.0122	+.0012	-.0043	.668	5
46668.4782	.0006	5226	+.0185	+.0070	+.0013	.801	4

Notes: 1 - Landolt (1975); 2 - Mayer (1980); 3 - Bloomer et al.
(1979), see text; 4 - this paper (Ondřejov); 5 - this
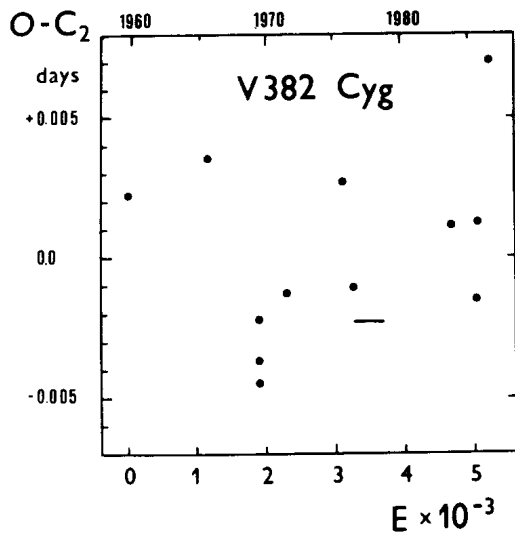paper (Sarajevo).

Figure 1. O–C differences for V382 Cyg according to ephemeris (2).
The horizontal line marks the probable time interval
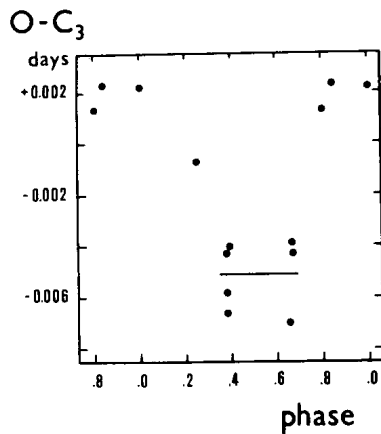and mean O–C for the minima times by Bloomer et al.

Figure 2. O–C differences for V382 Cyg according to ephemeris
(3), phased with the period of 1375 P. The horizontal line
marks the probable phase and mean O–C for the minima times
by Bloomer et al.

term. In spite of this agreement, the number of measurements is rather low
and the periodic term cannot be considered as proven at present.

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