V801 CYGNI

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Abstract

Linear and parabolic light elements have been derived for
the RR Lyr variable V801 Cygni using published data and
new epochs for the interval 1967-1980 derived from
photographs taken at the Maria Mitchell Observatory.

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V801 Cygni (=VV42) is an RR Lyrae star described by Miller and
Wachman (1958) as having a period of $0\overset{d}{.}51603470$ and epoch of maximum
at JD 2434180.6664. Using plates from the Maria Mitchell collection,
light curves for successive years from 1967-1980 were plotted with
these elements. The maxima all arrived some fraction of a period later
than predicted, and there was also quite a bit of scatter near maximum
(not evident in the Miller and Wachman light curve). As a result, the
data were put through a period-search program to ascertain whether the
published period could be spurious. However, the vicinity of $0\overset{d}{.}516$
was by far the best period analyzed.

O-C values were derived for each year by superimposing the pub-
lished mean light curve on the Maria Mitchell light curves and noting
the shift in phase, O (observed at Maria Mitchell) minus C (computed
from the elements). These values are plotted against Julian date (JD)
in Figure 1, along with the O-C values tabulated by Miller and Wachman.
The fairly large error bars represent the extremes in the range of ac-
ceptable O-C values.

The best line and the best parabola as computed by the least
squares method are drawn on the O-C plot. Each observation was weight-
ed inversely proportional to the square of the length of its error bar,
with the published O-C values and the best of the Nantucket observa-
tions given unit weight.

The parabola seems to describe the data more accurately: the mean
error in an O-C of unit weight is +.017 for the line and +.012 for the
parabola.

The linear elements are:

$$JD_{max} = 2434228.658 + 0\overset{d}{.}5160388\ E$$
$$\pm\qquad\quad .003\ \pm\quad .0000003$$

The parabolic elements are:

$$JD_{max} = 2442941.463 + .5160424\ E + (1.93 \times 10^{-10})\ E^2$$
$$\pm\qquad\quad .006\ \pm\ .0000009\quad \pm\quad .49 \times 10^{-10}$$

These elements imply an increase of 0.27 days per million years.

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REFERENCE

Miller, W. J. and Wachman, A. 1958, Ricerche Astronomiche 6,
    No. 5, p. 86.
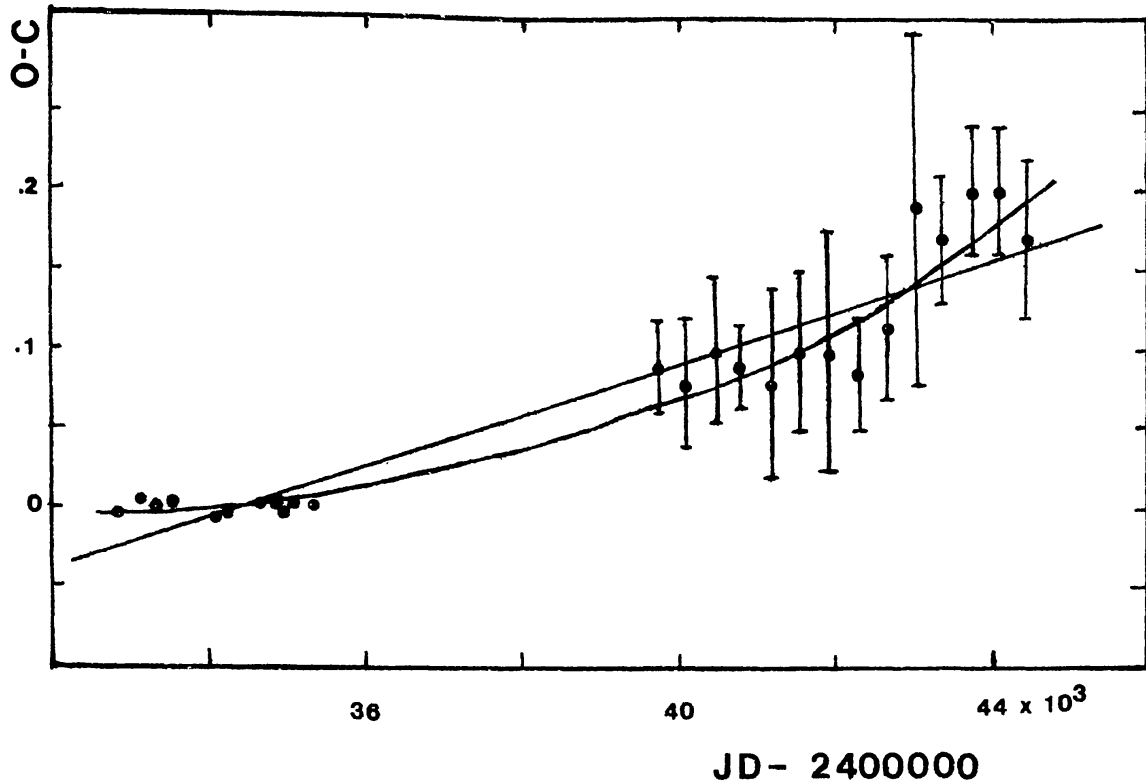
Figure 1. Residuals in the time of maximum for V801 Cygni with
respect to the elements JD(Hel) = 2434180.6664 + 0.51603470E.
The best linear and quadratic fits are indicated.

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