

PERIOD CHANGES IN V726 CYGNI:
A LINEAR SOLUTION

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Abstract

The changes in the period of V726 Cygni are discussed. Three instances where the period changed abruptly are noted. A new ephemeris is presented.

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Ellingson (1983) performed an analysis of the period changes of the Algol-type eclipsing variable V726 Cygni. In that paper, curve fitting methods were applied to the determinations of times of minimum light of this binary to analyze the changes in its period. First a linear equation, and then a parabolic curve was fitted, and finally a cubic equation was found to represent the data adequately. She also suggested a combination of a parabola and a linear segment but discounted this solution.

The idea of linear segments also has great merit, and it forms the basis of this present work. If one discards the assumption that is implicit in fitting a second or third degree polynomial to these data, namely that the period of the system is continuously varying, and examines the data again, linear segments can successfully represent the data. The data are plotted in Figure 1 with four linear segments chosen by inspection. A more rigorous analysis is not possible due to the paucity of the data, which causes an ambiguity in the choice of points at the ends of the segments.

In examining the hypothesis that the data can be fitted by a sequence of linear segments, one is making the assumption that the period of the system remains constant between abrupt changes. These changes occur at the intersections of the linear segments. These three period changes are indicated by arrows in Figure 1. The approximate times of the changes, the periods, and the change in the period are shown in Table I. An ephemeris may also be derived from the most recent period change and is represented by the equation

$$JD_{\min} = 2439850.450 + 0.49797288 E. \quad (1)$$

The piecewise method of fitting the observations used here tells us nothing of the nature of changes in the period of V726 Cyg in the future. Previous changes have been toward both longer and shorter periods, as shown in Table I. This method and the past behavior of the star indicate long intervals of constant period with infrequent (three in 50 years) changes in period.

This faint, interesting binary star system bears monitoring over the years to detect future changes in the period.

REFERENCE

Ellingson, E. 1983, Journ. Amer. Assoc. Var. Star Obs. 12, 10.

TABLE I
 Period Changes in V726 Cygni

<u>Julian Date</u>	<u>Period</u> (days)	<u>Change</u> (days)
2425900	0.49797314	-0.00000150
2432060	0.49797164	-0.00000267
2437800	0.49796897	+0.00000391
2439850	0.49797288	

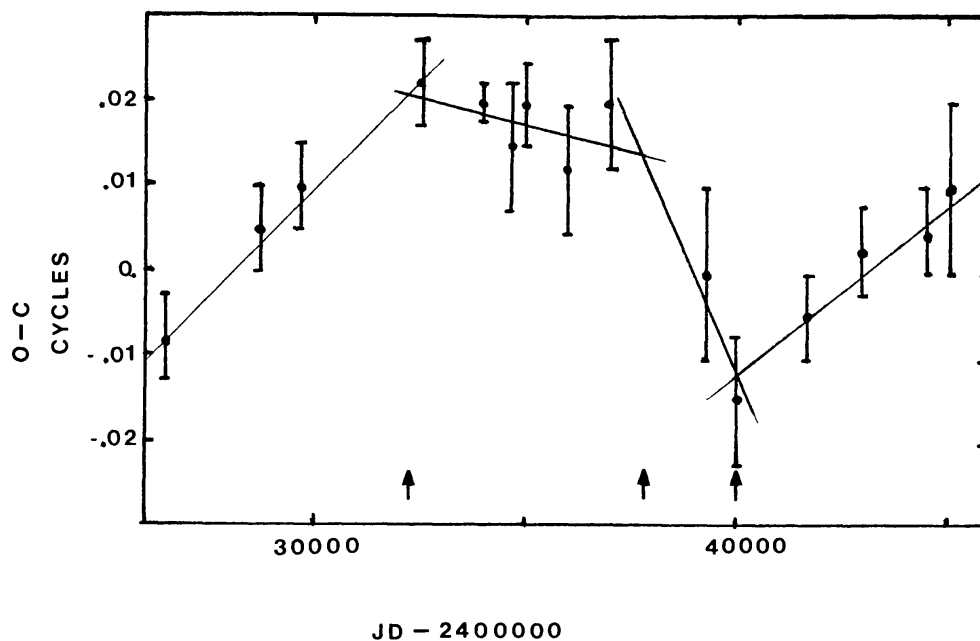


Figure 1. O-C diagram for V726 Cygni (from Ellingson). A piecewise linear fit for the data is shown. Three period changes occurred (arrows).