V343 CYGNI: A W VIRGINIS STAR WITH A CONSTANT PERIOD

Laura M. Woodney
Amy R. Lesser
Maria Mitchell Observatory
Nantucket, MA 02554

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Abstract

The W Virginis Cepheid variable V343 Cygni was examined on the plates of the Maria Mitchell Observatory collection in order to verify and refine the published elements. The new elements, valid for the interval 1927 through 1991, are:

$$JD_{max} = 2436139.005 + 11.927148\ E.$$

1. Introduction

V343 Cygni is presently classified as a W Virginis Cepheid variable in the *General Catalogue of Variable Stars* (Kholopov *et al.* 1985). Kukarkin *et al.* (1976), however, list it as a questionable W Virginis Cepheid and Kukarkin *et al.* (1969) classify V343 Cyg as only Cepheid. The elements are given by Hoffleit (1974) as

$$JD_{max} = 2431236.737 + 11.9275\ E. \quad (1)$$

The period was found to be constant by Hoffleit for the interval 1926 through 1974. In this study V343 Cyg is examined for deviations from the published elements.

2. Data

Data on V343 Cyg were gathered from the plate collection at the Maria Mitchell Observatory (MMO). Over 900 plates with Cygnus at the center have been taken at the MMO and over 800 contained acceptable observations of V343 Cyg. The apparent brightness was determined by comparing the relative brightness of V343 Cyg to four constant comparison stars.

3. Data Reduction and Analysis

A composite light curve showing apparent magnitude vs. phase was constructed using the first forty years of data and was used to create a mean light curve. Light curves were then plotted for 11 sub-intervals and each of the sub-intervals was compared to the mean light curve using a non-linear least squares fit to determine phase of maximum based on the best fit for the entire curve. Figure 1 shows the O-C diagram. C is defined in equation (1). The error bars show the mean errors as given by the least squares program. The following revised elements were determined:

$$JD_{max} = \underset{\pm 0.032}{2436139.005} + \underset{\pm 0.000052}{11.927148}\ E. \quad (2)$$

The data were found to have an extremely uniform periodicity. Note also that in Hoffleit (1974) the period of V343 Cyg was found to be very regular and unchanging

for the interval 1927 through 1974. There is now no evidence for a change in period for the interval 1927 through 1991.

4. Acknowledgements

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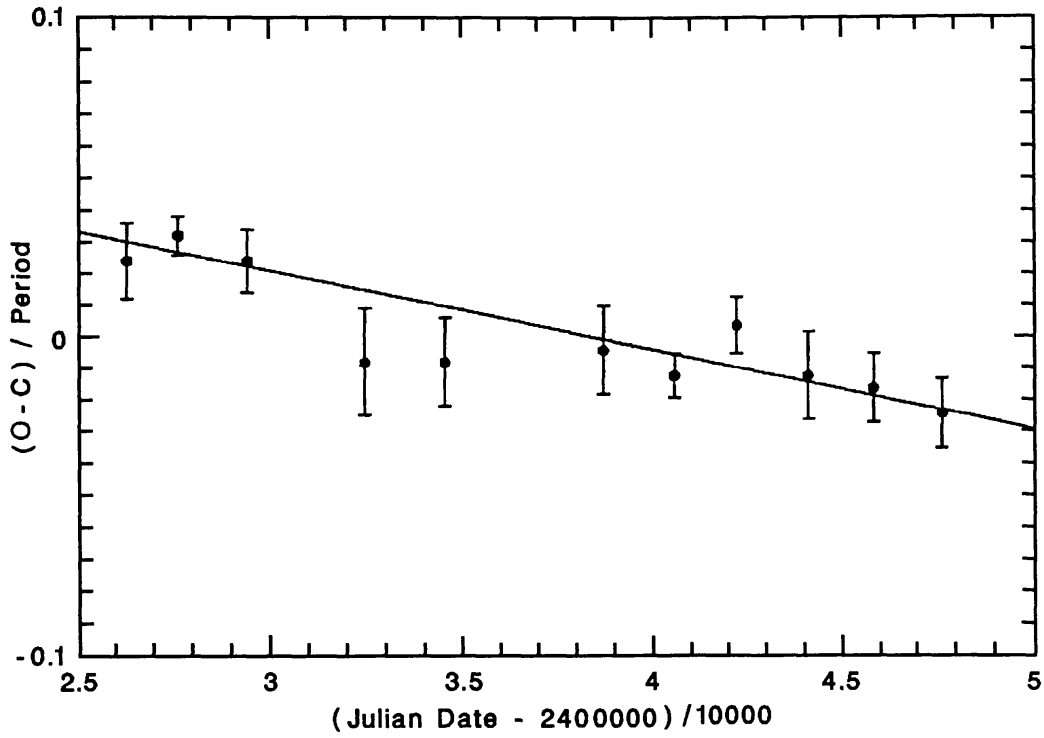

Figure 1. O-C diagram of V343 Cygni, where C is defined by the elements in equation (1). The line represents the refined elements in equation (2).