ANALYSIS OF THE V LIGHT CURVE OF THE SYSTEM CW CAS

R. BURCHI
Teramo Astronomical Observatory, Teramo, Italy
L. MILANO and G. RUSSO
Capodimonte Astronomical Observatory, Naples, Italy

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Abstract. The V light curve of CW Cas, observed during 1972, has been analysed by different methods of solution. The results show great differences between rectifiable and direct methods.

1. Introduction

The eclipsing binary CW Cassiopeiae was discovered by Zverev (1938), and photoelectric observations were made by Broglia (1957; 1960; 1964a; 1964b) and recently by Burchi (Burchi and De Santis, 1975). The system is classified as W UMa-type by Broglia, and in his works many peculiarities are shown that are typical of W UMa stars – particularly the variability of the light curve from year to year.

The aim of our analysis is to derive the geometrical and photometric elements of the system, from the V light curve of Burchi, with the methods of Russell and Merrill, Kitamura, Wood, Wilson (Russell and Merrill, 1952; Kitamura, 1965; Wood, 1971, 1972; Wilson and Devinney, 1971). This work is part of a study on the reliability of different methods in solving light curves of binaries with different degrees of distortion, work begun with the semi-detached system RT Persei (Mancuso et al., 1976, hereafter referred to as Paper I).

2. Methodology, Period and Light Curve

The observations by Burchi were made with the 40-cm Cooke refractor of the Teramo Observatory. For observations, methodology and instrumental apparatus, refer to the paper by Burchi (Burchi and De Santis, 1975).

The reduction in phase of the observations was made by the linear ephemeris

$$\text{Min. } I = \text{J.D. } 2441649.40322 + 0.3188449E,$$

$$\pm 9 \quad \pm 28$$

computed by Burchi.

The consistence among observations of different nights is good enough, taking into account the nature of the system, and only one night (JD 2441542) shows systematic
deviations from the trend of the whole light curve. Since this night precedes the remaining ones by about three months, some little change in the system may be accrued, which may explain this feature.

So this night has not been taken into account for the solutions. The remaining observations were then filtered, as in Paper I, with a five-point moving average (Rusconi and Sedmak, 1971), obtaining 383 points, which are plotted in Figure 1.

We have to remark that one of the peculiarities noted by Broglia, and characteristic of many W UMa-systems – that is, the different levels of maxima – is not present in our light curve; a fact which shows the variable characteristic of the system in study.

However, we have to note that, analysing the trend of the two comparison stars, we have standard deviations from the mean values of about 0.02. So, taking into account the observational sequence (sky, comparison, variable, check, sky) we are not sure of the constancy of the comparison star used first by Broglia, at least in the range of the σ's we got night by night.

From the filtered observations we derived 75 normal points, shown in Table I and plotted in Figure 2.