

# FREQUENCY ANALYSIS OF DELTA SCUTI VARIABLE STARS.I.

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**ABSTRACT.** The Fourier analyses are performed for photoelectric observations of two  $\delta$  Scuti stars V567 Oph and KU Cen. It is shown that V567 Oph is a multiperiodic star and KU Cen has one main period.

**Key words:** Stars:  $\delta$  Scuti, RR Lyrae, Fourier analysis.

V567 Oph. Two independent observational sets (189 V-measurements) of the star (Poretti et al., 1990) have been analysed by the frequency analysis method. The first set (49 observations for two nights at a time interval of 4 days) was received on Pic-du Midi one-meter telescope in 1984, the second one (the more extensive set) is obtained on 0.91-m reflector at Serra La Nave (Catania) for two consecutive nights two years later. The authors of the above article have confirmed, that the period offered by de Bruyn (1972) equal to 0.149 days holds true, instead of 0.130 days, Hoffmeister' (1943) period, who has discovered the star and classified it as  $RR_c$  Lyrae type. They give elements of the star, derived on the basis of all photoelectric maxima:

$$Max_{hel} = J.D.2445911.4396 + 0.1495218E. \quad (1)$$

As a result of our analysis it was found, that the first set is too short and does not suit at all. The biggest amplitude is at frequency 8.682, instead of the main frequency  $f_0=6.6879879$ , which gives smaller amplitude and much more greater remains. Therefore, the second set of observations (two consecutive nights) were analysed. The accounting of the main frequency  $f_0=6.6881135$  with the amplitude  $A=0.173$  mag and its two harmonics  $2f_0=13.3760455$  ( $A=0.039$ ) and  $3f_0=20.07039$

( $A=0.005$ ) has revealed the second main frequency  $f_1=11.8416729$  ( $A=0.009$ ). The relation  $f_1/f_0$  is equal to 1.77, that permits to identify the frequencies  $f_1$  and  $f_0$  as double frequency of the first overtone and the frequency  $f_g=1.5f_F$  introduced earlier by us (Bezdenezhnyi, 1995) at the analysis of RR Lyrae star AE Boo. If at AE Boo the main frequency is  $f_{1H}$ , at V567 Oph it is the frequency  $f_g$ . Two observational sets give bigger amplitude of the second harmonic of this  $3f_g$  frequency ( $A=0.008$ ) and the frequency  $1/2f_{1H}=2.9394139$  ( $A=0.014$ ). Thus, V567 Oph is a multimodal  $\delta$  Scuti star.

KU Cen. This star is also analysed by us on the basis of 148 standard B-observations (Poretti et al., 1990), obtained at 1.07-m ESO telescope (La Silla) for two consecutive nights. A standard deviation of one observation is 0.005 mag. These authors have specified, that for the description of such an asymmetric light curve the main frequency  $f_0$  and four its harmonics is required. Their accounting does not give any more significant frequency.

Our analysis has confirmed these results with that only by an insignificant difference, that the fifth harmonic ( $6f_0$ ) is as significant as the fourth one - their amplitudes are 0.006 mag. The amplitude of  $7f_0$  is considerably (4 times) less.

## References

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