

MULTIPERIODICITY OF RR LYRAE STARS. T SEXTANTIS.

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ABSTRACT. The Fourier analyses performed for 401 photoelectric V-magnitudes of the RR_c Lyrae variable T Sex (Barnes III et al.) show that the star may be multiperiodic with most significant frequency f_{1H} , frequencies multiple to that of f_{1H} as well as to frequencies f_g and f_s introduced by us.

Key words: Stars: RR Lyrae type, Fourier analysis, mode identifications

Earlier the author (Bezdenzhnyi, 1994) performed the analysis of periods of RR_c Lyr type star AE Bootis and showed, that it is a multiperiodic star. Fourteen frequencies have been found, the most important of which are: f_{1H} , f_0 , f_{2H} , $f_g=3/2f_0$ and $f_e=5/4f_0$. Other frequencies are expressed as linear combinations of the main ones.

In the present work a star of RR_c type T Sex is also investigated by the frequency analysis of 401 V-measurements (Barnes III et al., 1988) for five nights at 13 days' interval. The star was investigated photometrically by many authors. We have used elements present for different intervals JD and constructed a period variation graph: a wave is seen with the cycle $\Pi=24000$ days (about 66 years) and with an amplitude of period variation $\Delta P=0.00006$ days. Probably, it is due to the orbital motion because of star's binarity. At the analysis a period 0.324698 days from the fourth edition of the General Catalogue of Variable Stars (1987) is accepted as a period of the first overtone P_{1H} characteristic of the RR_c stars.

At the account of one frequency the biggest peak is at the frequency $f=3.079955$ ($P=0.32468$) with the amplitude $=0.180$. For

taking account of asymmetry of the light curve the main frequency f_{1H} and its four harmonics were considered: $f_{1H}=3.0797$ ($A=0.219$), $2f_{1H}=6.1509$ ($A=0.023$), $3f_{1H}=9.2390$ ($A=0.018$), $4f_{1H}=12.3128$ ($A=0.012$) and $5f_{1H}=15.3931$ ($A=0.006$). Then four more frequencies were found: two multiple ones to f_g frequency introduced earlier $8f_g=9f_{1H}=12f_0=27.6775$ ($A=0.004$) and $13f_g=45.042$ ($A=0.003$), as well as multiple to new frequency introduced in this work $f_s=1.5f_e$. The latter is related to the frequency f_e introduced earlier, like f_g is related to the fundamental frequency f_0 . The frequency f_s is also present in Cepheids and is as characteristic of them as the frequency f_{1H} - of RR_c stars (see in the same volume). Thus, two frequencies multiple to the frequency f_s are found: $3f_s=12.9882$ ($A=0.005$) and $15f_s=65.222$ ($A=0.003$). T Sex, as well as AE Boo, is a multiperiodic variable star.

References

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