ON CLASSICAL CEPHEIDS' PERIODS.

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ABSTRACT. The Fourier analyses performed for photoelectric Berdnikov's (1992) V-observations of seven classical Cepheids give periods (frequencies) and amplitudes their oscillations as well as their harmonics (from one to six for different stars).

Key words: Stars: Cepheids, Fourier analysis

Frequency analysis of photoelectric Berdnikov's (1992 a, 1992 b, 1992 c, 1992 d, 1992 e, 1992 f) V-observations, obtained at the Mt. Maidanak Observatory, some of classical Cepheids (U Aql, EV Aql, CE Cas, CF Cas, DL Cas, Z Lac, CI Per, S Sge and SV Vul) were performed. EV Aql and S Sge were attributed to bimodal Cepheids (therefore these are considered in another work, see in this volume), for other stars the following results are received.

CE Cas: It is known in the fourth edition of the General Catalogue of Variable Stars (Kholopov et al., hereafter *GCVS*, 1985a) as a visual-binary (2".4) star, both A and B components of which are Cepheids with periods: P_A=5.1410583 (f_A=0.1945124) and P_B=4.4793014 (f_B=0.223249). CEA Cas is a possible member of the cluster NGC 7790.

The frequency analysis has reliably shown these frequencies and double ones to them: f_A=0.1945163 (A=0.133mag), f_B=0.2232491 (A=0.143), $2f_A$=0.3890433 (A=0.055) and $2f_B$=0.4465072 (A=0.047).

CF Cas: According to *GCVS* (1985a) the star is a possible member of the cluster NGC 7790, period P=4.87522 (f=0.2051189). In the power spectrum this frequency and two more of its harmonics are found: f=0.2051244 (A=0.240), $2f$=0.4102539 (A=0.082), $3f$=0.6180549 (A=0.027).

CI Per: According to *GCVS* (1987) the form of a light curve and period are variable (P=3.35-3.40). Frequency analysis has given a little smaller value of the period P=3.297 (f=0.3033) with amplitude A=0.233 as well as two of its harmonics $2f$=0.6093 (A=0.061) and $3f$=0.9099 (A=0.026). The frequency $4f$=1.221 with the amplitude =0.014 is seen uncertainly.

SV Vul: In *GCVS* (1987) the period P=45.0121 (f=0.0222162) and its linear change with an epoch are given: -0.0001814. Our value of secular decrease of a period gives a factor not less than 0.00023. Frequency analysis has given, according to it, a little bigger value of frequency of the main oscillation f=0.0222302 (P=44.984255) with amplitude A=0.441. Its five harmonics were also found: $2f$=0.044465 (A=0.191), $3f$=0.066710 (A=0.098), $4f$=0.088953 (A=0.055), $5f$=0.113852 (A=0.026), $6f$=0.133486 (A=0.016). Besides these, there is an unidentified frequency f_1=0.001825 (A=0.020) in the power spectrum, which corresponds to a period of 548 days (1.50 years).

U Aql: In *GCVS* (1985a) the value of the period P=7.02393 (f=0.1423704) is given and its variability is informed. The frequency analysis has revealed the main frequency f=0.1423600 with an amplitude A=0.325 and four its harmonics: $2f$=0.2847470 (A=0.112), $3f$=0.4270484 (A=0.050), $7f$=0.9978584 (A=0.022) and $5f$=0.71185 (A=0.011).

DL Cas: In *GCVS* (1985a) the star is noted to be a member of the cluster NGC 129, P=8.000669 (f=0.1249895). Frequency analysis has confirmed the above period: f=0.1249895 (A=0.253). Three harmonics of this frequency are also found: $2f$=0.2499848 (A=0.070), $3f$=0.3723370 (A=0.023) and

$4f$=0.4998956 (A=0.010).

Z Lac: Progressive change of a period with epoch is noticed in *GCVS* (1985b), the elements contain the square-law member with a factor -3.4×10^{-8}, P=10.885613 (f=0.0918643).

Our analysis, except specified frequency, has revealed six more of its harmonics: f=0.0918621 (A=0.375), $2f$=0.1837106 (A=0.046), $3f$=0.2756523 (A=0.055), $4f$=0.3676261 (A=0.043), $5f$=0.4569291 (A=0.034), $6f$=0.546379 (A=0.021) and $7f$=0.6355304 (A=0.018). $M - m = 43$ for this star is more than for other ones.

Thus, for seven classical Cepheids periods (frequencies) and amplitudes of their oscillations as well as their harmonics (from one up to six) are determined. For SV Vul a factor of secular change of a period is specified.

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