MV LYRAE IN THE LAST LOW STATE IN 1995-1996

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ABSTRACT. The detailed TV photometry of novalike variable MV Lyr in the low brightness state covered 25 nights of observations in 1995-1996 years is made. Its brightness was B = 18.$^{\rm m}$2 - 16.$^{\rm m}$2. The flash with amplitude of about 0.$^{\rm m}$5, lasted half an hour was detected twice in two separated nights and the sequence of similar flashes but with amplitude reached 2$^{\rm m}$ was detected once. The quasi-periodic variations with typical time 0.$^{\rm m}$13 - 0.$^{\rm m}$14 and amplitude 0.$^{\rm m}$1 were found.

Key words: Stars: cataclysmic, novalike, MV Lyr

Introduction

MV Lyr is the unusual novalike variable. It spends most of its time in a high brightness state. Once every decade or so its brightness abruptly decreases by a factor of 100. The decrease of luminosity could be caused by a decrease or even a cessation of mass accretion onto the white dwarf in the system. The previous low state lasted approximately ten years. The brightness of MV lyr reached 18$^{\rm m}$, varied from 18$^{\rm m}$ to 17$^{\rm m}$ and sometimes the short-term outbursts (several days) up to 15$^{\rm m}$ have been detected. Marsakova and Shugarov (1995) detected the beginning of the last low state that occurred in April 1995. In the last decade of August, 1996 (Andronov, 1996) MV Lyr already was in the high state, so we could claim that the last low state lasted 1.5 years.

Observations

The observations of MV Lyr were undertaken in 1995-1996 years at TV-complex of 0.5m telescope of Crimean astrophysical observatory from August 1, 1995 till July 7, 1996 during 25 nights. The shortest row of observations was 0.5 hours and the longest – close to 5 hours. The exposure time varied from 0.75 minutes to 3 minutes depending from the conditions of observations. We obtained the observations in integral light. Taking into account that TV tube has maximum sensitivity at 4000 Å, we used the B-magnitudes of comparison stars (Andronov and Shugarov, 1982) in the vicinity of MV Lyr for brightness estimates. The typical error of a single estimate was 7%.

Results

One could note some peculiarity of MV Lyr behaviour in the last low brightness state: the absence of a several-days outbursts in compare with previous low state. At the same time the short-lived outbursts were detected (Pavlenko and Shugarov, 1996), but that events happened rarely. Its looked like single flash per night lasted 20-40 minutes with amplitude 0.$^{\rm m}$5, or like the quasi- periodic sequence of flashes with the same typical time but the huge amplitude up to 2$^{\rm m}$. Fig.1 shows the behavior of MV Lyr for the selected nights.

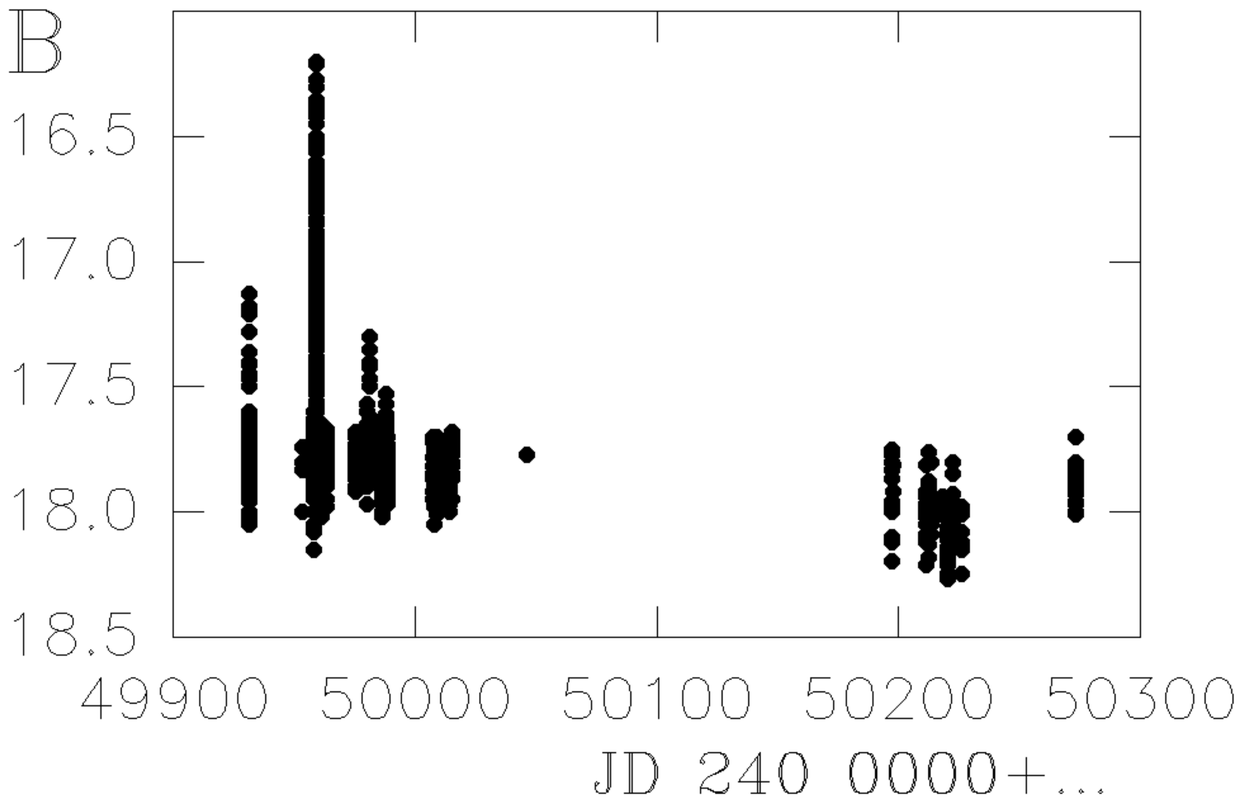

Figure 3. The last low state of MV Lyrae in 1995-1996.

Some of light curves showed the slow brightness variations with time scale 0.13-0.14 days, but with low amplitude of 0.$^{\rm m}$1. The periodogram for all data in 1995 is given in Fig.2. Several strongest peaks in the vicinity of the spectroscopic period (0.$^{\rm d}$133) as well as the position of period itself are marked. The side-band peaks are separated by day, another peak is close to the photometric period 0.$^{\rm d}$138, discovered by Borisov (1991) in the bright state and no coincided peaks with spectroscopic period. So we could say about the existence of small-amplitude (0.$^{\rm m}$1) light variations with rather typical time of 0.$^{\rm d}$13 - 0.$^{\rm d}$14, close to spectroscopic period, then exact periodic variations.

The light curve in the scale of tens months is performed in the Fig.3. It is seen that the mean brightness of MV Lyr (if we ignore the flashes) decreased with time from 17.$^{\rm m}$8 to 18.$^{\rm m}$1.

References

Andronov I.L.: 1996, *Private comm.*
Andronov I.L., Shugarov S.Yu.: 1982, *Astron. Tsirk.*, **1230**, 3.
Borisov G.V.: 1992, *Astron. Astrophys.*, **261**, 154.
Marsakova V.I., Shugarov S.Yu.: 1995, *IAU Circ.*, **6186**.
Pavlenko E.P., Shugarov S.Yu.: 1996, *As. Ap. Trans.*, in press.
Stellingwerf R.F.: 1978, *Ap.J.*, **224**, 953.

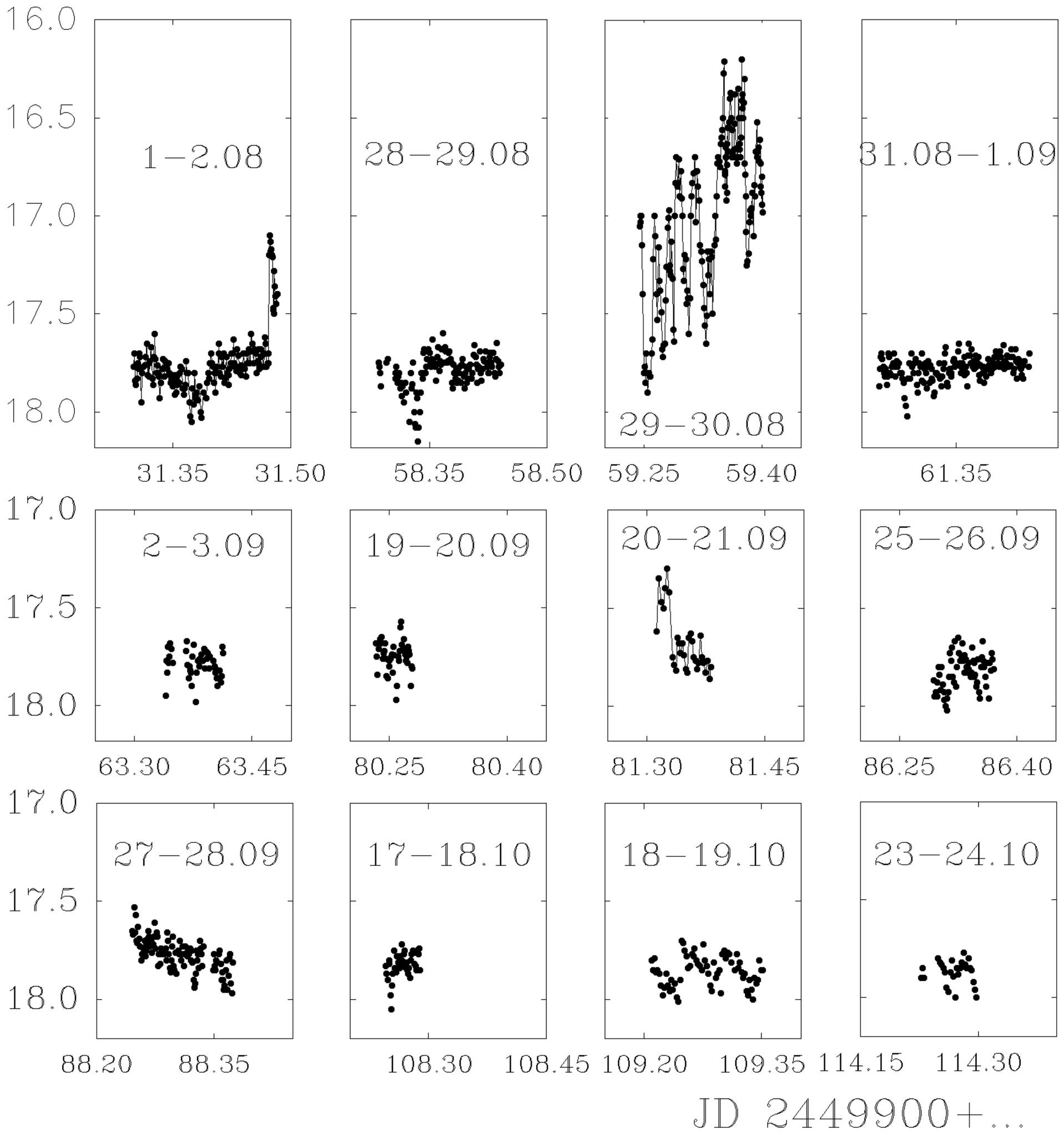

Figure 1. The behaviour of MV Lyrae for selected nights in 1995.

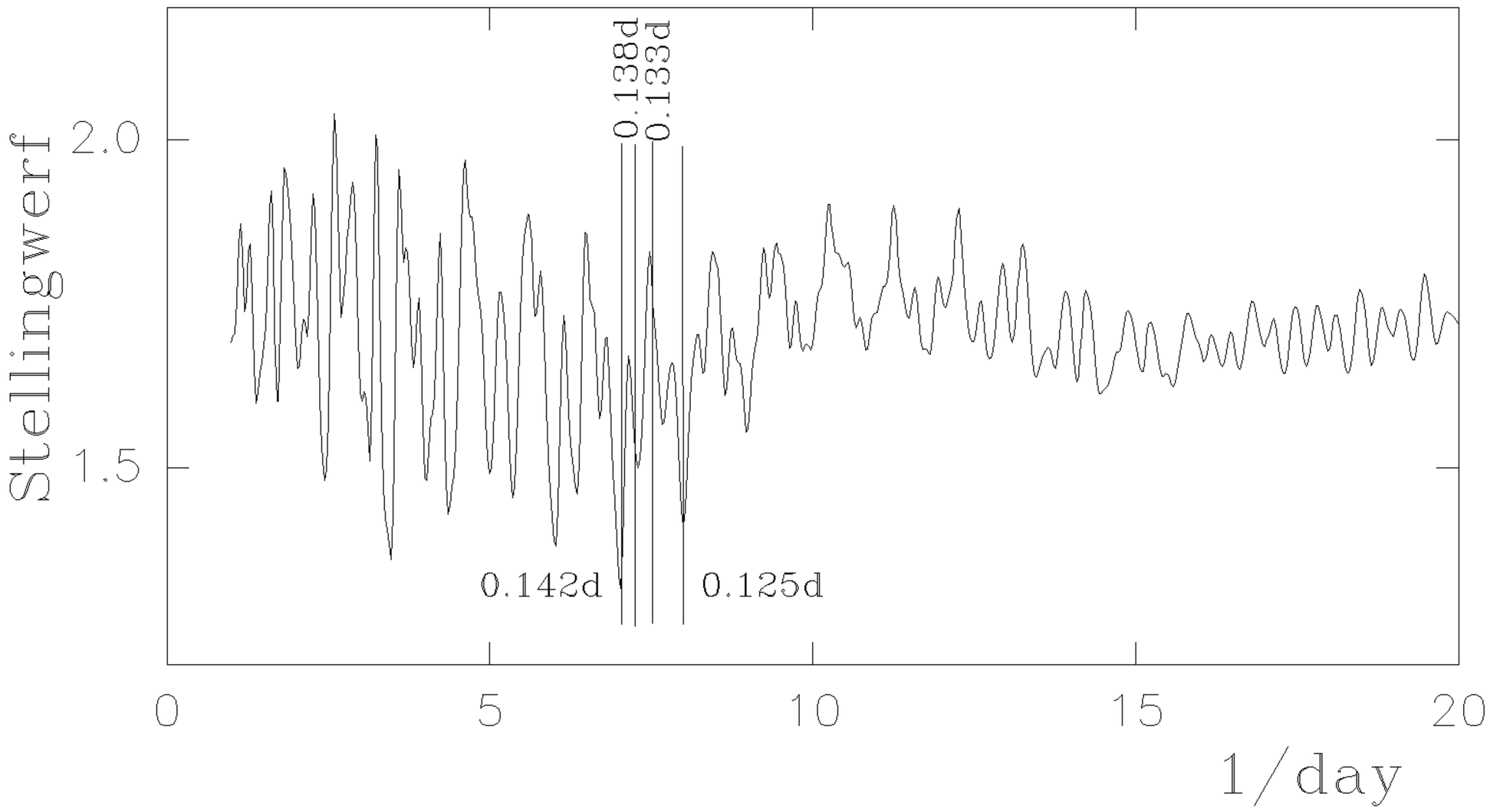

Figure 2. The periodogram for MV Lyrae in the vicinity of the spectroscopic period computed using the method by Stellingwerf (1978).