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AUTOCORRELATIVE AND SPECTRAL ANALYSIS  
OF THE LIGHT VARIATION OF AE Aqr.

Autocorrelative and spectral analyses of 2390 unpublished observations of AE Aqr in U region was carried out as described in [1]. The observations were made by M.F.Walker in 1956-1957 on the Mount-Wilson Observatory 60-inch reflector with Corning 9863 filter. They are kept in the Royal Astronomical Society library in London. On request from the Main Astronomical Observatory of the Ukrainian Academy of Sciences, Dr.E.W.Maddison kindly sent a copy of the observations to Kiev.

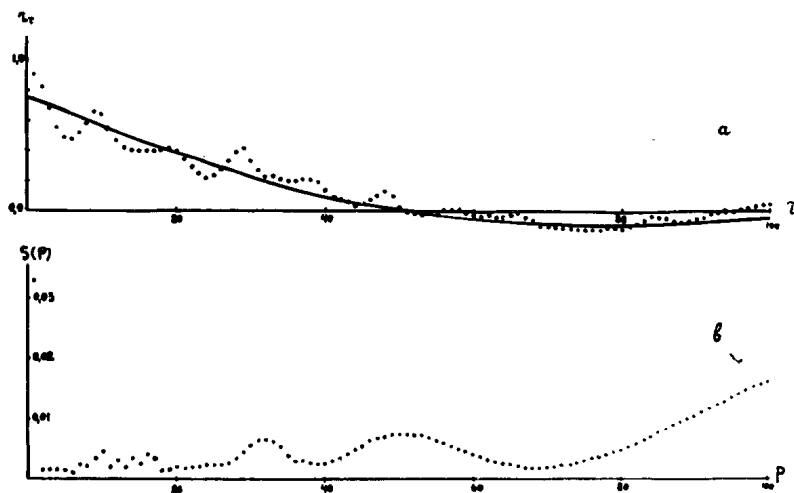


Fig. 1

A unit of correlative interval is taken equal to 0.001. The maximum correlative interval ( $\tau$ ) is equal to 100 unit. The received autocorrelative (a) and spectral (b) functions are shown by points on the figure 1. The solid curve is calculated by the formula:

$$r_{\tau} = 0,75 e^{-\frac{\tau^d}{0,042}} \cos \frac{2\pi}{0,2} \tau^d$$

It describes the principal run of  $r_{\tau}$  with  $\tau$  and corresponds to a stochastic process:

$$\xi(t) = A \cos \left( \frac{2\pi}{0,2} t^d + b \right)$$

where A and b are stochastic values. Moreover oscillations with maxima near the correlative intervals 0.001, 0.003 and 0.005 are seen on the correlative function. The existence of oscillations of such periods is confirmed by the spectral density curve. Besides small maxima near the enumerated periods and a possible maximum near  $P = 0.016$  there is an increase of  $S(P)$  with P related to the main component of the process with  $P = 0.2$ . As seen from the value  $r_{\tau}$  at  $\tau = 0$ , the dispersion of this component is three times greater than the sum of dispersions of the rest observations. Periods near 0.701 and 0.4 discovered by A.H.Joy [3] and M.F.Walker [4] from radial velocities are not seen from the examined observations of AE Aqr. If such oscillations exist, their dispersions are not greater than those for the enumerate short period oscillations.

Therefore, basing on the examined row of observations, the main part of the light variation process of AE Aqr in U region may be mathematically modelled by a harmonic oscillation with  $P = 0.2$  and stochastic amplitude and phase.

It is a pleasure to acknowledge my sincere thanks to Dr.E.W.Maddison for the copy of observations and the troubles of sending it to us and to A.Jemets for calculations on an electronic computer.

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August, 1968 Main Astronomical Observatory  
of the Ukrainian Academy of Sciences, Kiev

#### LITERATURE

1. F.J.Lukazkaja. *Astrophysica*, 2, 345, 1966.
2. M.F.Walker. *IAU(27) RAS-2*, November, 1966.
3. A.H.Joy. *ApJ*, 120, 377, 1954.
4. M.F.Walker, *Sky and Telescope*, 29, 23, 1965.