GEOS
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GEOS CIRCULAR ON RED VARIABLE STARS
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PRELIMINARY DECLARATION

GEOS is a European group of variable star observers which has performed more than 550 000 visual estimates from 1974 to 1977. The initials stand for " Groupe : Etude et Observation Stellaire " and " Gruppo Europeo di Osservazione Stellare " .

One of the essential characteristics of GEOS is the very wide range in types of the variable stars it studies by visual photometry. As a matter of fact, experience has shown us that photometry through visual estimates conducted with the Argelander method can be applied efficiently in nearly all fields (even for the observation of low amplitude stars) , provided that the observing sessions are programmed, the number of estimates is as large as possible and the estimates are processed statistically on a computer.

During the last five years, the results obtained on all types of variable stars have been issued in the " Notes Circulaires " (in abbreviate: " GEOS NC ") in the form of miscellaneous notes together with informative material for GEOS members.

The most important results will as from now appear separately in several different sets of new circulars: the " GEOS CIRCULARS ", while the " Notes Circulaires " will retain their roll of a liaison bulletin between the GEOS observers and will keep on giving partial results or results which are not sufficiently confirmed.

This particular set of GEOS CIRCULARS or " GEOS SR " is devoted to red variable stars such as the semiregular or slow irregular variable stars. Its main purpose consists in publishing accurate light-curves of bright SR and L type variable stars.

These curves are based on an unusually high density of visual estimates which allows a thorough statistical analysis following an appropriate method, as previously described (Figer,1975) .

Methodology : The accuracy of visual estimates is strongly dependent on personal and instrumental factors. Hence all the measures performed by one observer with one optical aid are listed in different " series " . Experimental errors in each series define a specific population with its mean Δm_i and its own standard deviation σ_i . The theory shows that the most probable value for the star brightness is given by :

$$\mu = \frac{\Sigma_i ((x_i - \Delta m_i)/\sigma_i^2)}{\Sigma_i (1/\sigma_i^2)}$$

where the x_i terms are the individual estimates performed during the time span on which the mean μ is calculated.
Since the true values of σ_i and Δm_i are not known, but only estimated from the mean light curve, an iterative procedure is required.

Experience, together with a comparison with photoelectrical measurements, have shown us that weighting the data by a $1/\sigma^2$ factor was a decisive improvement which allowed to reach a precision of a few hundredths of magnitude under the best conditions.

A. FIGER

BIBLIOGRAPHY :

SIGMA 1 , 35 , 1975. Figer A. : Résultats de la première campagne franco-italienne d'observations d'étoiles variables (été 1974) : I. Courbe de lumière de V 449 Cyg .

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