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NEW VARIABLE STARS IN THE OPEN CLUSTER NGC 6882/5

In a research program to detect new variable stars in open clusters (Peniche and Pena, 1987) a few stars in the direction of the open cluster NGC 6882/5 ($\alpha = 20^{\text{h}} 9^{\text{m}}.8$, $\delta = 26^{\circ} 26'$, 1960) were observed. The criterion followed in the selection of the stars was that they lie within the limits of the instability strip since, according to Breger (1979), one third of the stars found there would be variable.

The observations were carried out at the San Pedro Martir Observatory during the nights of September 3 and 4, 1986. The 0.84 m telescope was utilized provided with a pulse counting photomultiplier with a 1P21 cooled phototube, Johnson's V filter was used. The integration time for both sky and star measurements was of 10 s in a series of six measurements of the star and one of the sky. Table I lists the observed stars, the ID number which, in this case, follows the notation of Hoag et al. (1961), the V magnitude and the color index of each star. The last column lists the stellar spectral type that was obtained from the calibration of (B-V) given by Hoag et al. (1961) and the spectral type from Mihalas (1981).

The technique followed for determining which stars were variable and which constant was through the use of differential photometry and can briefly be summarized as follows: in order to obtain the instrumental magnitude, the flux of the sky was subtracted from the average flux of the star measurements and the instrumental magnitude was derived. Light curves for each star were constructed and a mean curve was established. The stars that did not conform to the average pattern defined by two or more stars were considered to be variable and the mean curve was subtracted. A zero base-line was established by subtracting the mean amplitude variation for each star. The final results are presented in Tables II and III and shown schematically in Figures 1 and 2. The accuracy of each figure is of $0^{\text{d}}.0035$ in time and 0.003 in magnitude.

As can be seen from Figure 1, the amplitude of variation of star 19 is 0.034 mag. with an interval of time between two consecutive maxima being

Table I

Parameters of the Observed Stars

ID	V	B-V	Spectral type	Comments
9	9.26	.280	A9	Constant
5	7.60	-.090	B8	Constant
19	10.23	.440	F6	Variable
25	10.49	.420	F5	Variable
8	9.18	.480	F7	Constant

Table II

Differential Photoelectric Photometry of Star 25

HJD	V	HJD	V
2440000+	(mag)	2440000+	(mag)
6677.7036	.008	6678.6878	.017
6677.7127	-.007	6678.6944	.002
6677.7211	-.013	6678.7023	.003
6677.7295	.005	6678.7098	-.002
6677.7378	.001	6678.7169	.014
6677.7453	-.007	6678.7315	.014
6677.7611	-.008	6678.7382	-.004
6677.7690	.000	6678.7473	.003
6677.7857	.005	6678.7557	-.004
6677.7932	.002	6678.7694	-.004
6677.8015	-.001	6678.7795	.001
6677.8099	-.012	6678.7836	.002
6677.8174	.006	6678.7911	-.009
6677.8253	.003	6678.7957	-.010
6677.8328	.018	6678.8073	-.015
		6678.8140	-.010
		6678.8215	-.007

Table III

Differential Photoelectric Photometry of Star 19

HJD	V	HJD	V
2440000+	(mag)	2440000+	(mag)
6677.7107	-.017	6678.6861	.000
6677.7194	-.008	6678.6932	-.001
6677.7279	.001	6678.7007	-.003
6677.7357	.001	6678.7153	.000
6677.7440	-.006	6678.7236	.001
6677.7599	-.010	6678.7307	.008
6677.7674	-.006	6678.7378	-.002
6677.7757	-.009	6678.7471	-.002
6677.7841	.009	6678.7544	-.003
6677.7920	-.003	6678.7682	.001
6677.8002	-.005	6678.7757	.001
6677.8086	-.001	6678.7828	.006
6677.8153	.015	6678.7898	-.009
6677.8228	-.013	6678.7982	-.010
6677.8315	.014	6678.8057	-.006
		6678.8132	.003
		6678.8203	.002

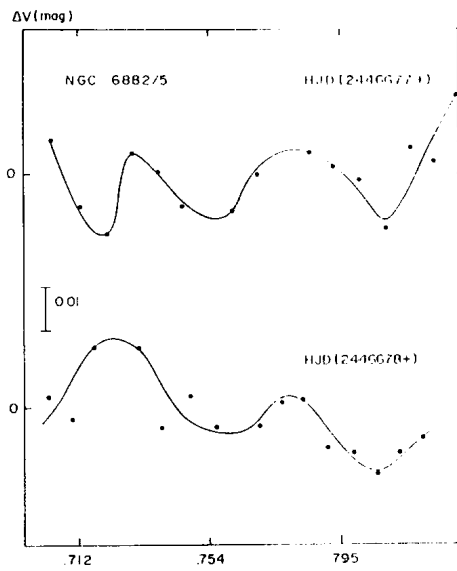


Figure 1. Light curve of star 25.

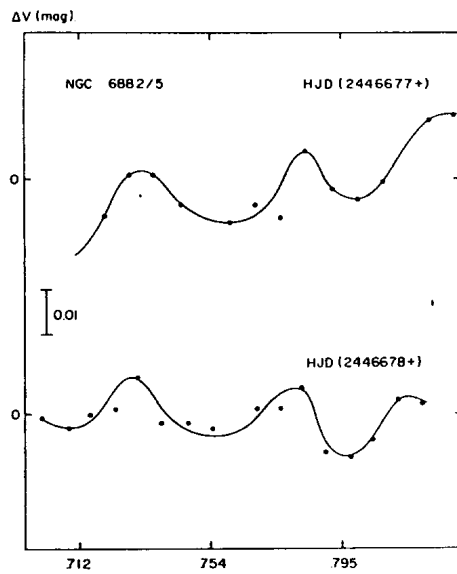


Figure 2. Light curve of star 19.

Table IV
Amplitude of Variation of the Observed Stars

	ΔV HJD2446677	ΔV HJD2446678
$V_5 - V_8$	0.000	0.000
$V_{25} - \langle V \rangle$	0.013	0.014
$V_{19} - \langle V \rangle$	0.016	0.009

$0^d.056$, whereas for star 25 (Figure 2), the amplitude is 0.032 mag with an estimated period of $0^d.053$.

We might conclude that two new variable stars in the direction of the open cluster NGC 6882/5 have been found. Due to the photometric characteristics of these stars, namely, that they are within the instability strip limits, their spectral types are F6 and F5, they show low amplitude variation and short periods of pulsation, it might be concluded that these are Delta Scuti type variables.

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