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Photometric variability of Ap and He-weak stars in clusters and associations. I.

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Summary. — The lightcurves determined in the Geneva photometric system are presented for twenty-five CP2 and CP4 stars belonging to seven associations and clusters. A unique period is proposed for each star and the coefficients of the best fitting Fourier series are given for each light-curve. One star, Cox 38 in NGC 2516, is an eclipsing binary, becoming the first such known CP2 star. Another star, HD 37151, is multiperiodic, but the existing data do not allow to sort out the true frequencies from the aliased ones.

Key words : He-weak, Bp, Ap stars — Geneva photometry — periods — variability.

1. Introduction.

Angular momentum is one of the basic parameters characterizing Ap stars. The origin of its low value for them has tentatively been explained by several authors, essentially in terms of magnetic braking during the main-sequence phase (Havnes and Conti, 1971 ; Strittmatter and Norris, 1971; Wolff, 1975, 1981; Fleck, 1980; Kulsrud, 1971; Mestel, 1975). Observations seem to favour this explanation (Wolff, 1975, 1981; Abt, 1979), although Hartoog (1977) reaches the conclusion that braking must take place before the main-sequence phase. Abt's (1979) and Wolff's (1981) conclusions are based on very few stars in open clusters and are not independent, so that the question of the origin of the small angular momentum of Ap stars remains open. Wolff (1975) had already discussed the loss of angular momentum of Ap stars on the basis of photometric periods. But she dealt with field stars only, whose evolutionary state could only be known *via* $R \sin i$ values obtained themselves *via* measured rotational velocities. A comparison between Wolff's 1975 and 1981 papers shows how uncertain the conclusions remain. This is why a systematic search for variability of Ap stars in clusters was undertaken four years ago. It is assumed that the oblique rotator model is valid, hence that the photometric period equals the rotational one. So the periods give the equatorial velocities through the well-known formula $V\,[\mathrm{km\,s^{-1}}] = 50.6\ R[R_\odot]/P[\mathrm{days}]$ without any inclination effect. This is an advantage because the $\sin i$ factor introduces an undesirable uncertainty in the statistics, which are inevitably based on a small sample. The radius may be inferred from the position of the star in the cluster's HR diagram, assuming it is the same as for a normal star. With this hypothesis, the discussion about angular momentum may be based directly on the periods rather than equatorial velocities. Such a discussion is under way now and will be submitted to the Main Journal.

2. Observations.

Most of the observations were made with the Swiss telescope at La Silla, Chile, but some were also made with the 1 m telescope at Gornergrat (Switzerland). The Swiss telescope at La Silla was a 40 cm one until the end of March 1980. In April 1980 a 70 cm telescope replaced the old one at Là Silla, and it is with this instrument that the lightcurves of most Ap stars presented here were established. Both instruments were equipped with the « P7 » double-beam, pulse-counting photometer built by Burnet (1976) at Geneva Observatory. The Gornergrat telescope was supplied with an old analogic photometer. All observations were made in a differential way, most of them with two comparison stars. When the old photometer was used, the observing sequence was C_1-V, where V is the variable and C_1 the first comparison star, or sometimes C_1-V-C_2 in order to check the constancy of the first comparison star with the aid of a second one. The sky was measured in all colours after the measure of each star. When the P7 photometer was used, the sequence was (with the exception of the stars HD 33647, HD 36916, HD 37151 and of those in NGC 6475) C_1-V-C_2-V-C_2-V-C_1 or C_1-C_2-V-V-V-C_2-C_1, the sky being measured simultaneously in each colour. P7 was programmed as usual so that at least 40,000 photons were counted in the U band-pass for each measure; but the duration of the whole measure was set between one minute (this minimum, corresponding to an integration of about four seconds per filter — taking the sky measurement into account — was later extended to three minutes for better security) and twelve minutes.

Table I gives all stars measured in this programme up to now, with the number and sequence of measurement for each. Table II lists the final results under the form of Fourier coefficients of the lightcurves (see the following section).

Differential magnitudes and colours are listed in table III, while some data, either very recent or old, are added in table IV. Mean colours and magnitudes of the comparison stars are displayed in table V.

3. Reduction and analysis of observations.

When a period determination was judged possible, the measures were examined with three techniques of period determination : 1) Deeming's (1975) method of discrete Fourier transform, 2) Renson's (1978) θ_1 test and 3) Stellingwerf's (1978) phase dispersion minimization method, or — in one case — the related method of Whittaker and Robinson (1926). The period search was always managed in the frequency domain, and separately for the three magnitudes $[U]$, $[B]$ and $[V]$ (brackets serve to distinguish these Geneva passbands from Johnson's). In some cases it is unfortunately not possible to distinguish between related periods because of inadequate time coverage (one measurement per night, near culmination). Then the most probable ones are given. In order to allow the reader to judge the choice of periods for himself, a periodogram is displayed in figure 1 to 24 for each relevant star and in at least one passband.

An attempt was made to describe the lightcurves in a quantitative way by adjusting a Fourier series of the form

$$m(t) = A_0 + \sum_{i=1}^{n} A_i \cos(2\pi\nu i(t - t_0) + \phi_i)$$

to the observations by an iterative, least-square fit method. The quantities to be determined are the coefficients A_0, A_i, ϕ_i and the fundamental frequency ν. For the visual magnitude for example, the process could be the following : an approximate initial value of ν is chosen from the above-mentioned periodograms, as well as a frequency step of about one-tenth of the width of the considered peak. The programme computes the amplitudes and phases by least squares for the given frequency as well as for the two nearest frequencies one step apart (the given frequency being at the centre of this triplet), as well as the three corresponding standard deviations of the residuals. A parabola is fitted to these three points (as a function of the frequency), and a new triplet of frequencies defined so that the central one coincides with the minimum of the curve. This process is iterated a few times until the three points lie in a quite symmetrical way around the minimum. This algorithm (devised and kindly made available to the author by Gilbert Burki), however, was not used as such because the need was felt to use all available photometric information, i.e. not only the V magnitude but the colours as well. As a consequence of the reduction process used for the Geneva photometry, the V magnitude and the colours U-B, V-B, B_1-B, B_2-B, V_1-B and G-B are obtained independently rather than the U, B, V, B_1, B_2, V_1 and G magnitudes themselves. We therefore chose to minimize the weighted sum of all seven variations of the residuals related to the seven lightcurves. This quantity to be minimized may be written

$$\chi^2 = \sum_{j=1}^{7} \left\{ \frac{1}{\sigma_j^2} \sum_{i=1}^{N} [y_{ij} - f_j^{\nu}(t_i)]^2 \right\}$$

with y_{ij} being either m_v, U-B, V-B, B_1-B, B_2-B, V_1-B or G-B observed at time t_i, and $f_j^{\nu}(t_i)$ being the value of the adjusted Fourier series in the corresponding magnitude or colour at the same time and for frequency ν.

In practice, the minimization was achieved in two steps. First, the seven sums of squared residuals were assigned the same weight equal to unity and a preliminary estimation of the frequency was made by minimizing the global sum with the algorithm described above. This gave a rough estimation of the seven corresponding standard deviations, assuming that the fitted curve is an ideal one, i.e. that all residuals may be attributed to random observational errors. Second, the minimization process was repeated, each sum of squared residuals being weighted by the inverse of the variance found in the first step.

Experience showed that in almost all cases the data could be fitted by Fourier series limited to $n = 2$, i.e. by the fundamental frequency and its first harmonic. The epoch of origin (zero phase) has been set at the minimum of the fundamental component of the Fourier series expressed in magnitudes, in the passband where the whole amplitude is the greatest (usually the U band). So the zero phase coincides with the maximum of the fundamental component of the light intensity. The coefficients of the fitted curves are given in table II together with the ephemeris of the star. The epoch is close to the mean of all measurement times t_i.

The lightcurves are given in figures 25 to 49 for the $[U]$, $[B]$ and $[V]$ magnitudes, and for the following parameters :

$$\begin{aligned} d &= (U\text{-}B_1) - 1.430(B_1\text{-}B_2) \\ m_2 &= (B_1\text{-}B_2) - 0.457(B_2\text{-}V_1) \\ \Delta(V_1\text{-}G) &= (V_1\text{-}G) - 0.289(B_2\text{-}G) + 0.302\,. \end{aligned}$$

The d and m_2 parameters are reddening-free and represent respectively the Balmer jump and line-blocking around λ4000 Å. Both are of course affected by the Ap characteristics, so that their values are less easy to interpret than for normal stars. The d parameter is generally smaller than for normal stars having the same B_2-G index (Gerbaldi *et al.*, 1974 ; Hauck and North, 1982), while m_2 is affected not only by the blocking near 4000 Å, but also by the λ5200 depression through the $(B_2$-$V_1)$ index. The $\Delta(V_1$-$G)$ parameter represents the depth of the λ5200 depression, and is slightly sensitive to interstellar reddening (Hauck and North, 1982). Its variation is often not significant through a cycle ; in these cases, the m_2 variations can be readily interpreted as variations of line-blocking near 4000 Å. Many other parameters or indices could be examined as a function of phase, but they would not provide much more information. The $\Delta(V_1$-$G)$ parameter was preferred to the equivalent Z parameter, because the latter generally is more noisy, due to the greater number of filters involved.

The precision of the differential measures is found to be of the order of two thousandths of a magnitude in the V band for the best cases of precise measurements (sequence C_1-V-C_2-V-C_2-V-C_1). It is slightly less good in U, and definitely still poorer in the parameters d, m_2 and $\Delta(V_1$-$G)$. This is because these parameters are combinations of three magnitudes, obtained furthermore through more opaque filters then $[U]$, $[B]$ and V.

For each curve, the uncertainty about the amplitude of the fundamental component and the amplitude of the first harmonic is the same and is given by the formula

$$\sigma_A = \sqrt{\frac{2}{N}}\,\sigma_{\text{res}},$$

N being the number of measures and σ_{res} the mean standard deviation of the residuals. The standard deviation of the phases is given by the formula $\sigma_\phi = \sigma_A/A$, A being the amplitude of either the fundamental or the first harmonic. These formulae are taken from Balona and Stobie (1980). The uncertainty ΔP on the period was found by using the formula $\chi^2(P + \Delta P) = \chi^2(P) + 1$ (Bevington, 1969) assuming $\frac{\chi^2}{N - n} \simeq 1$, P being the best period, N the number of measures and n the number of parameters fitted to the data, i.e. six in most cases.

The individual stars are discussed in the next section. The membership of some of them is doubtful or even plainly negative; the results concerning these stars are nevertheless reported here since they increase our knowledge of field stars.

4. Discussion of individual stars.

The stars are grouped by the clusters to which they belong and these are classed according to their age. The DM number is either a BD, CpD or CoD number, according to the HD practice.

A list of all stars is given in table I and the results of the least-square fit are displayed in table II; the differential measures are given in table III.

4.1 Orion OB1 association. — All observations have been made with the Swiss telescope at La Silla. In all, eleven stars have been observed, among which three may not be members according to the proper motion data compiled by Warren and Hesser (1977) : HD 36916, HD 37151 and HD 37642. HD 36916 and HD 37151 were observed differentially with HD 35640. The other stars were observed later (in December-January 1981-82) and more thoroughly with yet another comparison star which was chosen for its low dispersion of the magnitude and colours in the Geneva catalogue. However, this star is peculiar, of the Mn type. The analysis of the differential magnitudes HD 33647-HD 35640 showed that HD 33647 is indeed variable, but with an extremely low amplitude. This star was kept as a comparison in spite of its variation since the latter, diluted twice by the addition of the constant star HD 35640, is well under the average residual dispersion of all lightcurves.

HD 33647 (DM + 0°974). — This is an MnHg star (Schneider, 1981). The author was not aware of this at the time of the observations : the star had been chosen because it had been measured many times and had a small standard deviation. There are 318 good (i.e. with $P > 1$, $Q > 1$) differential measures of the type V-C_2, V being HD 33647 and C_2 being HD 35640. We shall assume that the latter is constant. Among those 318 measures, 312 were made during the same season (mid-December 1981 to end of January 1982) and so represent a good homogeneous sample. It is on this sample that the final curve-fitting was made. Renson's θ_1 test is practically of no use here because of the very low signal-to-noise ratio. The Deeming method is very suitable, on the contrary, as well as the test devised by Whittaker and Robinson (1926) cited by Stellingwerf (1978). We see that although the amplitudes are extremely low, the signal-to-noise ratio of the periodograms is high (Figs. 1c, d). However, an aliasing effect is still present although HD 33647 and HD 35640 were observed many times a night. This is because it was a bit late in the year to observe Orion and because no observation was made at air masses greater than about 1.6. A cosine wave was adjusted to the visual magnitude and to the colours following the above-described procedure. The amplitudes are so small that it would not have made sense to add a harmonic. The minimum residual dispersions in $[U]$, $[B]$, $[V]$ occur for the period $P = 0.56$ d ($0^m.00535$, $0^m.00404$ and $0^m.00305$ respectively), but they are hardly greater for the shorter period $P = 0.36$ d ($0^m.00539$, $0^m.00407$ and $0^m.00306$ respectively), which may be the true one as well. The larger period $P = 1.30$ d seems much less probable in view of the Fourier periodograms (Figs. 1c, d), but it cannot be completely ruled out since the residual dispersions are not significantly worse ($0^m.00309$ in V for example). Figure 25 shows the lightcurves in $[U]$, $[B]$ and $[V]$ for $P = 0.56$ days. The ephemeris is given for that period in table II.

It is most interesting to note that the very few HgMn stars for which a good period determination exists up to now all have very short periods. HD 27376 (HR 1347) has a period of 0.51 days, HD 42657 (HR 2202) has $P = 0.724$ days (Renson and Manfroid, 1981), and HD 33647 has $P = 0.566$ days or still shorter (this paper). Several others have been observed, but the authors do not consider the problem of aliased frequencies : there is usually only one measure per night ! (Preston *et al.*, 1969; Stepien, 1968; Rakosch, 1978; Hildebrandt and Schöneich, 1974). In a recent paper, Manfroid and Renson (1983) discuss the star HD 110073 (HR 4817) and find a period of 0.457 days, which may not be significant according to them. Rakosch (1971) and Stift (1973) give $P = 0.9636$ d for HD 358 (HR 15), but they do not say anything about the distribution of their observations. The projected rotational velocities are 12 km/s for HD 27376, 23 km/s for HD 42657, 39 km/s for HD 33647, 57 km/s for HD 110073 and 56 km/s for HD 358. Assuming a radius $R = 3\,R_\odot$, rotational velocities should be three to twenty-five times higher to be consistent with the oblique rotator model and with the inclination angle i close to 90°. Although the small values of $v \sin i$ may be due to a pole-on aspect, such occurrences have a low probability. One could of course hypothesize that HgMn stars are rapidly-rotating Si stars seen nearly pole on. However, this sounds rather far-fetched, since the magnetic axis should then be perpendicular to the rotational axis to account for the absence of significant effective field; furthermore, spectroscopic binaries should not be detected among them since one would expect that the rotational axes are more or less perpendicular to the orbital plane. So we propose tentatively that HgMn stars do not fit the oblique rotator model. They probably do have a small magnetic field, but multipolar, producing more than two « spots » on the surface of the star and a vanishing value of the effective field.

Many more CP3 stars should be observed with great care in order to test these suggestions.

HD 35298 (DM + 1°996, He wk). — This star has a typical double-wave lightcurve, and all colours vary in phase. The m_2 parameter varies so slightly that the first harmonic is not really significant ($A_2 = 0.57\ \sigma_A$). The variations of the parameter $\Delta(V_1\text{-}G)$ are significant : not the fundamental component ($A_1 = 0.97\ \sigma_A$), but the first overtone ($A_2 = 3.92\ \sigma_A$).

The period is much longer than suggested by the unique published value of its $v \sin i$: if $R = 3\ R_\odot$, then the equatorial velocity should be 82 km/s, while $v \sin i = 260$ km/s according to McNamara (1963) ! The period is quite certain, as can be judged from the periodogram (Fig. 2). It is probable that McNamara made a misidentification : HD 35298 appears as a relatively sharp-lined star on two spectra (dispersions 39 and 128 Å mm^{-1}), as Dr. Abt kindly pointed out to the author.

The effective magnetic field of HD 35298 has been measured by Borra (1981), who already proposed the right period (1.9 d). This result strengthens the doubt about the above-mentioned $v \sin i$ value.

HD 36313 (DM − 0°977, Si). — This star has the shortest period among the sample presented here. Only a few other magnetic stars share comparable periods (HD 9531, 19832, 124224, 133029, 148898, 164429, 220825, 221936). All colours vary in phase, with a double wave. All lightcurves can be fitted as usual with $n = 2$, except perhaps the U magnitude where a third harmonic improves the fit slightly, as shown in table IIb. The m_2 parameter is very slightly variable : the fundamental has a marginally significant amplitude $A_1 = 2.13\ \sigma_A$ while the first harmonic is not significant ($A_2 = 1.30\ \sigma_A$). The peculiarity parameter $\Delta(V_1\text{-}G)$ is only marginally variable, with a probable double-wave : $A_1 = 2.05\ \sigma_A$, $A_2 = 1.81\ \sigma_A$. Borra (1981) has measured the magnetic field of HD 36313 and proposed a period of either 3.5 or 6.2 days. He made only one measure per night, so that he obtained for example the aliased frequency $2 - P^{-1}$, P being the correct period.

HD 36526 (DM − 1°933, SiSr). — Here again, all colours vary in phase, but the secondary minimum is less conspicuous than in the two examples above. The U and B curves cannot be satisfactorily fitted between phases 0.2 and 0.5, unless we admit at least two harmonics. The metallicity parameter is marginally variable with a single wave : $A_1 = 2.09\ \sigma_A$ while $A_2 = 1.32\ \sigma_A$ in the case of a fit with one harmonic only. With two overtones, we have $A_1 = 2.49\ \sigma_A$, $A_2 = 1.76\ \sigma_A$, and $A_3 = 2.29\ \sigma_A$. $\Delta(V_1\text{-}G)$ is variable : $A_1 = 2.72\ \sigma_A$ if one or two harmonics are taken into account in the fit. The amplitudes of the latter are around one sigma only and so are not significant.

Borra (1981) measured the effective magnetic field of this star and found it very strong. He proposed the correct period (1.6 days).

HD 36540 (DM − 4°01162, He wk). — All colours vary in phase and in a quasi sinusoidal way. They are quite well fitted with $n = 2$. The m_2 parameter is hardly variable, since the amplitudes of the fundamental and of the harmonic are respectively $A_1 = 1.07\ \sigma_A$ and $A_2 = 1.46\ \sigma_A$. On the other hand, $\Delta(V_1\text{-}G)$ is variable since $A_1 = 4.60\ \sigma_A$, but the existence of a secondary maximum is not sure : $A_2 = 1.31\ \sigma_A$.

The effective magnetic field was measured four times by Borra (1981), which is not sufficient to derive a period.

HD 36668 (DM + 0°1113, Si, He wk). — This star has a secondary maximum almost as important as the main one in the U band. This maximum becomes the main one in the d parameter. The metallicity parameter seems to present a secondary maximum too, if it varies at all ($A_1 = 0.72\ \sigma_A$, $A_2 = 2.22\ \sigma_A$). The variation of $\Delta(V_1\text{-}G)$ is rather certain : $A_1 = 1.96\ \sigma_A$, $A_2 = 2.66\ \sigma_A$. There is also a double-wave here.

Borra (1981) made six magnetic measurements and proposed three possible periods, the first of them (2.1 days) being the right one.

HD 36916 (DM − 4°1173, SiMn). — This star had been measured during the southern summer 1980-1981. Meanwhile, its period has been published by Renson and Manfroid (1981) who found $P = 1^{d}.564 \pm 0^{d}.007$ for their observations of November 1977. Since the precision on the period presented here is at least ten times better, it is possible to compare our results with those of Renson and Manfroid (1981). Since their zero phase takes place at HJD 2443470.00, and the maximum of their u lightcurve at phase 0.43, a phase shift of about 0.1 can be inferred between both sets of measurements. The following new value of the period results : $P = 1^{d}.56515 \pm 0^{d}.00004$. Its precision is ten times better than the one resulting from the least-square fit and displayed in table II.

The scatter of the curve is rather large because the sequence of each observation was only C_1-V. All colours vary in phase. The m_2 parameter is probably variable ($A_1 = 2.14\ \sigma_A$) with a single wave ($A_2 = 0.71\ \sigma_A$). The $\Delta(V_1\text{-}G)$ parameter varies most definitely ($A_1 = 4.73\ \sigma_A$), with a single wave too ($A_2 = 1.36\ \sigma_A$).

The magnetic field of this star was measured by Brown *et al.* (1981); but they made only two measurements and so could not propose any period.

The projected rotational velocity was measured by Abt (1979) and amounts to about 100 km/s. From the formula $V = 50.6\ R/P$, we have the constraint on the radius $R \geqslant P/50.6\ v \sin i$. So the lower limit of the radius R is 3.09 $R_\odot$ if the $v \sin i$ value is reliable. On the ZAMS, the radius of a 4 $M_\odot$ star is about 2.3 $R_\odot$, and it is 2.6 $R_\odot$ for a 5 $M_\odot$ star according to models computed by Maeder (1976). Hence HD 36916 must be evolved since it has a greater radius, which is consistent with its classification B9IV p(Si) (Abt and Levato, 1977) and its doubtful membership (Warren and Hesser, 1977).

HD 37140 (DM − 0°1018, SiSr). — All lightcurves are quasi sinusoidal. The m_2 parameter, if variable, may however have a secondary maximum : $A_1 = 0.95\ \sigma_A$, $A_2 = 1.77\ \sigma_A$. The peculiarity parameter is marginally variable, the fundamental frequency being preponderant : $A_1 = 2.11\ \sigma_A$, $A_2 = 0.95\ \sigma_A$. There is no explanation for the discrepant point lying $0^{m}.023$ above the mean curve in the d diagram at phase 0.24.

Borra (1981) made six magnetic measures of this star but proposed no period.

HD 37151 (DM − 7°1131, Si). — This star has been observed from November 1980 to February 1981. It does vary, but in a very unexpected way : it surely is multi-periodic ! As can be seen on the periodogram (Fig. 9), the aliasing effect is present and impedes an unambiguous choice of periods. For the sake of simplicity, the set of small frequencies was chosen, but it must be remembered that further observations may very well favour some higher, aliased frequencies. Most peaks of the periodogram can be explained with two main frequencies, noted ν_1 and ν_2 in figure 9a. A least-square fit was tried without and with the first harmonic of each frequency. The latter fit gives a smaller residual dispersion and so was adopted rather than the former. The lightcurves are displayed in figure 33a, and the residues in figure 33b. It is interesting to notice that all lightcurves are perfectly in phase, the star being bluer when brighter. The ratio of the amplitudes in *U-B* and *V* is greater for the first frequency (ν_1) than for the other. Deeming's method was applied to the residues (data minus fitted function). It is seen that, if any periodicity remains, it is not very significant (Fig. 9d).

HD 37151 was classified B8Vp(Si) by Abt and Levato (1978). These authors describe it as having « moderately strong Si II lines » as well as HD 35008 and HD 36916. The $v \sin i$ value is 125 km/s according to Abt (1979). Borra (1981) found a weak, hardly significant effective magnetic field varying from − 530 to + 345 G (with a 380 G standard deviation); he could not suggest any period from his only four observations. The peculiarity of the light variation, together with the spectral peculiarity, makes this star most interesting. The multi-periodicity could be explained in two ways:

1) It might be a double system with two Ap stars, each one rotating with its own frequency. The observed lightcurve would then be the sum of two strictly periodic variations, provided that the orbit is too large to allow any synchronisation between rotational and orbital periods to take place. In this context, the $v \sin i$ value may not be reliable, since the superposition of two identical lines with different radial velocities (assuming two identical companions) may well mimic a single line enlarged by axial rotation.

2) By some unknown physical process perhaps related to the Ap characteristics (such as the magnetic field), HD 37151 might be linked with the « slow variables » (Le Contel *et al.*, 1981 ; Smith, 1981 ; Burki, 1983) although these are usually hotter. The periods of the 53 Per variables are generally shorter than two days (Smith, 1981); but, as mentioned above, the periods of HD 37151 could be shorter.

Of course, new measurements are still necessary in order to test the stability of the periods and to distinguish between aliased frequencies. Spectroscopic observations would also be most interesting, especially for a determination of any variation of the Si II lines.

HD 37210 (DM − 6°1254, Si). — The periodogram (Fig. 10) shows that the most probable period is a rather long one, of the order of ten days. The aliased frequency ($\nu \cong 1.1$) appears almost as probable at first sight, but the corresponding value of the θ_1 test remains twice greater than the value associated with the most probable period. The least square fit also favours the larger period, for which the residual dispersion is smaller. New measures have been made in December 1982 (Table IV, Fig. 34) which tend to confirm the long period rather than the shorter one. Furthermore, these data are shifted in phase by an amount $\Delta\phi \cong -0.076 \pm 0.010$, which implies a correction $\Delta P \cong -0.027 \pm 0.004$ to the period. This correction is well within the uncertainty given by the least-square fit (Table II). The new period is then

$$P = 11\overset{d}{.}0494 \pm 0\overset{d}{.}0040 .$$

The variation of the m_2 parameter is highly significant ($A_1 = 4.36\ \sigma_A$), but it is not clear whether the curve is sinusoidal or not ($A_2 = 1.56\ \sigma_A$). The same holds for the $\Delta(V_1\text{-}G)$ variations ($A_1 = 4.27\ \sigma_A$, $A_2 = 1.53\ \sigma_A$).

Borra (1981) made four magnetic measurements and found a rather small effective field.

Unless future measurements show that the shorter, associated period ($0\overset{d}{.}92$) should be preferred, which is very doubtful, then one should definitely conclude that the rotational braking of hot Ap stars may take place before their arrival on the main sequence.

HD 37633 (DM − 2°1332, B9.5p). — This star has a « null wavelength region » in the [*B*] band and shows a small secondary maximum in the [*U*] and in the *V* bands. However, the lightcurves on both sides of this wavelength region are in phase rather than in antiphase, which is surprising ! There is one other example of such behaviour : HD 5797 (Wolff, 1975b). To some extent HD 66605 behaves similarly (Renson and Manfroid, 1978). The metallicity parameter has the greatest variation here compared with the other Orion stars. The asymmetry of the curve is perhaps not real since $A_2 = 1.14\ \sigma_A$. The peculiarity parameter probably varies ($A_1 = 2.48\ \sigma_A$), but the first harmonic is not significant either.

HD 37642 (DM − 3°1167, Si). — One harmonic is more or less sufficient for a good fit, although the region between phases 0.0 and 0.4 in the *B* band are slightly better fitted with two harmonics. The coefficients of the latter fit are given in table IIb. The m_2 parameter varies and has quite a significant secondary maximum ($A_2 = 4.14\ \sigma_A$). The peculiarity also varies with a double wave : $A_1 = 3.82\ \sigma_A$, $A_2 = 2.62\ \sigma_A$. Borra (1981) observed this star six times and found one of the three greatest fields among his sample of thirteen Orion stars. The period he proposes (0.8 days) is not far from the real one and is probably the related period $(2 - P^{-1})^{-1}$.

4.2 Upper Scorpius association. — The Upper Scorpius region has been studied by Garrison (1967). It is part of the larger Sco-Cen association which has been specially searched for magnetic stars by Klochkova *et al.* (1981) and by Borra *et al.* (1982). Only two stars have been completely analysed up to now : HD 142301 and HD 147010.

HD 142301 (3 Sco, HR 5912, He wk). — Although this star is classed He wk, it is related to the Si λ4200 stars according to Norris (1971). The $v \sin i$ was measured by Klochkova *et al.* (1981), who found 47 km/s, rather close to Hartoog's (1977) value (58 km/s). Norris and Strittmatter (1975) give $v \sin i = 80$ km/s, which is rather far from the other values ! However, the latter authors used dispersions of 6.7 and 10.2 Å/mm (Norris, 1971), so the discrepancy is hard to explain.

Photometric observations had already been carried out by Pedersen and Thomsen (1977) of the strength of the HeI λ4026 Å line and in the Strömgren system. The period they found from the variability of the λ4026 line is $P = 1.461$ d, which is very close to ours. Unfortunately, their *uvby* data are not well distributed in phase, so a detailed comparison with our data is not easy. We nevertheless plotted the y data according to our ephemeris (Fig. 37), after addition of a correction $\Delta y = -0^{\mathrm{m}}.018$. The phase shift between both sets of measurements may be 0.1 approximately, which implies a correction of about -0.00014 d to the period. A slightly better estimate of the period can thus be suggested :

$$P = 1^{\mathrm{d}}.45937 \pm 0^{\mathrm{d}}.00005 .$$

The uncertainty remains relatively high, no less than half the standard deviation resulting from the least-square fit. It is encouraging that this period is in excellent agreement with the magnetic one : Landstreet *et al.* (1979) reported a strong longitudinal field varying according to the ephemeris

$$B_e \text{ (negative extremum)} = \text{JD } 2442921.875\ (\pm\ 0.022) + 1.45955\ (\pm\ 0.0003)\ E .$$

HD 142301 has been measured only once a night in the Geneva photometry, so it was not possible to make a choice between two related periods. However, the shorter one has to be preferred according to Pedersen and Thompsen (1977) as well as to Landstreet *et al.* (1979). The lightcurve has a double wave, as usual. The metallicity parameter does vary ($A_1 = 2.72\ \sigma_A$), but the secondary maximum is not significant ($A_2 = 1.25\ \sigma_A$). The peculiarity parameter certainly varies ($A_1 = 10.9\ \sigma_A$, $A_2 = 2.95\ \sigma_A$), but there is no phase shift between the fundamental frequency and the first overtone, so both amplitudes might be overestimated.

HD 147010 (DM − 19°4359, SiCr). — Here again, most measures were made once a night and more observations have been made during April-June 1983 in order to remove the ambiguity. The supplementary measures, not used in the least-square fit because they underwent only a preliminary reduction, are shown in figure 38 and listed in table IV. First of all, they show that the short period $P = 1^{\mathrm{d}}.34$ must be discarded. Second, a phase shift is evident, which shows that the period can be refined. Measuring a mean phase shift of $\Delta\phi = 0.0951 \pm 0.0031$ on the [U], [B] and [V] phase diagrams, the period becomes $P = 3^{\mathrm{d}}.9210 \pm 0^{\mathrm{d}}.0001$, which is ten times more precise than the period yielded by the least-square fit and displayed in table II.

HD 147010 is a spectrum variable according to Kameswara Rao and Rajamohan (1982, 1983); however, the five to seven days period they suggested is not confirmed by the present work.

The projected rotational velocity is small : 20 km/s (Wolff, 1981) or 23 km/s (Klochkova *et al.*, 1981). Taking the latter value and an assumed radius $R = 2.5\ R_{\odot}$, the period implies an inclination $i \simeq 45°$. The magnetic field has been measured by Brown *et al.* (1981), but only once, and more recently by Glagolevskii *et al.* (1982) who published eight values showing no reversal of the field. Then, in the framework of the oblique rotator model, the absence of reversal implies that the angle β between the rotational and magnetic axes must be smaller or equal to 45°.

The lightcurves are closely sinusoidal, mainly the d parameter. The m_2 parameter does vary ($A_1 = 3.61\ \sigma_A$), but the presence of a double-wave is not sure ($A_2 = 1.37\ \sigma_A$). The $\Delta(V_1\text{-}G)$ parameter has one of the most beautiful variations presented here, with a possible asymmetry ($A_2 = 1.80\ \sigma_A$).

4.3 Lacerta OB1 association. — Spectroscopic work has drawn attention to three abnormal stars : HD 213421 (Si, Adelman 1968), rejected as a non-member by Levato and Abt (1976) on the basis of its proper motion; HD 213918 (Si, Abt, 1979); and HD 214783 (Si, Adelman, 1968), reclassified by Levato and Abt (1976) as a shell star. HD 213918 was monitored at Gornergrat Observatory (Switzerland) before the publication of a work which casts serious doubts as to its membership, according to its radial velocity (Bijaoui *et al.*, 1981). The results are nevertheless presented here since they may be of some interest even if the age of this star remains unknown.

HD 213918 (DM + 38°4801, Si). — The star HD 213801 was used as a reference and its constancy was checked against the star HD 214243. The differential values HD 213918-HD 213801 were used. The amplitude in the U band ($0^{\mathrm{m}}.16$ peak-to-peak) is the greatest in the sample presented in this work. The lightcurves are not far from a sinusoid. The metallicity parameter varies ($A_1 = 4.2\ \sigma_A$), but the asymmetry of the curve is not significant ($A_2 = 1.29\ \sigma_A$). The peculiarity parameter behaves similarly ($A_1 = 3.99\ \sigma_A$, $A_2 = 1.61\ \sigma_A$). The magnetic field of this star has been measured three times by Brown *et al.* (1981), who found a relatively high intensity.

4.4 IC 2391. — This relatively young galactic cluster contains two Ap stars : HD 74169 (No. 18 according to the numeration of Perry and Hill, 1969) which was classified EuCr(Sr) by Houk (1978) and HD 74535 (No. 31) which was classified (Si) by the same author. Both stars have been monitored from La Silla with the Swiss telescope.

IC 2391-18 (HD 74169, DM − 52°1581, EuCr(Sr)) — This star has an extremely small amplitude and the lightcurve is not very satisfactory in the U band. On the basis of the U band alone one finds another period, but then the residual scatter is greater in the [B] band than in [U], which appears doubtful. This is why the $4^{\mathrm{d}}.59$ period was preferred to the $2^{\mathrm{d}}.86$ one. The variation in the [U] band is marginally significant ($A_1 = 1.36\ \sigma_A$, $A_2 = 2.28\ \sigma_A$), but the [B] and [V] lightcurves are well defined. The d parameter varies ($A_1 = 2.67\ \sigma_A$), but the secondary minimum is not significant ($A_2 = 1.65\ \sigma_A$). The m_2 parameter does not vary ($A_2 = 1.51\ \sigma_A$), while the peculiarity very probably does, with an almost perfect double-wave ($A_2 = 2.87\ \sigma_A$).

IC 2391-31 (HR 3466, HD 74535, Si). — The U and B curves need one harmonic to be properly adjusted, but the V curve is perfectly sinusoidal. The m_2 parameter hardly varies ($A_1 = 2.17\ \sigma_A$) and the asymmetry of the curve may not exist ($A_2 = 0.98\ \sigma_A$). The peculiarity parameter probably varies ($A_1 = 2.48\ \sigma_A$), but a double-wave is not ascertained either ($A_2 = 1.04\ \sigma_A$).

4.5 IC 2602. — This cluster has the same age as IC 2391 and contains also two Ap stars : HD 92385 (No. 17, Braes, 1962) and HD 92664 (No. 27), which were both classified Si by Bidelman and McConnell (1973) and by Houk and Cowley (1975) respectively. Here we present the results concerning HD 92664 only; HD 92385 was observed very recently and will be presented in a forthcoming paper.

IC 2602-27 (HR 4185, HD 92664, Si). — This star had been measured by Vanbeveren and Hensberge (1979) and by Mégessier and Hensberge (1983). It was measured just at the time of the publication of the former paper. The period given is that obtained by least squares on our measurements alone, although the period proposed by Mégessier and Hensberge (1983) is certainly better since it is based on more widely spaced measures. The metallicity parameter does not vary in a significant way ($A_1 = 1.43\ \sigma_A$, $A_2 = 2.11\ \sigma_A$), nor does the peculiarity ($A_1 = 1.77\ \sigma_A$, $A_2 = 1.63\ \sigma_A$). The number of measurements is too small to allow any confirmation of the short time-scale pulsations suggested by Mégessier and Hensberge (1983).

4.6 NGC 2516. — This cluster is very well known for the great number of peculiar stars it contains (Hartoog, 1976). Among them, the HgMn stars were not considered and some CP2 stars were not monitored because of close duplicity. Four stars have been examined : Cox 15, 24, 38 and c. The first and last are variable, while Cox 24 and 38 do not show any significant intrinsic variability. However, Cox 38 turned out to be an eclipsing binary, becoming the first such known CP2 star.

NGC 2516-15 (HD 65987, DM − 60°976, Si). — This is a silicon star according to Abt and Morgan (1969) and Hartoog (1976). The global least-square fit yielded two almost equally probable periods, 1.4496 and 1.4068 days. However, the first one was preferred since it is associated with a smaller residual dispersion in the main passbands [U], [B] and [V]. The amplitude is very small in all but the [U] band. The m_2 parameter presents only marginal variability ($A_1 = 2.42\ \sigma_A$, $A_2 = 1.42\ \sigma_A$), and so does the peculiarity ($A_1 = 2.64\ \sigma_A$, $A_2 = 1.38\ \sigma_A$). It is interesting to notice that the period is relatively short although the cluster is rather old (log age = 8.1, North and Cramer, 1981).

NGC 2516-38 (DM − 60°981, SrCrEu). — This star was classified (SrCrEu) by Hartoog (1976). Its photometric peculiarity is only marginal in Maitzen's $y\,g_1\,g_2$ system ($\Delta a = 0.014$, Maitzen and Hensberge, 1981) and null in the slightly less sensitive Geneva system ($\Delta(V_1\text{-}G) = -0.011$, Hauck and North, 1982). Eight measurements in the beginning of 1981 failed to reveal any intrinsic variation, but one showed a very different value of the V magnitude, but with the same colours. This indicated that the star is an eclipsing binary, so it was measured again in the southern summer 1981-82 and at the beginning of 1983. Although all phases could not be properly covered, we give here a preliminary V curve. Both minima have almost the same depth, suggesting that both companions are very similar. The secondary minimum takes place at phase 0.501, so the eccentricity is very small. More measurements will be made in 1983-84. If the peculiarity of one of the companions (or of both) is confirmed, then this system may prove most interesting since it is the first one containing a CP2 star.

The ephemeris of this star is

$$\text{HJD (Min. I)} = 2445387.538 + 3.17497\,E,$$

the secondary minimum taking place at phase 0.501.

An attempt was made to observe this system on February 18, 1981 with the Coravel spectro-velocimeter attached to the 1.5 m Danish telescope at La Silla, Chile. Although this instrument is conceived for cool stars only, experience showed that some SrCrEu stars do yield an autocorrelation peak. Unfortunately, it was not the case of Cox 38.

NGC 2516-c (DM − 60°978, Si). — This star, designated under the number 127 in the Geneva photometric catalogue, was classified Si by Abt and Morgan (1969) and EuCrSr by Hartoog (1976). Here again, the period is of the same order as those found in the Orion association, while the cluster is much older. The metallicity parameter varies significantly ($A_1 = 4.73\ \sigma_A$) but the first harmonic may be unnecessary ($A_2 = 1.23\ \sigma_A$). The $\Delta(V_1\text{-}G)$ parameter probably varies ($A_1 = 2.56\ \sigma_A$, $A_2 = 0.98\ \sigma_A$).

Some older, less precise measurements are available which allow to check the validity of the period. These are differential measures with generally one comparison star only, and were all obtained with the old 40 cm Swiss telescope at La Silla; they are listed in table IVb. These measures are displayed in figure 45 for the [U], [B] and V phase diagrams according to the ephemeris of table II. Their ordinate was obtained by adding the mean magnitude and colours of the unique comparison star to the differential values, and then by subtracting the arithmetic mean of the mean magnitudes and colours of the comparison stars 126 and 129. We see that apart from the visual magnitude, the agreement is rather poor, but that nevertheless no phase shift appears. The ordinates of the old measures seem systematically too low in the [B] magnitude, while they are so only between phases 0.2 and 0.65 in the [U] magnitude. Part, if not all, of these discrepancies can be explained by different choices of the sky background. In spite of these problems, the old measures show that the period obtained by least-square fit on the data of table III is valid and can define reliable phases for several years.

4.7 NGC 6475. — This is an old cluster : log age = 8.4 (North and Cramer, 1981). It contains three Ap stars (Abt, 1975) recognised spectroscopically, and perhaps two additional ones found photometrically by Maitzen and Floquet (1981). Geneva photometry confirms the marginal peculiarity of star No. 14 discovered by Maitzen and Floquet (1981), since its $\Delta(V_1\text{-}G)$ is + 0.004; however, star No. 23 is not found peculiar ($\Delta(V_1\text{-}G) = -0.008$), but this may be due to the lack of sensitivity of the Geneva system to cool Ap stars. Furthermore, star No. 26, a blue straggler, is an He wk star. Four stars have been monitored : Nos. 26, 55, 59 and 88.

NGC 6475-26 (HR 6647, HD 162374, He wk). — This star is an He-weak according to Norris (1971) and to Bond and Levato (1976). It is also He-available since the strength of the λ 4026 helium line varies with a period of either 2.52 or 1.658 d (Pedersen, 1979). Since the standard deviations of its magnitude and colours in the Geneva system are low, it had been chosen as a comparison star for the suspected variables Nos. 55, 59 and 88. However, when compared with the other comparison star (No. 42), it turned out that it is a variable itself, with mainly two possible periods close to those found by Pedersen. The periodograms as well as the least-square fit show nevertheless that the 1.658 d period is the most probable. The analysis of the absolute measures of star No. 26 and of star No. 42 respectively shows that only the former varies : no conspicuous peak appears in the periodograms of star No. 42, so it can be considered as a *bona fide* comparison star.

In spite of the very small amplitude, a double-wave function was fitted to the data as usual. We see that the secondary maximum in the $[U]$ magnitude becomes the main one on the other side of the Balmer jump. The amplitude of the first harmonic is significant in $[U]$ ($A_2 = 3.92\ \sigma_A$) and in V ($A_2 = 3.01\ \sigma_A$) but only marginally so in $[B]$ ($A_2 = 2.14\ \sigma_A$). The d parameter also has a marginally significant double-wave ($A_2 = 2.24\ \sigma_A$), while it is possible that the metallicity and peculiarity parameters may not vary at all : for m_2, $A_1 = 0.40\ \sigma_A$, $A_2 = 1.42\ \sigma_A$, and for $\Delta(V_1\text{-}G)$, $A_1 = 1.67\ \sigma_A$ and $A_2 = 1.75\ \sigma_A$.

NGC 6475-55 (HD 162576, SiCr). — This star has a very marginal variability, the frequency of which being near 0.3 or 1.3. The former frequency appears slightly more probable from the periodograms, but a least-square fit was performed for both (table II). These frequencies were chosen essentially from the periodograms based on the $[U]$ magnitude, where the amplitude is the greatest. The periodograms based on the $[B]$ magnitude confirm to some extent the lowest frequency ($\nu \cong 0.3$), mainly with Stellingwerf's method.

A double-wave was fitted to the data in spite of the very small amplitude. It is seen that the short period gives rise to slightly greater residual dispersion in the $[U]$, $[B]$ and $[V]$ magnitudes, and to slightly smaller ones for the d, m_2 and $\Delta(V_1\text{-}G)$ parameters. The fact that the standard deviation of the residues is the same (even a bit smaller) in the $[U]$ than in the $[B]$ band for the short period, tends to cast a doubt on that period since the signal is generally more noisy in $[U]$. Furthermore, the $v \sin i$ value is rather low (30 km/s according to Abt, 1979 and to Wolff, 1981) : unless the inclination be very small, i.e. less than 9° for an assumed 3 $R_\odot$ radius, the longer period is better suited. So let us discuss the variations relative to the long period : they are significant in $[U]$ and $[B]$ but not in $[V]$, and a double-wave is sure (with a probability of more than 95 %) in B only ($A_2 = 2.50\ \sigma_A$). Nevertheless, it is remarkable that the fundamental component has exactly the same phase (taking the uncertainty into account) in all three passbands.

The d parameter does not vary significanty, nor do m_2 and $\Delta(V_1\text{-}G)$.

NGC 6475-59 (HD 162588, Si). — The period being very close to two days, all phases have unfortunately not been covered. The greater dispersion of the points between phases 0.1 and 0.45 is very striking. The photometric weights P and Q (see Rufener, 1981 for a definition of these) of these measures are not significantly lower, on the average, than those of the others. So the scatter might be intrinsic to the star itself, but further measurements are necessary to confirm this. Some new, absolute measures (Fig. 48, Table IV) show that the period is indeed very precise : their phase shift, if any, is in the order of one or two hundredths. This implies a correction to the period of one or two standard deviations, so it is premature to propose a new, more precise period.

The first harmonic has quite a significant amplitude in $[U]$ as well as in $[B]$ ($A_2 = 4.28\ \sigma_A$) but less pronounced in $[V]$ ($A_2 = 2.65\ \sigma_A$). The m_2 parameter seems to have a double-wave ($A_2 = 2.59\ \sigma_A$) without a significant fundamental ($A_1 = 1.23\ \sigma_A$). The peculiarity parameter has quite a significant fundamental variation ($A_1 = 4.23\ \sigma_A$), with a very probable double-wave ($A_2 = 2.53\ \sigma_A$).

Abt (1979) gave $v \sin i = 30$ km/s for this star. Assuming a 3 $R_\odot$ radius, the period implies an equatorial velocity of 78 km/s, so the inclination angle $i \cong 23°$, which is surprisingly small given the relatively large photometric amplitude.

According to Abt (1970), this star is a single-line spectroscopic binary with an orbital period $P = 6.1411$ d and with $e = 0.55$. There is no relation at first sight, between our photometric period and the orbital one. It is most interesting to notice, however, that the aliased photometric period $P = 2.0454$ d is exactly three times less than the orbital one. This suggests that some kind of resonant synchronization has taken place. It is nevertheless necessary to accumulate further photometric as well as radial velocity data, because Gieseking (1977) has questioned Abt's results.

NGC 6475-88 (HR 6663, HD 162725, SiCr). — The projected rotational velocity of this star is 30 km/s according to Wolff (1981). It is in agreement with the relatively long period which best fits the data. Nevertheless, the residual dispersion remains high, especially in $[U]$, for some unknown reason. New measures (Fig. 49, Table IV) have been made which seem roughly consistent with the proposed ephemeris. However, the scatter in the $[U]$ lightcurve would be reduced if a phase shift of -0.15 ± 0.04 were applied to them. This would imply a correction to the period as great as four standard deviations, which is not very satisfactory. Nevertheless, we can propose tentatively the corrected period

$$P = 4^{\mathrm{d}}.4588 \pm 0^{\mathrm{d}}.0008$$

provided we keep in mind that the unusually great scatter makes this correction uncertain.

Conclusion.

We have presented the lightcurves of twenty-five chemically peculiar stars, nearly all of them having a uniquely defined period. Of these, 20 are CP2 stars (classical magnetic Ap stars, among which 3 might be CP4), one is a CP3 star (HgMn type) and 4 are CP4 stars (He weak). The period of three stars was already known from previous investigations (HD 36916, HD 142301 and IC 2602-27 or HD 92664), while a fourth star had two equally possible periods (NGC 6475-26 or HD 162374). This work should allow a new approach to the problem of the low angular momentum of peculiar stars since it is based on periods rather than $v \sin i$ values. Furthermore, 40 % of the stars presented here are very young, which is critically important for testing theories of braking mechanism : previous works gave only three rotational velocities in the Orion association and hardly more in the older Upper Scorpius region.

Each lightcurve was fitted with a Fourier series truncated to the first harmonic and this was shown to be sufficient. Most stars of this work being rather hot, the possibility remains that cooler Ap stars have more complex lightcurves. Anyway, this is the first attempt to express the lightcurve morphology in a quantitative way, which should make future statistical studies easier. Some stars have a precise enough period to allow the phase to be known for several years; this could prove useful for future studies.

It was shown that the peculiarity parameter $\Delta(V_1\text{-}G)$ varies in several cases, but always with a small amplitude which never exceeds about 30 % of its mean value. This shows that peculiarity parameters based on the $\lambda 5200$ Å depression can be safely obtained even with one or two measures, and that their relative variation is of the same order as the variation of the surface magnetic field, as could be expected (North, 1981).

This study has already sorted out some most interesting objects : HD 37151, which is multiperiodic; NGC 2516-38, an eclipsing binary with a CP2 component (if not both); HD 37210, a rather long period, but very young star; and NGC 6475-59, a very old, relatively short period Si star.

A thorough study of the problem of angular momentum of Ap stars clearly demands a wider statistical base, so this programme is being continued.

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TABLE I. — *List of stars measured.*

Cluster or association	HD	DM	Peculiarity or spectrum	m_v	No. of measures	Comparison stars 1 Cluster No.	Comparison stars 1 HD/DM	Comparison stars 2 Cluster No.	Comparison stars 2 HD/DM	Sequence of measurements	Remarks
Orion OB1											
	33647	+0° 974	MnHg	6.669	312		35640			V1	
	35298	+1° 996	He wk	7.907	23		33647		35640	1V2V2V1 12VVV21	
	36313	-0° 977	Si	8.199	31		33647		35640	1V2V2V1 12VVV21	
	36526	-1° 933	SiSr, He wk	8.285	22		33647		35640	1V2V2V1 12VVV21	
	36540	-4°1162	He wk	8.144	22		33647		35640	1V2V2V1 12VVV21	
	36668	+0°1113	Si, He wk	8.059	19		33647		35640	1V2V2V1 12VVV21	
	36916	-4°1173	Si	6.726	45		35640			V1	Perhaps non-member
	37140	-0°1018	SiSr, He wk	8.541	26		33647		35640	1V2V2V1 12VVV21	
	37151	-7°1131	Si	7.375	44		35640			V1	Multiperiodic
	37210	-6°1254	Si	8.107	20		33647		35640	1V2V2V1 12VVV21	
	37633	-2°1332	B9.5p	9.014	20		33647		35640	1V2V2V1 12VVV21	
	37642	-3°1167	Si	8.038	25		33647		35640	1V2V2V1 12VVV21	
Upper Sco	142301	-24°12365	He wk	5.859	26		142165		142445	1V2	3 Sco, HR 5912
	147010	-19°4359	SiCr	7.373	19		146284		147703	1V2V2V1	
Lacerta OB1	213918	+38°4801	Si	8.699	19		213801			V1	Non-member
IC 2391-18	74169	-52°1581	EuCr(Sr)	7.221	31	23	74275	29	74516	1V2V2V1	
31	74535	-52°1605	Si	5.490	29	23	74275	29	74516	1V2V2V1	HR 3466
IC 2602-27	92664	-64°1403	Si	5.499	17	48	93540	49	93549	1V2	HR 4185
NGC 2516-15	65987	-60°976	Si	7.616	33	126	65950	129	-60°982	1V2V2V1 12VVV21	
38	-	-60°981	(SrCrEu)	9.506	158	129	-60°982			V1	
127	-	-60°978	Si	8.923	42	126	65950	129	-60°982	1V2V2V1 12VVV21	Cox c
NGC 6475-26	162374	-34°12165	He wk	5.870	78	42	162515			V1	HR 6647
55	162576	-34°12198	SiCr	6.952	31	42	162515			V1	
59	162588	-34°12201	Si	7.255	35	42	162515			V1	
88	162725	-34°12228	SiCr	6.403	54	42	162515			V1	HR 6663

TABLE IIa. — *Fitted lightcurves and ephemeris of the stars.*

Cluster or association	HD/DM	Magnitude, colour or parameter	A_o	A_1	ϕ_1	A_2	ϕ_2	σ_{res}	Ephemeris	Remark
Orion OB1	33647	[U]	0.236771	.00353	$-\pi$	–	–	.00535	HJD (Min. U magnitude) =	choice of
		[B]	0.411497	.00265	3.1343	–	–	.00404	2444976.426 + 0.56589 E	period rather
		[V]	0.444150	.00161	3.1196			.00305	± .00057	uncertain
	35298	[U]	.96001	.02280	$-\pi$	.01978	4.007	.00340	HJD (Min. f. U) =	
		[B]	1.37936	.00954	3.483	.01585	3.712	.00246	2444973.958 + 1.85336 E	
		[V]	1.45779	.00993	3.316	.01006	3.799	.00140	± .00116	
		d	-.30847	.01607	3.276	.00523	5.738	.00473		
		m_2	-.03352	.00341	1.502	.00054	5.991	.00321		
		Δ(V1-G)	.01720	.00096	.892	.00391	1.038	.00339		
	36313	[U]	1.61067	.01833	$-\pi$	.02076	1.298	.00350	HJD (Min. f. U) =	
		[B]	1.75247	.01109	3.668	.01177	1.497	.00206	2444976.985 + 0.58933 E	
		[V]	1.75101	.00687	3.343	.00742	1.356	.00211	± .00012	
		d	-.15959	.00944	2.234	.00663	.636	.00571		
		m_2	.01355	.00226	2.181	.00138	2.268	.00418		
		Δ(V1-G)	.01773	.00196	.960	.00173	3.454	.00377		
	36526	[U]	1.37400	.02873	$-\pi$	.01149	-1.442	.00415	HJD (Min. f. U)=	
		[B]	1.78720	.01547	-3.055	.00716	-1.730	.00260	2444978.825 + 1.5405 E	
		[V]	1.83577	.01432	-3.222	.00276	-1.861	.00233	± .0016	
		d	-.32155	.00901	-3.184	.00363	- .276	.00550		
		m_2	-.03307	.00222	2.756	.00140	-1.629	.00356		
		Δ(V1-G)	.02265	.00290	.310	.00125	.890	.00353		
	36540	[U]	1.54542	.04343	π	.00533	4.007	.00247	HJD (Min. f. U)=	
		[B]	1.82395	.03165	3.363	.00455	4.268	.00233	2444977.577 + 2.1709 E	
		[V]	1.69632	.02426	3.243	.00327	3.907	.00233	± .0029	
		d	-.30879	.01132	2.232	.00485	2.498	.00746		
		m_2	-.03125	.00155	2.048	.00212	4.825	.00481		
		Δ(V1-G)	.00999	.00426	.107	.00122	3.123	.00307		
	36668	[U]	1.37060	.00873	2.593	.01949	4.322	.00359	HJD (Min. f. B) =	
		[B]	1.54962	.01030	$-\pi$	.00655	3.916	.00212	2444988.496 + 2.1211 E	
		[V]	1.61138	.00636	2.663	.00603	4.005	.00148	± .0026	
		d	-.11373	.00863	1.082	.01051	4.413	.00444		
		m_2	-.01131	.00065	-3.133	.00202	4.231	.00280		
		Δ(V1-G)	.02716	.00153	- .517	.00207	3.114	.00240		
	36916	[U]	-.04261	.03715	π	.00869	3.935	.00651	HJD (Min. f. U) =	
		[B]	.38028	.02955	2.689	.00618	4.391	.00550	2444614.835 + 1.56536 E	
		[V]	.49702	.02151	2.866	.00411	4.350	.00437	± .00043	
		d	-.28062	.02578	-2.112	.00691	2.125	.01343		
		m_2	-.03789	.00428	.506	.00322	4.249	.01075		
		Δ(V1-G)	.02600	.00568	-.355	.00070	2.069	.00589		
	37140	[U]	2.04784	.03253	$-\pi$	.00254	-.404	.00378	HJD (Min. f. U) =	
		[B]	2.27756	.02405	-2.911	.00209	-.059	.00294	2444978.036 + 2.7088 E	
		[V]	2.09716	.01638	-3.008	.00120	-.454	.00159	± .0030	
		d	-.30907	.00872	-4.001	.00138	-2.310	.00786		
		m_2	-.01990	.00114	.366	.00212	2.130	.00430		
		Δ(V1-G)	.01552	.00183	.725	.00082	-3.126	.00312		
	37151	[U]	.87300	.01893	-3.504	.00449	1.111	.00991	P_1 = 5.6732 ± .0143	
				.01865	-3.560	.00559	-2.387		P_2 = 4.1513 ± .0092	
		[B]	1.10978	.01064	-3.514	.00303	.833	.00773	Epoch of origin:	
				.01248	-3.628	.00278	-2.768		T_o = 2444614.266	
		[V]	1.14952	.00753	-3.445	.00316	1.052	.00609		
				.00840	-3.651	.00135	-2.325			
		[U-B]	-.23678	.00829	-3.491	.00178	-4.688	.00492		
				.00625	-3.423	.00318	-2.056			
		[B-V]	-.03974	.00317	-3.679	.00069	-.824	.00407		
				.00409	-3.581	.00166	-3.123			
	37210	[U]	1.45639	.02145	π	.01490	2.511	.00372	HJD (Min. f. U) =	
		[B]	1.63755	.02125	2.285	.00816	3.028	.00227	2444977.869 + 11.0763 E	
		[V]	1.66108	.01018	2.562	.00672	2.932	.00220	± .0844	
		d	-.16336	.01578	-1.741	.00696	1.477	.00699		
		m_2	.00878	.00512	-1.741	.00183	3.002	.00371		
		Δ(V1-G)	.01710	.00385	- .681	.00138	5.056	.00284		
	37633	[U]	2.57354	.03360	π	.01807	2.973	.00490	HJD (Min. f. U) =	
		[B]	2.69903	.00508	2.488	.00372	2.985	.00211	2444983.923 + 1.5718 E	
		[V]	2.57062	.03066	3.073	.00509	2.720	.00251	± .0011	
		d	-.24974	.06879	3.145	.01958	2.866	.00765		
		m_2	.03122	.01536	-.135	.00177	4.806	.00491		
		Δ(V1-G)	.00972	.00375	2.598	.00062	5.986	.00478		
	37642	[U]	1.08749	.04322	π	.00390	3.957	.00433	HJD (Min. f. U) =	
		[B]	1.51206	.01337	2.824	.00928	3.891	.00319	2444980.269 + 1.07977 E	
		[V]	1.58941	.01610	3.139	.00584	3.812	.00242	± .00068	
		d	-.32520	.03371	3.123	.00293	1.163	.00502		
		m_2	-.02473	.00514	-1.276	.00348	.450	.00298		
		Δ(V1-G)	.03231	.00278	-.768	.00191	.307	.00258		

TABLE IIa *(continued)*.

Cluster or association	HD/DM	Magnitude, colour or parameter	A_o	A_1	ϕ_1	A_2	ϕ_2	σ_{res}	Ephemeris
Upper Sco	142301	[U]	-.39423	.01335	π	.01954	2.119	.00510	HJD (Min. f. U) =
		[B]	.21293	.00734	2.416	.01154	1.990	.00400	2444256.572 + 1.459515 E
		[V]	.37199	.00520	2.463	.00887	2.010	.00414	± .000099
		d	-.38159	.00963	4.458	.00608	2.467	.01194	
		m_2	-.06857	.00663	2.047	.00306	1.189	.00880	
		Δ(V1-G)	.01842	.00639	1.042	.00249	1.178	.00518	
	147010	[U]	-.00291	.03864	-π	.00845	.105	.00271	HJD (Min. f. U) =
		[B]	.29360	.04155	-3.122	.00646	.072	.00213	2444808.447 + 3.9232 E
		[V]	.30923	.02161	-3.024	.00336	.056	.00248	± .0012
		d	-.25983	.01566	.342	.00014	-1.984	.00622	
		m_2	-.00800	.00516	-1.183	.00197	3.444	.00441	
		Δ(V1-G)	.05531	.00919	-.380	.00178	2.521	.00304	
Lacerta OB1	213918	[U]	.29316	.07503	-π	.01122	-4.066	.00575	HJD (Min. f. U) =
		[B]	.52290	.05085	-3.311	.00285	1.429	.00443	2444613.264 + 1.430823 E
		[V]	.53584	.03596	-3.234	.00356	1.496	.00661	± .000074
		d	-.18698	.01978	-3.005	.01077	-4.108	.00970	
		m_2	-.01530	.00465	-1.223	.00143	-2.692	.00341	
		Δ(V1-G)	.02535	.00664	-.586	.00267	-.981	.00513	
IC 2391-18	74169	[U]	-.24888	.00164	π	.00275	-.364	.00474	HJD (Min. f. U) =
		[B]	-.13261	.00360	-1.872	.00239	-.453	.00201	2444687.257 + 4.5875 E
		[V]	-.09361	.00195	-2.088	.00183	3.459	.00208	± .0134
		d	-.08808	.00632	2.183	.00392	4.353	.00932	
		m_2	.00775	.00072	-.122	.00223	1.823	.00581	
		Δ(V1-G)	.03393	.00042	3.259	.00229	1.572	.00313	
IC 2391-31	74535	[U]	-2.64627	.01710	π	.00345	5.211	.00291	HJD (Min. f. U) =
		[B]	-2.00502	.01772	3.438	.00302	.584	.00205	2444688.488 + 3.37629 E
		[V]	-1.82507	.01025	3.065	.00027	1.834	.00167	± .00376
		d	-.37682	.00793	1.369	.00660	4.307	.00783	
		m2	-.08681	.00265	-.012	.00120	.271	.00466	
		Δ(V1-G)	.02119	.00199	.757	.00084	1.986	.00306	
IC 2602-27	92664	[U]	-.00555	.03607	π	.01359	3.112	.00401	HJD (Min. f. U) =
		[B]	.13375	.01362	3.567	.01114	3.147	.00583	2443946.427 + 1.67544 E
		[V]	.23349	.01243	3.444	.00619	3.418	.00598	± .00127
		d	-.06311	.02023	2.622	.00528	2.257	.00810	
		m_2	-.00958	.00315	3.329	.00465	5.161	.00643	
		Δ(V1-G)	.01501	.00384	1.827	.00354	6.144	.00632	
NGC 2516-15	65987	[U]	.20380	.01526	π	.00556	4.245	.00566	HJD (Min. f. U) =
		[B]	.47887	.00801	2.776	.00255	3.976	.00319	2444776.669 + 1.44962 E
		[V]	.57372	.00542	3.204	.00160	4.377	.00223	± .00018
		d	-.26261	.00704	-1.915	.00143	3.775	.00947	
		m_2	.03534	.00366	2.118	.00214	5.868	.00614	
		Δ(V1-G)	.02624	.00281	.535	.00146	.613	.00432	
NGC 2516-127 (Cox c)	-60°978	[U]	1.82299	.03454	-π	.01364	3.138	.00526	HJD (Min. f. U) =
		[B]	1.93704	.00245	2.189	.00743	3.083	.00259	2444818.149 + 1.812077 E
		[V]	1.88280	.00894	-3.297	.00944	3.016	.00377	± .000071
		d	-.24568	.02778	-3.018	.00851	2.942	.00843	
		m_2	.06373	.00654	-3.172	.00170	-1.222	.00634	
		Δ(V1-G)	.01301	.00283	-3.530	.00108	-1.121	.00506	
NGC 6475-26	162374	[U]	-1.58631	.00908	π	.00459	1.379	.00731	HJD (Min. f. U) =
		[B]	-.80527	.00475	4.551	.00209	.569	.00608	2444334.700 + 1.658552 E
		[V]	-.66469	.00363	4.069	.00242	6.240	.00502	± .000099
		d	-.56542	.00801	2.663	.00481	1.698	.01339	
		m_2	-.07618	.00065	.624	.00230	4.144	.01016	
		Δ(V1-G)	.00126	.00199	1.446	.00208	1.718	.00744	
NGC 6475-55	162576	[U]	.26981	.00779	π	.00091	1.174	.00674	HJD (Min. f. U) =
		[B]	.38007	.00534	3.323	.00402	1.508	.00634	2444229.442 + 3.43628 E
		[V]	.41695	.00147	3.625	.00065	.371	.00576	± .00089
		d	-.06154	.00271	4.127	.00510	4.148	.01803	
		m_2	-.01307	.00256	3.094	.00452	.126	.01381	
		Δ(V1-G)	.01042	.00369	4.493	.00188	5.668	.00793	
NGC 6475-55	162576	[U]	.26965	.00723	π	.00189	5.253	.00676	HJD (Min. f. U) =
		[B]	.38000	.00525	3.492	.00221	.321	.00682	2444227.701 + .772914 E
		[V]	.41671	.00090	4.321	.00296	.366	.00554	± .000054
		d	-.06038	.00828	2.786	.01384	3.429	.01605	
		m_2	-.01403	.00479	-.973	.01269	6.264	.01211	
		Δ(V1-G)	.01050	.00479	4.636	.00299	5.713	.00749	
NGC 6475-59	162588	[U]	.50786	.06555	-π	.01756	3.541	.00735	HJD (Min. f. U) =
		[B]	.69545	.01056	-3.718	.00707	-1.957	.00690	2444052.237 + 1.946381 E
		[V]	.72145	.01102	-3.370	.00400	-1.903	.00632	± .000022
		d	-.15683	.05752	-3.079	.02525	2.973	.01667	
		m_2	-.00533	.00354	-1.254	.00744	-.034	.01201	
		Δ(V1-G)	.01400	.00790	-.268	.00472	1.399	.00782	
NGC 6475-88	162725	[U]	-.12998	.03660	π	.01172	5.554	.01165	HJD (Min. f. U) =
		[B]	-.13680	.01170	2.702	.00634	5.644	.00755	2444444.201 + 4.45597 E
		[V]	-.13381	.01043	3.208	.00450	5.549	.00663	± .00068
		d	.00350	.02623	3.292	.00612	6.007	.01991	
		m_2	.00904	.00356	-.794	.00188	4.799	.00924	
		Δ(V1-G)	.02213	.00381	-.884	.00089	3.696	.00660	

TABLE IIb. — *Least-square fit of some lightcurves with two overtones.*

HD	Magnitude, colour or parameter	A_o	A_1	ϕ_1	A_2	ϕ_2	A_3	ϕ_3	σ_{res}	Ephemeris
3613	[U]	1.61075	.01821	π	.02010	1.332	.00251	2.366	.00308	HJD (Min. f. U) = 2444976.985 + .58931 E
	[B]	1.75259	.01095	3.667	.01168	1.510	.00090	1.497	.00196	± .00012
	[V]	1.75099	.00685	3.352	.00724	1.396	.00072	2.716	.00206	
	d	-.15943	.00955	2.220	.00650	.626	.00135	1.650	.00564	
	m_2	.01333	.00209	2.297	.00163	2.536	.00163	3.729	.00403	
	Δ(V1-G)	.01750	.00166	.929	.00191	3.393	.00151	4.301	.00362	
36526	[U]	1.37352	.02898	$-\pi$	.01127	-1.541	.00376	1.799	.00346	HJD (Min. f. U) = 2444978.820 + 1.5405 E
	[B]	1.78682	.01568	-3.055	.00722	-1.840	.00241	1.924	.00213	± .0014
	[V]	1.83542	.01447	-3.233	.00296	-2.021	.00142	2.374	.00215	
	d	-.32148	.00904	-3.132	.00329	-.214	.00391	1.295	.00494	
	m_2	-.03338	.00244	2.626	.00172	-1.732	.00224	4.008	.00325	
	Δ(V1-G)	.02241	.00284	.329	.00102	.906	.00093	3.410	.00347	
37642	[U]	1.08837	.04185	π	.00214	3.899	.00410	2.304	.00356	HJD (Min. f. U) = 2444980.272 + 1.08034 E
	[B]	1.51242	.01255	2.775	.00773	3.872	.00440	2.652	.00169	± .00076
	[V]	1.58973	.01537	3.132	.00484	3.775	.00286	2.594	.00164	
	d	-.32420	.03318	3.124	.00303	1.073	.00371	.479	.00449	
	m_2	-.02494	.00524	-1.303	.00337	.477	.00084	3.519	.00292	
	Δ(V1-G)	.03211	.00268	- .898	.00154	.167	.00075	5.258	.00256	

TABLE III. — *Differential measures of programme stars. They are defined by the formula* $\Delta m = \langle m(V) \rangle - 1/2[\langle m(C_1) \rangle + \langle m(C_2) \rangle]$ *if two comparison stars are used, or by* $\Delta m = m(V) - m(C_1)$ *if only one is used;* $\langle m(V) \rangle$, $\langle m(C_1) \rangle$ *and* $\langle m(C_2) \rangle$ *are the average magnitude or index of the variable and of the comparison stars respectively. For the star NGC 2516-38, the measures listed are absolute ones. The quantities Q and P are the average weights (over the sequence of measurement) on the visual magnitude and on the colours respectively, as defined by Rufener (1981).*

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
HD 33647									
44954.616	4	.447	3	-.166	.037	-.011	.013	.035	.034
44954.638	4	.447	3	-.172	.033	-.016	.014	.031	.036
44954.663	4	.445	3	-.165	.035	-.011	.017	.037	.033
44954.686	4	.447	3	-.173	.032	-.019	.012	.029	.032
44954.704	4	.444	3	-.171	.034	-.015	.015	.033	.032
44954.756	4	.449	3	-.171	.034	-.012	.019	.037	.030
44954.774	4	.444	3	-.174	.035	-.014	.021	.036	.032
44954.794	4	.446	3	-.173	.031	-.020	.011	.031	.029
44954.814	4	.438	3	-.171	.030	-.019	.017	.036	.037
44955.595	3	.441	3	-.156	.041	-.008	.028	.049	.047
44955.615	3	.443	3	-.152	.038	-.006	.023	.037	.033
44955.632	3	.444	3	-.170	.024	-.019	.012	.029	.032
44955.640	3	.450	3	-.172	.032	-.019	.018	.025	.027
44955.657	3	.444	3	-.176	.032	-.018	.004	.032	.030
44955.675	3	.449	3	-.176	.034	-.020	.013	.031	.028
44956.599	2	.444	2	-.174	.032	-.014	.012	.033	.032
44956.616	2	.442	2	-.182	.034	-.015	.012	.034	.032
44956.634	2	.439	2	-.175	.034	-.013	.018	.034	.037
44956.645	2	.448	2	-.183	.030	-.019	.010	.025	.027
44956.668	2	.443	2	-.176	.036	-.013	.013	.039	.030
44956.686	2	.447	2	-.171	.032	-.017	.010	.032	.026
44956.711	2	.444	2	-.176	.026	-.018	.010	.032	.028
44956.731	2	.448	2	-.172	.036	-.015	.017	.030	.028
44956.752	2	.451	2	-.177	.033	-.017	.007	.030	.029
44956.762	2	.442	2	-.170	.031	-.021	.016	.032	.038
44958.593	4	.447	4	-.174	.036	-.016	.015	.031	.035
44958.610	4	.447	4	-.168	.033	-.014	.013	.032	.029
44958.628	4	.444	4	-.172	.036	-.013	.017	.033	.034
44958.705	4	.445	4	-.174	.035	-.013	.019	.027	.031
44958.723	4	.446	4	-.175	.037	-.012	.015	.037	.026
44958.740	4	.446	4	-.169	.036	-.013	.015	.032	.035
44958.756	4	.446	4	-.173	.031	-.022	.016	.028	.029
44958.772	4	.443	4	-.176	.031	-.017	.011	.031	.027
44958.790	4	.443	4	-.172	.025	-.016	.009	.026	.031
44959.707	3	.445	3	-.173	.033	-.013	.014	.031	.028
44959.725	3	.446	3	-.173	.033	-.014	.016	.031	.031
44960.700	3	.442	3	-.184	.033	-.010	.016	.038	.034
44960.717	3	.441	3	-.179	.031	-.015	.013	.037	.037
44960.746	3	.445	3	-.176	.036	-.013	.021	.038	.034
44961.586	2	.447	2	-.172	.031	-.015	.005	.034	.030
44961.603	3	.440	2	-.176	.033	-.014	.019	.041	.037
44961.632	3	.445	2	-.173	.035	-.015	.018	.031	.034
44961.640	3	.442	2	-.181	.028	-.015	.009	.034	.028
44961.657	3	.446	2	-.167	.041	-.011	.015	.039	.037
44961.676	3	.441	2	-.171	.032	-.015	.015	.029	.027
44961.686	3	.444	2	-.167	.040	-.012	.021	.036	.039
44961.702	3	.440	2	-.172	.034	-.012	.016	.033	.027
44961.720	3	.444	2	-.181	.033	-.015	.014	.031	.032
44961.730	3	.446	2	-.178	.034	-.017	.008	.027	.035
44961.748	3	.443	2	-.181	.036	-.016	.011	.031	.030
44961.765	3	.444	2	-.173	.035	-.012	.012	.035	.028
44967.569	3	.439	3	-.175	.032	-.014	.010	.035	.032
44967.585	3	.442	3	-.182	.032	-.016	.010	.031	.029
44967.603	3	.444	3	-.173	.034	-.010	.013	.037	.032
44967.612	3	.446	3	-.175	.029	-.014	.017	.031	.033
44967.629	3	.444	3	-.174	.028	-.014	.012	.031	.032
44967.646	3	.441	3	-.180	.029	-.018	.016	.030	.024
44967.655	3	.445	3	-.180	.030	-.021	.015	.034	.031
44967.672	3	.449	3	-.177	.033	-.014	.019	.027	.026
44967.690	3	.447	3	-.175	.035	-.015	.011	.033	.030
44967.699	3	.447	3	-.180	.026	-.018	.014	.030	.030
44967.715	3	.444	3	-.181	.033	-.018	.013	.031	.026
44967.732	3	.447	3	-.176	.029	-.018	.007	.027	.030
44968.565	3	.440	3	-.180	.031	-.015	.007	.029	.024
44968.583	3	.441	3	-.175	.037	-.015	.020	.036	.042
44968.604	3	.450	3	-.178	.038	-.017	.015	.034	.036
44968.612	3	.443	3	-.180	.031	-.017	.012	.030	.038
44968.630	3	.438	3	-.176	.030	-.016	.012	.034	.033
44968.646	3	.441	3	-.179	.033	-.016	.015	.036	.028
44968.655	3	.442	3	-.177	.031	-.018	.014	.031	.028
44968.671	3	.446	3	-.177	.035	-.016	.012	.031	.027
44968.688	3	.443	3	-.176	.031	-.014	.013	.029	.031
44968.697	3	.444	3	-.176	.031	-.015	.014	.036	.034
44968.713	3	.445	3	-.178	.033	-.011	.016	.025	.026
44968.735	3	.442	3	-.170	.032	-.014	.020	.036	.031
44969.554	3	.432	3	-.179	.028	-.013	.021	.036	.034
44969.571	3	.444	3	-.177	.033	-.017	.015	.036	.037
44969.591	3	.441	3	-.171	.032	-.012	.015	.032	.031
44969.599	3	.442	3	-.177	.033	-.017	.013	.036	.032
44969.617	3	.445	3	-.174	.035	-.011	.015	.028	.031
44969.633	3	.442	3	-.176	.037	-.016	.012	.036	.030
44969.645	3	.448	3	-.177	.034	-.017	.018	.035	.027
44969.666	3	.438	3	-.175	.034	-.013	.014	.033	.033
44969.683	3	.446	3	-.179	.035	-.016	.011	.032	.035
44969.713	3	.445	3	-.173	.035	-.015	.015	.035	.033
44969.731	3	.443	3	-.175	.029	-.013	.002	.028	.028
44969.735	3	.445	3	-.173	.040	-.017	.021	.037	.046
44969.754	3	.437	3	-.174	.026	-.018	.012	.026	.028
44970.557	3	.441	3	-.179	.032	-.016	.016	.029	.029
44970.574	3	.444	3	-.175	.035	-.016	.008	.033	.032
44970.591	3	.448	3	-.172	.033	-.019	.008	.029	.031
44970.600	3	.448	3	-.172	.031	-.018	.014	.034	.034
44970.617	3	.443	3	-.173	.029	-.013	.019	.030	.026
44970.635	3	.442	3	-.168	.036	-.012	.021	.039	.030
44970.644	3	.441	3	-.175	.031	-.015	.017	.035	.035
44970.660	3	.443	3	-.174	.029	-.016	.014	.030	.029
44970.676	3	.446	3	-.170	.031	-.010	.016	.033	.039

TABLE III (continued).

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
44970.685	3	.445	3	-.178	.033	-.017	.015	.032	.030
44970.701	3	.441	3	-.173	.035	-.016	.020	.036	.032
44970.720	3	.447	3	-.174	.034	-.013	.008	.034	.028
44970.730	3	.446	3	-.180	.034	-.018	.010	.031	.024
44970.748	3	.440	3	-.178	.031	-.017	.014	.033	.027
44971.560	3	.439	3	-.175	.035	-.015	.017	.033	.038
44971.580	3	.441	3	-.175	.035	-.016	.020	.041	.034
44971.601	3	.444	3	-.175	.031	-.015	.015	.033	.035
44971.609	3	.442	3	-.176	.029	-.018	.012	.028	.036
44971.626	3	.446	3	-.176	.030	-.019	.009	.024	.027
44971.644	3	.445	3	-.169	.034	-.012	.007	.032	.040
44971.653	3	.444	3	-.177	.030	-.013	.011	.032	.026
44971.670	3	.445	3	-.180	.029	-.016	.007	.035	.021
44971.688	3	.448	3	-.177	.031	-.013	.017	.027	.028
44971.706	3	.449	3	-.176	.031	-.015	.008	.030	.027
44971.714	3	.445	3	-.193	.024	-.023	.014	.026	.033
44971.734	3	.438	3	-.176	.033	-.014	.015	.030	.031
44971.751	3	.446	3	-.186	.028	-.018	.004	.028	.028
44972.550	3	.441	3	-.178	.026	-.021	.011	.029	.021
44972.566	3	.441	3	-.171	.037	-.012	.019	.041	.043
44972.583	3	.452	3	-.171	.042	-.011	.019	.035	.027
44972.591	3	.440	3	-.175	.030	-.010	.014	.030	.033
44972.608	3	.442	3	-.179	.028	-.018	.011	.029	.032
44972.626	3	.447	3	-.174	.040	-.013	.016	.038	.033
44972.635	3	.445	3	-.173	.029	-.017	.012	.028	.029
44972.663	3	.444	3	-.180	.031	-.017	.013	.030	.036
44972.679	3	.443	3	-.176	.030	-.016	.018	.032	.038
44972.688	3	.446	3	-.176	.029	-.016	.016	.029	.029
44972.704	3	.447	3	-.174	.031	-.013	.009	.031	.031
44972.746	3	.451	3	-.178	.033	-.014	.015	.027	.034
44973.574	3	.442	3	-.173	.031	-.019	.014	.035	.033
44973.591	3	.442	3	-.173	.035	-.017	.017	.037	.033
44973.613	3	.438	3	-.174	.037	-.015	.014	.036	.041
44973.714	3	.445	3	-.174	.032	-.015	.011	.022	.036
44973.733	3	.453	3	-.170	.030	-.017	.014	.034	.021
44974.563	3	.442	3	-.176	.037	-.010	.009	.030	.031
44974.580	3	.446	3	-.171	.035	-.019	.016	.029	.039
44974.597	3	.444	3	-.176	.034	-.016	.012	.033	.026
44974.604	3	.447	3	-.174	.034	-.015	.018	.033	.033
44974.625	3	.443	3	-.166	.034	-.014	.018	.033	.032
44974.645	3	.443	3	-.172	.035	-.015	.017	.032	.031
44974.654	3	.440	3	-.172	.034	-.013	.015	.033	.037
44974.697	3	.442	3	-.176	.029	-.013	.010	.033	.028
44974.705	3	.447	3	-.174	.031	-.014	.010	.033	.037
44974.727	3	.445	3	-.180	.031	-.017	.015	.032	.033
44974.751	3	.450	3	-.176	.029	-.016	.010	.032	.026
44975.567	2	.443	2	-.167	.030	-.017	.012	.030	.025
44975.584	2	.444	2	-.170	.036	-.015	.015	.040	.033
44975.602	3	.444	3	-.176	.032	-.019	.018	.029	.037
44975.611	3	.447	3	-.171	.031	-.017	.017	.027	.033
44975.645	3	.442	3	-.178	.032	-.015	.018	.038	.035
44975.657	3	.448	3	-.174	.029	-.019	.009	.030	.029
44975.684	3	.447	3	-.173	.036	-.016	.017	.030	.033
44975.719	2	.438	2	-.174	.026	-.014	.014	.030	.025
44976.549	3	.441	3	-.174	.030	-.017	.015	.028	.030
44976.565	3	.447	3	-.174	.036	-.016	.014	.034	.029
44976.583	3	.444	3	-.178	.033	-.015	.012	.032	.023
44976.592	3	.444	3	-.176	.030	-.017	.009	.029	.031
44976.623	3	.439	3	-.171	.031	-.016	.008	.032	.028
44976.651	3	.439	3	-.176	.024	-.018	.011	.029	.036
44976.682	3	.452	3	-.174	.032	-.017	.015	.034	.032
44976.722	3	.452	3	-.175	.025	-.016	.011	.029	.027
44976.746	3	.448	3	-.176	.028	-.015	.013	.023	.037
44977.554	3	.441	3	-.174	.035	-.015	.016	.033	.034
44977.579	3	.446	3	-.181	.034	-.020	.017	.032	.031

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
44977.598	3	.442	3	-.175	.030	-.018	.013	.028	.034
44977.620	3	.447	3	-.169	.043	-.013	.021	.038	.037
44978.563	2	.446	2	-.175	.036	-.014	.013	.029	.027
44978.588	3	.438	3	-.176	.028	-.022	-.003	.026	.013
44978.605	3	.441	3	-.175	.035	-.014	.017	.037	.033
44978.613	3	.444	3	-.181	.031	-.016	.010	.030	.025
44978.639	3	.444	3	-.178	.039	-.012	.018	.037	.033
44978.656	3	.442	3	-.177	.034	-.016	.015	.037	.038
44978.664	3	.444	3	-.185	.031	-.018	.010	.034	.035
44978.694	3	.440	3	-.183	.029	-.019	.013	.032	.024
44978.710	3	.443	3	-.178	.030	-.019	.012	.036	.025
44978.719	3	.445	3	-.182	.035	-.015	.009	.036	.031
44978.748	3	.443	3	-.182	.028	-.018	.010	.022	.029
44979.557	3	.446	3	-.180	.031	-.019	.007	.034	.036
44979.571	3	.452	3	-.171	.032	-.014	.016	.034	.034
44979.602	3	.439	3	-.173	.033	-.015	.015	.040	.030
44979.612	3	.447	3	-.171	.037	-.011	.019	.034	.032
44979.638	3	.448	3	-.171	.038	-.014	.011	.035	.035
44979.647	3	.445	3	-.171	.030	-.019	.017	.035	.034
44979.664	3	.439	3	-.178	.036	-.012	.023	.040	.039
44979.689	3	.445	3	-.180	.030	-.018	.016	.032	.033
44979.698	3	.450	3	-.178	.037	-.018	.016	.037	.030
44979.728	3	.439	3	-.190	.032	-.020	.008	.025	.028
44979.748	3	.446	3	-.185	.037	-.019	.013	.035	.036
44980.580	3	.445	3	-.174	.038	-.014	.018	.039	.038
44980.605	3	.448	3	-.179	.033	-.018	.015	.028	.033
44980.615	3	.442	3	-.172	.034	-.013	.014	.033	.035
44980.644	3	.441	3	-.170	.037	-.010	.026	.035	.043
44980.670	3	.444	3	-.179	.031	-.017	.016	.030	.030
44980.680	3	.450	3	-.178	.031	-.016	.015	.031	.023
44980.708	3	.440	3	-.183	.032	-.025	.017	.034	.033
44980.739	2	.444	2	-.177	.036	-.016	.011	.039	.031
44981.559	3	.441	3	-.181	.034	-.015	.015	.037	.033
44981.576	3	.443	3	-.174	.034	-.013	.010	.028	.033
44981.588	3	.442	3	-.169	.037	-.014	.018	.036	.035
44981.604	3	.440	3	-.169	.029	-.019	.009	.036	.028
44981.628	3	.444	3	-.172	.031	-.018	.017	.028	.039
44981.646	3	.440	3	-.171	.029	-.015	.014	.034	.033
44981.658	3	.446	3	-.170	.037	-.014	.013	.035	.038
44981.672	3	.448	3	-.178	.034	-.015	.013	.028	.033
44981.694	3	.447	3	-.173	.035	-.017	.015	.031	.023
44981.710	3	.443	3	-.169	.032	-.013	.016	.030	.036
44981.721	3	.447	3	-.172	.035	-.010	.015	.030	.026
44981.736	3	.443	3	-.170	.031	-.009	.011	.026	.033
44982.554	3	.442	3	-.174	.035	-.014	.017	.038	.030
44982.570	3	.444	3	-.168	.041	-.007	.021	.037	.046
44982.580	3	.439	3	-.171	.031	-.015	.017	.036	.032
44982.596	3	.439	3	-.174	.031	-.017	.015	.034	.036
44982.606	3	.443	3	-.175	.038	-.011	.012	.030	.036
44982.629	3	.445	3	-.172	.039	-.011	.017	.038	.041
44982.655	3	.444	3	-.168	.039	-.010	.023	.035	.040
44982.668	3	.440	3	-.171	.036	-.013	.022	.035	.039
44982.688	3	.438	3	-.175	.035	-.017	.025	.033	.034
44982.704	3	.449	3	-.177	.040	-.014	.018	.031	.027
44982.714	3	.448	3	-.167	.044	-.002	.019	.040	.035
44982.731	3	.446	3	-.176	.034	-.012	.010	.038	.031
44983.552	3	.443	3	-.174	.029	-.019	.011	.026	.033
44983.568	3	.442	3	-.182	.026	-.016	.010	.033	.029
44983.580	3	.441	3	-.176	.025	-.024	.008	.029	.024
44983.597	3	.443	3	-.176	.034	-.016	.019	.034	.034
44983.607	3	.443	3	-.176	.035	-.016	.014	.039	.040
44983.619	3	.442	3	-.175	.030	-.018	.011	.033	.035
44983.637	3	.446	3	-.174	.031	-.018	.015	.035	.033
44983.648	3	.441	3	-.179	.031	-.011	.018	.037	.034
44983.665	3	.443	3	-.176	.032	-.019	.012	.027	.024

TABLE III (*continued*).

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
44983.673	3	.447	3	-.178	.038	-.013	.020	.034	.036
44983.689	3	.446	3	-.177	.031	-.018	.013	.027	.024
44983.700	3	.438	3	-.173	.030	-.016	.014	.032	.030
44983.716	3	.441	3	-.177	.027	-.017	.010	.026	.033
44983.727	3	.445	3	-.185	.033	-.018	.006	.031	.031
44983.748	3	.439	3	-.180	.034	-.015	.016	.030	.039
44984.556	2	.445	2	-.173	.031	-.020	.010	.029	.032
44984.575	2	.445	2	-.170	.029	-.015	.014	.032	.030
44984.587	2	.447	2	-.167	.033	-.015	.023	.036	.030
44984.604	2	.447	2	-.174	.031	-.015	.016	.035	.035
44984.617	2	.446	2	-.170	.034	-.014	.012	.035	.034
44985.558	3	.442	3	-.183	.028	-.017	.009	.028	.031
44985.574	3	.441	3	-.171	.029	-.018	.021	.041	.030
44985.587	3	.446	3	-.169	.036	-.011	.022	.032	.035
44985.603	3	.446	3	-.177	.035	-.019	.013	.032	.027
44985.624	3	.443	3	-.173	.034	-.011	.010	.041	.031
44985.640	3	.446	3	-.177	.032	-.012	.019	.032	.035
44985.655	3	.449	3	-.177	.029	-.014	.018	.030	.038
44985.674	3	.447	3	-.175	.031	-.016	.011	.033	.034
44985.689	3	.449	3	-.177	.031	-.021	.009	.031	.029
44985.704	3	.445	3	-.175	.028	-.016	.017	.030	.023
44985.716	3	.447	3	-.171	.033	-.016	.009	.031	.032
44986.556	2	.444	2	-.175	.036	-.019	.014	.031	.028
44986.573	2	.441	2	-.184	.032	-.020	.014	.030	.025
44986.584	3	.443	3	-.173	.031	-.014	.017	.040	.032
44986.610	3	.438	3	-.170	.030	-.014	.018	.031	.038
44986.623	3	.440	3	-.178	.034	-.014	.014	.034	.033
44986.635	3	.442	3	-.174	.035	-.017	.014	.030	.026
44986.653	3	.443	3	-.175	.035	-.014	.017	.033	.034
44986.665	3	.440	3	-.174	.027	-.022	.019	.031	.021
44986.684	3	.446	3	-.176	.030	-.019	.007	.031	.022
44986.692	3	.443	3	-.175	.032	-.013	.019	.032	.030
44986.708	3	.443	3	-.171	.032	-.013	.016	.035	.026
44986.719	3	.442	3	-.183	.027	-.021	.006	.026	.027
44987.549	3	.453	2	-.169	.028	-.020	.004	.023	.031
44987.566	3	.447	2	-.180	.034	-.015	.007	.036	.029
44987.577	3	.443	2	-.174	.035	-.017	.016	.034	.036
44987.619	3	.443	2	-.171	.030	-.014	.010	.026	.025
44987.636	3	.448	2	-.163	.041	-.016	.017	.042	.031
44987.691	3	.441	2	-.168	.036	-.008	.020	.038	.039
44987.707	3	.443	2	-.175	.032	-.021	.011	.030	.032
44987.717	3	.441	2	-.174	.033	-.015	.010	.024	.028
44988.561	2	.446	2	-.163	.034	-.011	.018	.030	.040
44988.571	2	.447	2	-.168	.032	-.016	.011	.031	.028
44988.587	2	.445	2	-.174	.033	-.013	.014	.033	.034
44988.598	2	.446	2	-.168	.033	-.017	.016	.028	.034
44988.609	2	.447	2	-.169	.031	-.015	.012	.029	.030
44988.625	2	.445	2	-.172	.028	-.017	.015	.029	.023
44988.639	2	.449	2	-.172	.033	-.017	.006	.032	.033
44988.656	2	.445	2	-.175	.031	-.012	.016	.027	.024
44988.666	2	.446	2	-.174	.028	-.020	.007	.027	.035
44988.679	2	.451	2	-.174	.021	-.020	.009	.027	.026
44988.695	2	.447	2	-.183	.030	-.015	.010	.031	.031
44988.706	2	.439	2	-.172	.022	-.017	.014	.026	.032
44989.554	3	.444	3	-.169	.034	-.018	.010	.034	.031

	HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
	44989.571	3	.444	3	-.177	.031	-.016	.018	.030	.030
	44989.583	3	.447	3	-.168	.038	-.016	.015	.036	.033
	44989.656	3	.446	3	-.179	.030	-.016	.008	.025	.030
	44989.672	3	.448	3	-.172	.034	-.024	.018	.035	.035
	44989.690	3	.444	3	-.174	.026	-.023	.006	.024	.029
	44989.706	3	.446	3	-.177	.025	-.025	.011	.026	.029
	44989.716	3	.445	3	-.171	.037	-.012	.019	.040	.038
	44992.555	3	.446	3	-.178	.033	-.014	.014	.031	.037
	44992.573	3	.445	3	-.173	.034	-.014	.016	.035	.030
	44992.584	3	.449	3	-.166	.031	-.017	.011	.034	.030
	44992.628	3	.448	3	-.171	.039	-.013	.014	.032	.031
	44992.647	3	.445	3	-.173	.035	-.015	.014	.033	.036
	44992.693	3	.448	3	-.173	.035	-.018	.016	.030	.041
	44992.710	3	.450	3	-.171	.037	-.013	.017	.032	.035
	44993.544	2	.442	2	-.176	.032	-.013	.013	.030	.031
	44993.561	2	.444	2	-.184	.032	-.016	.012	.028	.033
	44993.571	2	.445	2	-.178	.033	-.017	.013	.027	.035
	44993.588	2	.444	2	-.181	.031	-.016	.014	.033	.024
	44993.600	2	.447	2	-.179	.032	-.011	.008	.028	.028
	44994.542	3	.437	3	-.180	.032	-.019	.019	.036	.034
	44994.564	3	.440	3	-.179	.036	-.018	.019	.036	.039
	44994.574	3	.443	3	-.183	.037	-.016	.018	.032	.035
	44994.647	3	.441	3	-.179	.030	-.021	.019	.034	.026
	44994.665	3	.439	3	-.178	.030	-.019	.013	.031	.028
	44994.676	3	.443	3	-.180	.032	-.016	.013	.031	.036
	44996.554	3	.445	3	-.168	.039	-.010	.019	.038	.037
	44996.570	3	.445	3	-.176	.030	-.016	.010	.030	.031
	44996.581	3	.448	3	-.165	.037	-.016	.021	.033	.036
	44996.686	3	.442	3	-.168	.037	-.011	.020	.042	.029
	44996.697	3	.448	3	-.171	.039	-.015	.018	.033	.034
HD 35298										
	44954.627	4.	1.464	3.	-.394	.082	-.027	.025	.086	.083
	44954.765	4.	1.470	3.	-.405	.076	-.025	.029	.074	.079
	44955.604	3.	1.452	3.	-.429	.074	-.028	.028	.069	.074
	44956.607	2.	1.469	2.	-.400	.071	-.027	.026	.071	.076
	44967.577	3.	1.464	3.	-.402	.081	-.032	.026	.083	.079
	44967.663	3.	1.470	3.	-.399	.082	-.026	.027	.080	.078
	44968.573	3.	1.452	3.	-.435	.074	-.032	.024	.073	.072
	44968.663	3.	1.462	3.	-.421	.077	-.026	.032	.076	.077
	44969.607	3.	1.471	3.	-.405	.077	-.029	.028	.076	.077
	44969.674	3.	1.472	3.	-.408	.072	-.029	.025	.073	.074
	44970.625	3.	1.468	3.	-.421	.073	-.030	.028	.077	.071
	44970.709	3.	1.468	3.	-.418	.071	-.029	.023	.069	.066
	44971.590	3.	1.468	3.	-.413	.078	-.025	.027	.074	.072
	44971.723	3.	1.456	3.	-.425	.077	-.026	.027	.080	.076
	44972.558	3.	1.465	3.	-.421	.071	-.030	.031	.076	.068
	44972.712	3.	1.465	3.	-.424	.078	-.031	.030	.078	.074
	44986.601	3.	1.451	3.	-.429	.076	-.026	.028	.083	.076
	44986.674	3.	1.444	3.	-.430	.082	-.028	.031	.086	.078
	44987.628	3.	1.460	2.	-.421	.077	-.033	.024	.074	.080
	44987.712	3.	1.457	2.	-.419	.081	-.035	.030	.084	.075
	44988.647	2.	1.439	2.	-.435	.082	-.030	.024	.083	.075
	44988.700	2.	1.441	2.	-.430	.086	-.030	.030	.085	.075
	44989.698	3.	1.459	3.	-.402	.090	-.032	.029	.088	.083

TABLE III (*continued*).

Star	HJD −2400000.	Q	m_V	P	U−B	V−B	B1−B	B2−B	V1−B	G−B
HD 36313	44955.623	3.	1.748	3.	−.142	.003	.002	−.003	.010	−.010
	44956.655	2.	1.763	2.	−.126	−.002	.009	−.007	.005	−.015
	44958.601	4.	1.751	4.	−.136	.002	.007	−.008	.007	−.016
	44958.764	4.	1.743	4.	−.158	.003	.003	−.005	.001	−.016
	44967.620	3.	1.739	3.	−.162	.003	.003	−.003	.006	−.020
	44967.706	3.	1.751	3.	−.150	−.006	.005	−.008	.001	−.020
	44968.620	3.	1.754	3.	−.136	−.001	.002	−.009	.002	−.020
	44968.704	3.	1.747	3.	−.142	−.001	.003	−.003	.005	−.010
	44969.624	3.	1.760	3.	−.131	−.001	.005	−.007	.004	−.015
	44969.723	3.	1.742	3.	−.144	.003	−.003	−.010	.012	−.015
	44970.582	3.	1.739	3.	−.157	.003	.008	.000	.002	−.018
	44970.668	3.	1.755	3.	−.148	−.010	.003	−.007	−.003	−.025
	44978.596	3.	1.748	3.	−.140	.003	.004	−.011	.010	−.018
	44978.647	3.	1.752	3.	−.137	.001	.006	−.004	.006	−.022
	44978.702	3.	1.753	3.	−.138	.000	.006	−.006	.000	−.020
	44979.559	3.	1.762	3.	−.130	−.010	.009	.001	−.010	−.028
	44979.624	3.	1.759	3.	−.128	−.009	.000	−.013	−.004	−.021
	44979.710	3.	1.744	3.	−.139	−.001	.006	−.002	.005	−.013
	44980.569	3.	1.738	3.	−.156	.002	.000	−.004	.009	−.011
	44980.690	3.	1.758	3.	−.140	−.009	.008	−.008	−.006	−.030
	44981.715	3.	1.746	3.	−.150	.004	.004	−.004	.008	−.021
	44982.562	3.	1.760	3.	−.121	−.006	.011	−.003	.002	−.018
	44982.601	3.	1.758	3.	−.125	.003	.006	−.001	.007	−.012
	44982.695	3.	1.747	3.	−.143	.005	.002	−.007	−.001	−.014
	44983.681	3.	1.764	3.	−.142	−.013	.005	−.009	−.010	−.030
	44983.721	3.	1.762	3.	−.132	−.008	.000	−.011	.000	−.025
	44985.665	3.	1.749	3.	−.145	.006	.002	−.011	.008	−.019
	44988.592	2.	1.745	2.	−.145	.002	.000	−.006	.007	−.021
	44991.633	1.	1.750	2.	−.132	−.004	−.001	−.008	.002	−.022
	44992.638	3.	1.756	3.	−.136	.000	.000	−.006	−.002	−.015
	44996.563	3.	1.748	3.	−.157	−.004	.002	−.006	.000	−.026
HD 36526	44956.741	2.	1.844	2.	−.405	.047	−.023	.025	.054	.031
	44961.711	3.	1.823	2.	−.427	.052	−.028	.027	.054	.033
	44973.583	3.	1.854	3.	−.393	.043	−.023	.016	.046	.027
	44974.571	3.	1.832	3.	−.417	.040	−.025	.021	.048	.026
	44974.715	3.	1.841	3.	−.412	.049	−.026	.021	.047	.032
	44975.575	2.	1.827	2.	−.425	.061	−.025	.025	.060	.033
	44976.557	3.	1.853	3.	−.391	.046	−.021	.021	.050	.035
	44976.735	3.	1.846	3.	−.400	.047	−.023	.023	.047	.039
	44977.565	3.	1.836	3.	−.419	.047	−.025	.022	.050	.029
	44978.575	2.	1.826	2.	−.425	.054	−.026	.026	.059	.037
	44979.586	3.	1.846	3.	−.403	.048	−.024	.019	.051	.036
	44979.676	3.	1.851	3.	−.394	.045	−.029	.018	.047	.032
	44981.596	3.	1.834	3.	−.419	.055	−.022	.025	.052	.037
	44981.651	3.	1.826	3.	−.422	.053	−.025	.021	.061	.034
	44982.661	3.	1.848	3.	−.399	.045	−.019	.023	.050	.033
	44982.709	3.	1.851	3.	−.397	.047	−.026	.021	.052	.032
	44983.602	3.	1.826	3.	−.421	.044	−.025	.020	.050	.024
	44983.656	3.	1.827	3.	−.418	.044	−.028	.018	.045	.030
	44984.580	2.	1.839	2.	−.416	.050	−.023	.018	.053	.031
	44985.594	3.	1.842	3.	−.406	.052	−.026	.023	.051	.036
	44985.696	3.	1.848	3.	−.402	.054	−.025	.021	.058	.036
	44989.592	3.	1.817	3.	−.425	.049	−.025	.024	.053	.030
HD 36540	44956.721	2.	1.713	2.	−.269	−.134	.010	−.007	−.119	−.177
	44958.619	4.	1.702	4.	−.282	−.134	.004	−.005	−.115	−.177
	44958.780	4.	1.714	4.	−.275	−.126	.008	−.008	−.123	−.169
	44971.617	3.	1.700	3.	−.283	−.134	.008	−.013	−.119	−.177
	44971.678	3.	1.704	3.	−.279	−.130	.005	−.006	−.121	−.178
	44972.574	3.	1.705	3.	−.267	−.126	.004	−.010	−.118	−.169
	44972.695	3.	1.693	3.	−.270	−.122	.004	−.019	−.114	−.174
	44973.602	3.	1.693	3.	−.293	−.127	.005	−.011	−.119	−.178
	44973.722	3.	1.697	3.	−.285	−.131	.011	−.014	−.117	−.174
	44974.588	3.	1.712	3.	−.269	−.133	.005	−.018	−.126	−.177
	44974.737	3.	1.710	3.	−.266	−.127	.002	−.015	−.118	−.180
	44975.592	3.	1.676	3.	−.293	−.129	.004	−.014	−.118	−.181
	44979.626	3.	1.667	3.	−.289	−.120	.004	−.008	−.106	−.160
	44979.714	3.	1.671	3.	−.290	−.117	.008	−.008	−.108	−.168
	44980.591	3.	1.711	3.	−.277	−.137	.007	−.010	−.124	−.183
	44980.694	3.	1.720	3.	−.275	−.134	.008	−.018	−.132	−.185
	44981.567	3.	1.681	3.	−.279	−.116	.006	−.005	−.103	−.162
	44981.665	3.	1.672	3.	−.283	−.122	.002	−.008	−.110	−.172
	44982.588	3.	1.707	3.	−.282	−.137	.002	−.016	−.122	−.185
	44983.694	3.	1.688	3.	−.277	−.119	.006	−.008	−.106	−.161
	44988.579	2.	1.677	2.	−.295	−.124	.006	−.009	−.115	−.177
	44989.711	3.	1.715	3.	−.259	−.132	.005	−.015	−.124	−.177
HD 36668	44958.714	4.	1.602	4.	−.185	.067	−.020	.014	.066	.049
	44972.618	3.	1.615	3.	−.183	.058	−.016	.016	.057	.045
	44980.659	3.	1.610	3.	−.195	.057	−.018	.016	.059	.042
	44986.579	3.	1.606	3.	−.160	.060	−.016	.014	.062	.046
	44986.700	3.	1.614	3.	−.171	.063	−.015	.017	.067	.041
	44987.571	3.	1.619	2.	−.175	.058	−.019	.012	.059	.045
	44987.698	3.	1.623	2.	−.162	.063	−.016	.014	.066	.048
	44988.552	2.	1.602	2.	−.174	.070	−.013	.023	.070	.052
	44988.661	2.	1.606	2.	−.172	.064	−.015	.019	.065	.047
	44989.577	3.	1.614	3.	−.183	.058	−.022	.016	.061	.047
	44991.593	1.	1.609	2.	−.190	.057	−.017	.017	.061	.044
	44991.663	1.	1.611	2.	−.188	.056	−.016	.012	.058	.043
	44992.579	3.	1.604	3.	−.191	.071	−.017	.021	.068	.049
	44992.702	3.	1.600	3.	−.180	.069	−.016	.020	.071	.050
	44993.565	2.	1.610	2.	−.192	.058	−.019	.011	.059	.034
	44994.550	3.	1.605	3.	−.184	.063	−.017	.020	.070	.053
	44994.657	3.	1.605	3.	−.189	.065	−.018	.018	.068	.053
	44996.575	3.	1.610	3.	−.180	.067	−.021	.017	.069	.048
	44996.691	3.	1.606	3.	−.186	.067	−.021	.014	.066	.049

TABLE III (*continued*).

Star	HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
HD 36916	44561.773	3.	.481	3.	-.434	.118	-.047	.028	.112	.113
	44568.700	3.	.503	3.	-.420	.117	-.032	.036	.110	.111
	44568.720	3.	.520	3.	-.417	.106	-.038	.032	.105	.102
	44569.752	3.	.492	3.	-.411	.126	-.041	.029	.121	.116
	44570.742	2.	.489	3.	-.441	.116	-.031	.039	.125	.110
	44570.788	2.	.483	3.	-.434	.117	-.032	.040	.122	.112
	44571.741	3.	.516	3.	-.420	.111	-.042	.030	.109	.111
	44573.746	2.	.502	3.	-.428	.109	-.042	.029	.104	.101
	44576.749	3.	.517	3.	-.428	.104	-.038	.036	.102	.101
	44581.730	3.	.484	3.	-.435	.114	-.026	.028	.108	.115
	44583.815	3.	.485	3.	-.407	.123	-.039	.040	.131	.113
	44601.725	3.	.515	3.	-.416	.110	-.035	.033	.113	.118
	44604.771	3.	.522	3.	-.412	.105	-.036	.036	.106	.098
	44606.614	3.	.504	3.	-.428	.112	-.040	.034	.114	.110
	44607.746	3.	.514	3.	-.418	.109	-.041	.034	.104	.103
	44610.637	3.	.493	3.	-.407	.121	-.042	.027	.132	.123
	44613.587	3.	.491	3.	-.421	.124	-.038	.042	.122	.114
	44613.593	3.	.492	3.	-.410	.131	-.027	.048	.128	.117
	44613.682	3.	.494	3.	-.399	.124	-.033	.038	.122	.123
	44619.574	3.	.478	3.	-.433	.129	-.032	.040	.126	.116
	44619.705	3.	.475	3.	-.425	.121	-.030	.051	.126	.118
	44620.557	3.	.522	3.	-.426	.107	-.025	.021	.103	.091
	44621.557	3.	.497	3.	-.403	.126	-.037	.048	.126	.130
	44622.553	2.	.475	2.	-.441	.117	-.036	.036	.116	.113
	44622.683	3.	.469	3.	-.432	.127	-.036	.047	.137	.127
	44623.569	3.	.522	3.	-.418	.104	-.036	.030	.112	.108
	44623.735	3.	.505	3.	-.440	.094	-.046	.034	.100	.106
	44624.657	4.	.497	3.	-.404	.121	-.045	.028	.127	.119
	44625.555	3.	.491	3.	-.445	.114	-.043	.030	.110	.088
	44625.560	3.	.490	3.	-.437	.117	-.038	.036	.110	.098
	44626.619	3.	.519	3.	-.420	.108	-.039	.038	.109	.111
	44629.671	3.	.511	3.	-.416	.110	-.039	.045	.104	.098
	44634.632	3.	.519	3.	-.421	.109	-.026	.048	.103	.108
	44636.586	3.	.490	3.	-.438	.126	-.037	.035	.117	.109
	44637.665	3.	.526	3.	-.423	.114	-.032	.034	.097	.107
	44638.631	2.	.486	2.	-.402	.118	-.039	.027	.127	.123
	44639.593	3.	.488	3.	-.445	.113	-.035	.040	.108	.103
	44640.596	3.	.512	3.	-.408	.116	-.035	.048	.122	.120
	44641.575	3.	.482	3.	-.428	.124	-.035	.046	.125	.122
	44642.584	3.	.507	3.	-.428	.107	-.032	.042	.100	.102
	44643.590	1.	.505	2.	-.406	.121	-.045	.061	.117	.125
	44644.587	4.	.473	4.	-.436	.120	-.032	.034	.123	.108
	44645.584	3.	.519	2.	-.425	.109	-.033	.033	.108	.099
	44659.577	3.	.524	3.	-.428	.112	-.030	.038	.106	.114
	44659.582	3.	.530	3.	-.426	.100	-.037	.029	.100	.099
HD 37140	44958.730	4.	2.085	4.	-.234	-.172	.016	-.026	-.159	-.231
	44961.666	3.	2.084	2.	-.240	-.176	.015	-.029	-.160	-.240
	44967.638	3.	2.089	3.	-.246	-.177	.014	-.024	-.163	-.240
	44967.723	3.	2.093	3.	-.235	-.177	.015	-.029	-.164	-.242
	44968.638	3.	2.117	3.	-.221	-.186	.017	-.029	-.172	-.253
	44968.726	3.	2.111	3.	-.216	-.183	.023	-.024	-.168	-.246
	44969.581	3.	2.080	3.	-.234	-.176	.018	-.029	-.157	-.241
	44969.656	3.	2.085	3.	-.228	-.170	.015	-.025	-.154	-.232
	44970.565	3.	2.097	3.	-.244	-.186	.018	-.036	-.172	-.248
	44970.651	3.	2.101	3.	-.230	-.182	.016	-.028	-.166	-.245
	44971.570	3.	2.107	3.	-.222	-.187	.016	-.024	-.168	-.248
	44971.742	3.	2.104	3.	-.218	-.179	.018	-.021	-.158	-.241
	44972.670	3.	2.081	3.	-.237	-.174	.023	-.021	-.157	-.231
	44974.635	3.	2.096	3.	-.224	-.178	.020	-.025	-.164	-.239
	44981.702	3.	2.109	3.	-.230	-.190	.015	-.025	-.171	-.247
	44983.735	3.	2.087	3.	-.244	-.179	.019	-.025	-.160	-.241
	44984.595	2.	2.110	2.	-.224	-.190	.021	-.025	-.173	-.247
	44985.565	3.	2.090	3.	-.229	-.182	.011	-.029	-.163	-.241
	44985.631	3.	2.088	3.	-.228	-.171	.014	-.030	-.156	-.237
	44985.710	3.	2.086	3.	-.229	-.168	.017	-.022	-.157	-.229
	44988.565	2.	2.082	2.	-.240	-.176	.011	-.029	-.156	-.235
	44989.563	3.	2.100	3.	-.232	-.181	.017	-.028	-.163	-.247
	44993.553	2.	2.097	2.	-.225	-.177	.017	-.029	-.165	-.242
	44993.579	2.	2.094	2.	-.219	-.175	.018	-.027	-.163	-.246
	44994.569	3.	2.086	3.	-.234	-.176	.021	-.018	-.159	-.238
	44994.671	3.	2.089	3.	-.234	-.179	.015	-.022	-.166	-.238
HD 37151	44561.771	3.	1.154	3.	-.236	.031	-.017	.008	.025	.050
	44568.706	3.	1.117	3.	-.256	.049	-.014	.015	.041	.060
	44568.725	3.	1.142	3.	-.242	.046	-.017	.019	.037	.049
	44569.751	3.	1.134	3.	-.243	.038	-.018	.016	.044	.044
	44570.737	2.	1.157	3.	-.229	.044	-.014	.016	.045	.051
	44570.793	2.	1.165	3.	-.216	.036	-.014	.012	.035	.045
	44571.743	3.	1.173	3.	-.232	.026	-.023	.005	.030	.037
	44573.749	2.	1.153	3.	-.231	.044	-.019	.015	.039	.046
	44576.744	3.	1.144	3.	-.239	.041	-.016	.013	.041	.046
	44581.727	3.	1.141	3.	-.243	.044	-.014	.012	.043	.051
	44583.811	3.	1.155	3.	-.232	.035	-.022	.013	.041	.042
	44601.721	3.	1.147	3.	-.241	.045	-.014	.020	.048	.056
	44604.768	3.	1.146	3.	-.222	.042	-.011	.013	.048	.058
	44606.616	3.	1.145	3.	-.233	.043	-.014	.013	.036	.063
	44607.740	3.	1.156	3.	-.236	.038	-.022	.005	.032	.035
	44610.634	3.	1.153	3.	-.240	.038	-.014	.009	.038	.045
	44613.590	3.	1.155	3.	-.243	.042	-.020	.013	.035	.042
	44613.679	3.	1.149	3.	-.246	.042	-.011	.015	.046	.057
	44619.571	3.	1.150	3.	-.238	.049	-.016	.018	.039	.057
	44619.702	3.	1.149	3.	-.239	.034	-.019	.021	.031	.034
	44620.554	3.	1.151	3.	-.242	.036	-.007	.000	.034	.036
	44621.554	3.	1.156	3.	-.235	.040	-.016	.026	.037	.049
	44622.556	2.	1.150	2.	-.236	.042	-.010	.018	.045	.047
	44622.686	3.	1.149	3.	-.230	.037	-.021	.013	.050	.056
	44623.566	3.	1.151	3.	-.229	.039	-.015	.017	.042	.052
	44623.731	3.	1.143	3.	-.235	.028	-.017	.007	.043	.046
	44624.653	4.	1.152	3.	-.241	.037	-.017	.002	.043	.040
	44625.553	2.	1.156	2.	-.232	.038	-.019	.013	.031	.030
	44625.558	3.	1.150	3.	-.236	.033	-.016	.013	.031	.032
	44626.616	3.	1.142	3.	-.246	.047	-.009	.024	.047	.052
	44629.669	3.	1.157	3.	-.227	.030	-.010	.011	.029	.043
	44634.629	3.	1.146	3.	-.230	.043	-.013	.014	.040	.049
	44636.582	3.	1.138	3.	-.246	.043	-.017	.016	.033	.051
	44637.662	3.	1.149	3.	-.243	.040	-.012	.016	.041	.058
	44638.628	2.	1.147	2.	-.243	.041	-.015	.016	.045	.058
	44639.590	3.	1.150	3.	-.238	.045	-.018	.012	.044	.055
	44640.593	3.	1.152	3.	-.227	.043	-.017	.025	.047	.041
	44641.572	3.	1.154	3.	-.225	.036	-.010	.023	.038	.050
	44642.580	3.	1.138	3.	-.247	.044	-.019	.018	.043	.046
	44643.587	1.	1.136	2.	-.253	.050	-.015	.017	.049	.052
	44644.584	4.	1.147	4.	-.242	.042	-.018	.021	.037	.038
	44645.581	3.	1.176	2.	-.222	.036	-.015	.012	.033	.048
	44659.574	3.	1.144	3.	-.258	.052	-.016	.009	.050	.056
	44659.580	3.	1.133	3.	-.257	.040	-.015	.016	.048	.047

TABLE III *(continued)*.

Star	HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
HD 37210	44959.715	3.	1.663	3.	-.139	.029	-.003	-.001	.031	.022
	44960.708	3.	1.663	3.	-.157	.021	-.002	-.003	.022	.008
	44961.693	3.	1.666	2.	-.173	.019	.001	.004	.022	.007
	44967.594	3.	1.648	3.	-.177	.033	-.006	-.003	.035	.016
	44967.680	3.	1.645	3.	-.175	.034	-.004	.006	.039	.025
	44968.593	3.	1.652	3.	-.168	.033	-.003	.005	.042	.024
	44968.678	3.	1.655	3.	-.156	.036	-.003	.003	.035	.021
	44969.563	3.	1.661	3.	-.158	.032	.001	-.001	.036	.018
	44969.744	3.	1.667	3.	-.151	.033	.000	-.002	.035	.028
	44970.607	3.	1.663	3.	-.144	.028	.002	-.003	.029	.027
	44970.692	3.	1.663	3.	-.142	.028	-.003	.002	.031	.015
	44971.635	3.	1.668	3.	-.155	.028	-.003	.000	.027	.018
	44971.697	3.	1.663	3.	-.155	.022	-.004	-.002	.023	.012
	44972.737	3.	1.661	3.	-.177	.015	-.005	-.001	.022	.016
	44974.615	3.	1.672	3.	-.183	.011	.001	.001	.020	.004
	44986.645	3.	1.673	3.	-.180	.012	-.004	.001	.013	.005
	44986.713	3.	1.670	3.	-.180	.015	.000	.001	.020	.003
	44988.632	2.	1.649	2.	-.181	.028	-.004	.002	.032	.015
	44988.687	2.	1.644	2.	-.184	.031	-.003	.008	.035	.018
	44989.664	3.	1.647	3.	-.182	.032	-.005	-.002	.035	.020
HD 37633	44974.682	3.	2.543	3.	-.147	-.147	.035	-.049	-.140	-.178
	44975.635	3.	2.583	3.	-.111	-.122	.024	-.038	-.108	-.159
	44976.667	3.	2.589	3.	-.105	-.114	.018	-.036	-.102	-.151
	44977.608	3.	2.535	3.	-.176	-.160	.030	-.056	-.146	-.188
	44978.624	3.	2.593	3.	-.109	-.112	.018	-.033	-.111	-.150
	44979.655	3.	2.583	3.	-.108	-.119	.020	-.038	-.115	-.159
	44979.738	3.	2.591	3.	-.088	-.110	.025	-.030	-.103	-.145
	44980.594	3.	2.548	3.	-.149	-.149	.034	-.041	-.142	-.185
	44980.721	3.	2.540	3.	-.155	-.151	.043	-.046	-.144	-.202
	44981.729	3.	2.590	3.	-.115	-.115	.021	-.029	-.101	-.154
	44983.573	3.	2.573	3.	-.116	-.131	.028	-.046	-.122	-.179
	44983.628	3.	2.564	3.	-.129	-.137	.030	-.042	-.123	-.162
	44984.565	2.	2.595	2.	-.108	-.104	.025	-.032	-.098	-.141
	44984.610	2.	2.597	2.	-.108	-.099	.019	-.024	-.097	-.135
	44985.581	3.	2.542	3.	-.169	-.150	.043	-.051	-.145	-.202
	44985.647	3.	2.539	3.	-.157	-.153	.038	-.054	-.144	-.193
	44991.579	1.	2.556	2.	-.149	-.148	.033	-.045	-.136	-.184
	44991.647	1.	2.544	2.	-.155	-.151	.034	-.051	-.138	-.186
	44992.563	3.	2.598	3.	-.100	-.100	.024	-.025	-.090	-.140
	44993.594	2.	2.548	2.	-.133	-.147	.030	-.053	-.138	-.177
HD 37642	44961.648	3.	1.593	2.	-.437	.069	-.027	.027	.072	.050
	44961.755	3.	1.581	2.	-.444	.070	-.027	.022	.074	.057
	44971.662	3.	1.566	3.	-.448	.075	-.027	.020	.084	.054
	44976.573	3.	1.605	3.	-.397	.077	-.027	.027	.080	.061
	44976.738	3.	1.594	3.	-.428	.073	-.031	.026	.072	.057
	44977.568	3.	1.602	3.	-.397	.082	-.025	.028	.090	.070
	44978.577	2.	1.599	2.	-.392	.087	-.026	.022	.089	.074
	44978.734	3.	1.607	3.	-.398	.077	-.028	.026	.083	.063
	44979.589	3.	1.594	3.	-.403	.086	-.025	.028	.094	.073
	44979.678	3.	1.599	3.	-.389	.083	-.028	.021	.087	.067
	44980.566	3.	1.596	3.	-.415	.083	-.023	.026	.089	.071
	44980.655	3.	1.594	3.	-.395	.084	-.027	.028	.091	.072
	44980.725	3.	1.598	3.	-.384	.087	-.020	.028	.092	.068
	44981.582	3.	1.593	3.	-.433	.073	-.028	.021	.075	.056
	44981.637	3.	1.596	3.	-.421	.084	-.024	.027	.085	.065
	44982.575	3.	1.583	3.	-.444	.075	-.021	.028	.080	.052
	44982.645	3.	1.591	3.	-.435	.075	-.025	.022	.078	.058
	44982.722	3.	1.595	3.	-.421	.080	-.031	.020	.082	.055
	44983.560	3.	1.569	3.	-.454	.076	-.025	.020	.079	.055
	44983.588	3.	1.579	3.	-.449	.080	-.026	.027	.081	.055
	44983.643	3.	1.581	3.	-.450	.075	-.028	.018	.081	.057
	44983.708	3.	1.590	3.	-.438	.075	-.027	.021	.083	.057
	44986.564	2.	1.586	2.	-.441	.075	-.028	.027	.079	.052
	44987.557	3.	1.590	2.	-.435	.071	-.029	.026	.076	.053
	44988.617	2.	1.595	2.	-.429	.073	-.028	.025	.078	.055
HD 142301	44022.640	3.	.379	3.	-.612	.153	-.065	.045	.150	.160
	44023.686	3.	.374	3.	-.593	.154	-.062	.050	.154	.181
	44030.663	3.	.363	3.	-.607	.152	-.063	.059	.156	.171
	44032.689	4.	.363	4.	-.613	.157	-.054	.051	.160	.190
	44035.616	3.	.371	3.	-.605	.166	-.059	.070	.156	.180
	44040.643	3.	.360	3.	-.626	.167	-.057	.057	.158	.176
	44042.594	2.	.377	2.	-.591	.150	-.064	.051	.147	.159
	44048.571	3.	.376	3.	-.616	.159	-.056	.051	.145	.170
	44051.568	3.	.361	3.	-.614	.150	-.060	.047	.150	.168
	44052.636	3.	.376	3.	-.596	.163	-.057	.071	.159	.182
	44062.511	3.	.359	3.	-.626	.164	-.061	.064	.167	.176
	44067.621	3.	.377	3.	-.602	.161	-.070	.031	.153	.157
	44401.610	3.	.383	3.	-.593	.159	-.060	.049	.153	.173
	44404.624	2.	.378	2.	-.594	.163	-.060	.056	.152	.174
	44407.607	3.	.377	3.	-.603	.161	-.062	.057	.154	.166
	44417.680	3.	.379	3.	-.594	.153	-.061	.051	.151	.173
	44420.677	3.	.380	3.	-.596	.161	-.060	.053	.153	.174
	44429.537	3.	.370	2.	-.609	.155	-.064	.050	.158	.170
	44443.521	4.	.360	4.	-.617	.161	-.062	.059	.157	.175
	44456.510	3.	.368	3.	-.621	.156	-.067	.051	.156	.163
	44457.496	3.	.372	3.	-.607	.161	-.062	.050	.154	.170
	44458.495	3.	.381	3.	-.588	.161	-.056	.044	.150	.177
	44459.508	3.	.350	3.	-.614	.163	-.062	.062	.158	.179
	44460.518	3.	.377	3.	-.606	.160	-.056	.055	.162	.170
	44461.516	2.	.380	2.	-.593	.159	-.064	.054	.157	.177
	44462.515	3.	.367	3.	-.613	.170	-.061	.056	.161	.177
HD 147010	44705.786	2.	.294	2.	-.290	.026	-.009	.013	.039	-.030
	44708.865	2.	.321	2.	-.297	-.007	-.006	.012	.014	-.050
	44714.871	3.	.293	3.	-.290	.028	-.015	.007	.044	-.029
	44802.648	3.	.332	3.	-.296	-.007	-.008	.006	.006	-.056
	44803.616	2.	.302	3.	-.299	.021	-.014	.004	.031	-.038
	44804.514	3.	.292	3.	-.292	.037	-.014	.013	.050	-.023
	44804.711	3.	.292	3.	-.298	.030	-.012	.008	.042	-.030
	44805.646	3.	.309	3.	-.301	.013	-.013	.004	.027	-.044
	44829.539	3.	.327	2.	-.302	.000	-.010	.002	.013	-.055
	44830.549	2.	.321	3.	-.298	.002	-.007	.003	.013	-.044
	44831.546	2.	.289	3.	-.295	.023	-.013	.017	.038	-.029
	44833.523	3.	.332	3.	-.299	.002	-.007	.006	.017	-.053
	44834.552	3.	.320	3.	-.300	.007	-.013	.004	.017	-.046
	44835.515	3.	.292	3.	-.289	.031	-.009	.015	.043	-.028
	44838.504	2.	.317	2.	-.297	.006	-.013	.005	.012	-.049
	44839.493	3.	.293	3.	-.294	.031	-.017	.005	.049	-.032
	44840.532	2.	.306	2.	-.298	.032	-.010	.004	.044	-.029
	44841.539	3.	.332	3.	-.295	-.002	-.001	.007	.014	-.053
	44842.489	2.	.315	1.	-.303	.008	-.017	.004	.019	-.047
HD 213918	44509.427	3.	.559	3.	-.195	-.009	-.018	.004	.009	-.028
	44510.443	3.	.508	3.	-.244	.031	-.004	.016	.037	.002
	44510.579	3.	.533	3.	-.213	.022	-.010	.010	.027	-.006
	44511.398	3.	.531	3.	-.238	.019	-.017	.008	.016	-.011
	44511.576	3.	.505	3.	-.255	.022	-.015	.008	.027	-.010
	44512.357	3.	.571	3.	-.204	.005	-.007	.011	.008	-.017
	44512.582	3.	.564	3.	-.225	-.002	-.020	.004	.006	-.021
	44515.432	3.	.556	3.	-.228	-.003	-.009	.011	.007	-.023
	44515.579	2.	.536	2.	-.222	-.002	-.013	.004	.008	-.013
	44516.389	3.	.549	3.	-.208	.017	-.005	.007	.020	-.016
	44516.587	3.	.575	3.	-.198	.009	-.009	.006	.007	-.004
	44598.258	3.	.588	3.	-.220	.004	-.002	.011	.015	-.019
	44602.292	3.	.549	3.	-.201	.008	-.017	-.003	.007	-.021
	44603.299	3.	.498	3.	-.258	.026	-.015	.011	.037	-.004
	44838.549	3.	.564	2.	-.217	-.004	-.023	.001	.008	-.026
	44839.499	4.	.501	3.	-.252	.023	-.012	.008	.031	-.005
	44840.491	3.	.539	3.	-.244	.017	-.022	.001	.007	-.017
	44842.539	3.	.530	3.	-.221	.018	-.015	.006	.026	-.008
	44844.577	3.	.546	3.	-.223	.001	-.016	.003	.016	-.020

TABLE III (*continued*).

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
IC 2391-18									
44668.638	3.	-.096	3.	-.110	.033	-.009	-.005	.044	.012
44669.604	3.	-.091	3.	-.125	.038	-.012	.002	.043	.013
44670.550	3.	-.088	3.	-.114	.038	-.013	.004	.049	.017
44670.668	3.	-.093	3.	-.115	.038	-.012	.009	.054	.014
44671.552	2.	-.091	2.	-.105	.043	-.012	.011	.050	.021
44671.672	3.	-.095	3.	-.109	.036	-.011	-.005	.044	.013
44672.586	3.	-.095	3.	-.113	.044	-.007	.001	.051	.023
44672.704	3.	-.093	3.	-.122	.044	-.008	.002	.051	.017
44673.579	3.	-.096	3.	-.117	.035	-.005	.005	.045	.004
44673.705	3.	-.095	3.	-.117	.038	-.010	.005	.042	.014
44674.584	3.	-.092	3.	-.115	.034	-.012	-.003	.047	.015
44674.717	3.	-.089	3.	-.117	.045	-.006	.005	.051	.029
44675.530	3.	-.096	3.	-.122	.033	-.009	.007	.042	.012
44675.709	3.	-.093	3.	-.121	.037	-.007	.006	.044	.020
44676.539	2.	-.095	2.	-.118	.038	-.015	.006	.047	.025
44676.685	2.	-.093	2.	-.118	.041	-.020	-.005	.045	.016
44677.592	3.	-.100	3.	-.108	.038	-.008	.003	.048	.018
44678.665	3.	-.087	3.	-.124	.043	-.015	-.002	.036	.013
44679.542	3.	-.090	3.	-.120	.042	-.007	.005	.051	.019
44680.530	3.	-.098	3.	-.113	.030	-.017	-.001	.042	.016
44681.548	3.	-.091	3.	-.113	.049	-.011	.004	.058	.028
44681.652	3.	-.093	3.	-.113	.045	-.009	.002	.048	.015
44686.641	3.	-.097	2.	-.117	.039	-.012	.001	.046	.019
44686.664	3.	-.094	2.	-.114	.041	-.011	.001	.044	.010
44693.629	2.	-.091	2.	-.120	.040	-.011	.001	.043	.012
44709.582	3.	-.096	3.	-.113	.042	-.008	.006	.047	.018
44712.553	3.	-.095	3.	-.120	.036	-.011	-.004	.044	.012
44729.545	3.	-.096	3.	-.120	.036	-.009	.000	.042	.016
44730.523	3.	-.094	3.	-.122	.034	-.007	-.007	.043	.013
44730.587	3.	-.094	3.	-.113	.036	-.009	.000	.046	.010
44731.514	3.	-.093	2.	-.108	.042	-.010	.006	.048	.020
IC 2391-31									
44668.653	3.	-1.834	3.	-.646	.177	-.074	.063	.174	.188
44669.614	3.	-1.815	3.	-.652	.170	-.070	.064	.166	.176
44670.659	3.	-1.824	3.	-.637	.185	-.070	.068	.181	.195
44671.664	3.	-1.836	3.	-.644	.183	-.067	.061	.179	.191
44672.595	3.	-1.822	3.	-.645	.177	-.068	.067	.174	.186
44672.714	3.	-1.822	3.	-.651	.169	-.069	.068	.166	.187
44673.590	3.	-1.816	3.	-.637	.180	-.067	.073	.177	.192
44673.715	3.	-1.814	3.	-.633	.185	-.069	.068	.177	.191
44674.592	3.	-1.829	3.	-.640	.191	-.070	.069	.184	.194
44674.727	3.	-1.834	3.	-.640	.187	-.070	.066	.181	.194
44675.540	3.	-1.832	3.	-.634	.186	-.068	.074	.184	.195
44675.719	3.	-1.829	3.	-.645	.176	-.070	.066	.170	.194
44676.549	2.	-1.817	2.	-.649	.164	-.070	.057	.159	.169
44676.694	2.	-1.816	2.	-.639	.168	-.070	.065	.167	.182
44677.600	3.	-1.827	3.	-.636	.188	-.069	.073	.181	.196
44678.674	3.	-1.833	3.	-.641	.183	-.068	.066	.179	.199
44679.551	3.	-1.817	3.	-.652	.175	-.060	.064	.171	.181
44680.540	3.	-1.820	3.	-.631	.180	-.070	.064	.172	.189
44681.557	3.	-1.836	3.	-.644	.183	-.072	.063	.176	.193
44681.661	3.	-1.835	3.	-.644	.184	-.074	.065	.179	.197
44686.651	3.	-1.814	2.	-.647	.172	-.071	.071	.163	.168
44686.674	3.	-1.813	2.	-.639	.170	-.070	.063	.159	.177
44693.639	2.	-1.814	2.	-.635	.174	-.067	.067	.168	.183
44709.592	3.	-1.827	3.	-.644	.172	-.072	.066	.172	.182
44712.563	3.	-1.833	3.	-.642	.184	-.072	.063	.175	.192
44729.553	3.	-1.829	3.	-.639	.182	-.069	.069	.177	.192
44730.512	3.	-1.817	3.	-.649	.168	-.070	.067	.167	.186
44730.576	3.	-1.819	3.	-.644	.167	-.069	.066	.165	.175
44731.504	3.	-1.823	2.	-.636	.188	-.071	.067	.180	.190

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
IC 2602-27									
43926.753	4.	.235	4.	-.145	.078	-.025	.012	.074	.086
43928.815	4.	.230	3.	-.123	.089	-.017	.016	.097	.093
43930.796	4.	.230	4.	-.119	.091	-.024	.010	.084	.081
43931.761	4.	.227	3.	-.139	.082	-.015	.026	.083	.093
43933.698	3.	.232	3.	-.122	.091	-.012	.030	.089	.105
43934.720	3.	.206	3.	-.164	.091	-.024	.024	.081	.091
43934.874	3.	.207	3.	-.152	.091	-.018	.023	.082	.092
43935.749	4.	.225	4.	-.123	.083	-.020	.014	.083	.084
43936.674	4.	.225	4.	-.151	.088	-.014	.022	.083	.090
43939.701	4.	.203	3.	-.164	.097	-.018	.018	.101	.090
43940.700	4.	.237	4.	-.110	.101	-.012	.027	.095	.107
43941.699	4.	.220	4.	-.148	.086	-.016	.022	.081	.086
43942.714	4.	.225	3.	-.139	.088	-.021	.025	.085	.097
43973.671	3.	.234	3.	-.138	.088	-.017	.024	.086	.097
43976.795	4.	.237	3.	-.179	.096	-.032	.000	.069	.092
43977.534	4.	.228	3.	-.120	.098	-.018	.024	.101	.099
43978.621	4.	.236	3.	-.152	.079	-.023	.008	.069	.083
NGC 2516-15									
44655.538	2.	.581	2.	-.275	.094	-.005	.001	.091	.089
44655.596	3.	.577	3.	-.268	.091	-.004	.006	.088	.088
44655.639	3.	.579	3.	-.271	.092	-.006	-.005	.092	.094
44655.686	3.	.580	3.	-.268	.093	.000	-.002	.096	.101
44655.733	3.	.583	3.	-.262	.095	.002	.005	.089	.100
44656.535	3.	.569	3.	-.283	.092	-.004	.003	.092	.099
44656.591	3.	.572	3.	-.276	.100	-.003	.005	.096	.103
44656.635	3.	.568	3.	-.275	.092	-.003	.014	.098	.093
44656.676	3.	.577	3.	-.262	.099	-.004	.013	.093	.102
44659.598	3.	.574	3.	-.269	.099	.003	.007	.099	.101
44659.649	3.	.577	3.	-.273	.098	.001	.002	.095	.099
44659.698	3.	.575	3.	-.271	.094	-.004	.007	.093	.100
44660.543	2.	.566	2.	-.284	.095	.000	.001	.094	.099
44660.594	2.	.570	2.	-.287	.098	-.008	.003	.095	.093
44660.639	2.	.565	2.	-.284	.097	-.004	.006	.096	.094
44667.548	2.	.572	2.	-.281	.088	-.002	.002	.100	.093
44668.604	2.	.575	2.	-.262	.095	.000	.000	.090	.103
44681.576	3.	.574	3.	-.265	.096	-.002	.007	.101	.099
44686.549	3.	.573	2.	-.270	.094	-.006	.005	.100	.093
44695.593	2.	.571	3.	-.272	.101	-.002	-.004	.100	.090
44697.585	4.	.577	3.	-.268	.089	-.007	-.001	.091	.096
44710.530	2.	.578	2.	-.272	.099	-.004	.000	.098	.097
44991.776	1.	.577	2.	-.277	.097	.001	.003	.096	.095
44991.834	1.	.576	2.	-.277	.098	-.006	.009	.097	.093
44992.719	3.	.568	3.	-.283	.098	-.006	.004	.103	.095
44992.850	3.	.571	3.	-.278	.104	-.006	.008	.102	.103
44993.832	2.	.570	2.	-.280	.097	-.005	.001	.094	.090
44994.764	3.	.578	3.	-.266	.099	-.001	.005	.095	.100
44994.836	3.	.577	3.	-.267	.095	-.001	-.001	.095	.092
44995.698	3.	.573	3.	-.278	.100	-.003	.008	.100	.098
44995.819	3.	.577	3.	-.270	.094	-.007	.005	.090	.091
44996.708	3.	.572	3.	-.286	.090	-.001	.005	.092	.092
44996.840	3.	.568	3.	-.295	.089	-.009	-.001	.092	.089

TABLE III (*continued*).

HJD −2400000.		Q	m_V	P	U−B	V−B	B1−B	B2−B	V1−B	G−B
NGC 2516-38										
43527.754	1.21	2	9.516	2	1.567	.711	.936	1.429	1.395	1.853
43530.653	1.19	4	9.528	3	1.560	.724	.941	1.428	1.434	1.883
43533.615	1.23	3	9.528	3	1.563	.730	.943	1.443	1.435	1.871
43555.652	1.18	3	9.512	3	1.554	.703	.940	1.427	1.409	1.828
43573.582	1.17	3	9.493	3	1.565	.711	.936	1.435	1.409	1.859
43601.563	1.22	2	9.568	2	1.531	.708	.946	1.425	1.402	1.854
43607.519	1.19	1	9.498	1	1.559	.712	.937	1.420	1.396	1.840
43616.509	1.20	1	9.496	1	1.562	.697	.927	1.410	1.396	1.819
43927.585	1.18	3	9.531	3	1.567	.716	.962	1.437	1.429	1.853
43930.768	1.58	4	9.497	4	1.561	.700	.942	1.437	1.434	1.854
43931.715	1.36	4	9.516	3	1.551	.722	.956	1.446	1.437	1.883
43986.532	1.27	4	9.502	3	1.577	.720	.957	1.445	1.442	1.864
44220.802	1.17	3	9.515	3	1.553	.713	.952	1.444	1.418	1.867
44667.618	1.19	3	9.500	3	1.568	.701	.946	1.440	1.423	1.858
44667.630	1.20	3	9.507	3	1.558	.705	.946	1.436	1.427	1.852
44667.641	1.22	3	9.506	3	1.562	.701	.956	1.447	1.422	1.850
44686.587	1.21	3	9.499	2	1.550	.707	.946	1.428	1.408	1.843
44686.598	1.23	3	9.500	2	1.572	.711	.947	1.435	1.416	1.837
44686.608	1.25	3	9.492	2	1.565	.707	.941	1.429	1.416	1.855
44693.581	1.23	2	9.504	2	1.558	.711	.946	1.432	1.420	1.849
44693.591	1.25	2	9.504	2	1.550	.717	.942	1.440	1.419	1.853
44693.602	1.28	2	9.498	2	1.553	.704	.947	1.435	1.414	1.845
44694.645	1.43	3	9.504	3	1.568	.709	.947	1.436	1.417	1.850
44694.656	1.47	3	9.498	3	1.567	.711	.949	1.430	1.418	1.854
44694.665	1.53	3	9.500	3	1.567	.715	.946	1.439	1.422	1.857
44694.679	1.60	3	9.506	3	1.573	.704	.939	1.431	1.412	1.840
44695.620	1.35	2	9.511	3	1.571	.706	.939	1.436	1.408	1.851
44695.632	1.39	2	9.512	3	1.550	.705	.936	1.436	1.408	1.842
44695.643	1.43	2	9.508	3	1.555	.700	.946	1.428	1.412	1.845
44696.586	1.26	1	9.506	1	1.567	.719	.958	1.444	1.436	1.877
44696.597	1.29	3	9.510	3	1.562	.710	.947	1.431	1.406	1.847
44696.609	1.32	3	9.513	3	1.549	.714	.947	1.430	1.418	1.849
44697.646	1.47	4	9.515	3	1.578	.710	.947	1.439	1.419	1.855
44697.657	1.52	4	9.508	3	1.563	.712	.948	1.429	1.425	1.852
44697.668	1.58	4	9.508	3	1.564	.710	.947	1.431	1.410	1.843
44698.536	1.19	1	9.630	1	1.562	.707	.947	1.436	1.411	1.831
44698.547	1.20	1	9.648	1	1.567	.704	.951	1.433	1.414	1.826
44698.559	1.22	2	9.664	2	1.572	.707	.946	1.440	1.409	1.843
44731.533	1.39	3	9.510	2	1.548	.717	.939	1.437	1.421	1.858
44731.545	1.43	3	9.505	2	1.556	.714	.949	1.436	1.425	1.864
44731.557	1.49	3	9.507	2	1.560	.712	.941	1.440	1.423	1.863
44731.569	1.55	3	9.505	2	1.555	.710	.941	1.444	1.429	1.858
44958.793	1.17	4	9.499	4	1.560	.699	.939	1.426	1.404	1.839
44959.727	1.21	3	9.495	3	1.572	.699	.947	1.430	1.416	1.848
44960.764	1.17	3	9.499	3	1.559	.694	.941	1.418	1.404	1.841
44961.828	1.21	3	9.500	2	1.554	.698	.951	1.428	1.416	1.853
44962.816	1.20	3	9.496	3	1.563	.705	.950	1.436	1.410	1.844
44963.795	1.18	3	9.504	3	1.558	.706	.954	1.440	1.413	1.844
44964.821	1.21	3	9.509	3	1.562	.716	.949	1.442	1.424	1.851
44965.782	1.18	3	9.504	3	1.551	.701	.945	1.434	1.422	1.853
44966.781	1.18	4	9.523	3	1.568	.709	.952	1.443	1.423	1.855
44967.796	1.19	3	9.496	3	1.571	.693	.944	1.426	1.404	1.845
44968.764	1.17	3	9.504	3	1.556	.702	.950	1.430	1.413	1.845
44969.762	1.17	3	9.506	3	1.572	.707	.946	1.427	1.408	1.845
44970.748	1.17	1	9.504	1	1.558	.704	.938	1.429	1.413	1.844
44971.762	1.18	3	9.503	3	1.557	.701	.940	1.424	1.401	1.840
44972.751	1.17	1	9.492	1	1.559	.694	.942	1.413	1.408	1.842
44973.667	1.24	3	9.498	3	1.559	.698	.938	1.428	1.405	1.835
44974.866	1.38	3	9.541	3	1.558	.695	.941	1.415	1.396	1.813
44975.780	1.20	1	9.489	1	1.605	.688	.956	1.420	1.408	1.825
44976.749	1.18	3	9.492	3	1.578	.695	.938	1.415	1.412	1.826
44978.753	1.18	3	9.500	3	1.593	.706	.946	1.409	1.419	1.838
44979.753	1.18	3	9.511	3	1.547	.707	.957	1.401	1.431	1.839
44980.767	1.20	3	9.507	3	1.575	.714	.958	1.437	1.419	1.846
44981.752	1.19	3	9.498	3	1.554	.711	.950	1.438	1.416	1.830
44982.767	1.20	3	9.596	3	1.563	.705	.949	1.439	1.417	1.853
44982.794	1.24	3	9.536	3	1.572	.705	.950	1.428	1.411	1.844
44982.803	1.26	3	9.513	3	1.546	.698	.946	1.418	1.411	1.842
44982.814	1.29	3	9.510	3	1.575	.709	.950	1.434	1.409	1.850
44982.822	1.31	3	9.499	3	1.570	.707	.958	1.432	1.409	1.853
44982.833	1.34	3	9.501	3	1.557	.702	.957	1.430	1.406	1.836
44982.842	1.37	3	9.502	3	1.570	.704	.942	1.432	1.406	1.839
44983.758	1.20	3	9.505	3	1.594	.701	.954	1.440	1.411	1.841
44984.876	1.55	2	9.508	2	1.567	.706	.946	1.441	1.431	1.852
44985.733	1.18	3	9.489	3	1.569	.699	.957	1.455	1.421	1.836
44985.862	1.49	3	9.585	3	1.566	.705	.944	1.424	1.418	1.836
44985.877	1.57	2	9.614	2	1.526	.699	.934	1.414	1.406	1.833
44985.881	1.60	2	9.612	2	1.549	.697	.946	1.405	1.399	1.820
44985.884	1.61	1	9.617	1	1.508	.699	.941	1.414	1.396	1.846
44985.887	1.63	1	9.607	1	1.531	.713	.928	1.462	1.433	1.864
44985.890	1.65	1	9.613	1	1.552	.719	.936	1.425	1.430	1.834
45000.591	1.25	3	9.499	3	1.561	.706	.945	1.433	1.434	1.842
45000.596	1.24	3	9.499	3	1.547	.704	.943	1.436	1.418	1.868
45000.602	1.23	3	9.500	3	1.556	.694	.938	1.425	1.407	1.835
45001.572	1.28	2	9.515	2	1.570	.705	.958	1.436	1.412	1.834
45001.578	1.27	2	9.507	2	1.547	.686	.942	1.426	1.410	1.824
45001.583	1.26	2	9.515	2	1.590	.712	.952	1.446	1.426	1.844
45001.588	1.25	2	9.516	2	1.573	.702	.946	1.428	1.397	1.831
45001.593	1.24	2	9.514	2	1.579	.707	.961	1.418	1.413	1.841
45001.599	1.23	2	9.506	2	1.568	.696	.948	1.426	1.414	1.834
45001.604	1.22	2	9.498	2	1.580	.689	.954	1.430	1.401	1.863
45001.609	1.21	3	9.499	3	1.575	.693	.953	1.434	1.397	1.848
45001.615	1.20	3	9.501	3	1.563	.697	.943	1.423	1.412	1.844
45001.620	1.20	3	9.499	3	1.552	.693	.943	1.423	1.410	1.842
45001.625	1.19	3	9.500	3	1.562	.698	.950	1.427	1.412	1.839
45001.630	1.19	3	9.509	3	1.563	.710	.933	1.432	1.423	1.832
45001.635	1.18	3	9.503	3	1.579	.704	.949	1.424	1.408	1.835
45001.641	1.18	3	9.507	3	1.544	.707	.946	1.432	1.424	1.845
45001.646	1.18	3	9.499	3	1.560	.703	.957	1.436	1.434	1.865
45001.651	1.18	3	9.511	3	1.578	.711	.956	1.441	1.420	1.856
45001.656	1.17	3	9.514	3	1.542	.714	.946	1.446	1.418	1.848
45001.662	1.17	3	9.510	3	1.581	.714	.949	1.422	1.431	1.861
45095.502	1.28	3	9.557	4	1.584	.696	.946	1.432	1.412	1.852
45382.542	1.00	1	9.489	1						
45382.653	1.00	1	9.492	1						
45382.767	1.00	1	9.638	1						
45382.783	1.00	1	9.639	1						
45382.795	1.00	1	9.633	1						
45382.831	1.00	1	9.568	1						
45382.840	1.00	1	9.541	1						
45382.847	1.00	1	9.536	1						
45382.856	1.00	1	9.508	1						
45382.863	1.00	1	9.501	1						
45382.871	1.00	1	9.497	1						
45382.878	1.00	1	9.502	1						
45383.536	1.00	1	9.495	1						
45383.653	1.00	1	9.492	1						
45383.736	1.00	1	9.496	1						
45383.826	1.00	1	9.496	1						
45384.545	1.00	1	9.497	1						
45384.618	1.00	1	9.499	1						
45384.750	1.00	1	9.499	1						
45385.535	1.00	1	9.498	1						
45385.632	1.00	1	9.499	1						
45385.708	1.00	1	9.503	1						
45385.830	1.00	1	9.497	1						
45385.886	1.00	1	9.532	1						
45385.891	1.00	1	9.553	1						

TABLE III (*continued*).

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
NGC 2516-38									
45385.897 1.00	1	9.544	1						
45386.552 1.00	1	9.497	1						
45386.702 1.00	1	9.500	1						
45387.548 1.00	1	9.656	1						
45387.574 1.00	1	9.619	1						
45387.576 1.00	1	9.597	1						
45387.586 1.00	1	9.575	1						
45387.595 1.00	1	9.560	1						
45387.613 1.00	1	9.515	1						
45387.621 1.00	1	9.503	1						
45387.628 1.00	1	9.494	1						
45387.684 1.00	1	9.492	1						
45388.717 1.00	1	9.492	1						
45389.572 1.00	1	9.490	1						
45412.538 1.00	1	9.516	1						
45413.517 1.00	1	9.513	1						
45414.514 1.00	1	9.629	1						
45414.535 1.00	1	9.648	1						
45414.558 1.00	1	9.621	1						
45414.577 1.00	1	9.560	1						
45414.591 1.00	1	9.533	1						
45452.643 1.88	1	9.626	1						
45457.463 1.20	1	9.525	1						
45457.468 1.20	1	9.522	1						
45457.474 1.21	1	9.512	1						
45457.479 1.22	1	9.511	1						
45457.485 1.23	1	9.508	1						
45457.490 1.24	1	9.498	1						
45457.495 1.25	1	9.505	1						
45457.501 1.26	1	9.507	1						
NGC 2516-127									
44655.559	3.	1.891	3.	-.103	-.054	.031	-.041	-.050	-.063
44655.613	3.	1.904	3.	-.090	-.048	.034	-.035	-.044	-.064
44655.657	3.	1.897	3.	-.088	-.045	.026	-.042	-.043	-.068
44655.704	3.	1.901	3.	-.089	-.037	.032	-.023	-.043	-.066
44655.757	3.	1.896	3.	-.088	-.043	.034	-.037	-.040	-.063
44656.555	3.	1.888	3.	-.127	-.055	.033	-.032	-.049	-.079
44656.609	3.	1.886	3.	-.138	-.052	.035	-.035	-.055	-.072
44656.653	3.	1.876	3.	-.131	-.060	.032	-.037	-.051	-.077
44656.692	3.	1.872	3.	-.139	-.063	.034	-.031	-.064	-.076
44659.617	3.	1.881	3.	-.087	-.050	.037	-.038	-.042	-.063
44659.667	3.	1.882	3.	-.089	-.051	.036	-.040	-.046	-.076
44659.720	3.	1.885	3.	-.087	-.052	.035	-.041	-.048	-.071
44660.563	2.	1.863	2.	-.154	-.062	.029	-.038	-.053	-.085
44660.612	2.	1.869	2.	-.146	-.063	.030	-.034	-.053	-.077
44660.657	2.	1.870	2.	-.140	-.063	.031	-.040	-.057	-.080
44667.563	3.	1.876	3.	-.146	-.063	.030	-.044	-.046	-.084
44681.589	3.	1.891	3.	-.089	-.048	.034	-.041	-.041	-.073
44686.620	3.	1.884	2.	-.096	-.049	.032	-.033	-.050	-.072
44693.614	2.	1.887	2.	-.101	-.051	.035	-.032	-.048	-.069
44695.605	2.	1.884	3.	-.092	-.050	.029	-.048	-.045	-.071
44696.573	1.	1.873	1.	-.146	-.062	.029	-.034	-.056	-.080
44698.614	3.	1.865	3.	-.144	-.063	.035	-.030	-.054	-.073
44973.650	3.	1.887	3.	-.131	-.056	.027	-.031	-.049	-.070
44973.757	3.	1.879	3.	-.144	-.059	.037	-.032	-.059	-.076
44974.766	3.	1.881	3.	-.086	-.052	.035	-.037	-.049	-.072
44975.693	3.	1.871	3.	-.150	-.063	.029	-.042	-.059	-.082
44980.754	3.	1.896	3.	-.103	-.049	.033	-.040	-.046	-.063
44980.836	3.	1.890	3.	-.117	-.057	.029	-.039	-.049	-.079
44981.769	3.	1.890	3.	-.096	-.049	.036	-.036	-.051	-.075
44981.845	3.	1.887	3.	-.096	-.052	.032	-.038	-.047	-.064
44982.752	3.	1.881	3.	-.129	-.060	.033	-.031	-.054	-.073

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
44983.770	3.	1.885	3.	-.087	-.047	.033	-.036	-.049	-.063
44983.848	3.	1.880	3.	-.087	-.051	.033	-.045	-.043	-.065
44985.744	3.	1.884	3.	-.093	-.049	.033	-.045	-.045	-.072
44985.846	3.	1.882	3.	-.085	-.050	.031	-.038	-.046	-.070
44986.730	3.	1.870	3.	-.161	-.058	.033	-.032	-.057	-.088
44986.843	3.	1.868	3.	-.140	-.060	.030	-.039	-.055	-.070
44987.741	3.	1.890	2.	-.085	-.043	.037	-.032	-.040	-.065
44987.844	3.	1.890	2.	-.100	-.054	.035	-.035	-.046	-.073
44988.723	2.	1.873	2.	-.136	-.063	.031	-.035	-.053	-.076
44988.844	2.	1.883	2.	-.127	-.055	.035	-.038	-.055	-.071
44990.801	2.	1.889	2.	-.099	-.054	.022	-.045	-.044	-.075
NGC 6475-26									
43972.895	2.	-.667	2.	-.776	.146	-.049	.057	.138	.166
43972.902	2.	-.667	2.	-.763	.147	-.052	.052	.142	.156
43973.890	3.	-.660	3.	-.764	.131	-.062	.051	.117	.144
43973.896	3.	-.657	3.	-.767	.139	-.057	.056	.136	.149
43975.882	3.	-.666	2.	-.771	.143	-.059	.063	.141	.168
43975.889	3.	-.666	2.	-.776	.134	-.054	.049	.142	.160
43976.887	4.	-.661	3.	-.784	.139	-.054	.043	.130	.157
43976.895	4.	-.666	3.	-.785	.130	-.075	.035	.131	.135
43977.874	4.	-.659	3.	-.777	.165	-.048	.060	.156	.164
43978.707	4.	-.661	3.	-.766	.149	-.050	.073	.128	.171
43978.717	4.	-.670	3.	-.775	.142	-.056	.069	.128	.165
43978.878	4.	-.666	3.	-.776	.140	-.054	.064	.146	.173
43978.886	4.	-.668	3.	-.770	.138	-.052	.066	.140	.162
43980.702	1.	-.658	1.	-.783	.134	-.060	.064	.125	.159
43980.711	1.	-.647	1.	-.764	.160	-.049	.056	.131	.167
43981.783	3.	-.665	3.	-.785	.146	-.053	.075	.135	.161
43981.791	3.	-.673	3.	-.793	.135	-.052	.076	.129	.159
43984.775	3.	-.670	3.	-.796	.137	-.055	.065	.129	.157
43984.781	3.	-.665	3.	-.781	.146	-.053	.069	.135	.167
43985.762	3.	-.668	3.	-.764	.153	-.049	.055	.152	.177
43985.769	3.	-.666	3.	-.761	.152	-.050	.052	.138	.169
43986.858	4.	-.654	3.	-.785	.147	-.051	.049	.139	.158
43989.798	3.	-.651	3.	-.796	.142	-.071	.034	.119	.154
44053.709	3.	-.663	3.	-.784	.146	-.043	.057	.137	.169
44053.717	3.	-.651	3.	-.784	.153	-.049	.058	.135	.162
44061.622	3.	-.660	3.	-.784	.140	-.058	.052	.135	.164
44061.629	3.	-.660	3.	-.786	.142	-.053	.052	.136	.162
44067.633	3.	-.670	3.	-.802	.135	-.062	.052	.150	.159
44067.640	3.	-.663	3.	-.807	.141	-.060	.045	.133	.161
44069.665	3.	-.663	3.	-.789	.138	-.064	.044	.134	.162
44069.673	3.	-.658	3.	-.789	.140	-.066	.048	.123	.172
44107.555	3.	-.665	3.	-.788	.144	-.062	.045	.129	.169
44107.561	3.	-.667	3.	-.797	.140	-.056	.050	.124	.175
44419.720	3.	-.661	3.	-.777	.143	-.058	.059	.139	.171
44419.726	3.	-.663	3.	-.777	.140	-.063	.046	.135	.164
44450.534	2.	-.674	2.	-.771	.134	-.062	.058	.118	.146
44458.508	3.	-.670	3.	-.777	.146	-.053	.061	.134	.165
44458.513	3.	-.671	3.	-.783	.142	-.057	.052	.142	.160
44458.645	3.	-.677	3.	-.779	.142	-.056	.070	.137	.175
44458.650	3.	-.678	3.	-.774	.141	-.054	.065	.139	.171
44459.499	3.	-.666	3.	-.779	.137	-.061	.050	.118	.153
44459.504	3.	-.670	3.	-.782	.139	-.057	.052	.121	.159
44459.659	3.	-.666	3.	-.772	.140	-.057	.062	.133	.163
44459.665	3.	-.661	3.	-.779	.136	-.063	.051	.132	.153
44460.503	3.	-.676	3.	-.774	.141	-.045	.063	.138	.157
44460.514	3.	-.678	3.	-.782	.136	-.057	.054	.132	.162
44460.641	3.	-.667	3.	-.787	.133	-.063	.058	.138	.161
44460.647	3.	-.668	3.	-.789	.126	-.060	.057	.130	.158
44462.636	3.	-.668	3.	-.795	.139	-.054	.052	.125	.157
44462.642	3.	-.670	3.	-.795	.134	-.057	.050	.125	.162
44463.626	4.	-.670	4.	-.773	.144	-.058	.062	.142	.170

TABLE III *(continued)*.

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
44463.631	4.	-.665	4.	-.782	.142	-.056	.052	.139	.165
44464.574	3.	-.663	3.	-.792	.126	-.059	.040	.118	.145
44464.579	3.	-.659	3.	-.785	.129	-.062	.039	.123	.146
44468.519	4.	-.667	4.	-.776	.142	-.062	.045	.137	.164
44468.524	4.	-.668	4.	-.777	.140	-.059	.052	.134	.171
44469.524	3.	-.658	3.	-.772	.143	-.047	.060	.126	.158
44469.529	3.	-.659	3.	-.786	.139	-.052	.050	.127	.159
44470.517	4.	-.666	3.	-.785	.140	-.050	.063	.138	.160
44470.522	4.	-.666	3.	-.786	.141	-.056	.060	.135	.163
44471.533	3.	-.661	3.	-.773	.145	-.051	.059	.136	.170
44471.537	3.	-.661	3.	-.775	.138	-.056	.057	.124	.164
44478.512	3.	-.669	3.	-.781	.141	-.061	.047	.127	.172
44479.564	3.	-.658	3.	-.773	.138	-.056	.052	.126	.171
44808.564	3.	-.671	3.	-.778	.137	-.055	.058	.133	.164
44808.586	3.	-.672	3.	-.774	.136	-.056	.054	.131	.164
44808.669	3.	-.666	3.	-.778	.137	-.055	.057	.132	.166
44808.692	3.	-.666	3.	-.777	.136	-.054	.055	.133	.169
44810.567	3.	-.661	3.	-.781	.140	-.054	.058	.129	.157
44810.588	3.	-.664	3.	-.785	.144	-.055	.058	.135	.159
44810.656	3.	-.666	3.	-.787	.139	-.056	.055	.134	.166
44810.675	3.	-.666	3.	-.791	.139	-.052	.054	.135	.159
44825.508	2.	-.661	3.	-.782	.138	-.058	.055	.133	.159
44825.533	2.	-.664	3.	-.782	.141	-.056	.063	.139	.169
44825.650	2.	-.663	3.	-.785	.139	-.055	.059	.134	.163
44825.671	2.	-.669	3.	-.779	.136	-.053	.057	.130	.164
44829.587	3.	-.671	3.	-.778	.135	-.054	.060	.134	.168
44829.600	3.	-.662	3.	-.782	.142	-.062	.058	.130	.163
NGC 6475-55									
43972.897	2.	.423	2.	-.105	.040	-.006	.011	.043	.032
43973.892	3.	.420	3.	-.092	.038	-.016	.022	.045	.023
43975.884	3.	.417	2.	-.106	.044	-.006	.011	.042	.045
43976.890	4.	.419	3.	-.110	.032	-.014	-.002	.045	.024
43978.710	4.	.415	3.	-.112	.045	-.014	.021	.044	.046
43978.880	4.	.417	3.	-.114	.050	-.013	.027	.056	.054
43981.785	3.	.419	3.	-.113	.037	-.015	.037	.031	.036
43984.777	3.	.405	3.	-.107	.025	-.019	.019	.032	.018
43985.764	3.	.420	3.	-.098	.054	.002	.012	.054	.047
43986.853	4.	.419	3.	-.106	.031	-.014	.010	.044	.022
43989.792	3.	.425	3.	-.125	.030	-.026	.006	.032	.023
44053.711	3.	.427	3.	-.127	.053	-.011	.006	.037	.035
44061.624	3.	.416	3.	-.112	.039	-.010	.020	.050	.026
44067.635	3.	.426	3.	-.121	.033	-.007	.006	.036	.043
44069.668	3.	.423	3.	-.107	.033	-.017	-.002	.030	.040
44107.557	3.	.422	3.	-.108	.039	-.018	-.003	.027	.035
44419.722	3.	.417	3.	-.106	.033	-.019	.006	.037	.032
44450.572	3.	.410	3.	-.111	.033	-.021	.012	.034	.029
44458.509	3.	.417	3.	-.108	.039	-.009	.012	.034	.040
44458.646	3.	.411	3.	-.108	.041	-.007	.026	.034	.046
44459.501	3.	.409	3.	-.110	.036	-.012	.012	.039	.032
44459.661	3.	.405	3.	-.111	.026	-.020	.004	.041	.025
44460.506	3.	.405	3.	-.099	.027	-.004	.015	.032	.025
44460.643	3.	.424	3.	-.120	.032	-.025	.009	.031	.026
44462.638	3.	.420	3.	-.117	.034	-.015	-.004	.031	.040
44463.628	4.	.416	4.	-.116	.045	-.014	.018	.047	.037
44464.575	3.	.419	3.	-.122	.022	-.021	.012	.021	.021
44468.521	4.	.418	4.	-.112	.032	-.018	-.003	.038	.031
44469.526	3.	.412	3.	-.106	.040	.000	.010	.040	.039
44470.518	4.	.420	3.	-.113	.039	-.016	.017	.039	.039
44471.534	3.	.413	3.	-.108	.034	-.006	.014	.035	.031

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
NGC 6475-59									
41149.637	4.	.732	3.	-.167	.023	-.014	.008	.022	.017
41181.603	3.	.710	3.	-.207	.020	-.004	.012	.023	.015
43972.900	2.	.727	2.	-.171	.036	-.007	.005	.041	.023
43973.895	3.	.727	3.	-.162	.023	-.007	.026	.028	.013
43975.887	3.	.722	2.	-.194	.022	-.011	.010	.037	.024
43976.893	4.	.727	3.	-.165	.024	-.019	-.012	.022	.023
43978.715	4.	.718	3.	-.179	.036	-.008	.014	.028	.022
43978.884	4.	.719	3.	-.146	.034	-.009	.023	.042	.031
43980.709	1.	.735	1.	-.167	.025	-.011	.001	.025	.013
43981.789	3.	.712	3.	-.202	.018	-.015	.022	.032	.023
43984.780	3.	.711	3.	-.147	.024	-.008	.023	.036	.019
43985.767	3.	.710	3.	-.203	.031	.007	.013	.041	.018
43986.857	4.	.733	3.	-.149	.041	.002	.000	.055	.027
43989.796	3.	.714	3.	-.257	.020	-.024	-.011	.020	.004
44053.715	3.	.742	3.	-.190	.037	-.005	.008	.028	.025
44061.627	3.	.718	3.	-.205	.027	-.008	.005	.037	.005
44067.638	3.	.716	3.	-.255	.023	-.014	-.002	.029	-.004
44069.671	3.	.709	3.	-.251	.032	-.003	.006	.036	.011
44107.560	3.	.727	3.	-.160	.019	-.019	-.008	.015	.018
44419.725	3.	.720	3.	-.208	.025	-.022	.007	.030	.010
44450.568	3.	.729	3.	-.152	.018	-.011	.010	.020	.021
44458.512	3.	.728	3.	-.185	.021	-.013	.006	.024	.015
44458.649	3.	.718	3.	-.209	.023	-.019	.007	.017	.016
44459.503	3.	.711	3.	-.181	.021	-.022	.007	.034	.011
44459.663	3.	.716	3.	-.147	.030	-.012	.008	.039	.019
44460.511	3.	.711	3.	-.177	.019	-.009	.009	.026	.011
44460.512	3.	.724	3.	-.194	.010	-.013	-.004	.014	-.008
44460.646	3.	.714	3.	-.207	.018	-.014	.018	.031	.015
44462.640	3.	.710	3.	-.228	.017	-.018	.001	.007	.007
44463.630	4.	.727	4.	-.135	.033	-.010	.009	.039	.039
44464.578	3.	.717	3.	-.225	.029	-.013	.020	.029	.004
44468.523	4.	.709	4.	-.220	.028	-.005	.005	.038	.013
44469.528	3.	.719	3.	-.132	.037	.001	.012	.038	.042
44470.520	4.	.708	3.	-.248	.026	-.004	.016	.036	.006
44471.536	3.	.727	3.	-.135	.039	-.013	.015	.032	.027

TABLE III (continued).

HJD -2400000.	Q	m_V	P	U-B	V-B	B1-B	B2-B	V1-B	G-B
NGC 6475-88									
43972.904	2.	-.134	2.	.018	.017	.005	-.002	.031	-.005
43973.898	3.	-.114	3.	.058	.010	-.011	.001	.019	-.012
43975.890	3.	-.153	2.	-.021	-.013	-.006	-.007	.004	-.028
43976.896	4.	-.142	3.	-.024	-.010	.005	-.021	.008	-.042
43977.876	4.	-.125	3.	.013	.008	.001	-.004	.002	-.016
43978.719	4.	-.127	3.	.038	.008	.010	.000	.009	-.006
43978.887	4.	-.125	3.	.026	-.008	-.011	-.003	.008	-.017
43980.713	1.	-.121	1.	-.010	.015	-.003	-.002	.012	-.015
43981.792	3.	-.125	3.	.011	.025	-.009	.015	.013	-.016
43984.783	3.	-.149	3.	-.030	-.005	-.002	-.003	-.001	-.035
43985.771	3.	-.153	3.	-.016	-.010	-.006	-.014	-.012	-.032
43986.860	4.	-.128	3.	.014	-.005	.010	-.012	.009	-.025
43989.801	3.	-.137	3.	-.019	.002	-.015	-.013	.008	.000
44053.718	3.	-.120	3.	.028	.009	-.001	-.005	.002	-.018
44061.630	3.	-.135	3.	.010	.022	.002	.003	.025	-.004
44067.641	3.	-.119	3.	.016	-.013	-.003	-.015	.001	-.032
44069.674	3.	-.143	3.	-.008	.000	-.003	-.011	.013	-.004
44107.563	3.	-.122	3.	.056	.011	-.001	.002	.009	-.003
44419.728	3.	-.125	3.	.046	.009	.002	.006	.022	-.004
44458.514	3.	-.144	3.	-.022	-.006	-.002	-.011	-.001	-.038
44458.651	3.	-.146	3.	-.006	-.005	.004	.002	.001	-.031
44459.506	3.	-.135	3.	.007	-.002	.002	-.001	-.003	-.026
44459.665	3.	-.119	3.	.026	-.002	-.005	-.003	.003	-.040
44460.515	3.	-.139	3.	.028	-.008	.008	.000	.005	-.013
44460.648	3.	-.118	3.	.014	-.007	-.006	-.005	.003	-.026
44462.643	3.	-.142	3.	-.002	.009	.000	-.012	.013	-.011
44463.633	4.	-.129	4.	.039	.015	-.002	-.001	.015	-.001
44464.580	3.	-.119	3.	.025	.001	-.004	-.007	.014	-.026
44468.525	4.	-.124	4.	.028	-.003	.005	-.013	.004	-.015
44469.530	3.	-.120	3.	.031	.005	.011	-.002	-.002	-.021
44470.523	4.	-.139	3.	-.009	.001	.003	.001	.006	-.026
44471.539	3.	-.132	3.	-.001	.018	.001	-.003	.019	-.014
44478.513	3.	-.119	3.	.022	-.003	-.005	-.012	-.012	-.020
44479.565	3.	-.143	3.	-.008	.002	-.001	-.007	.006	-.018
44808.568	3.	-.144	3.	-.012	.007	.004	.003	.017	-.016
44808.575	3.	-.142	3.	-.018	.006	-.001	.002	.012	-.012
44808.582	3.	-.147	3.	-.013	-.002	-.005	-.008	.002	-.013
44808.673	3.	-.146	3.	-.017	-.002	-.004	-.007	.008	-.023
44808.680	3.	-.145	3.	-.019	-.001	-.004	-.002	.009	-.020
44808.686	3.	-.146	3.	-.013	.002	.001	-.003	.011	-.015
44810.570	3.	-.133	3.	.011	.009	-.003	-.006	.010	-.022
44810.578	3.	-.138	3.	.015	.012	.001	-.004	.015	-.013
44810.585	3.	-.138	3.	.007	.015	-.001	.002	.020	-.008
44810.660	3.	-.138	3.	.011	.012	.002	-.002	.021	-.005
44810.665	3.	-.136	3.	.011	.013	.000	-.005	.021	-.008
44810.672	3.	-.139	3.	.015	.012	.003	-.006	.021	-.012
44825.525	2.	-.119	3.	.036	-.005	-.004	-.005	.002	-.026
44825.530	2.	-.120	3.	.028	.001	.004	-.002	.007	-.014
44825.655	2.	-.121	3.	.029	-.006	.004	.000	.001	-.016
44825.662	2.	-.119	3.	.025	-.002	.002	-.004	.006	-.019
44825.667	2.	-.121	3.	.035	-.003	.001	-.002	.006	-.013
44829.589	3.	-.125	3.	.035	.006	-.002	.000	.016	-.007
44829.593	3.	-.125	3.	.035	.006	-.005	.005	.012	.001
44829.597	3.	-.121	3.	.036	.007	-.008	-.004	.010	-.005

TABLE IVa. — *New measures of some stars. The listed values have undergone only a preliminary reduction and must be considered as provisional. However, their precision is only slightly poorer than for the values listed in table III.*

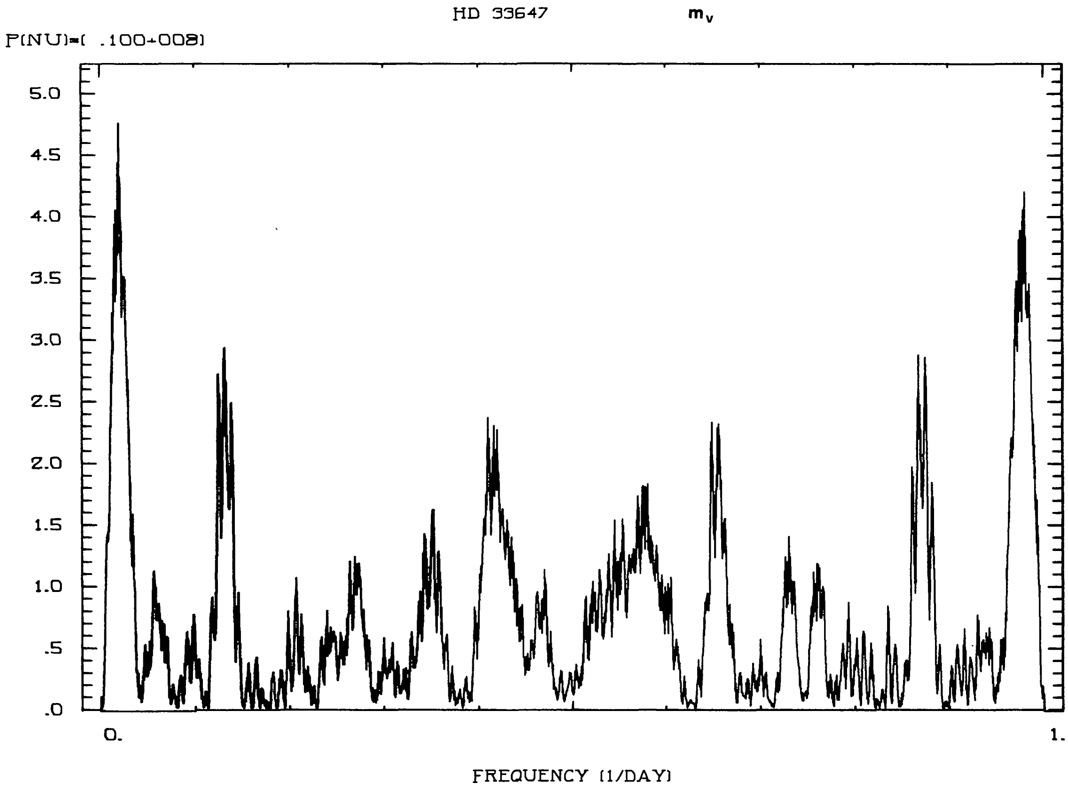
Stars	HJD-2445000	m_v	[U-B]	[V-B]	Remark
HD 37210	313.665	8.116	.976	1.063	HD 35640 and HD 36151
	313.717	8.115	.972	1.068	were used as reference
	313.766	8.114	.973	1.065	stars, and their well-
	314.666	8.118	.952	1.066	known mean magnitude
	314.713	8.115	.952	1.060	and colours were added
	314.765	8.116	.948	1.062	to the differential values
	315.694	8.117	.929	1.050	in order to obtain the
	322.675	8.111	.965	1.074	tabulated ones.
	330.698	8.101	.941	1.062	
	331.598	8.092	.946	1.069	
	332.633	8.089	.939	1.070	
	332.754	8.086	.951	1.061	
HD 147010	450.900	7.353	1.080	.801	Absolute measures, but
	483.654	7.366	1.074	.796	standard stars close in
	483.705	7.366	1.085	.793	time and at same airmass.
	483.790	7.373	1.073	.793	
	484.682	7.403	1.080	.770	
	484.825	7.413	1.068	.774	
	485.737	7.370	1.080	.785	
	485.834	7.369	1.064	.788	
NGC 6475-59	484.733	7.232	1.158	.979	idem
	484.851	7.236	1.166	.984	
	498.691	7.245	1.206	.985	
	498.832	7.252	1.244	.981	
	499.696	7.268	1.263	.996	
	499.831	7.261	1.240	.980	
	500.675	7.254	1.223	.985	
NGC 6475-88	484.730	6.403	1.429	.952	idem
	484.848	6.408	1.433	.956	
	498.687	6.408	1.450	.967	
	498.829	6.415	1.453	.969	
	499.694	6.400	1.405	.965	
	499.828	6.397	1.403	.958	
	500.672	6.389	1.388	.960	

TABLE IVb. — *Old differential measures of NGC 2516-c. These were done differentially with generally one comparison star only, which was No 126 or No 129 in NGC 2516, so that they are not so precise as the later measures of table III. The sequence of measurements is indicated,* 1 *denoting the comparison star NGC 2516-126,* 2 *denoting the other comparison star NGC 2516-129 and V the variable. The differential magnitudes and indices are simply given by* $m = m(\upsilon) - m(1)$ *in the case of one comparison star, and* $m = m(\upsilon) - 1/2((m(1) + m(2))$ *with two comparison stars.*

HJD - 2442000	Q	m_v	P	U-B	V-B	B1-B	B2-B	V1-B	G-B	Sequence
815.579	2	1.678	3	-.327	-.057	.018	-.032	-.045	-.062	V2
1164.689	3	1.709	3	-.274	-.026	.015	-.050	-.012	-.045	V2
1530.660	4	1.700	3	-.228	-.020	.037	-.034	-.010	-.027	2V
1533.605	3	1.887	3	-.128	-.050	.032	-.035	-.056	-.097	2V1
1558.683	2	2.060	2	.016	-.095	.036	-.051	-.090	-.114	1V
1573.590	3	2.059	3	.052	-.096	.050	-.048	-.094	-.117	1V
1601.555	2	2.066	2	.074	-.098	.039	-.071	-.091	-.109	V1
1616.535	2	1.873	2	-.144	-.071	.034	-.043	-.049	-.088	1V2
1927.600	3	1.727	3	-.239	-.011	.025	-.024	-.013	-.016	2V
1928.780	4	1.709	3	-.263	-.025	.023	-.039	-.023	-.045	2V
1931.728	4	1.707	3	-.293	-.032	.016	-.037	-.030	-.037	2V
1936.697	4	1.705	4	-.233	-.020	.024	-.032	-.021	-.030	2V
1972.499	2	1.711	2	-.239	-.020	.025	-.018	-.021	-.040	V2
1978.525	4	1.704	3	-.251	-.033	.015	-.008	-.014	-.040	V2
2220.782	3	1.709	3	-.250	-.026	.008	-.032	-.030	-.041	V2

TABLE V. — *Mean magnitudes and colours at the comparison stars. The spectral type is taken from Jaschek (1978) or from the Bright Star Catalogue.*

Cluster No	HD	DM	Spectrum	Q	σ_v	m_v	P	σ_c	U-B	V-B	B1-B	B2-B	V1-B	G-B
	33647	+ 0°974	B9Vn Mn	14	.005	6.669	16	.005	1.032	1.048	.835	1.539	1.740	2.242
	35640	- 5°1247	B9.5Vn	65	.005	6.226	68	.005	1.208	1.020	.849	1.529	1.711	2.220
NGC 2516-126	65950	-60°967	B9III	107	.006	6.857	106	.005	1.050	.962	.833	1.539	1.661	2.140
NGC 2516-129	-	-60°982	B9.5IV	138	.009	7.224	139	.005	1.382	.892	.848	1.527	1.595	2.054
IC 2391-23	74275	-52°1587	A0V	91	.005	7.265	95	.005	1.365	.968	.878	1.504	1.660	2.163
IC 2391-29	74516	-52°1601	A0V	118	.005	7.364	123	.004	1.439	.941	.890	1.491	1.635	2.134
IC 2602-48	93540	-63°1646	B6V	26	.005	5.318	23	.005	.828	1.079	.823	1.561	1.772	2.289
IC 2602-49	93549	-63°1649	B7IV	24	.005	5.229	22	.005	.830	1.055	.829	1.555	1.752	2.254
	142165	-24°12354	B6IVn	31	.004	5.361	30	.004	.906	.975	.842	1.533	1.666	2.159
	142445	-25°11190	A3V	34	.005	5.615	34	.004	1.669	.788	.923	1.458	1.492	1.940
	146284	-23°12816	B8IV	55	.004	6.670	55	.004	1.278	.783	.876	1.495	1.491	1.921
	147703	-26°11327	B9Vn	58	.005	7.458	58	.005	1.464	.759	.898	1.478	1.468	1.897
NGC 6475-42	162515	-34°12187	B9.5V	81	.004	6.535	79	.004	1.417	.960	.860	1.520	1.656	2.142
	213801	+38°4797	B9V	20	.009	8.156	20	.004	1.002	1.005	.845	1.533	1.703	2.198



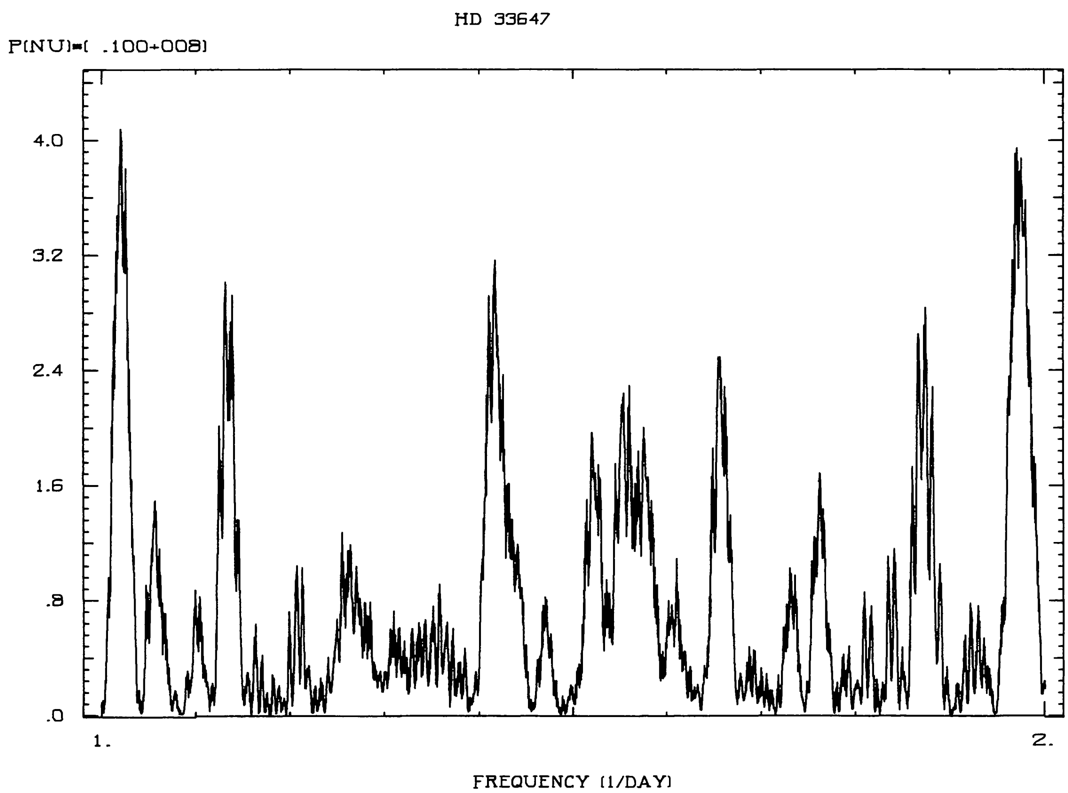
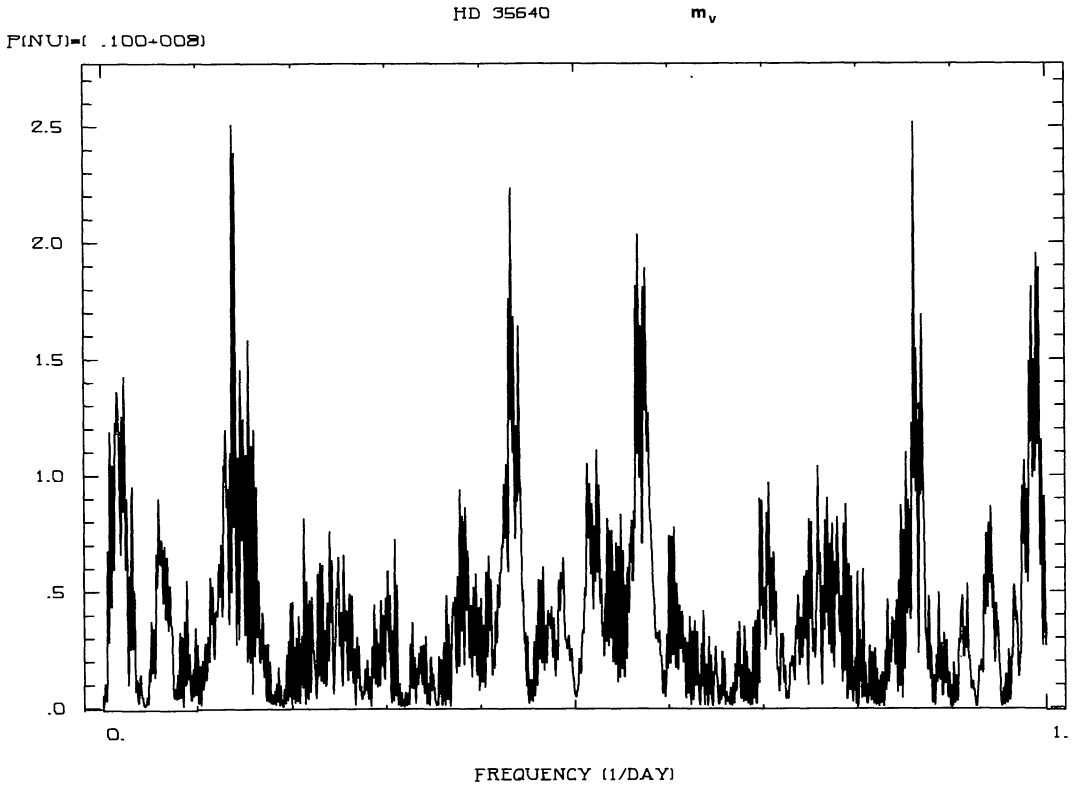


FIGURE 1a. — Normalized power spectrum of the discrete Fourier transform (Deeming, 1975) for the absolute measures of HD 33647 (visual magnitude). Note the rather large noise of the periodogram.



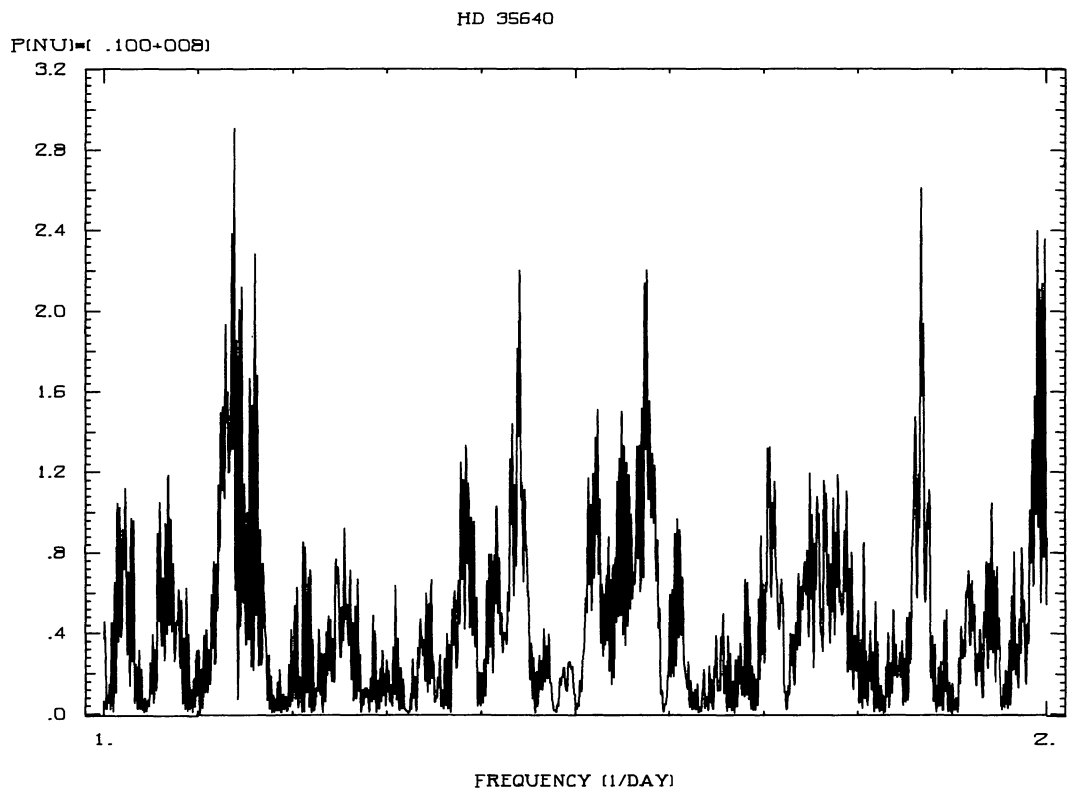


FIGURE 1b. — Same as figure 1a, but for the reference star HD 35640. Note that the peaks appearing here are roughly the same as in figure 1a, and so must be due to some very small systematic errors in the reduction process.

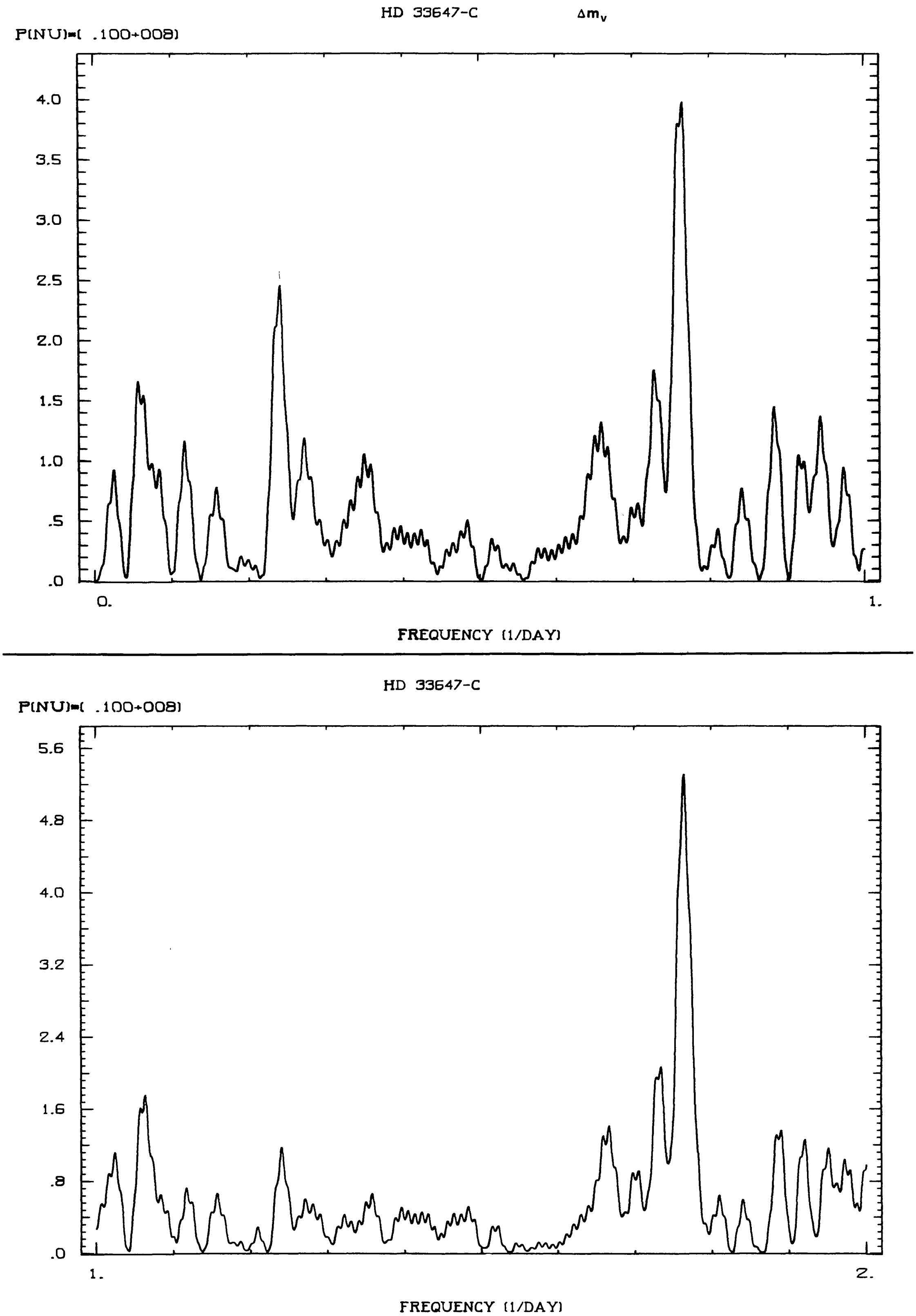


FIGURE 1c. — Same as figure 1a, but for the differential measures m_v(HD 33647) − m_v(HD 35640). Note the very good signal-to-noise ratio, as well as the extremely low amplitude.

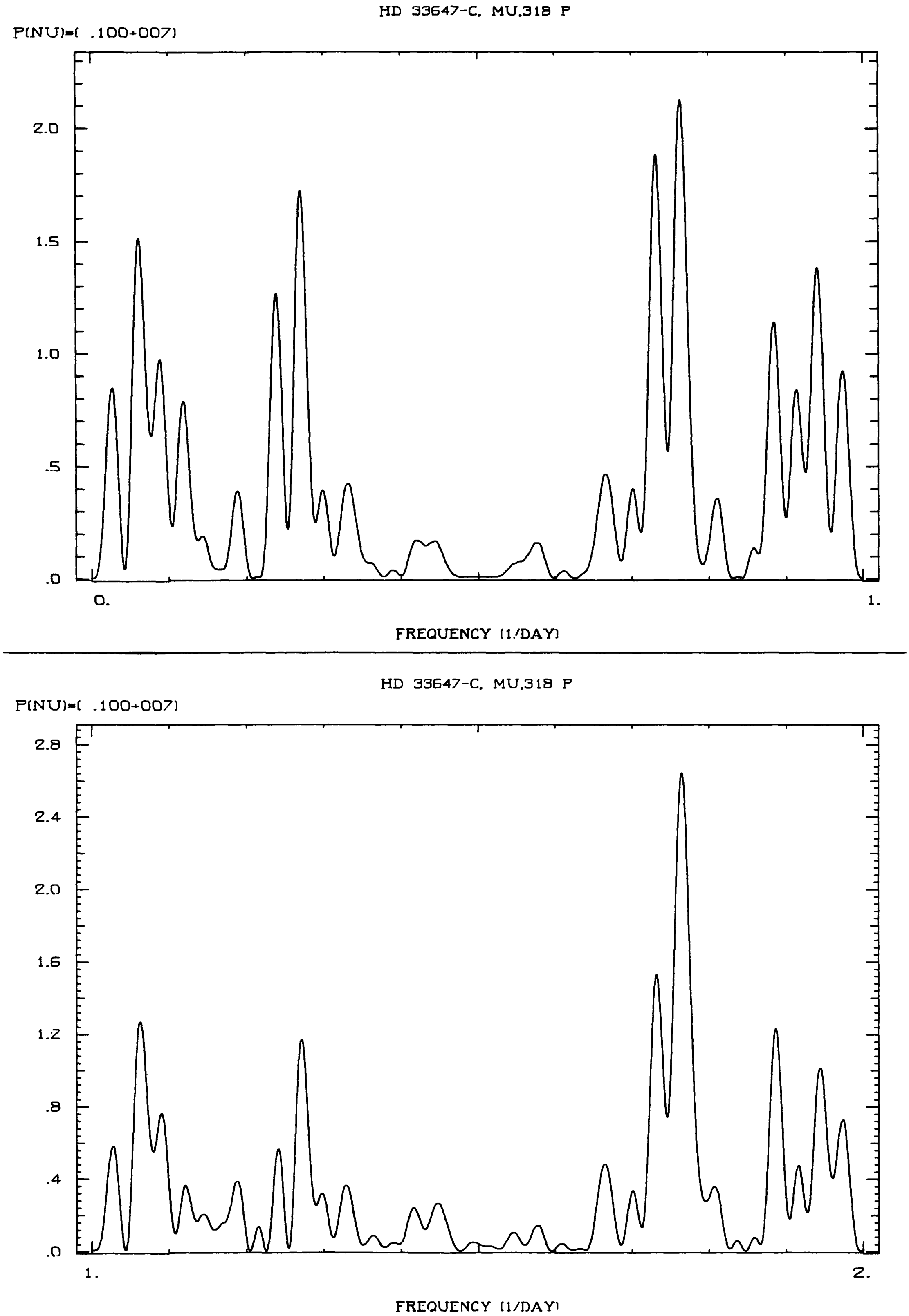


FIGURE 1d. — Same as figure 1c, but for the differential $[U]$ magnitudes.

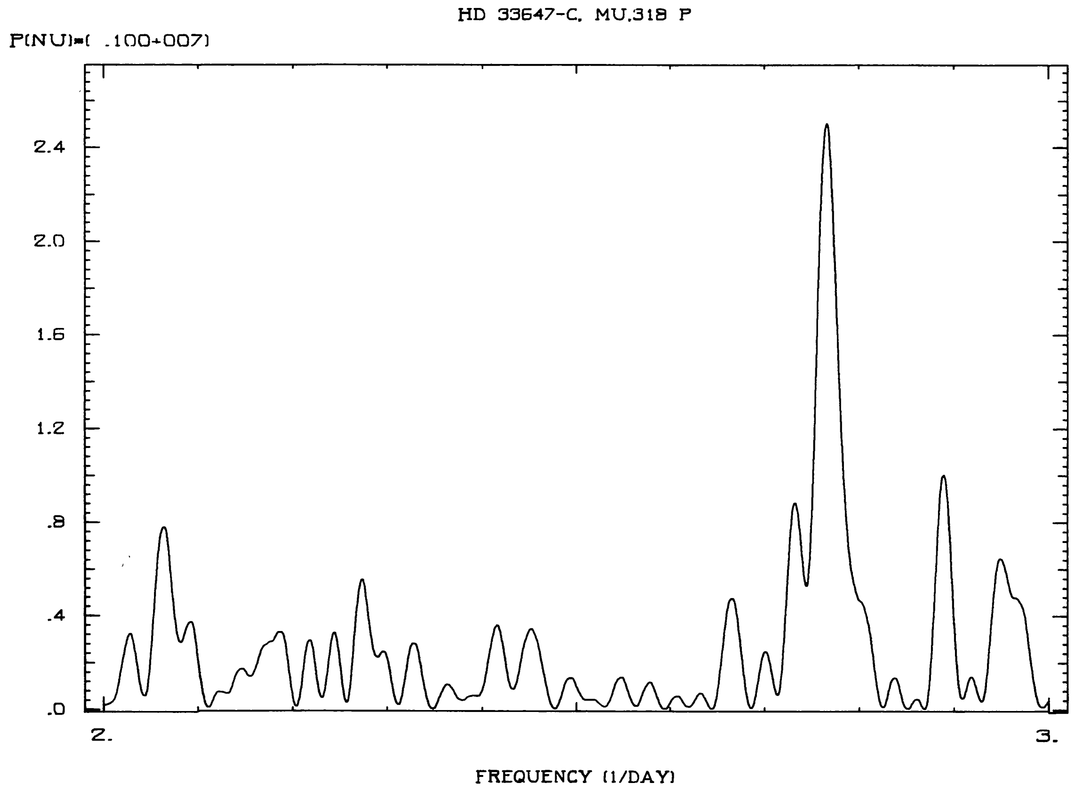


FIGURE 1d *(continued)*.

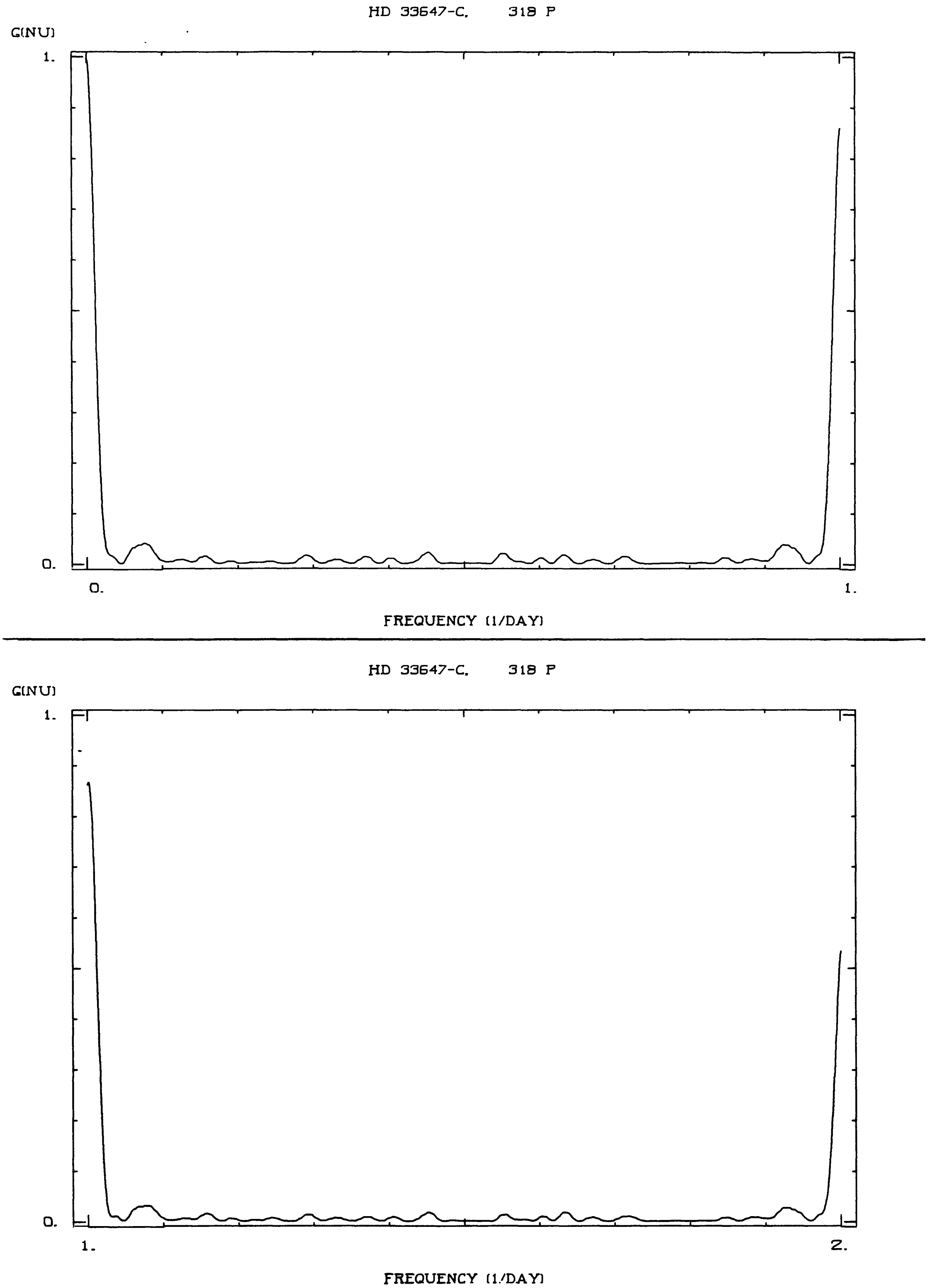


FIGURE 1e. — Power window of the differential measures of HD 33647.

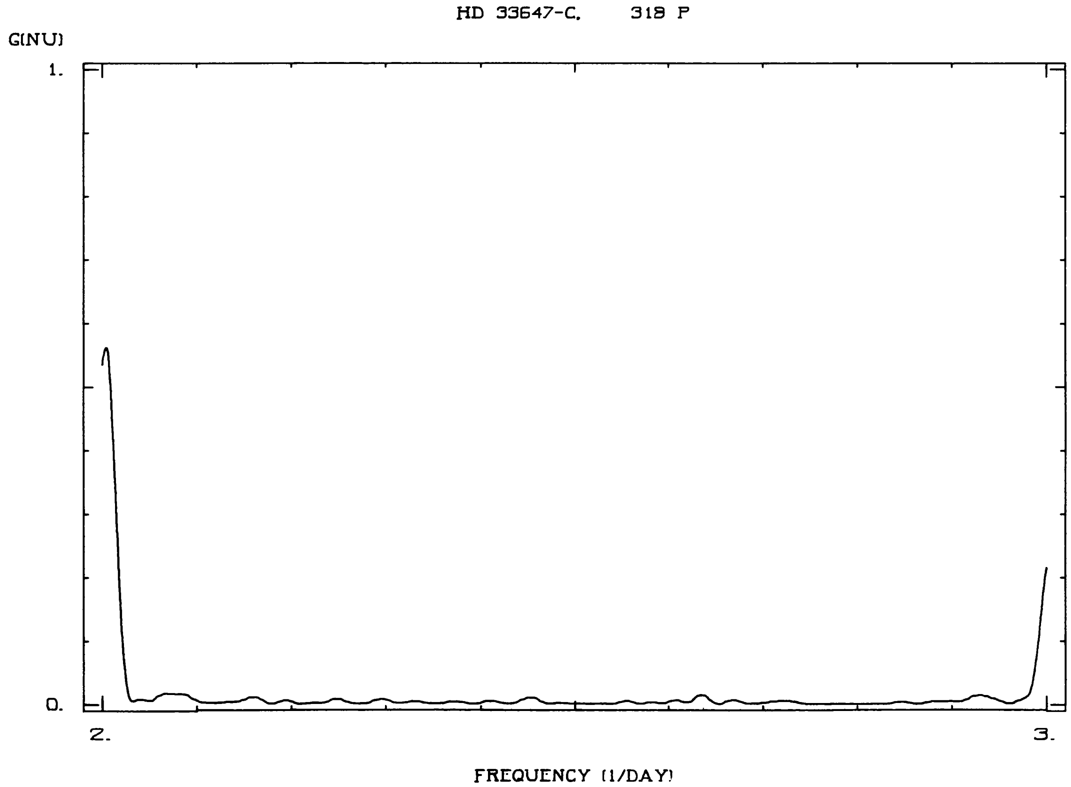


FIGURE 1e *(continued)*.

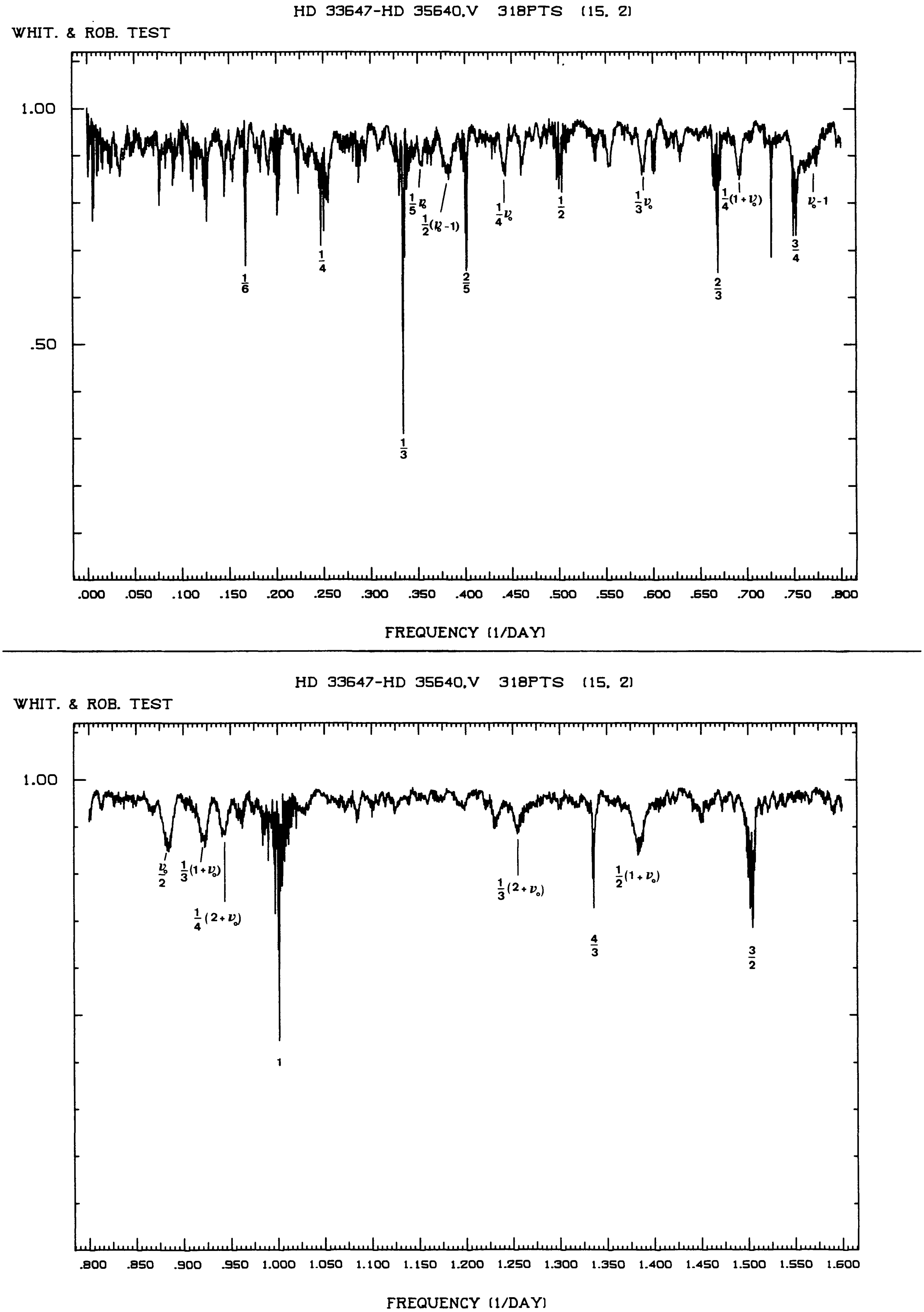
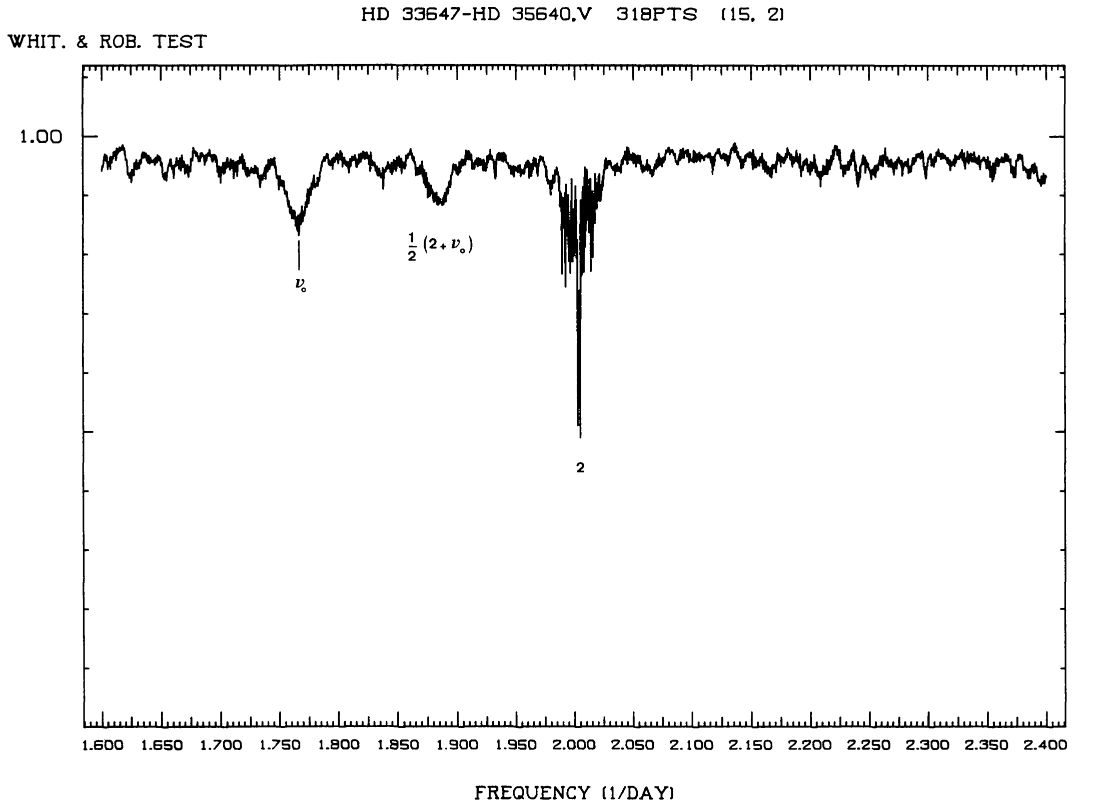


FIGURE 1f. — Whittaker and Robinson's (1926) method applied to the differential measures HD 33647-HD 35640. The spurious peaks related with the duration of the sidereal day are indicated by ratios defining their frequency in units of (1 sid. day)$^{-1}$. The peaks deriving from the supposedly true frequency ν_0 are identified as well.



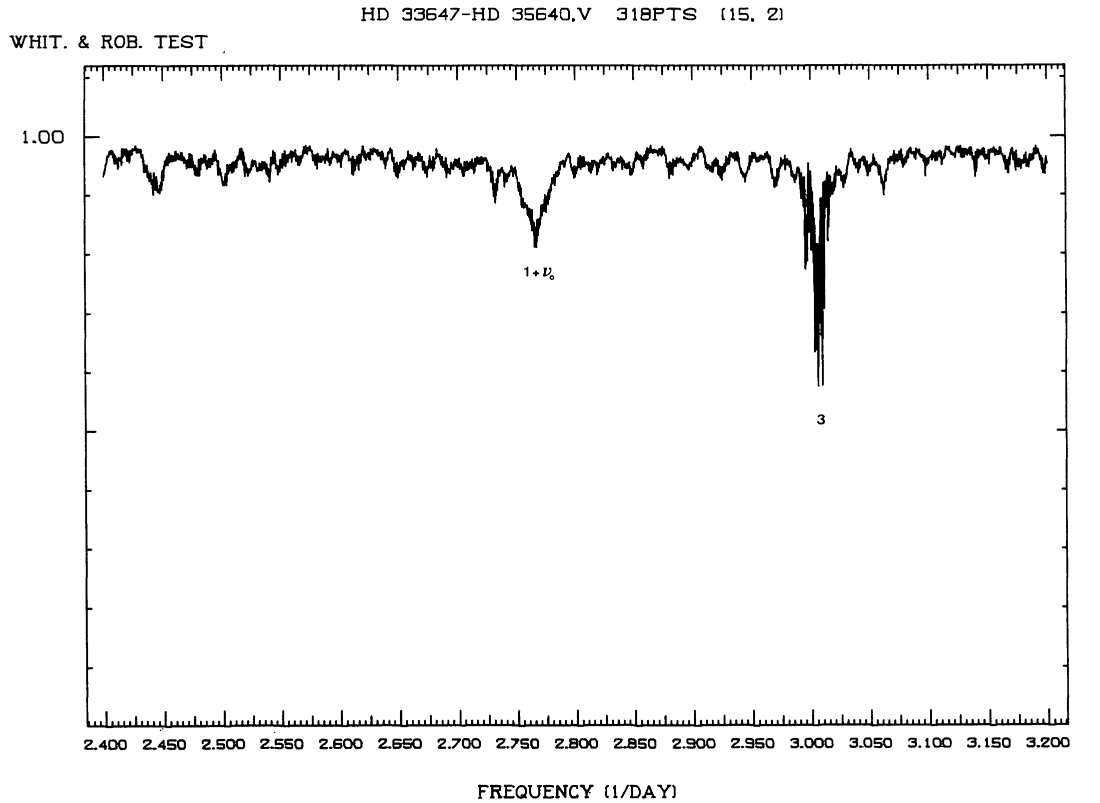


FIGURE 1f *(continued)*.

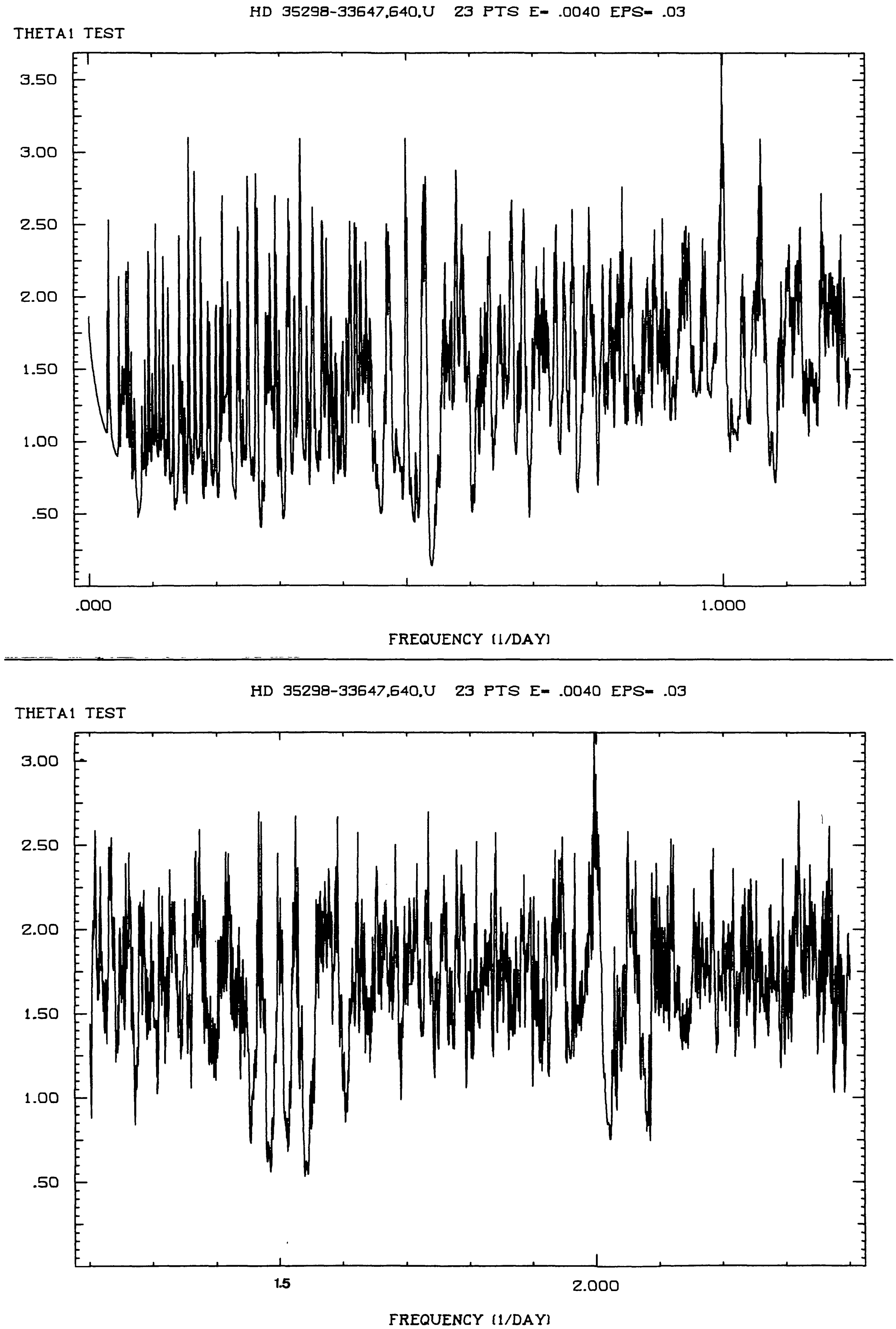


FIGURE 2. — Renson's θ_1 test applied to the differential [U] magnitudes of HD 35298, with the value of the e parameter (defined in Renson, 1978) set to 0.004.

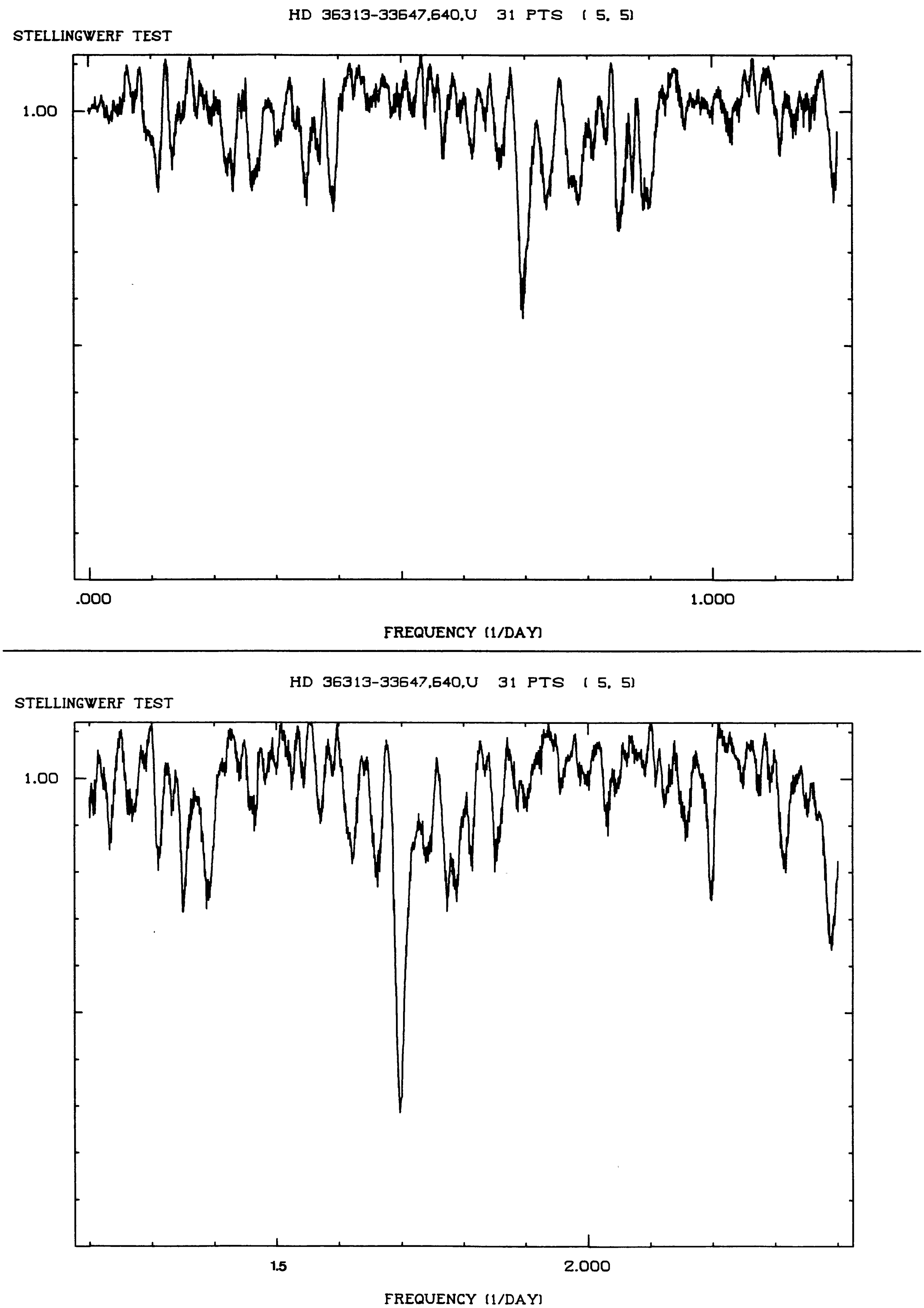
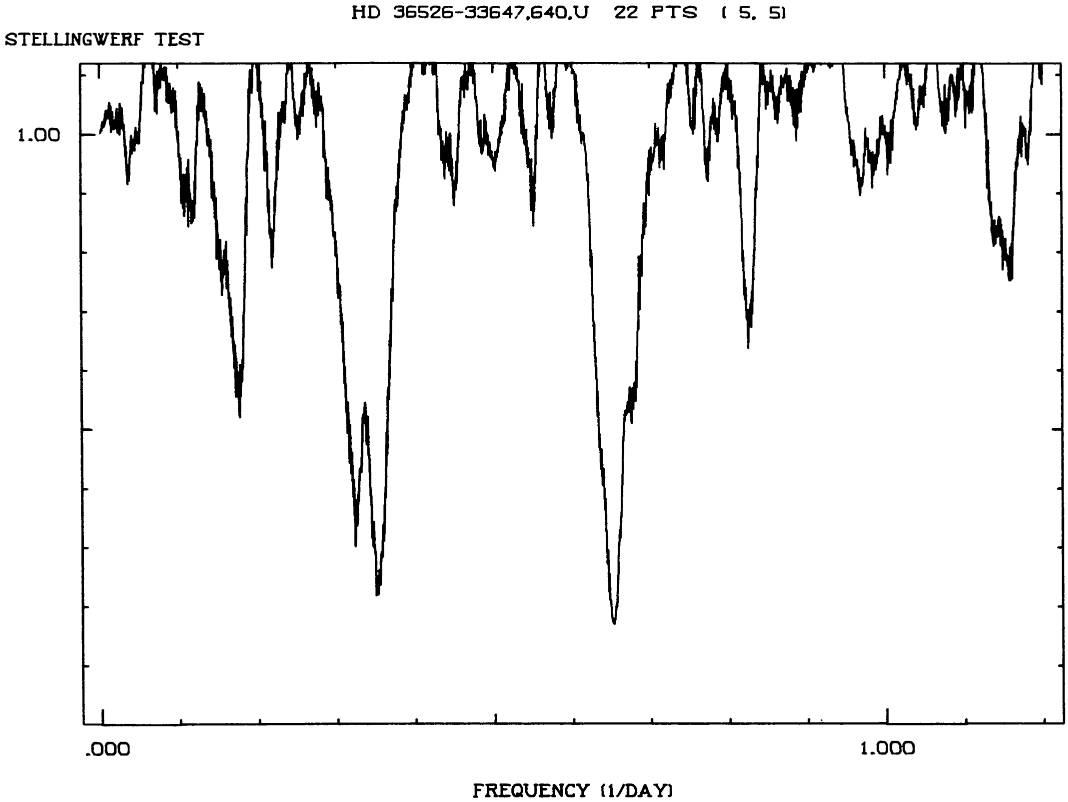


FIGURE 3. — Stellingwerf's test applied to the differential [U] magnitudes of HD 36313, with a bin structure (5,5).



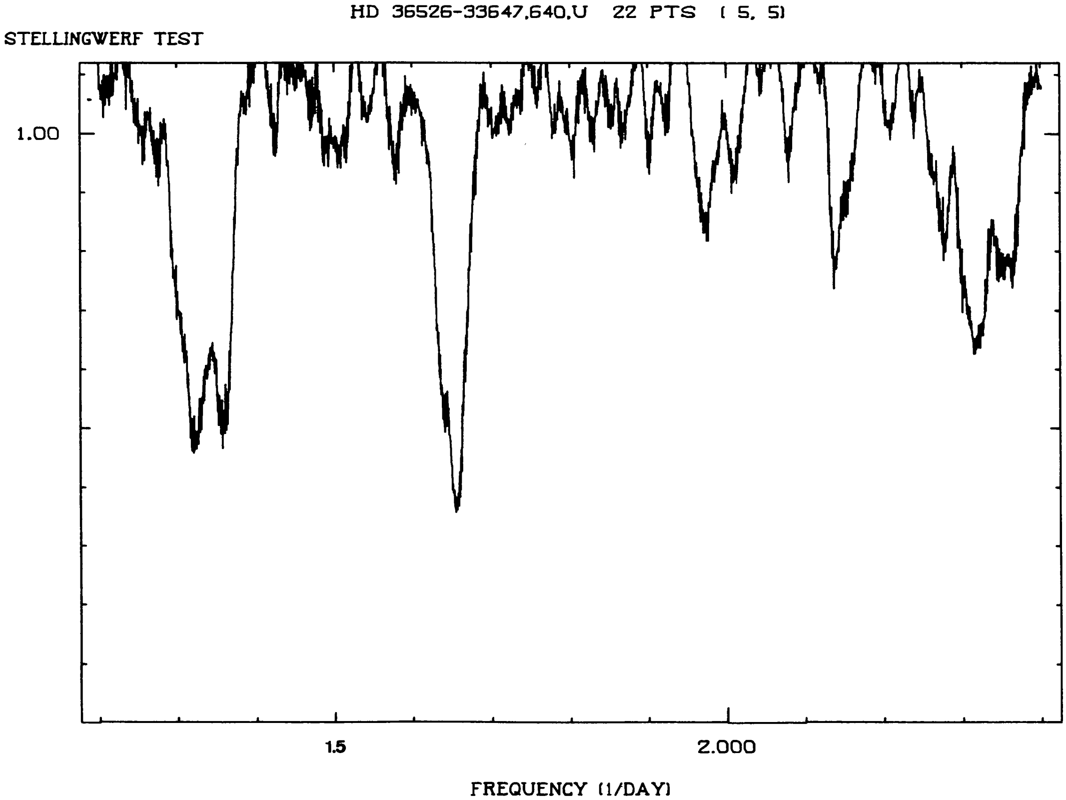


FIGURE 4. — Stellingwerf's test applied to the differential [U] magnitudes of HD 36526.

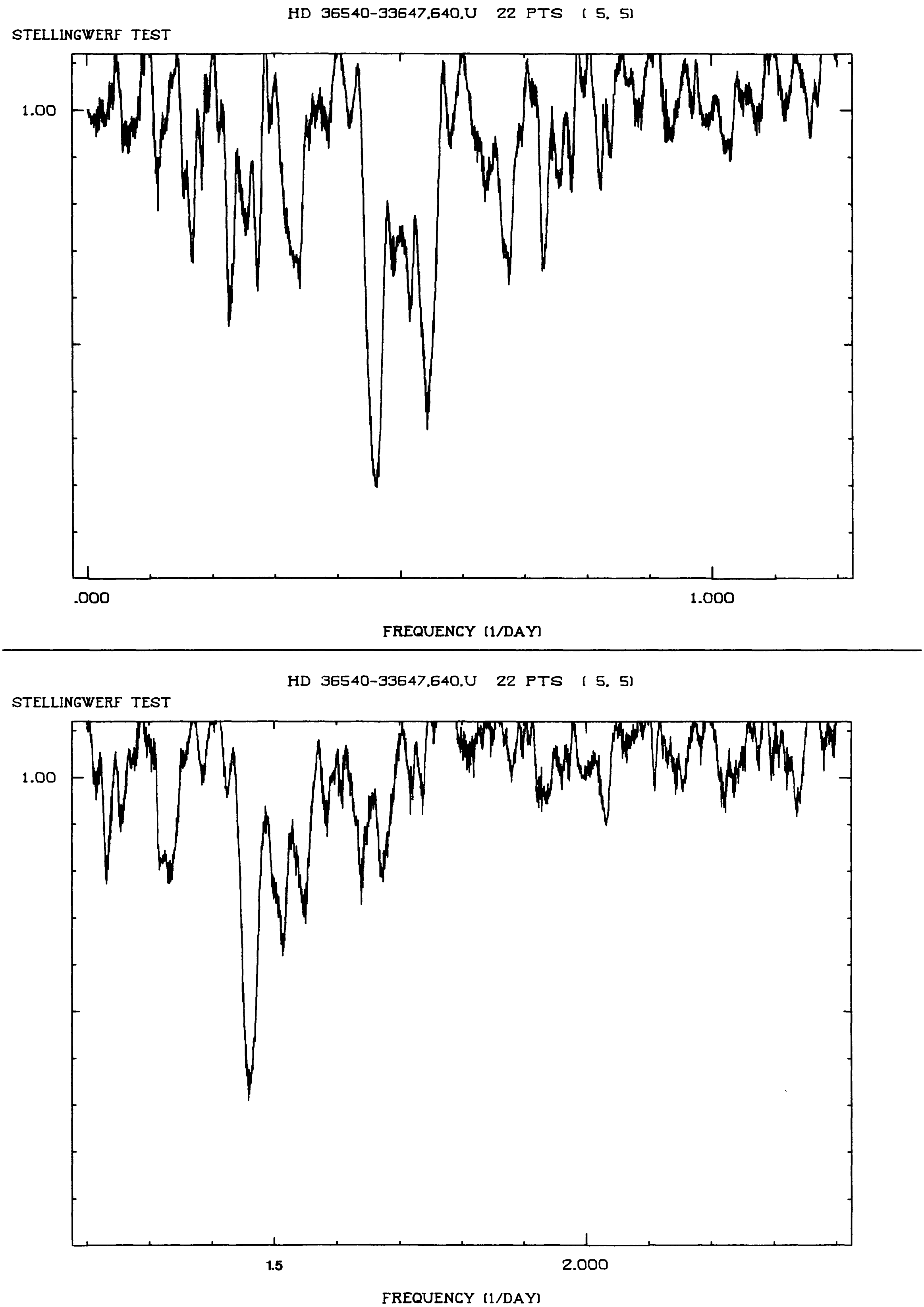
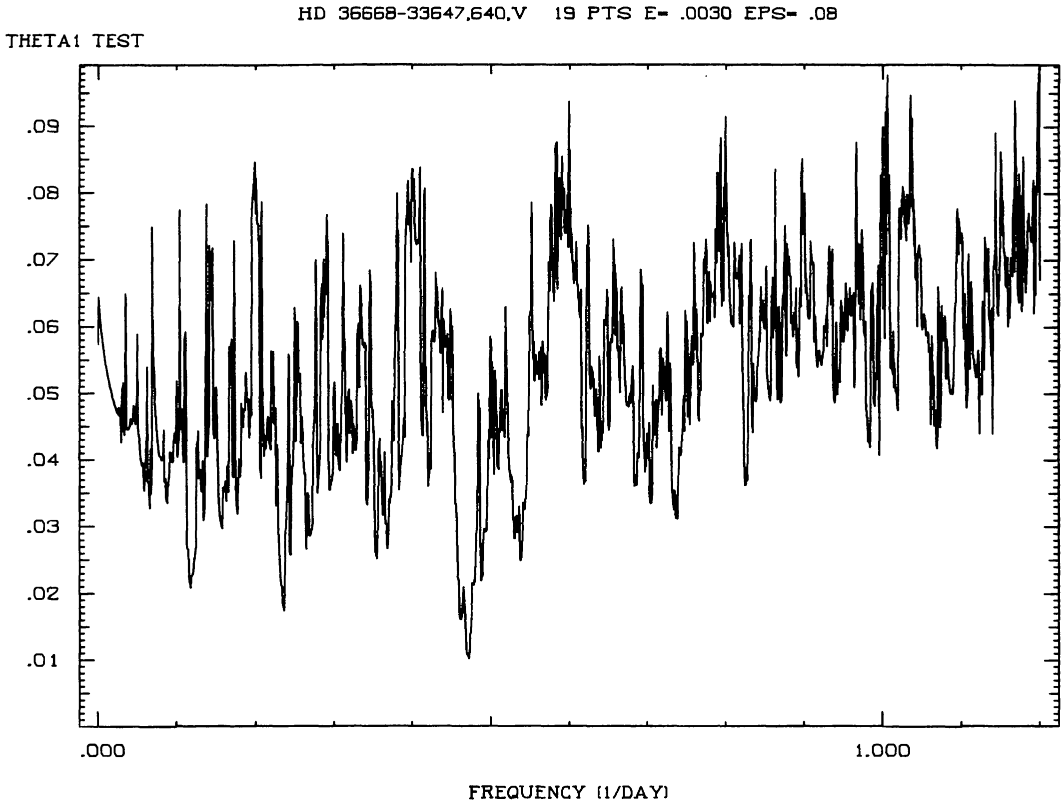


FIGURE 5. — Stellingwerf's test applied to the differential [U] magnitudes of HD 36540.



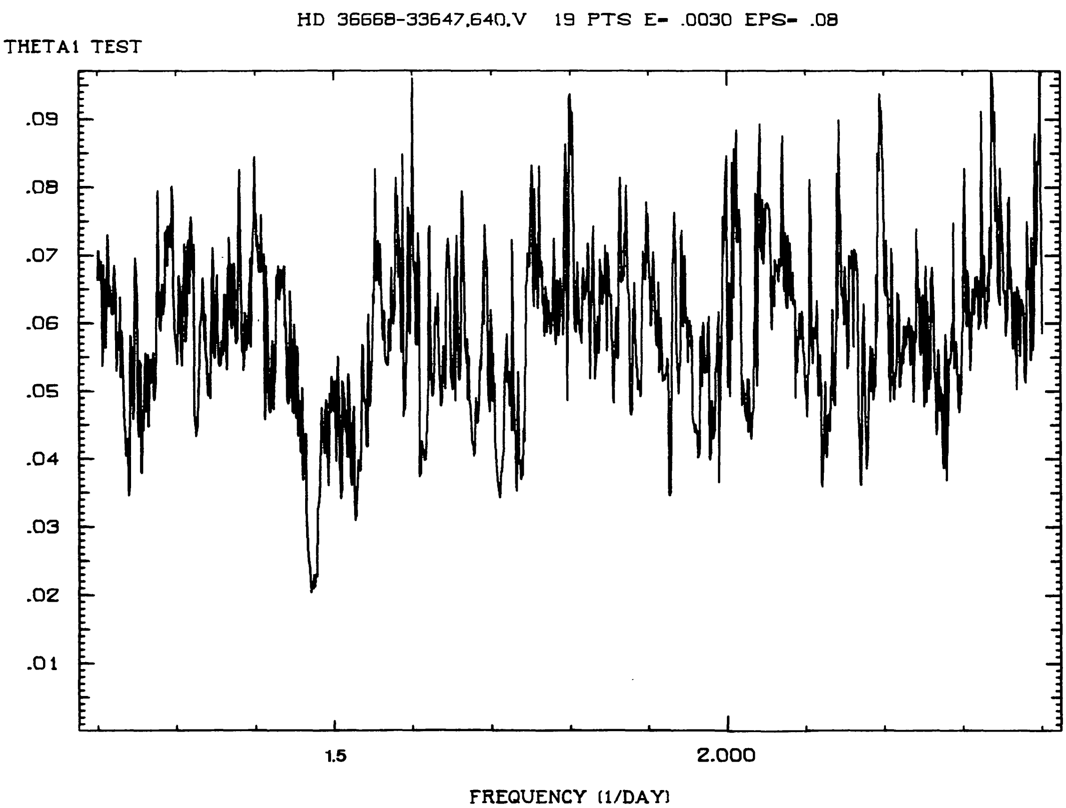


FIGURE 6. — Renson's θ_1 test applied to the differential [V] magnitudes of HD 36668. The chosen value of the e parameter is stated in the title of the diagram.

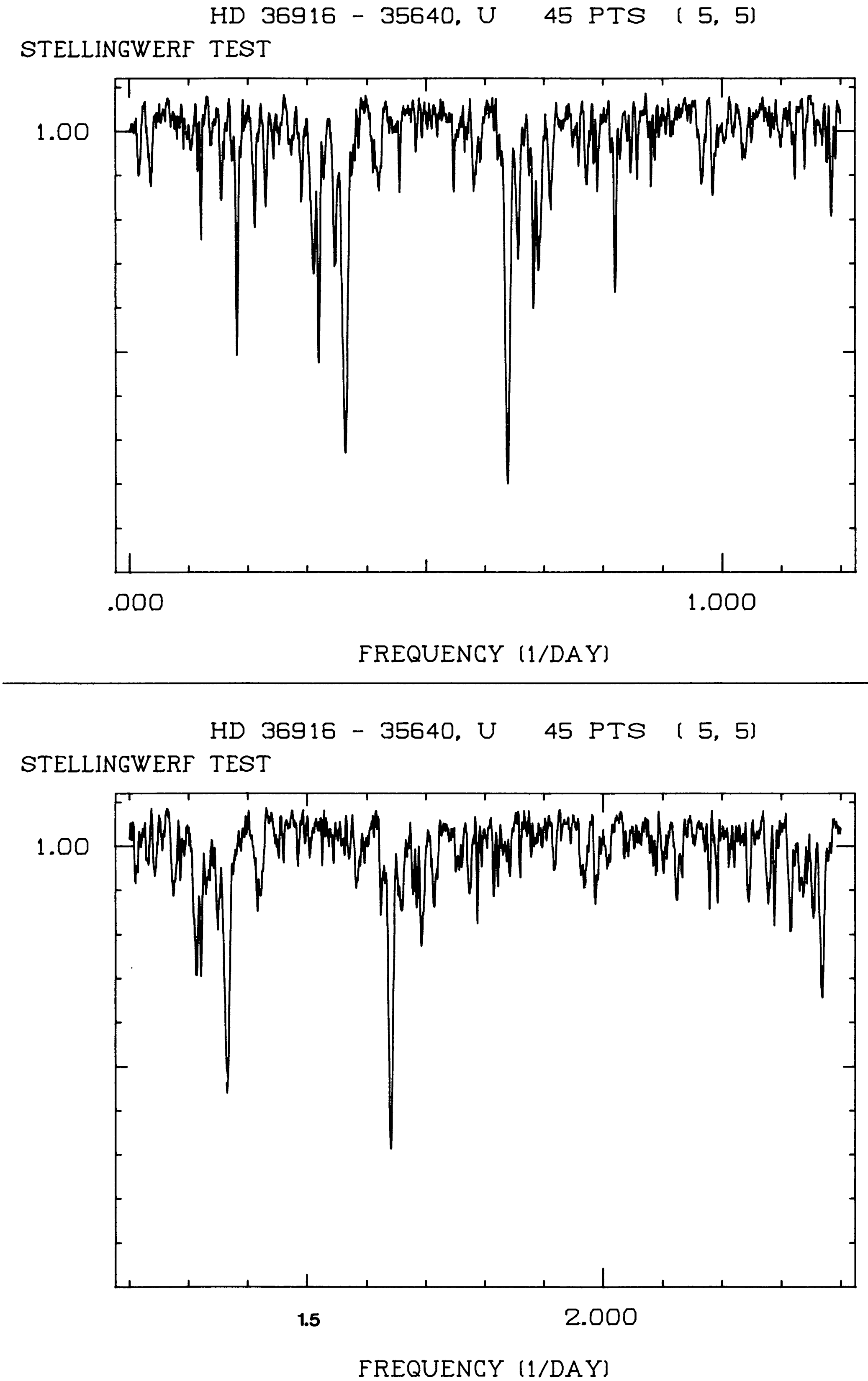
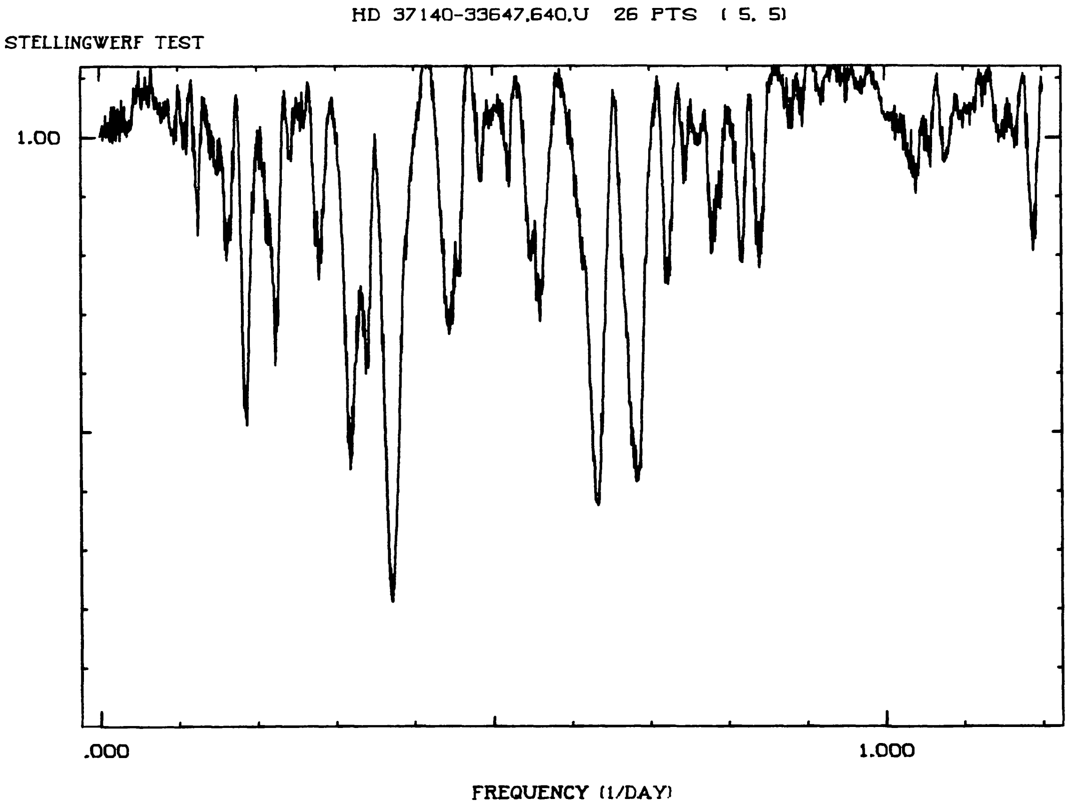


FIGURE 7. — Stellingwerf's test applied to the differential [U] magnitudes of HD 36916.



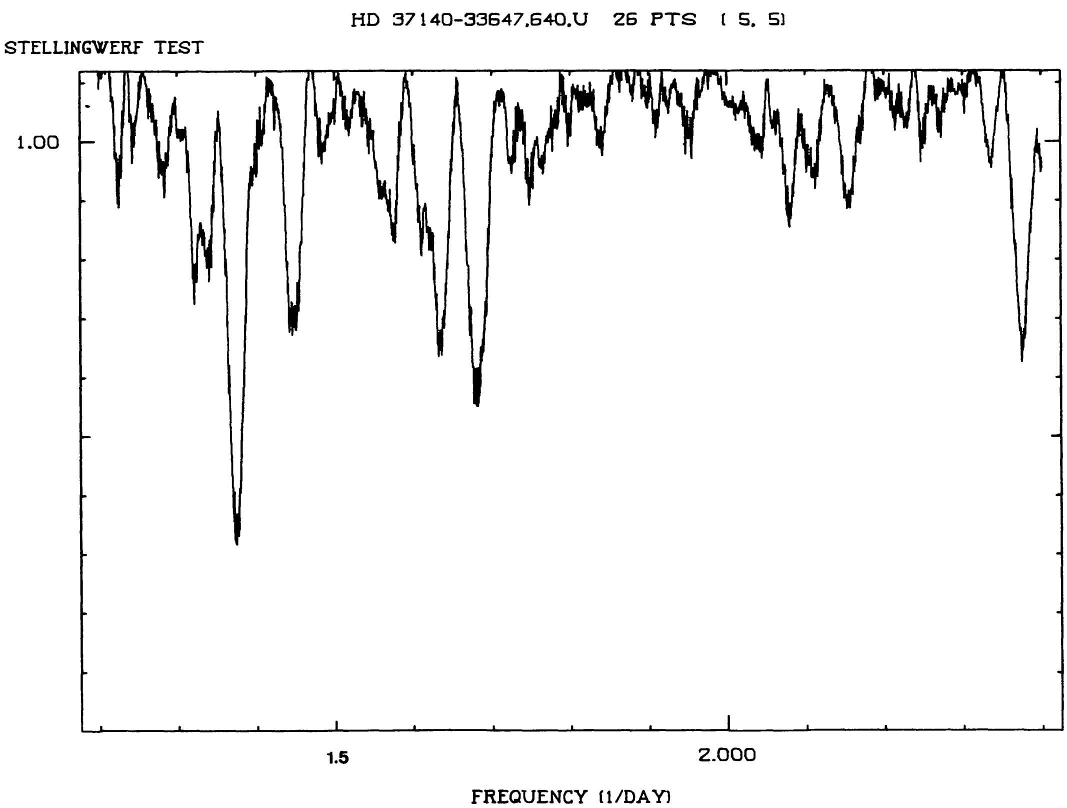


FIGURE 8. — Stellingwerf's test applied to the differential [U] magnitudes of HD 37140.

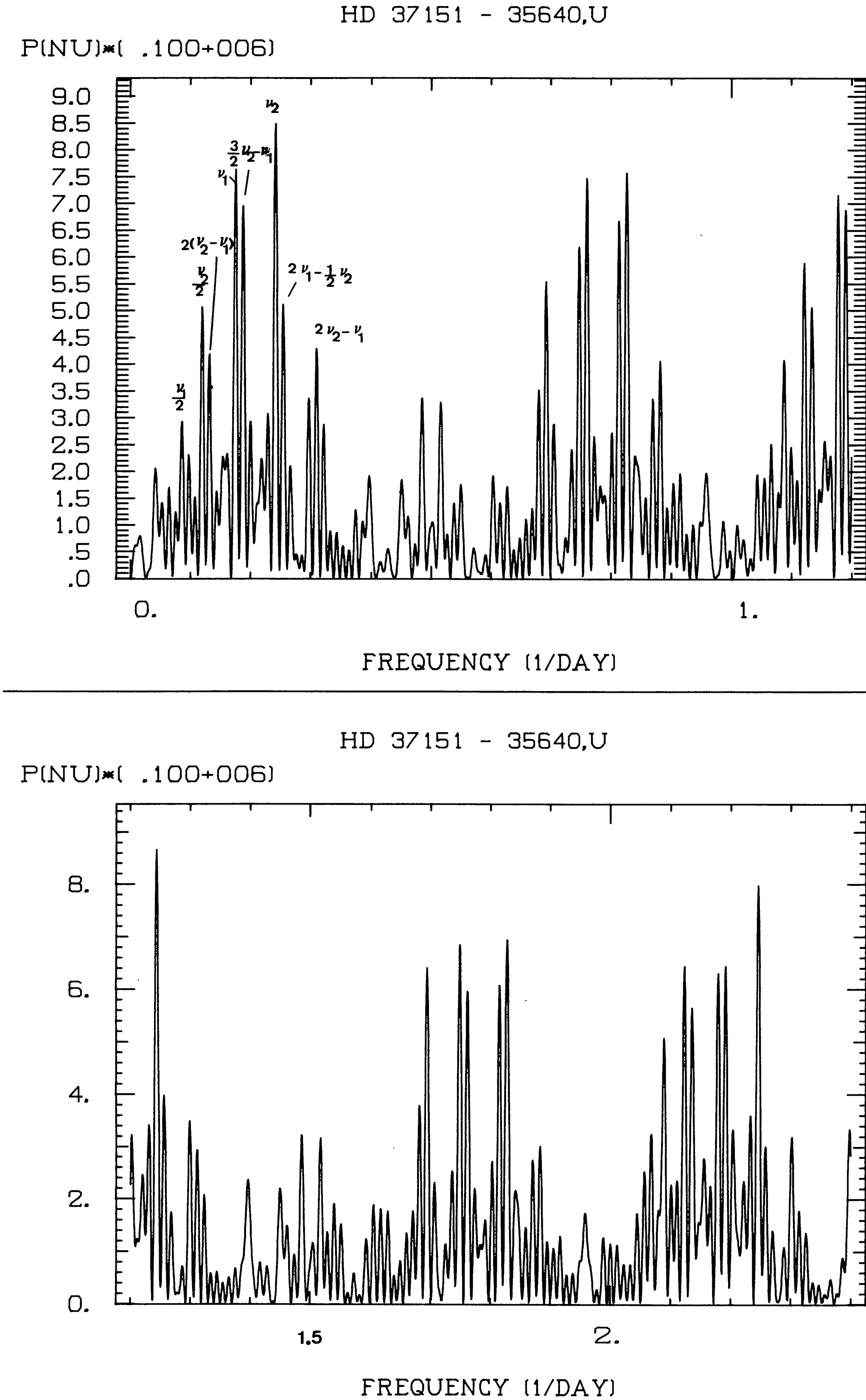


FIGURE 9a. — Deeming's method of discrete Fourier transform applied to the differential [U] magnitudes of HD 37151. The main low-frequency peaks can be explained as aliases of two main frequencies ν_1 and ν_2.

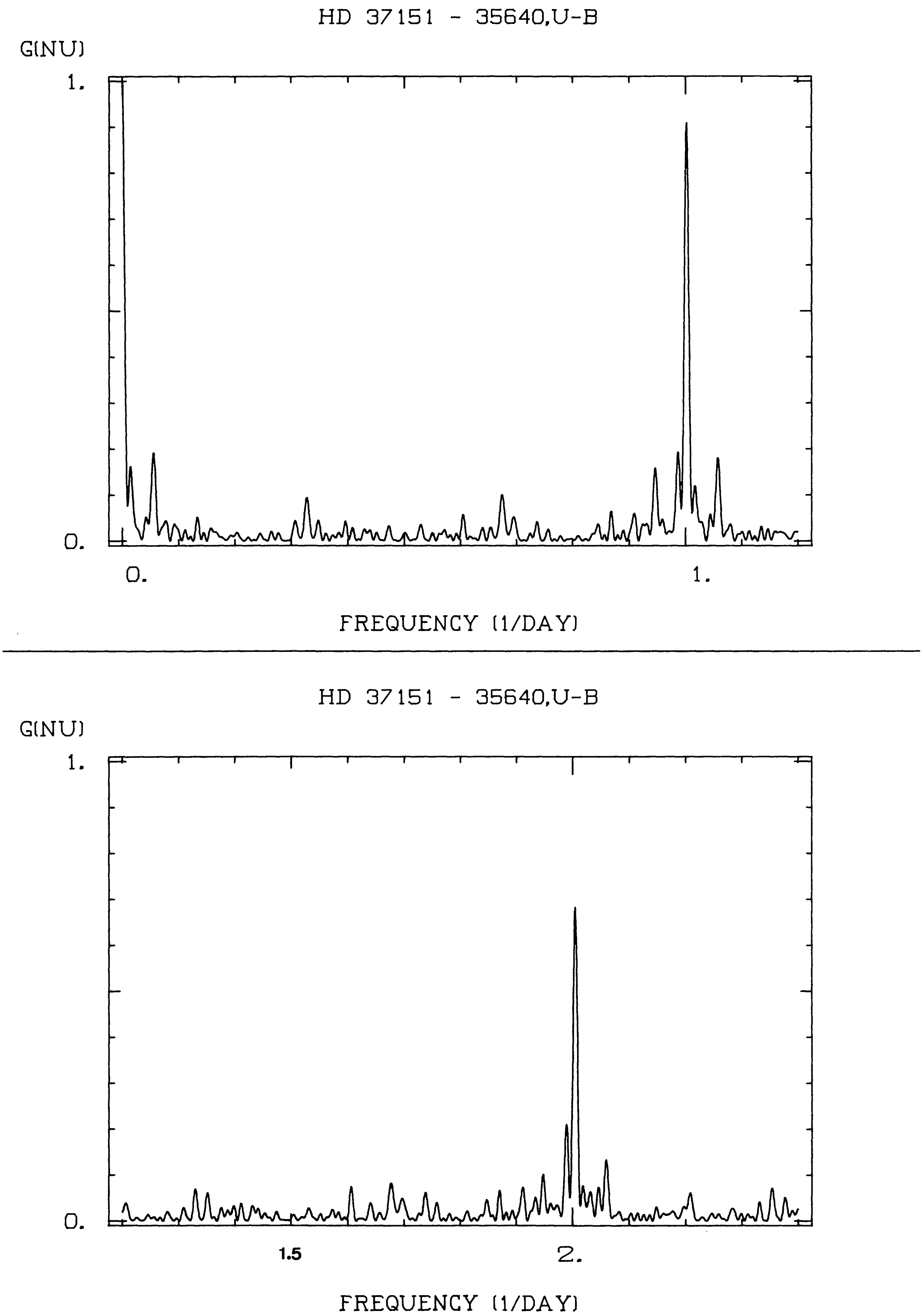
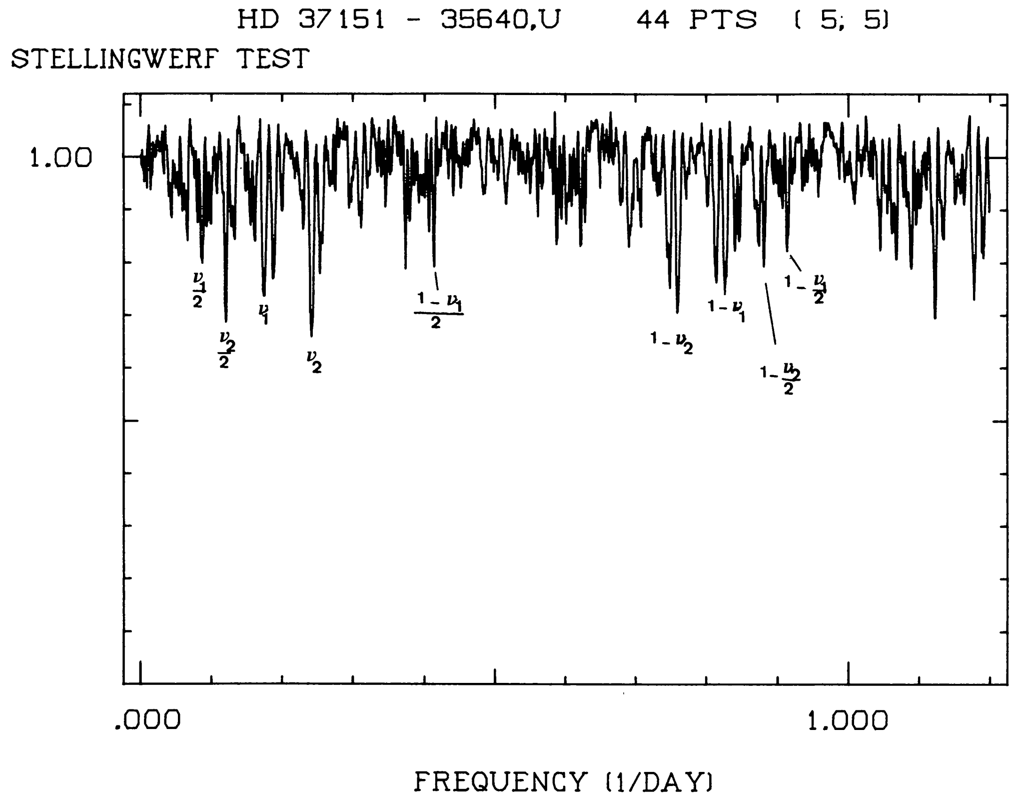


FIGURE 9b. — Power window of the measures of HD 37151.



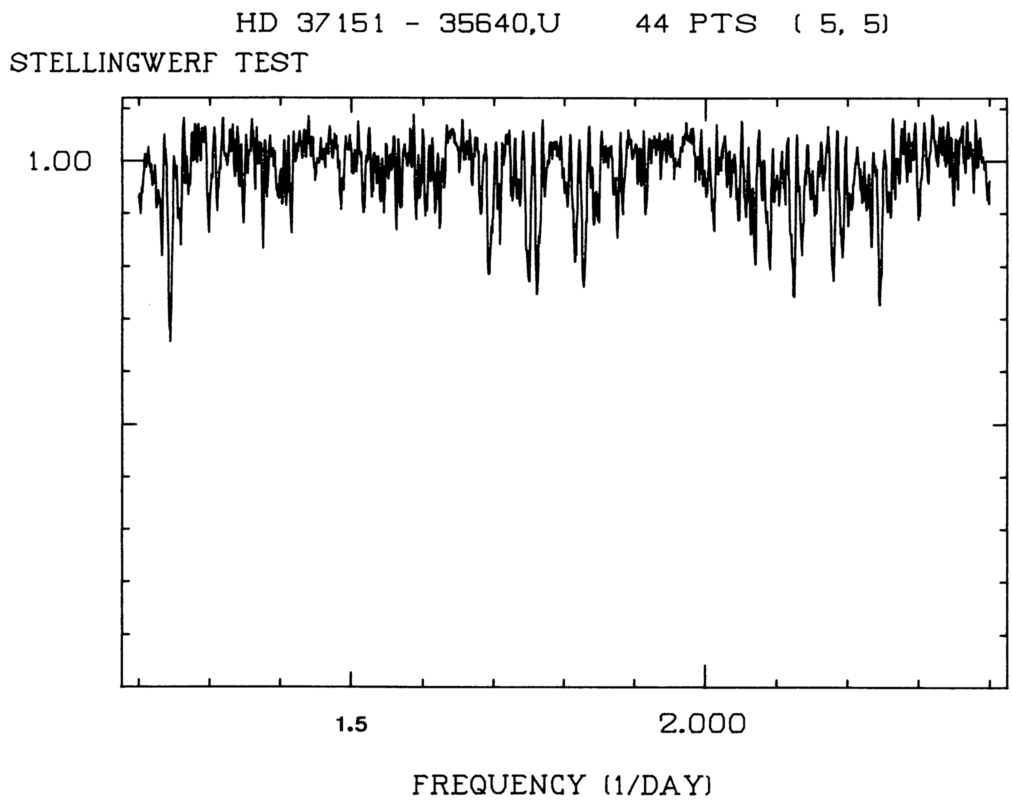
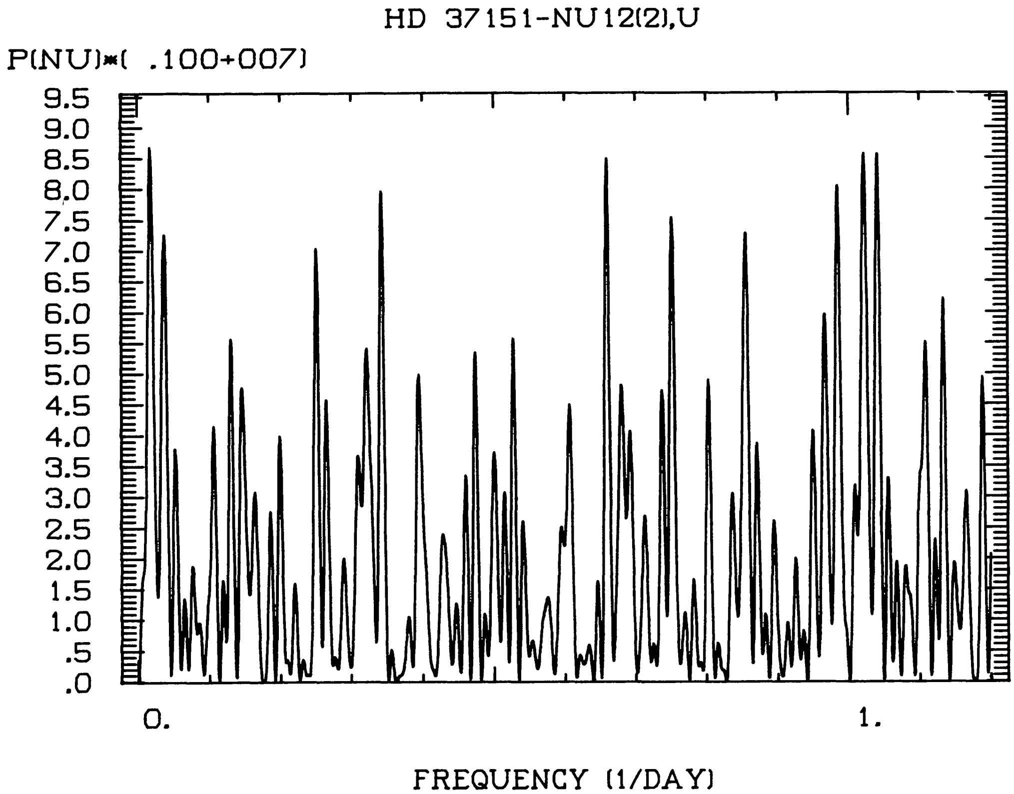


FIGURE 9c. — Same as 9a, but with Stellingwerf's method and with a (5,5) bin structure.



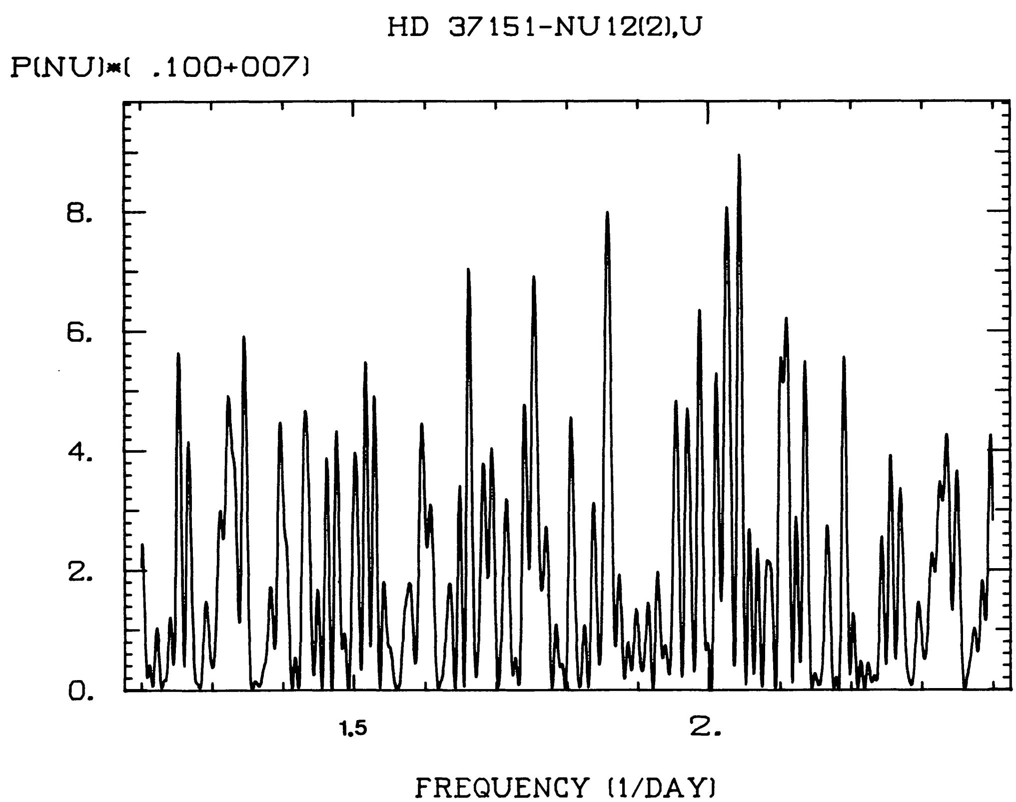
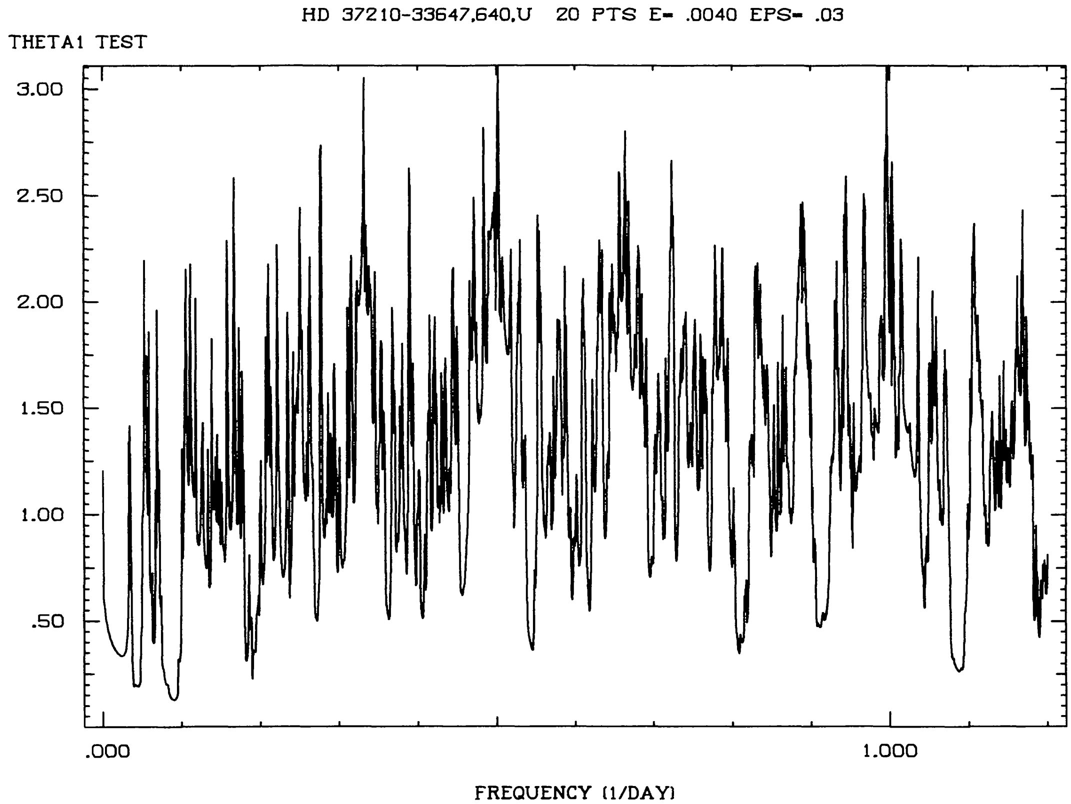


FIGURE 9d. — Power spectrum of the discrete Fourier transform of the differential [U] magnitudes of HD 37151 prewhitened with the two main frequencies ν_1 and ν_2. Comparison with figure 9a shows that the height of the peaks has been reduced by a factor of almost ten (or three if the amplitude rather than the power spectrum is used).



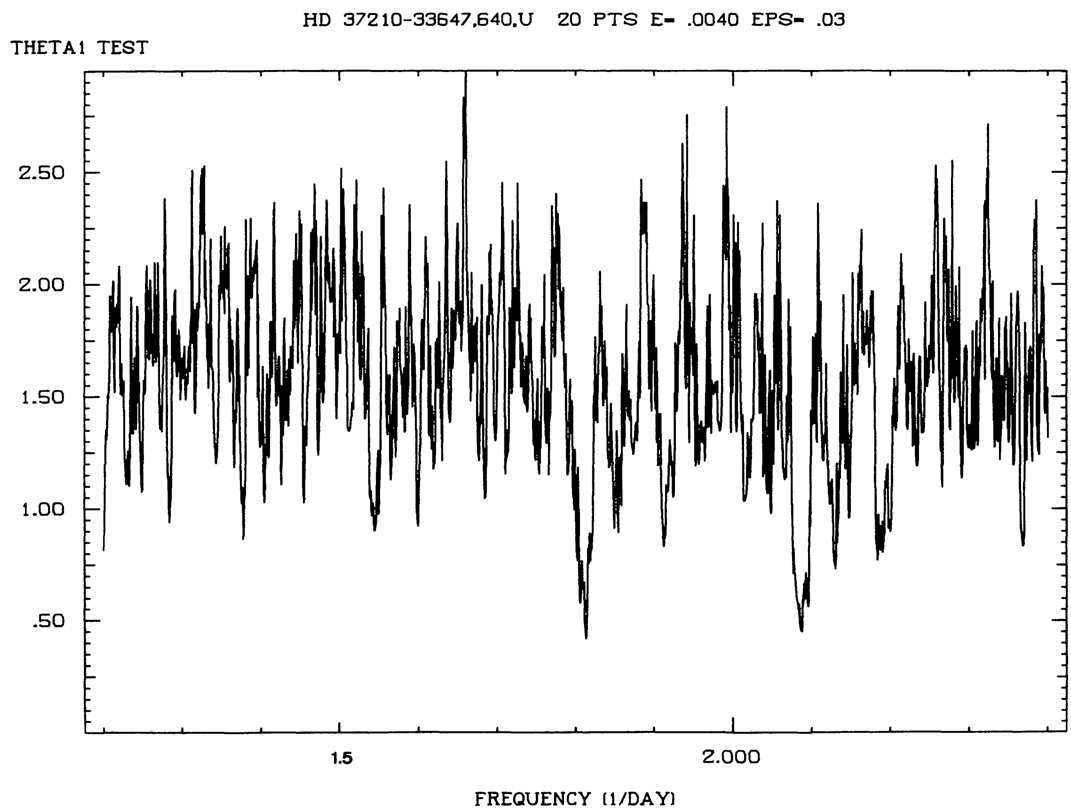
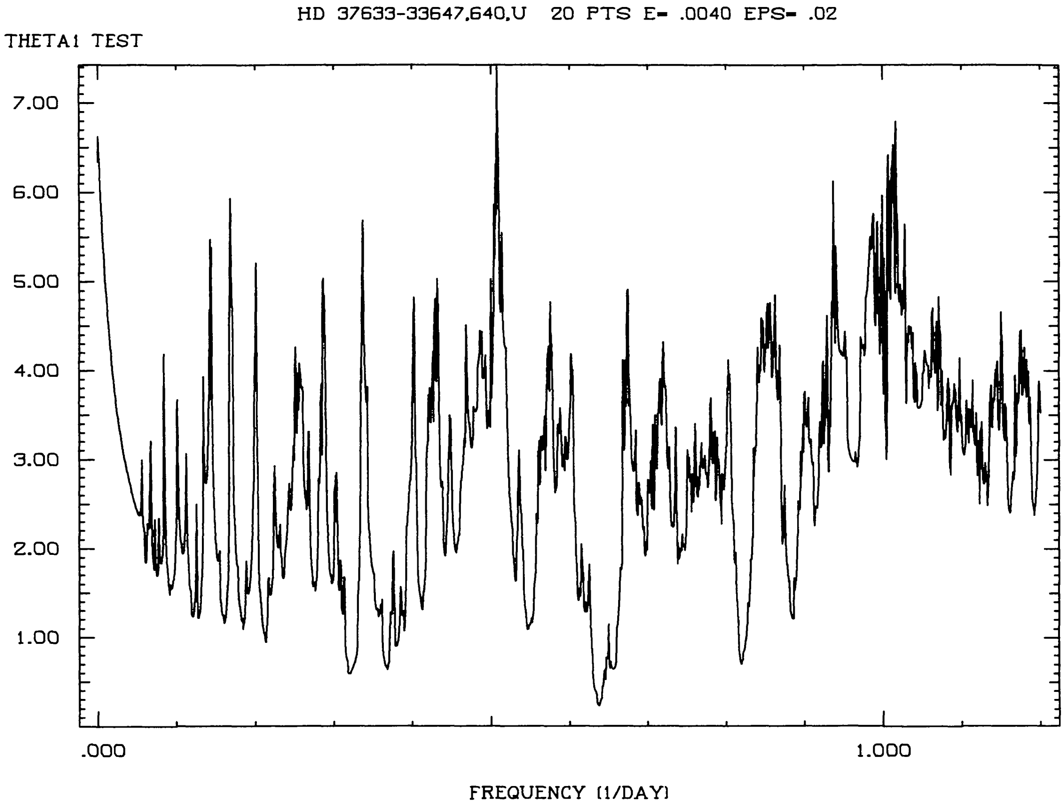


FIGURE 10. — Renson's θ_1 test applied to the differential $[U]$ magnitudes of HD 37210.



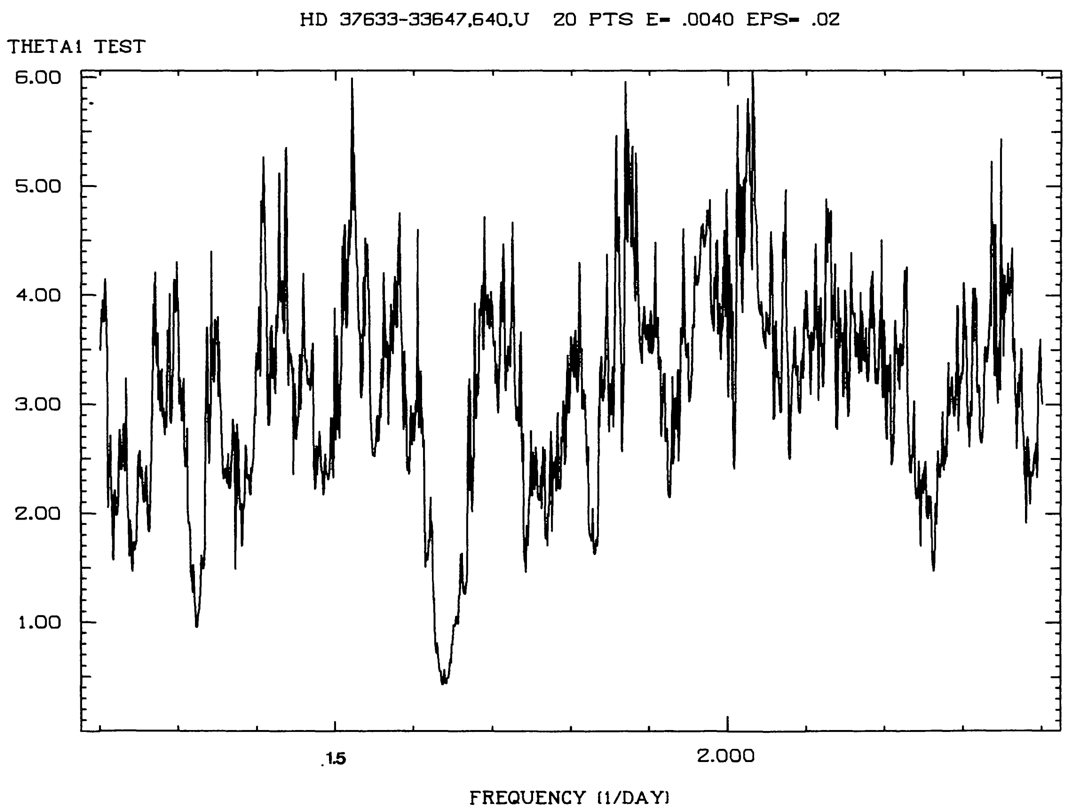


FIGURE 11. — Renson's θ_1 test applied to the differential $[U]$ magnitudes of HD 37633.

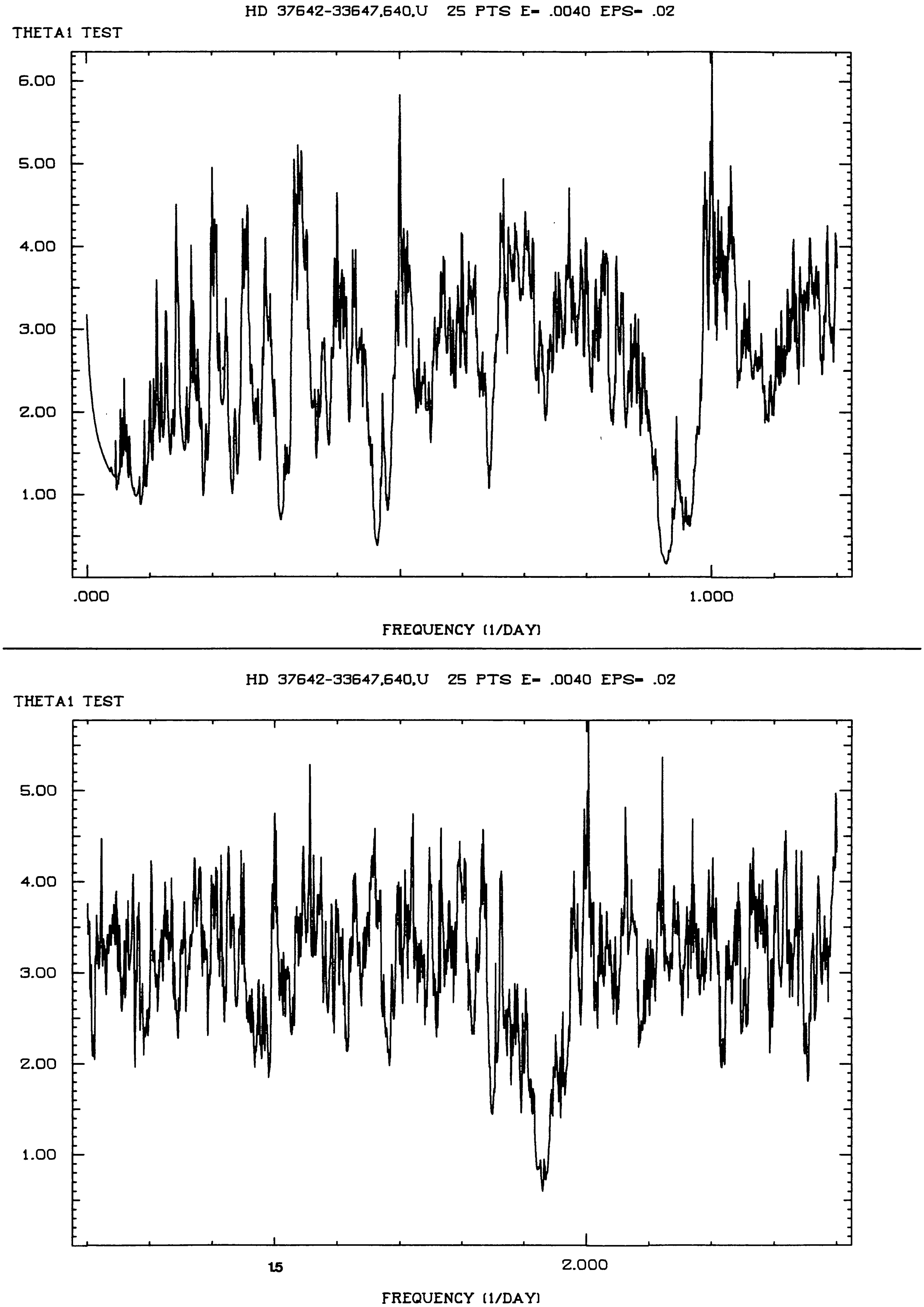
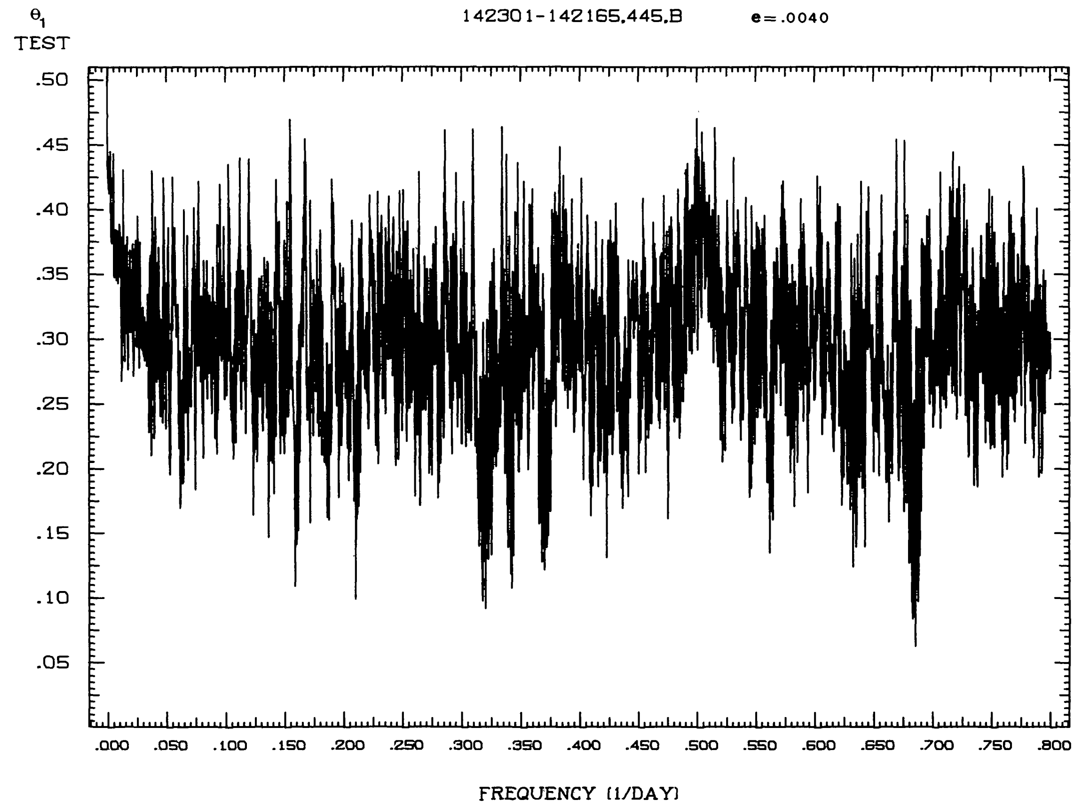


FIGURE 12. — Renson's θ_1 test applied to the differential $[U]$ magnitudes of HD 37642.



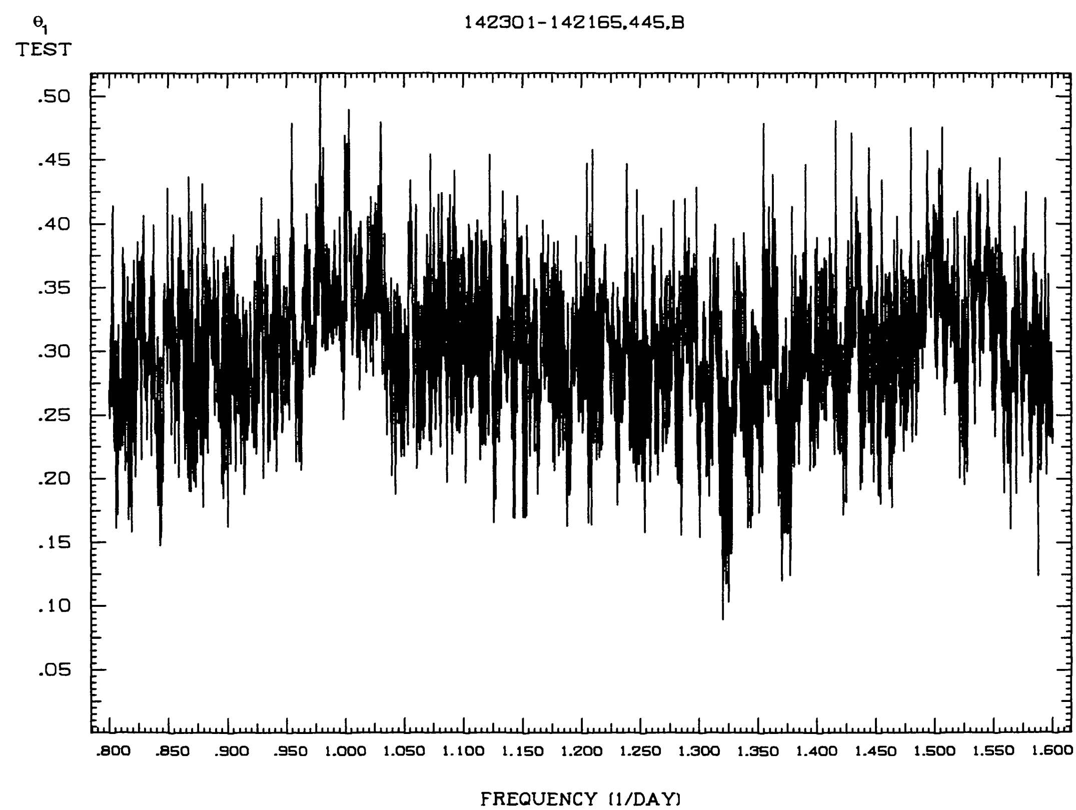


FIGURE 13. — Renson's θ_1 test applied to the differential [B] magnitudes of HD 142301, with $e = 0.003$.

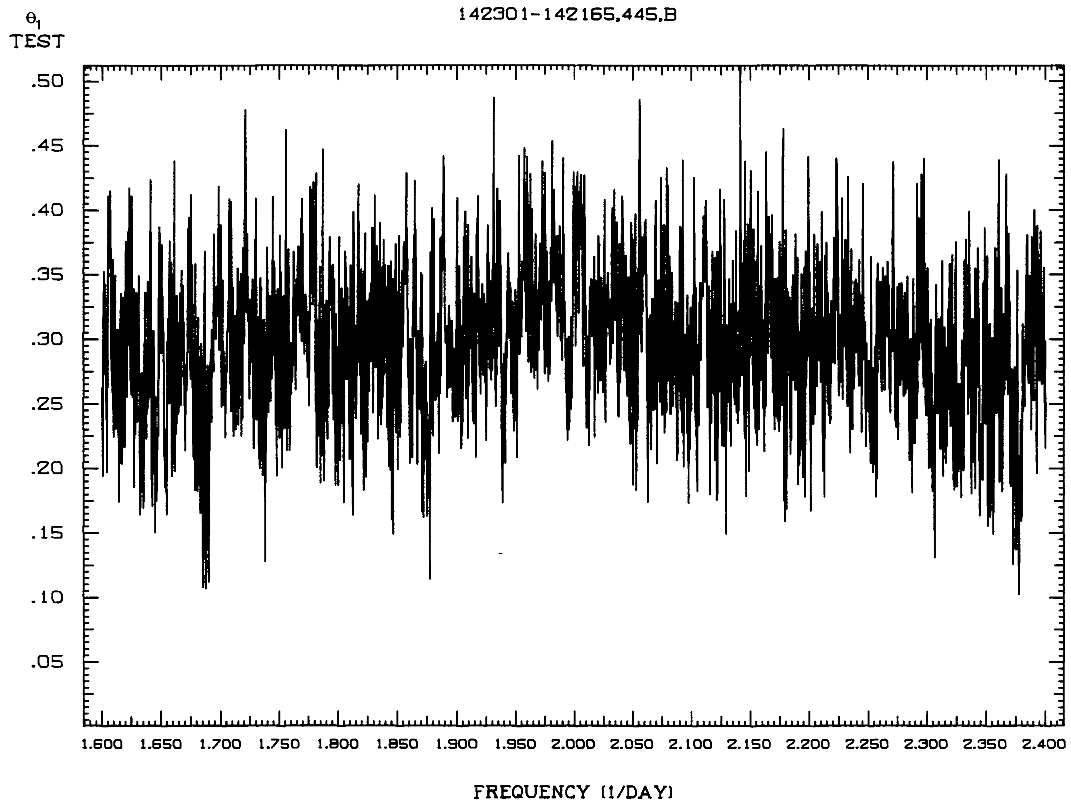


FIGURE 13 *(continued)*.

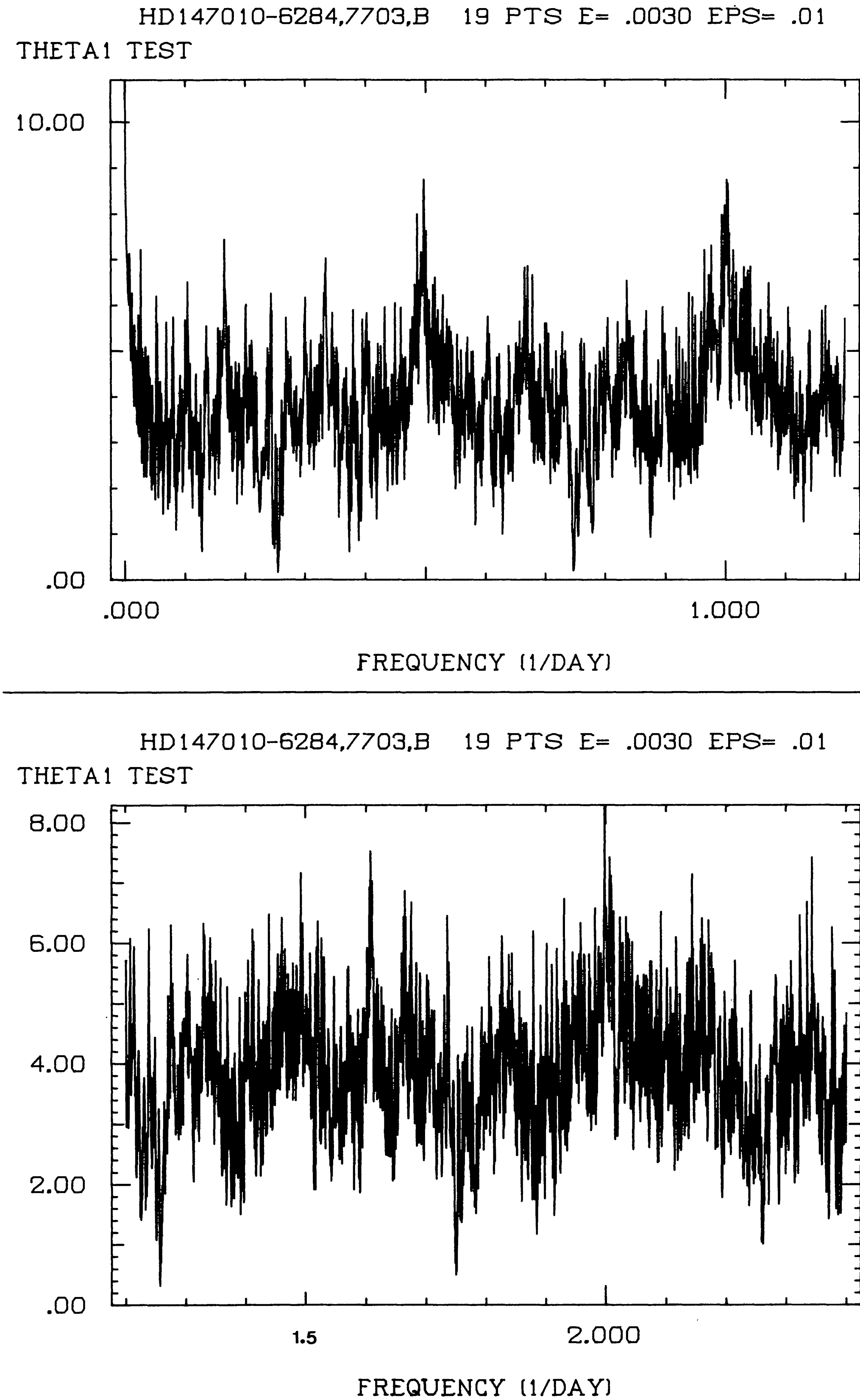


FIGURE 14. — Renson's θ_1 test applied to the differential [B] magnitudes of HD 147010. The new observations made in 1983 have not not been included in this diagram.

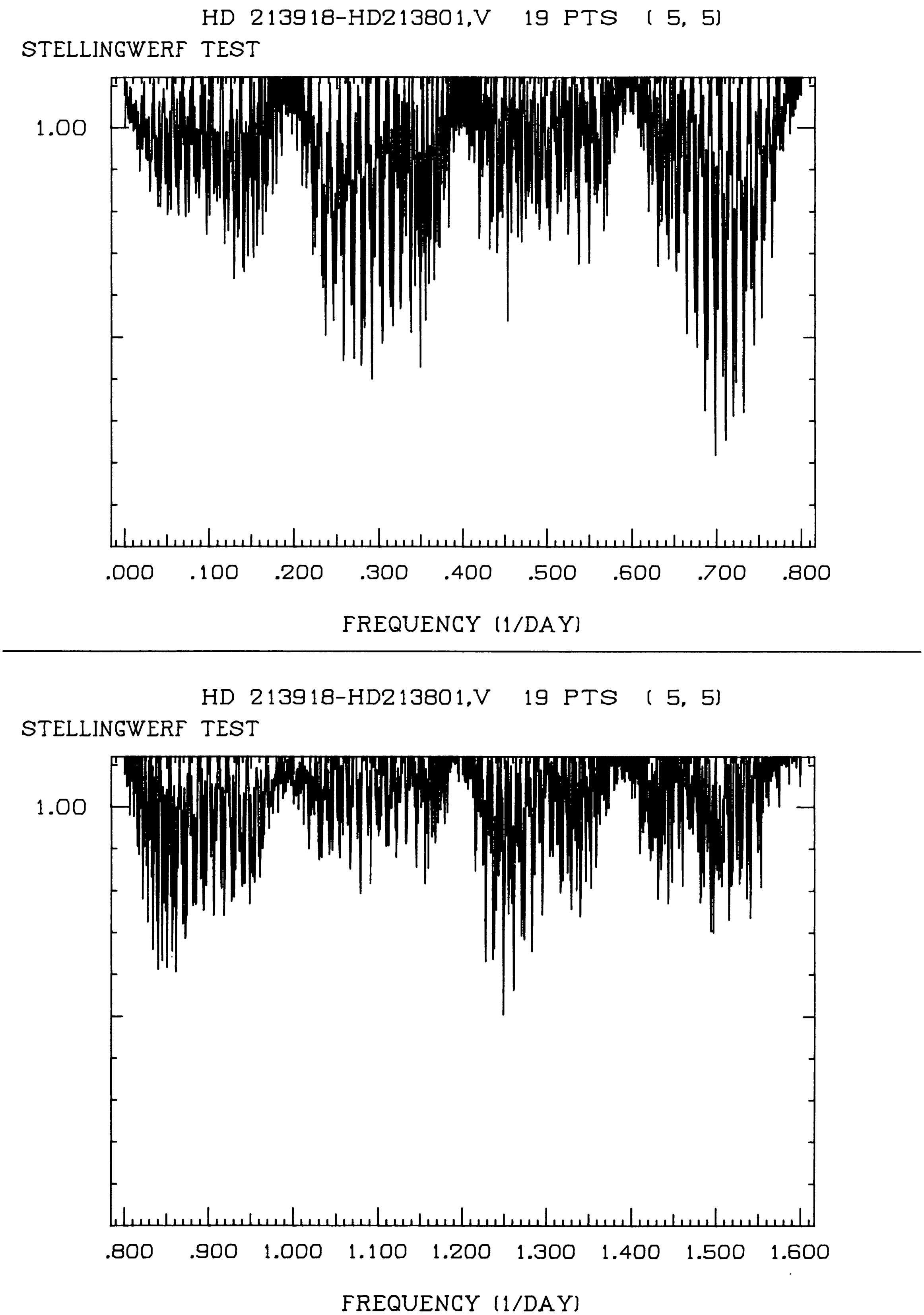


FIGURE 15. — Stellingwerf's test applied to the differential [*V*] magnitudes of HD 213918. In spite of the rather complicated structure of the periodogram, a unique period can be defined.

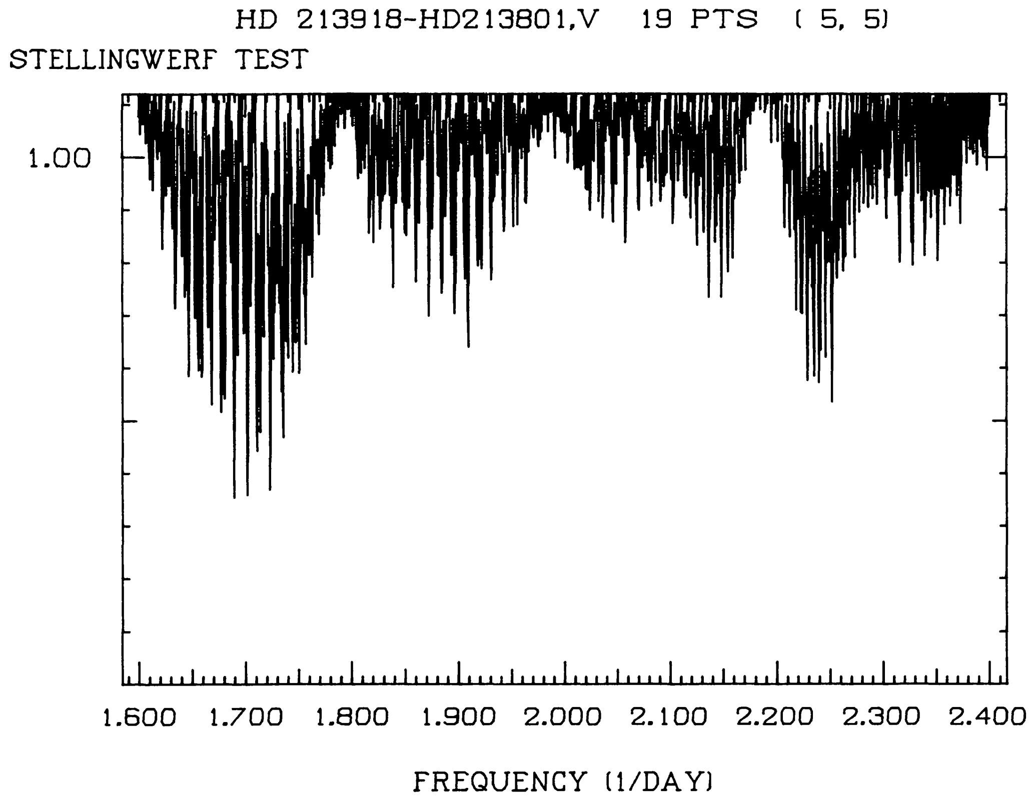


FIGURE 15 *(continued)*.

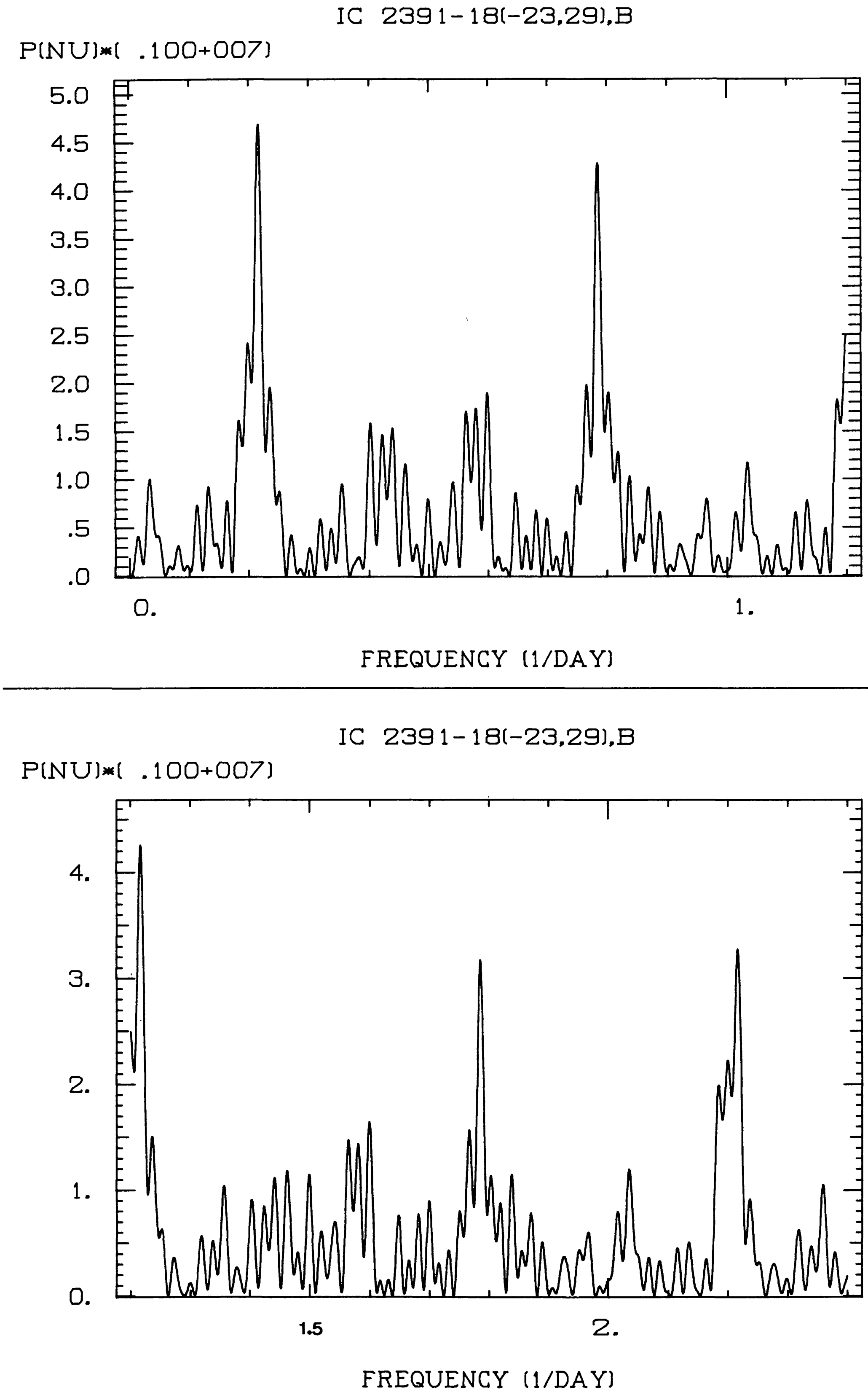
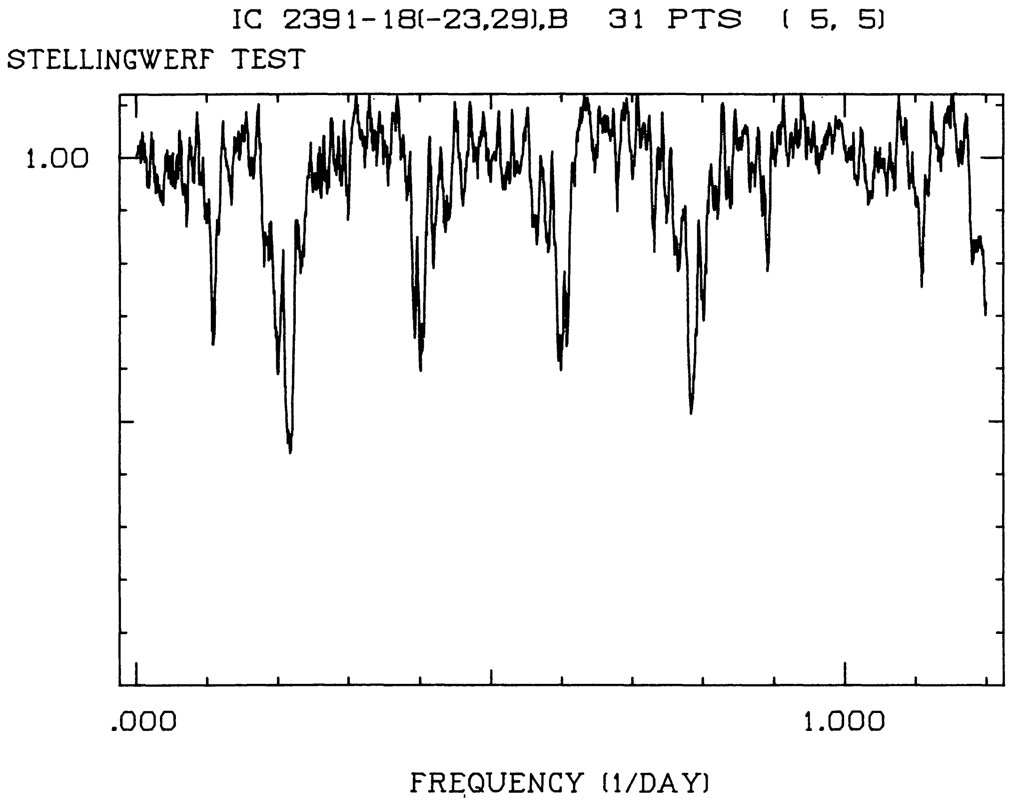


FIGURE 16a. — Deeming's method applied to the differential [B] magnitudes of IC 2391-18.



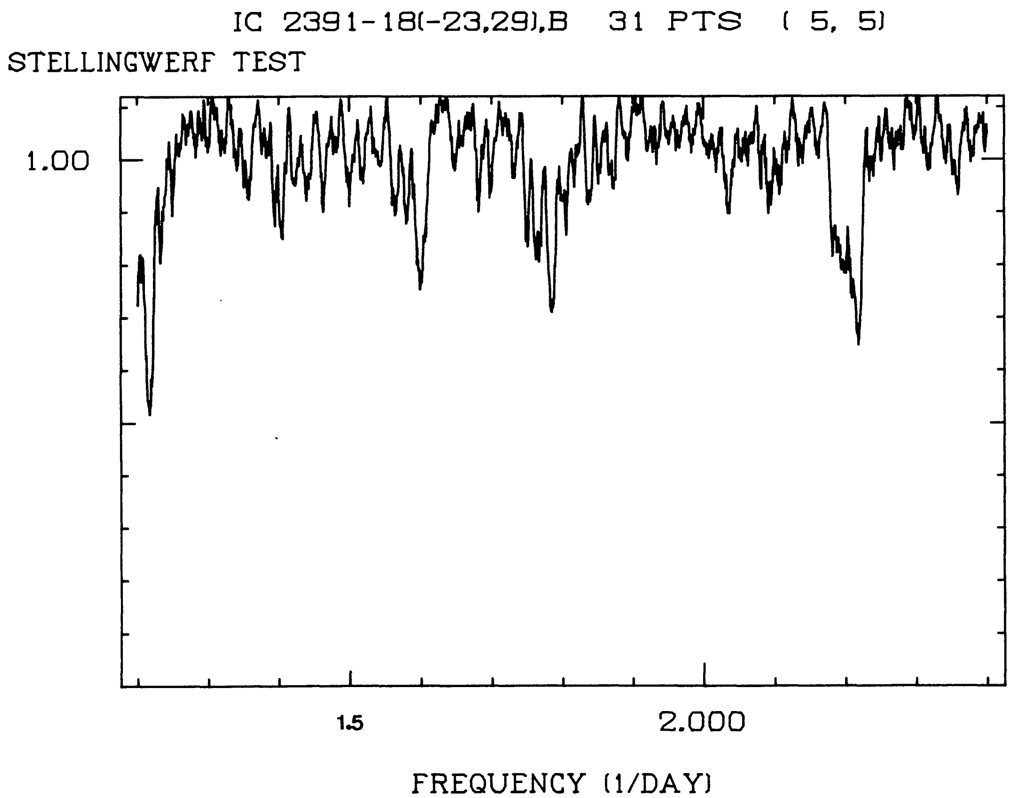
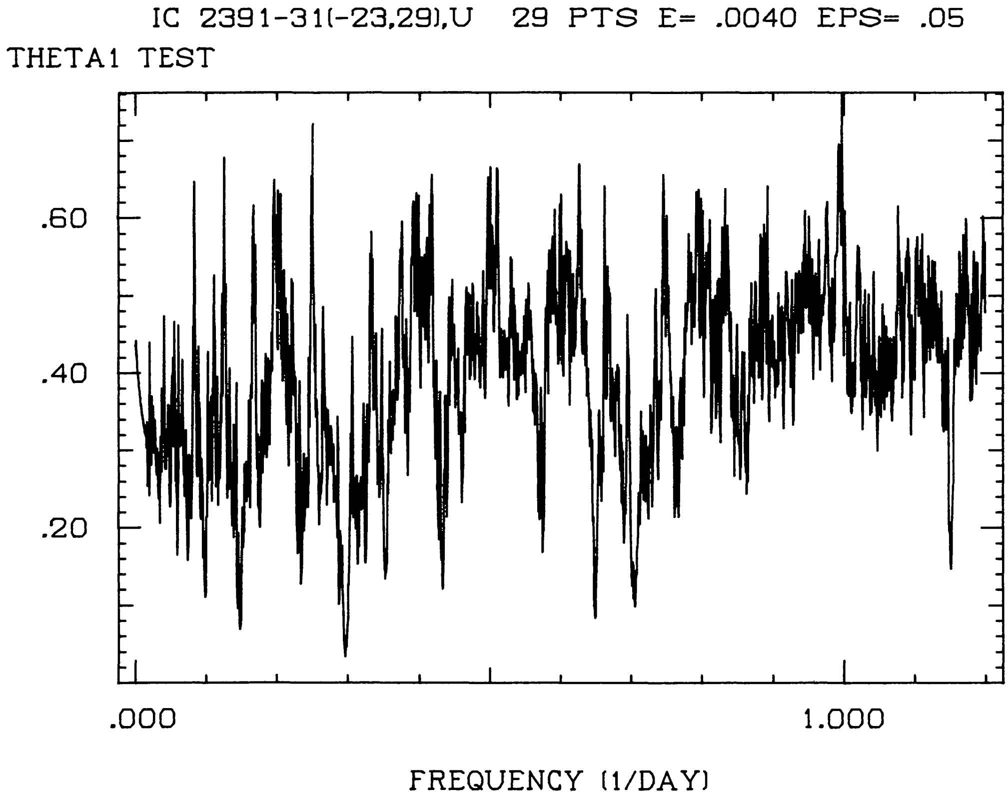


FIGURE 16b. — Same as 16a, but with Stellingwerf's method.



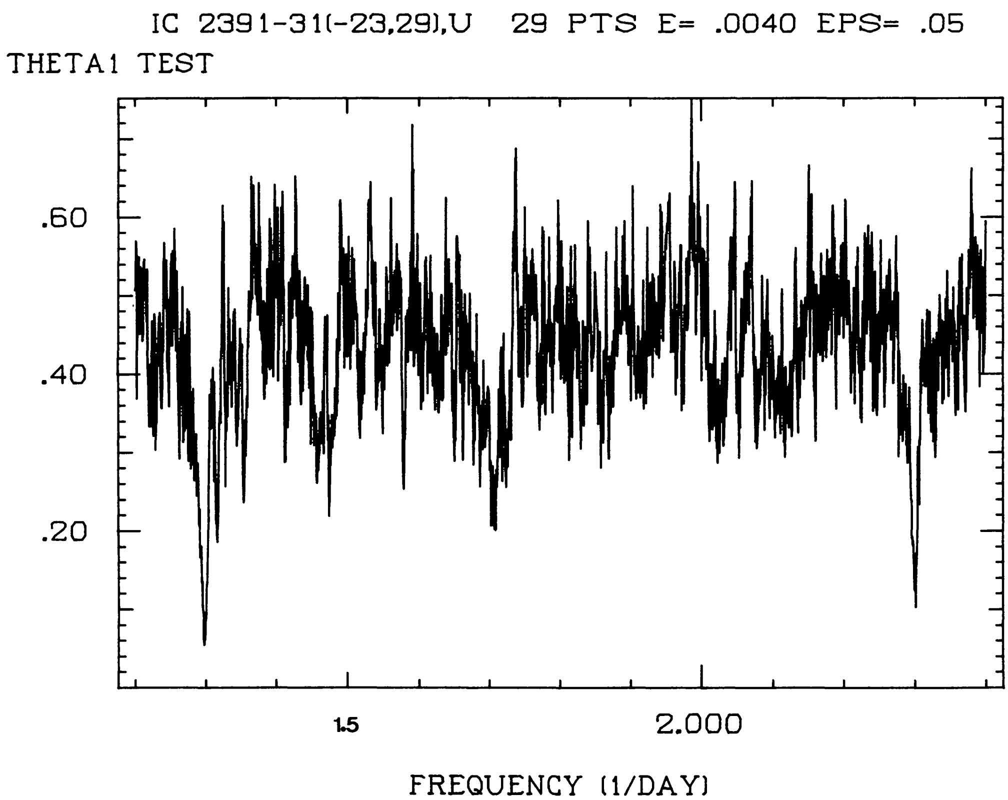
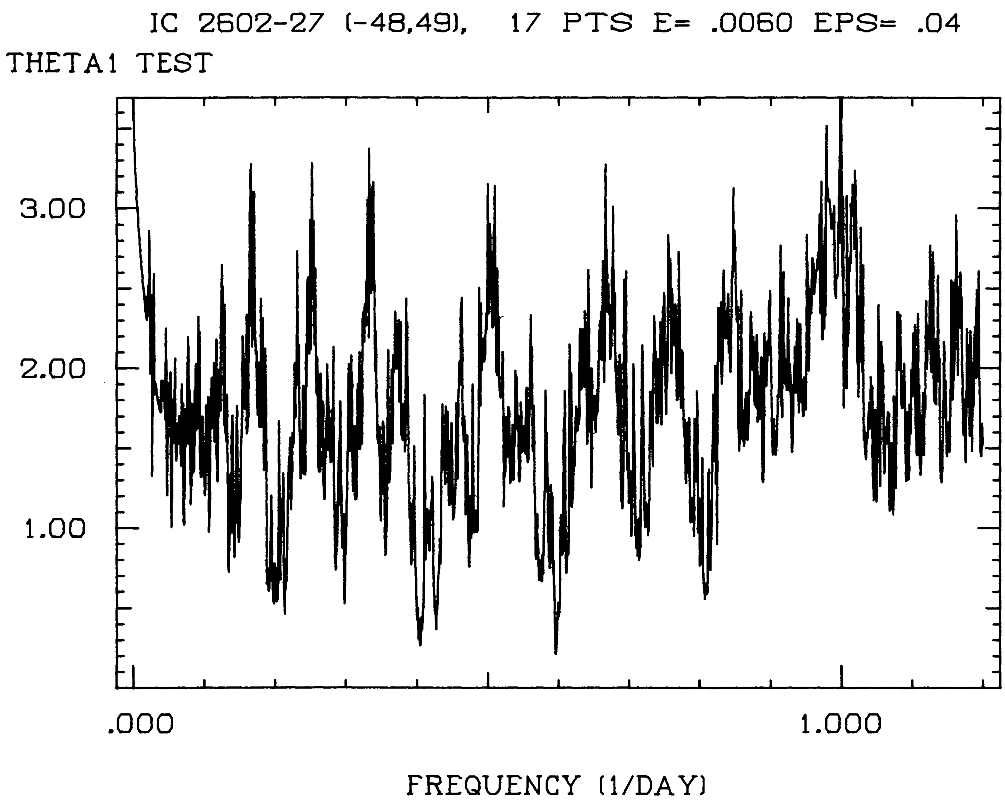


FIGURE 17. — Renson's θ_1 test applied to the differential [U] magnitudes of IC 2391-31.



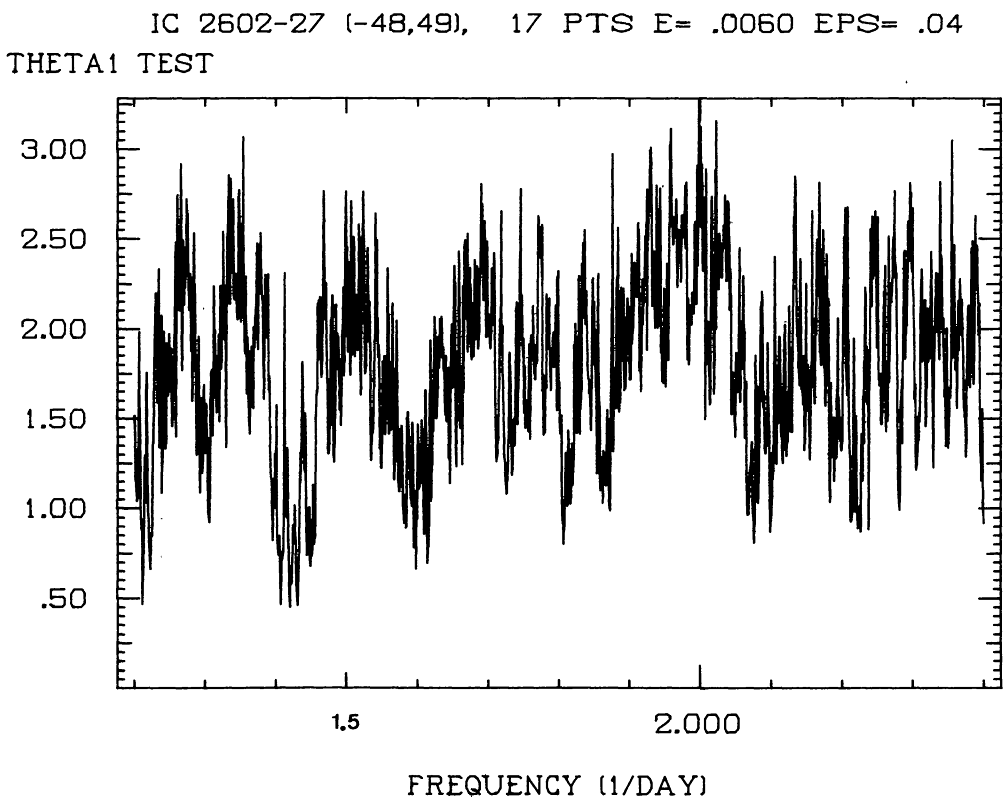


FIGURE 18. — Renson's θ_1 test applied to the differential [U] magnitudes of IC 2602-27.

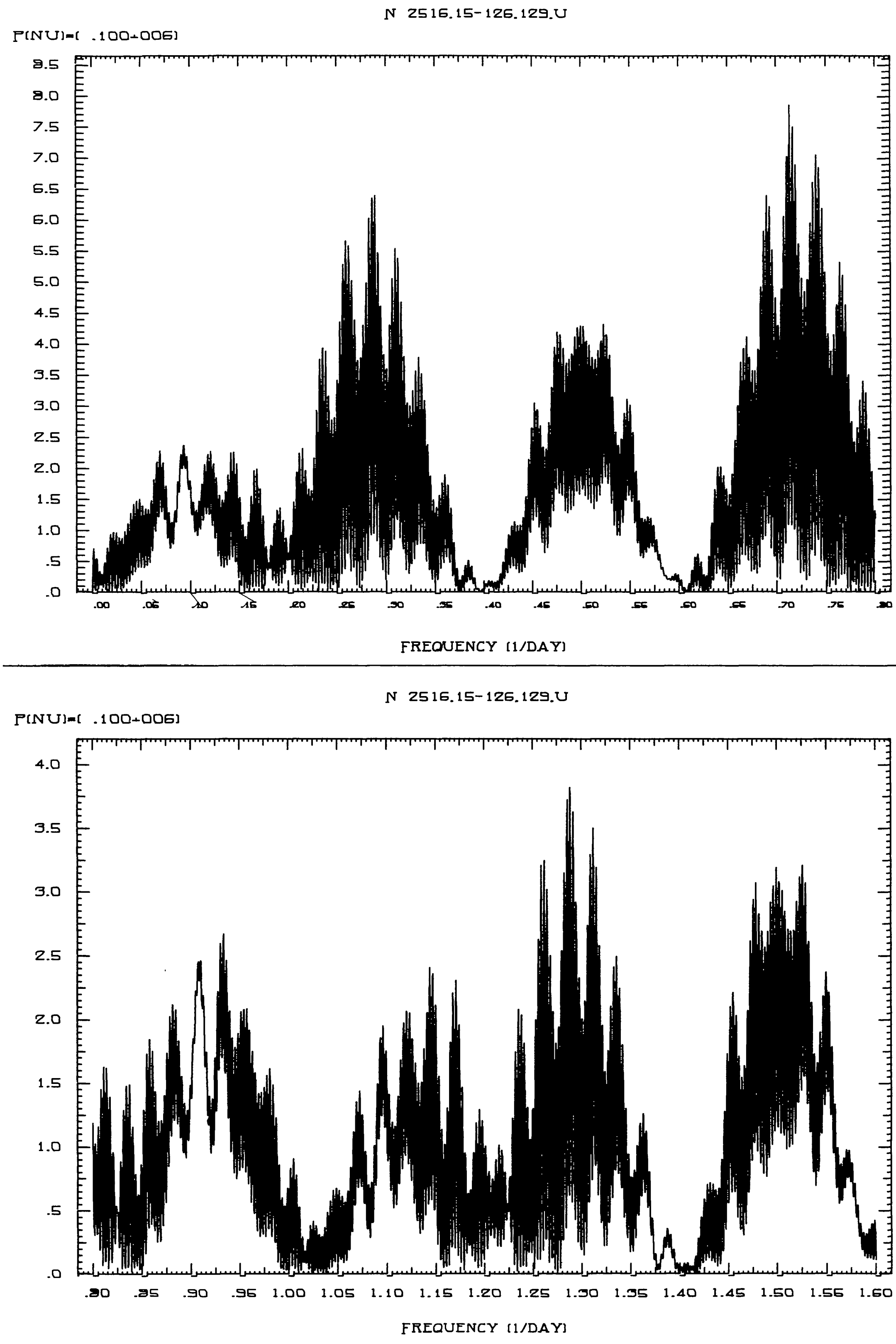


FIGURE 19. — Deeming's method applied to the differential [U] magnitudes of NGC 2516-15. A unique period can be defined in spite of the complexity of the power spectrum.

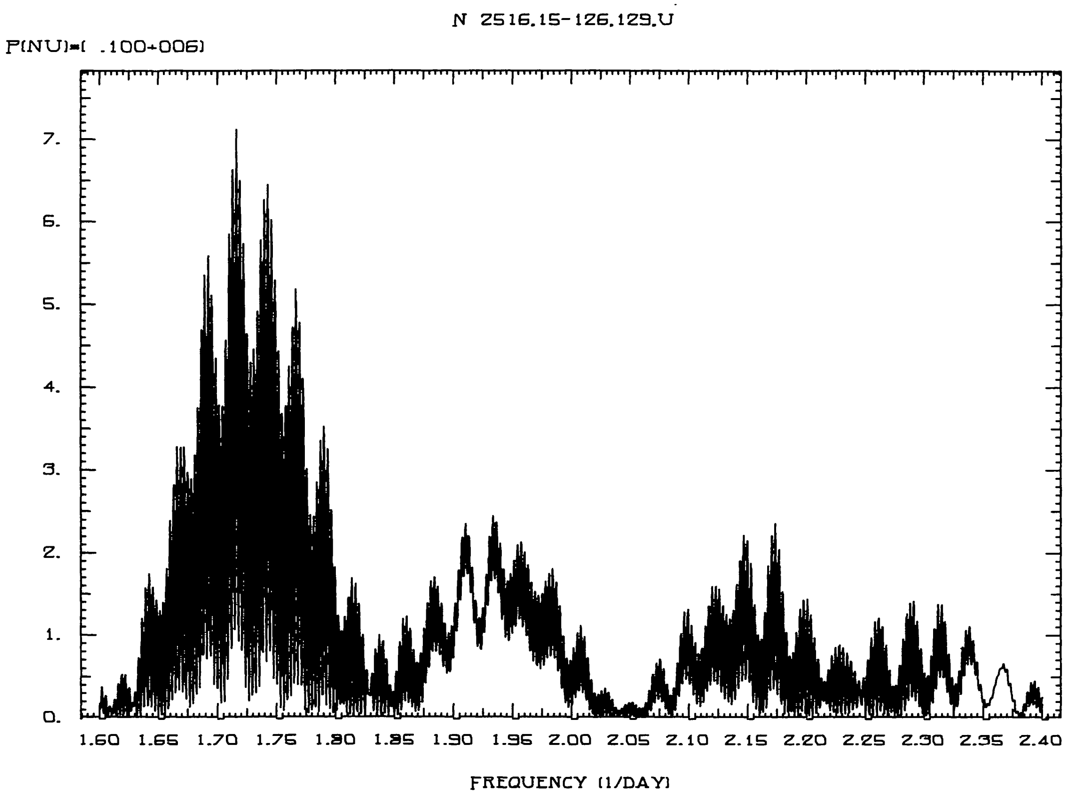
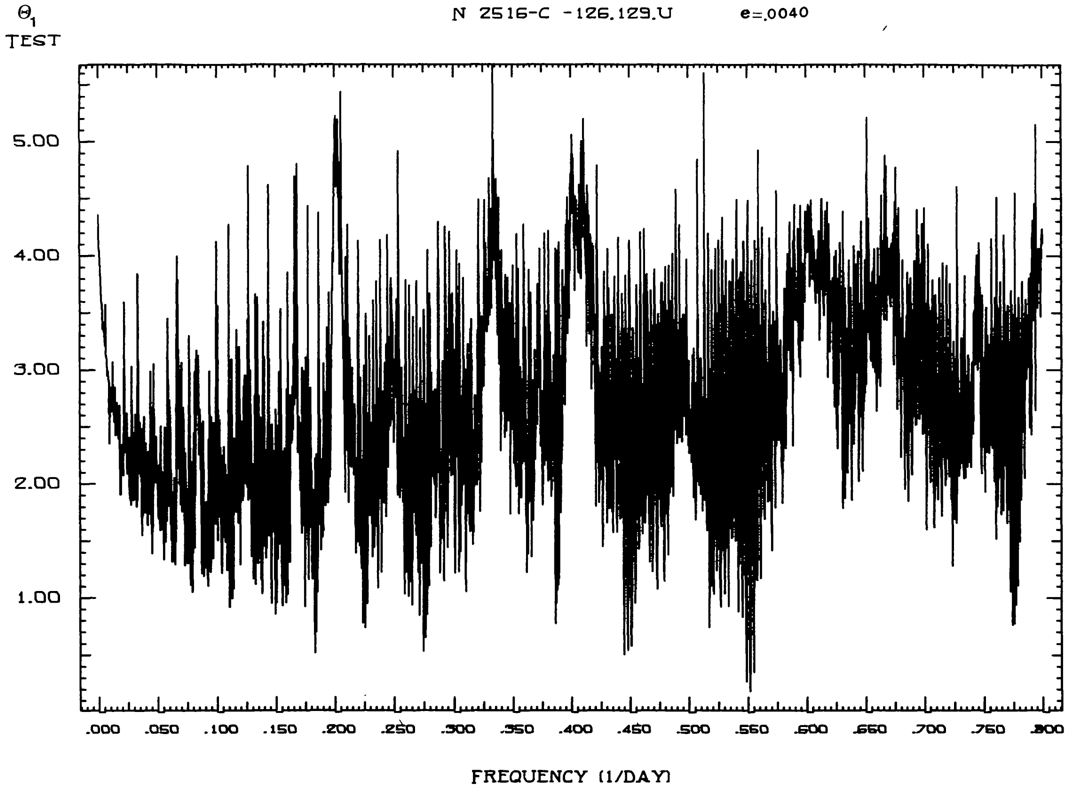


FIGURE 19 *(continued)*.



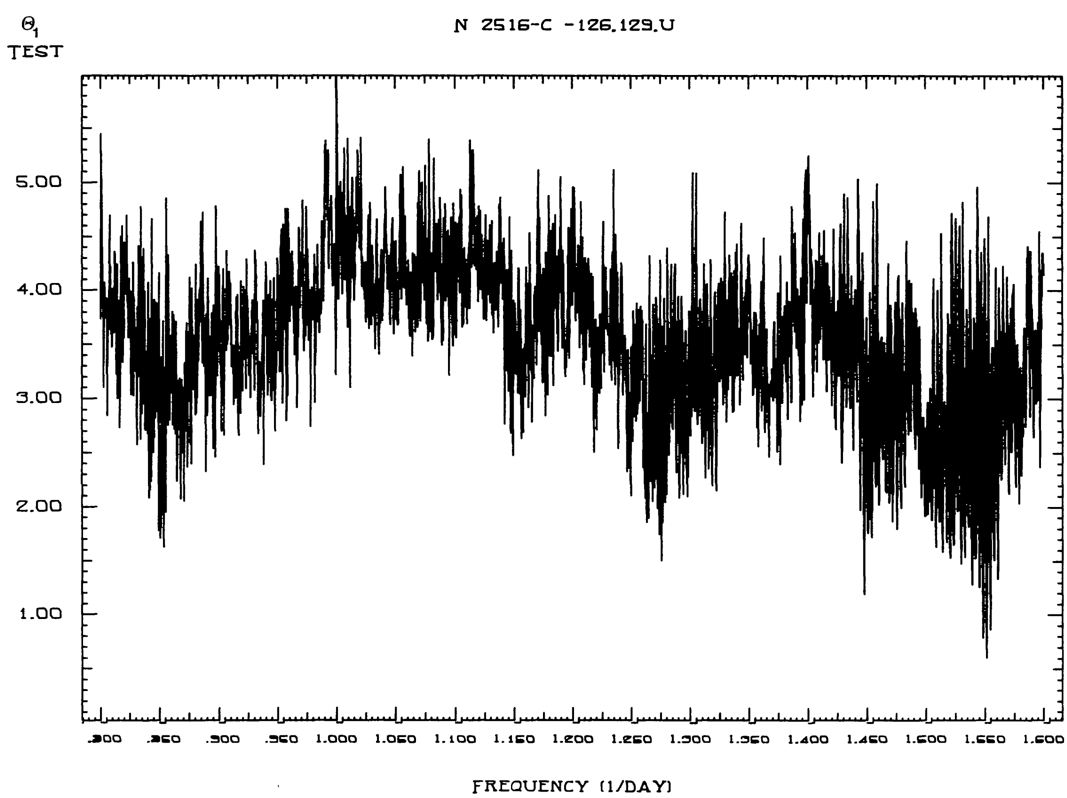


FIGURE 20. — Renson's θ_1 test applied to the differential [U] magnitudes of NGC 2516-127 (Cox c). Although it seems difficult to make a choice between two or three possible periods, there is one which is associated with minimum residual dispersions in magnitude and colours.

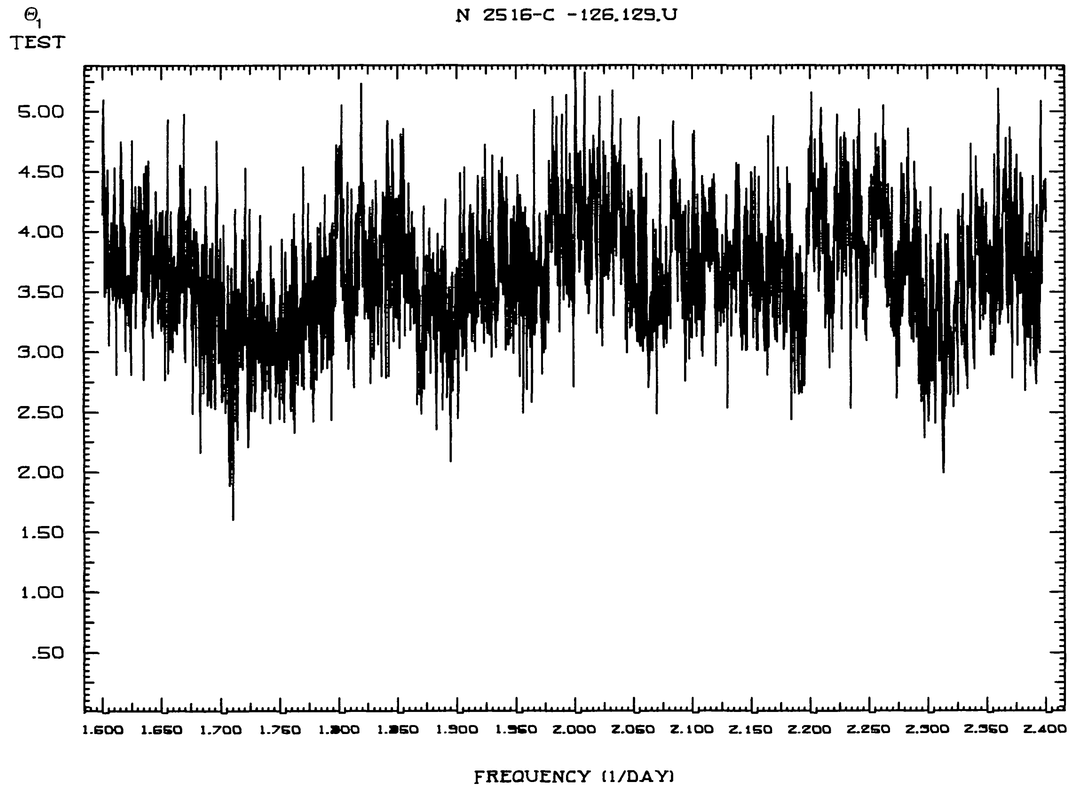
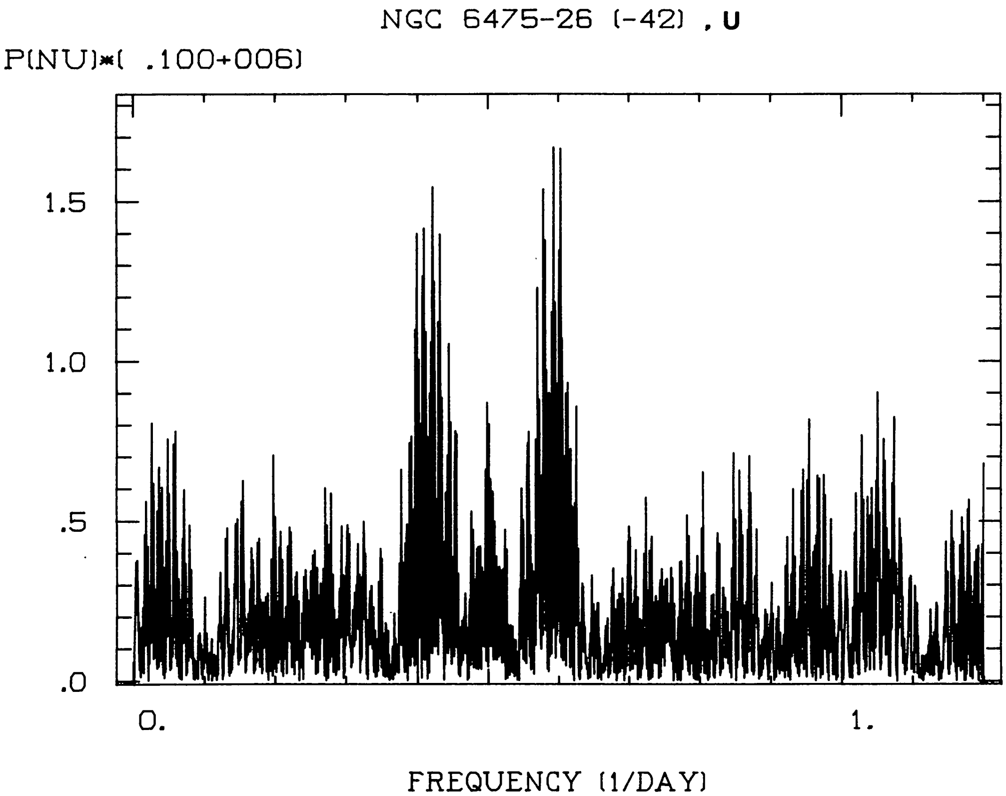


FIGURE 20 *(continued)*.



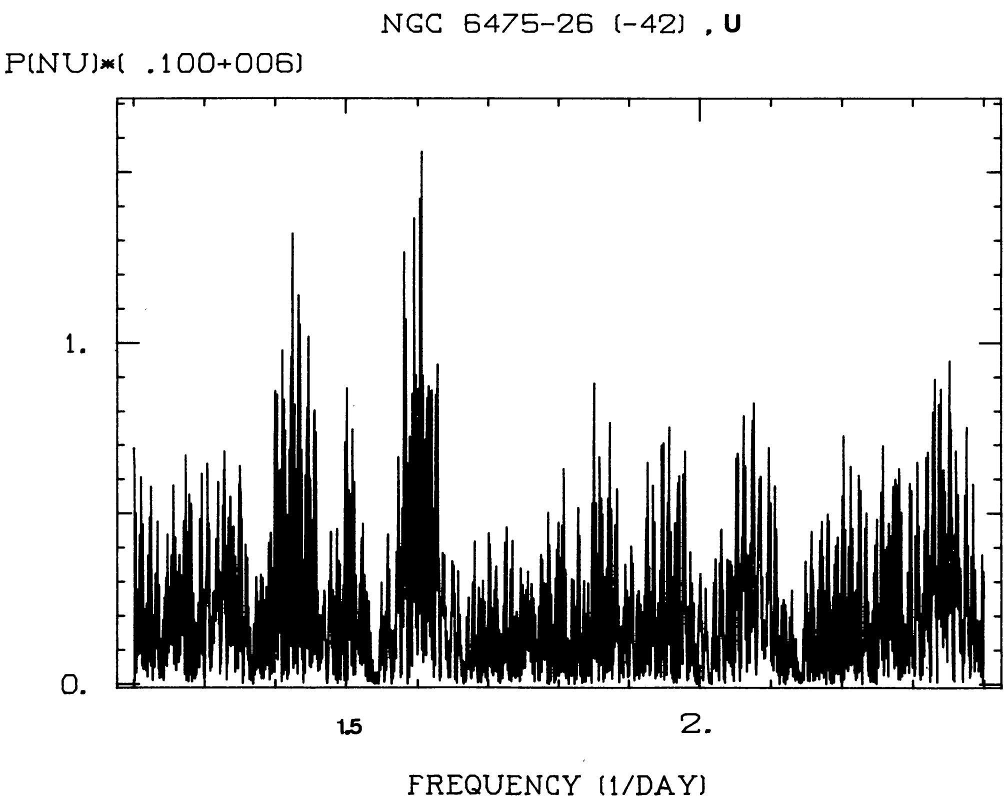
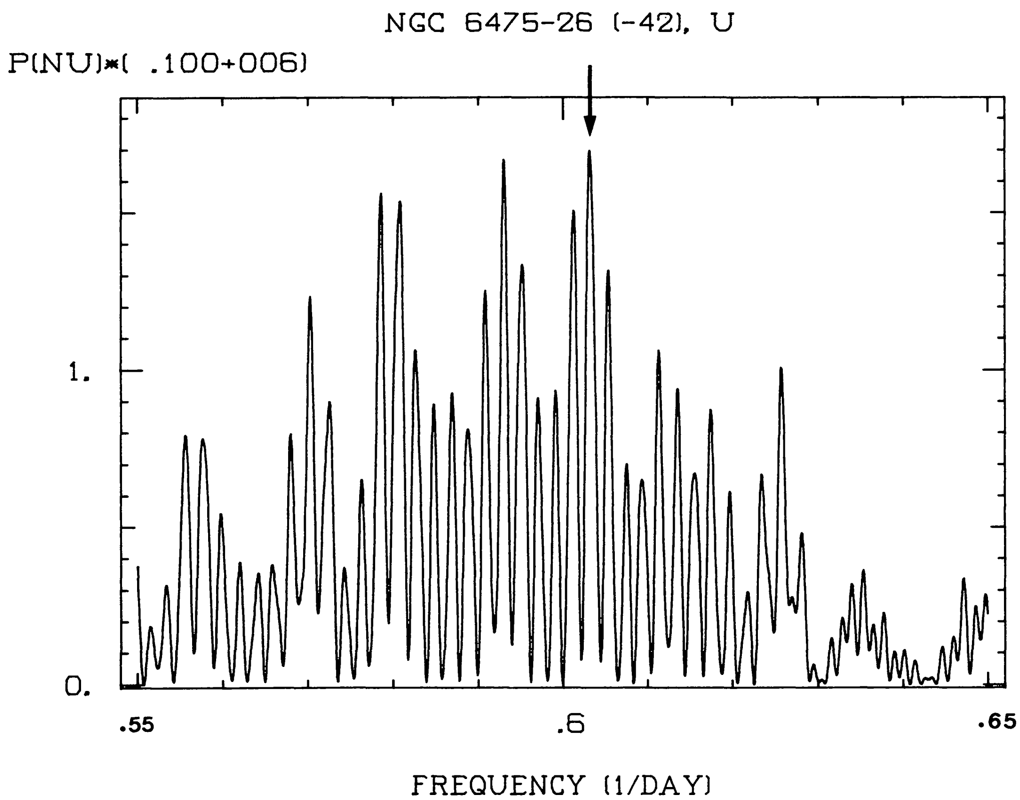


FIGURE 21a. — Deeming's method applied to the differential [U] magnitudes of the blue straggler NGC 6475-26.



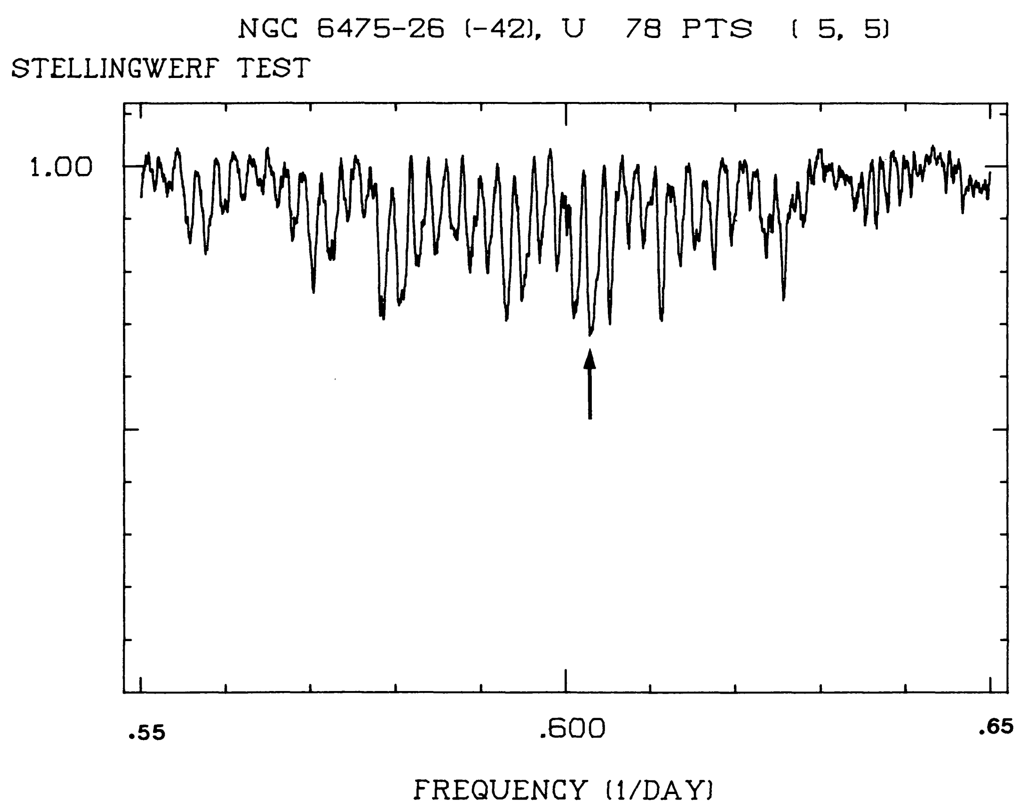


FIGURE 21b. — Detail of Deeming's power spectrum and of Stellingwerf's periodogram in the vicinity of the most probable frequency (arrow), with the [U] data.

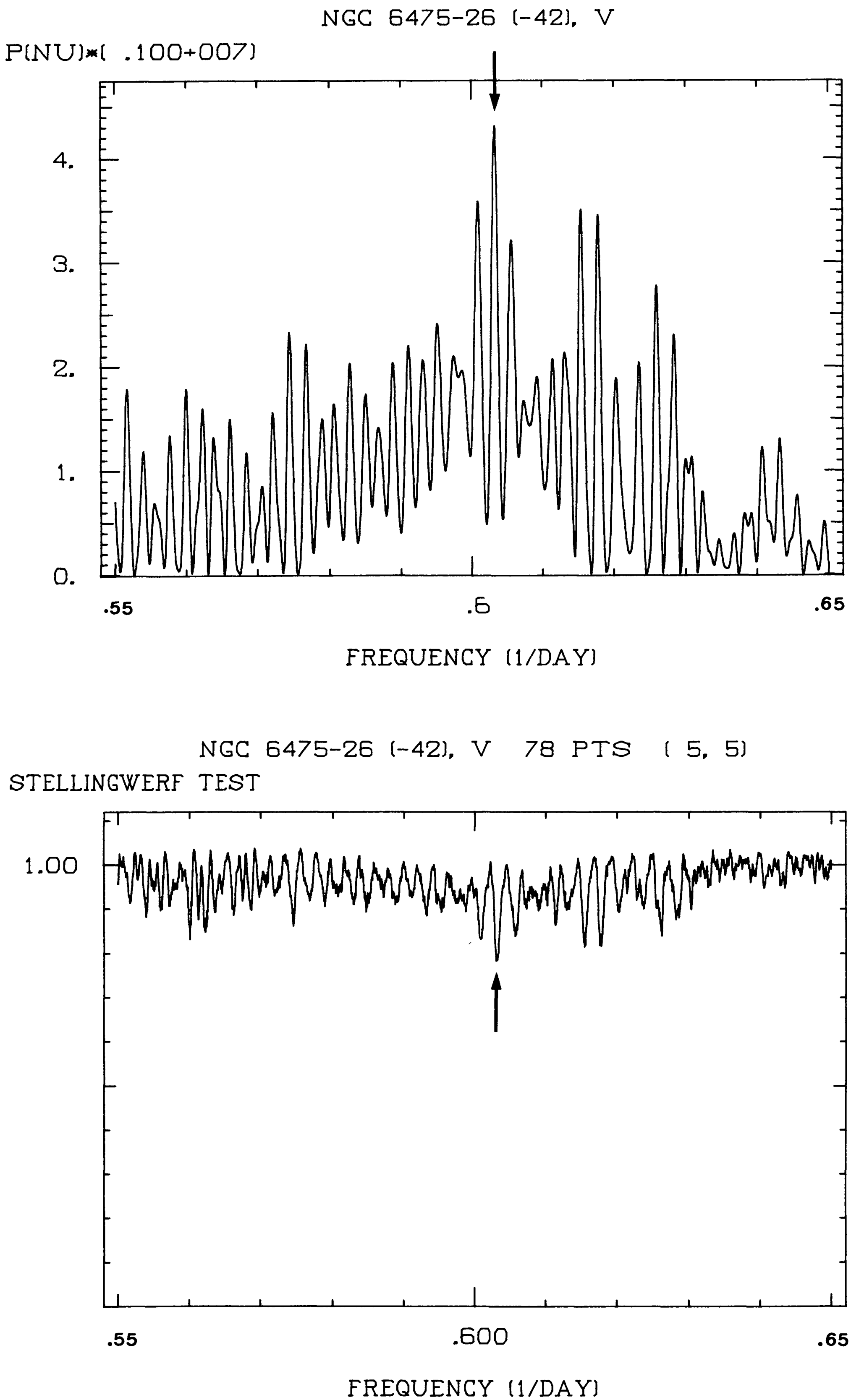


FIGURE 21c. — Same as 21b, but for the V data.

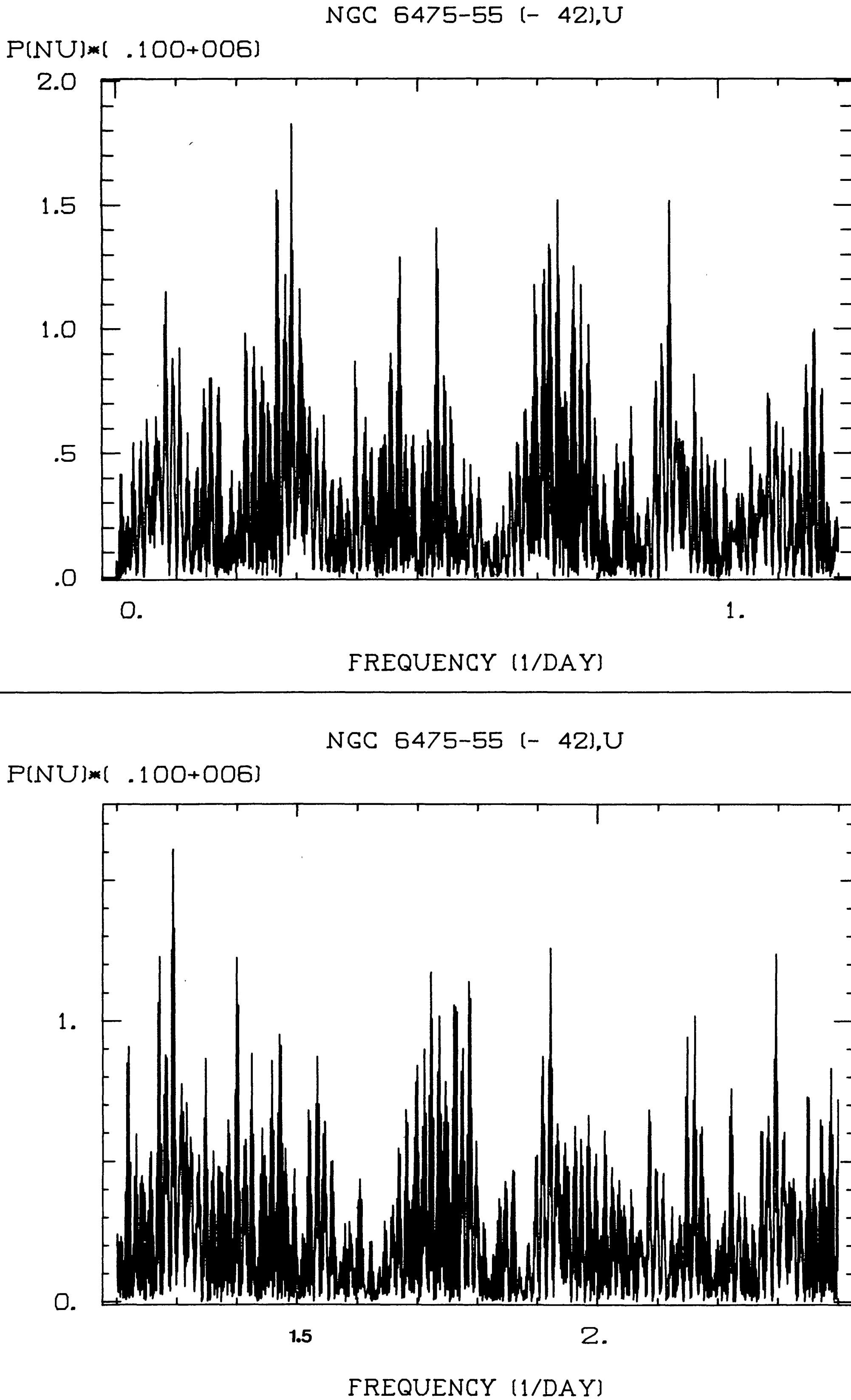
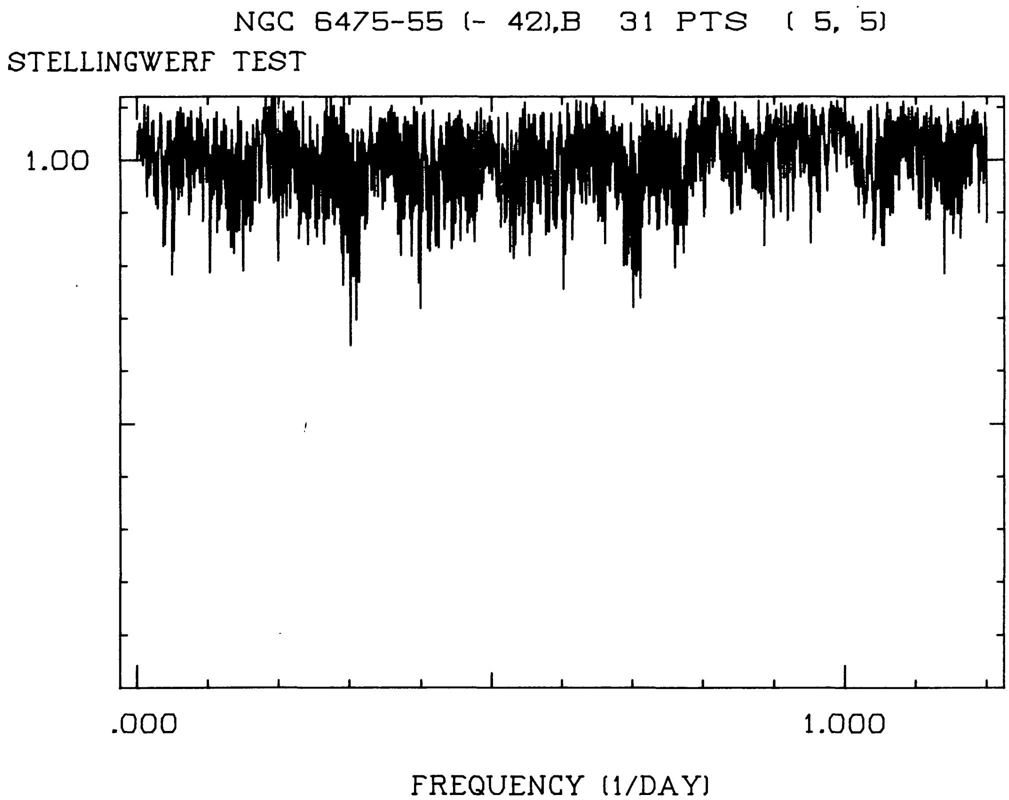


FIGURE 22a. — Deeming's method applied to the differential [U] magnitudes of NGC 6475-55.



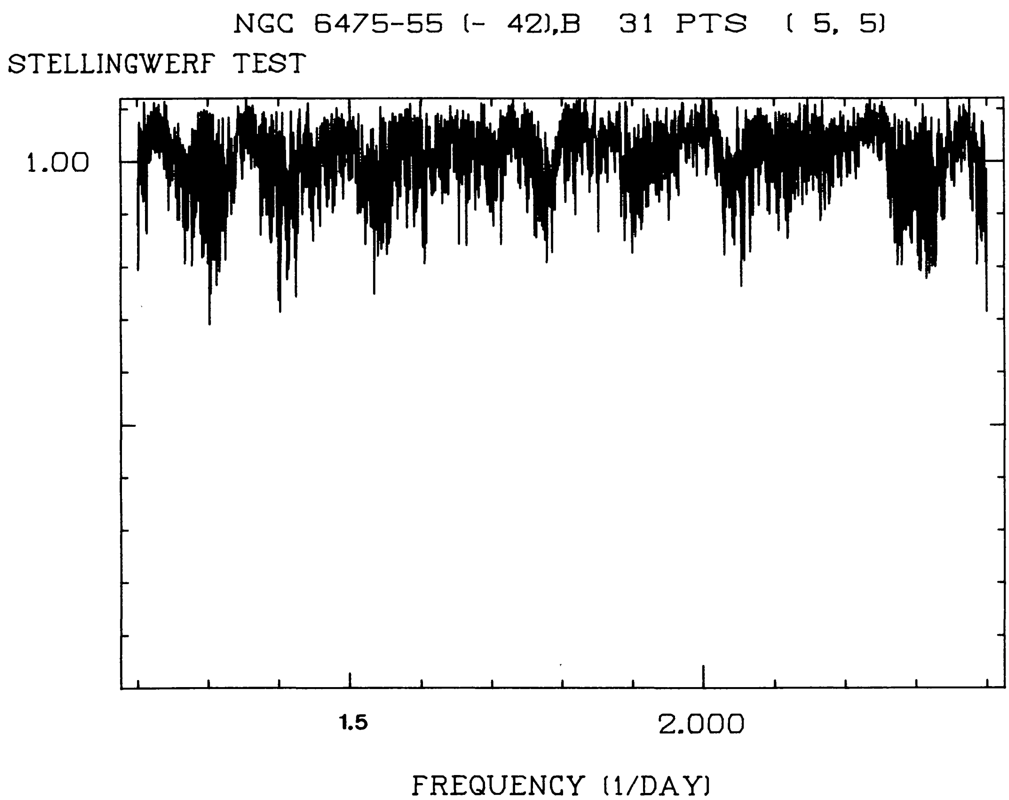


FIGURE 22b. — Stellingwerf's method applied to the differential [B] magnitudes of NGC 6475-55.

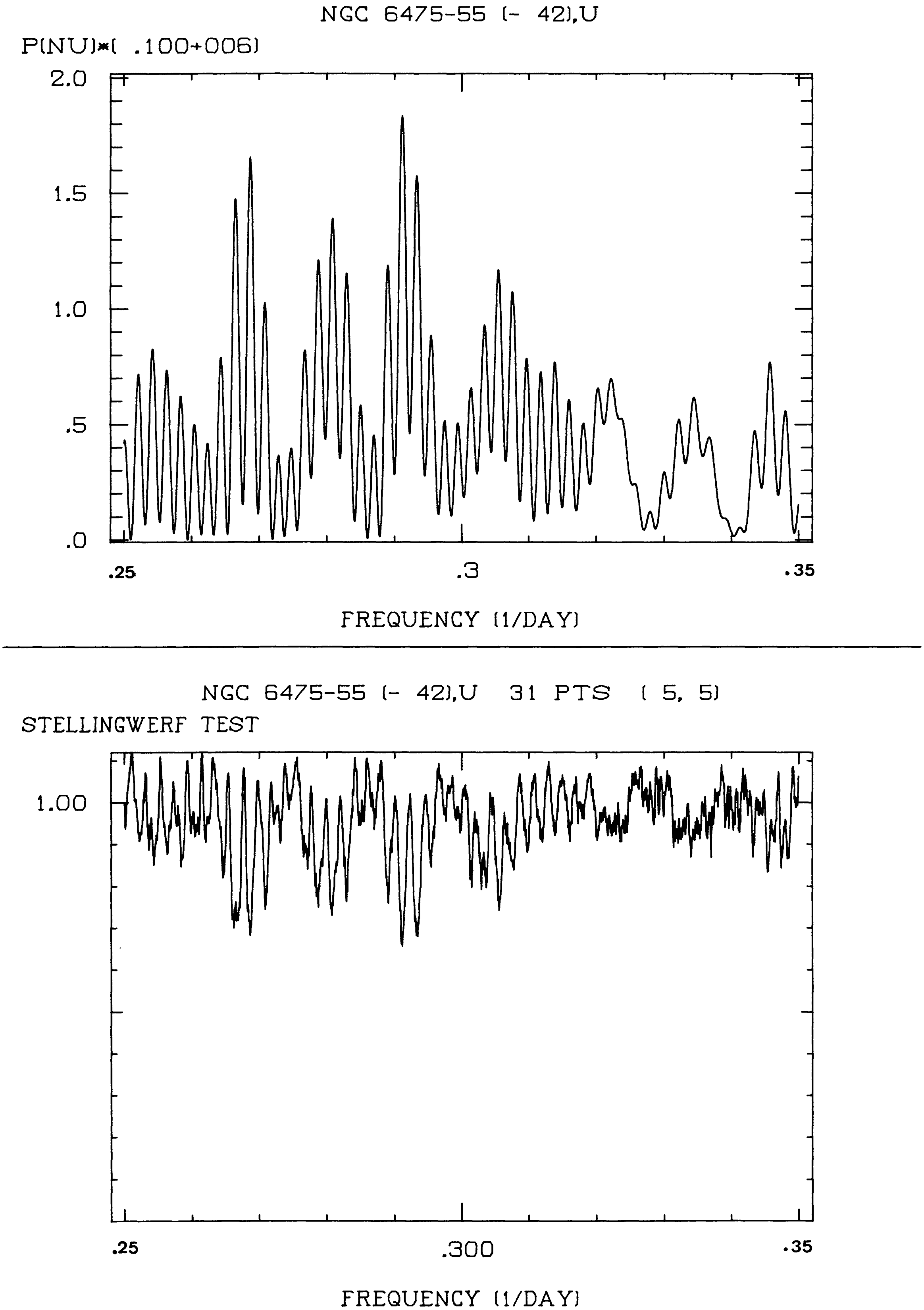
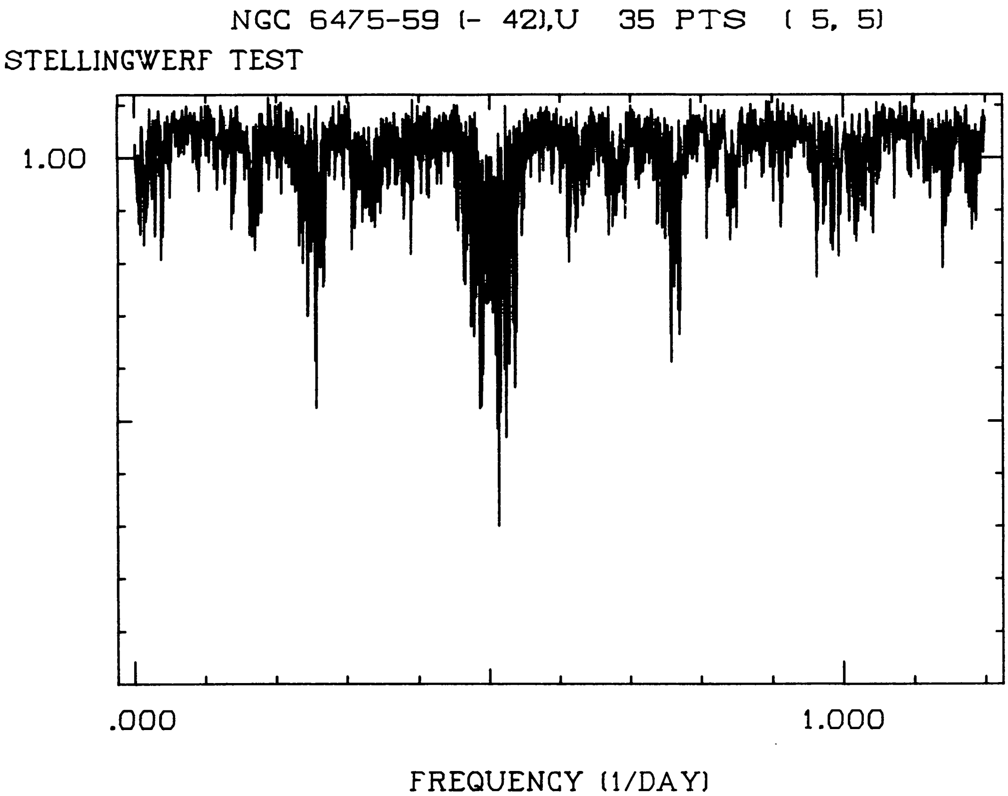


FIGURE 22c. — Detail of Deeming's power spectrum and of Stellingwerf's periodogram in the vicinity of the most probable frequency, with the [U] data.



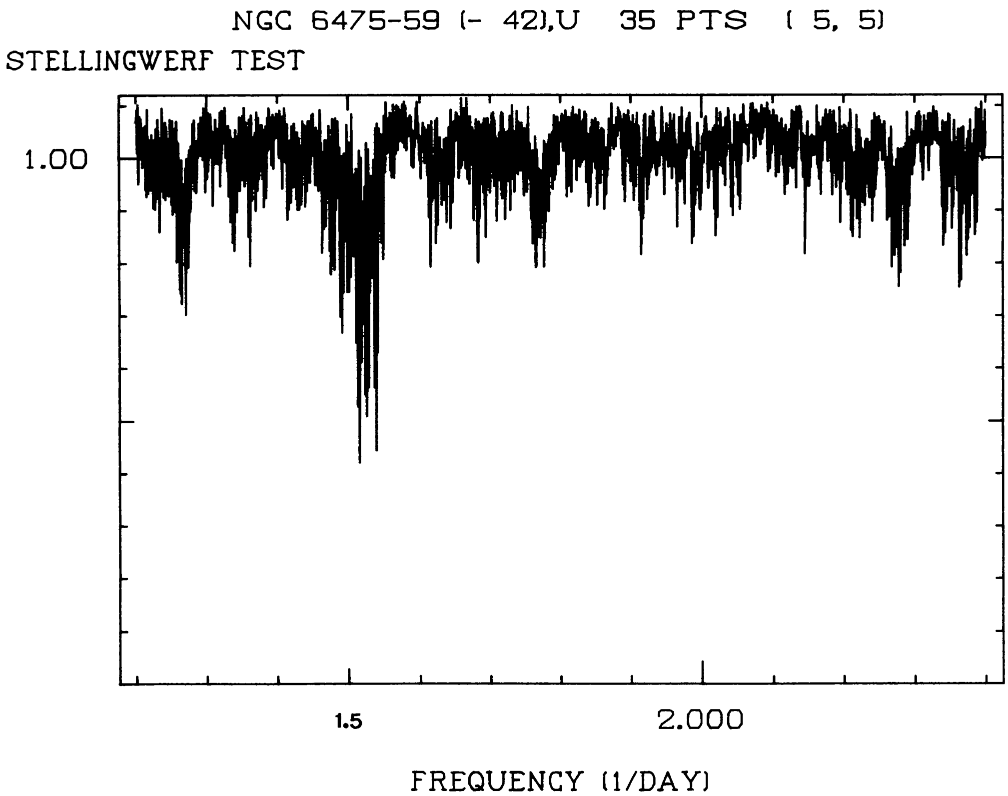
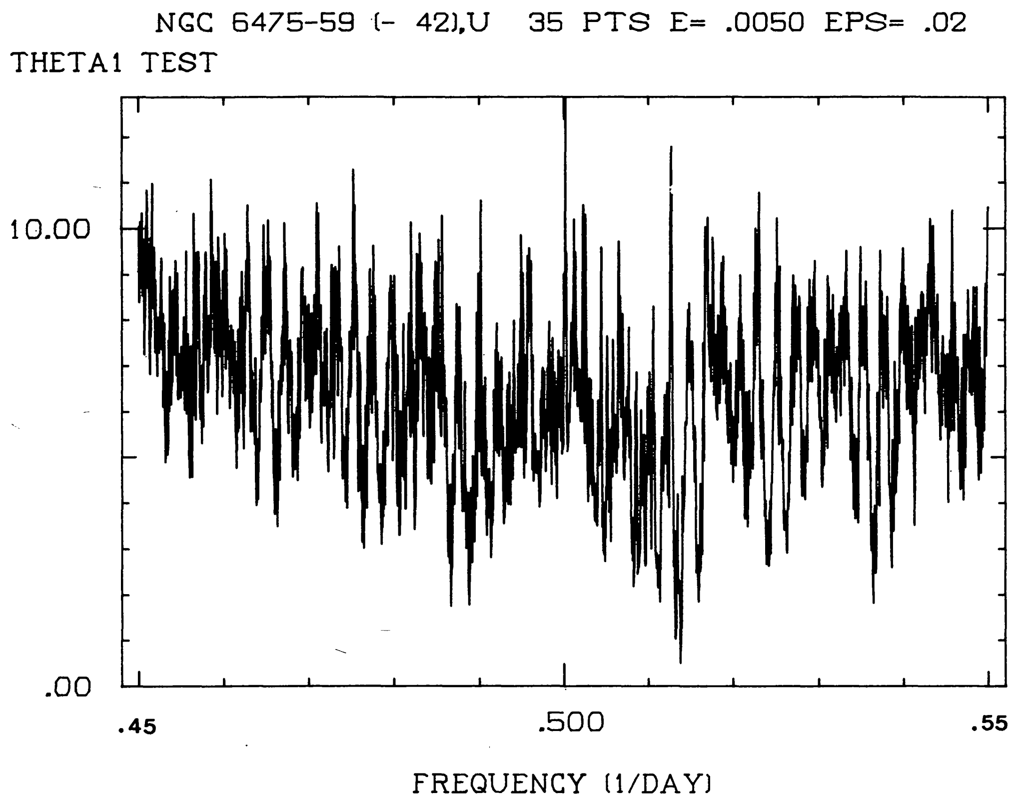


FIGURE 23a. — Stellingwerf's method applied to the differential [U] magnitudes of NGC 6475-59.



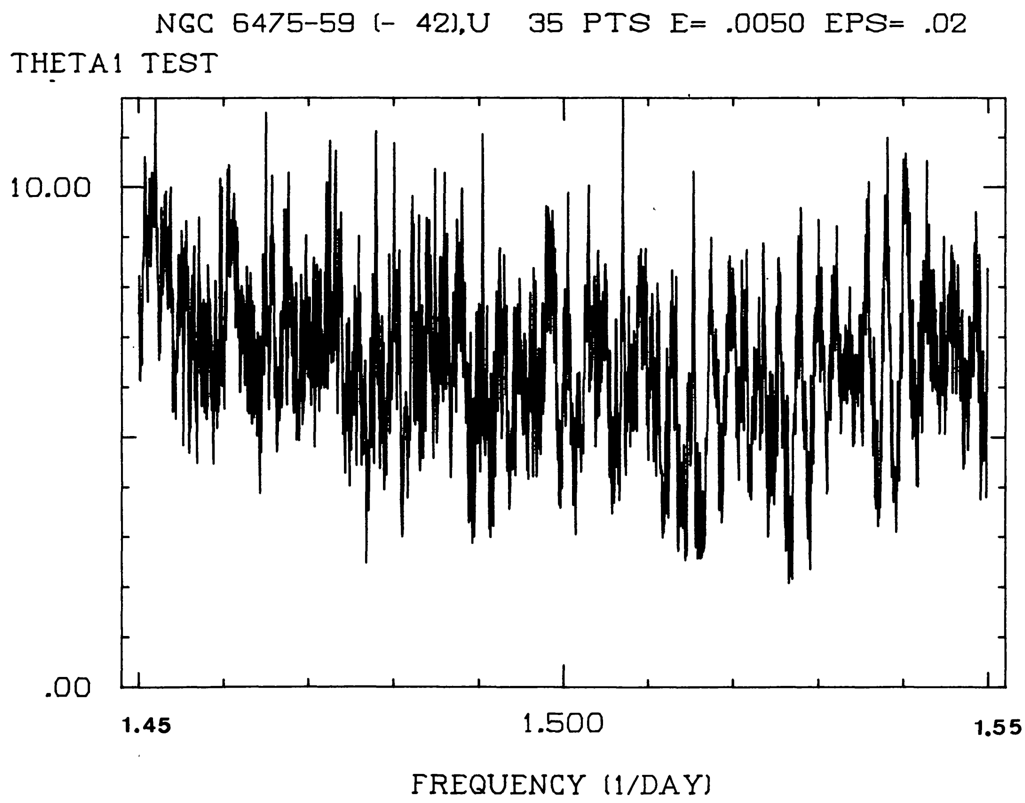
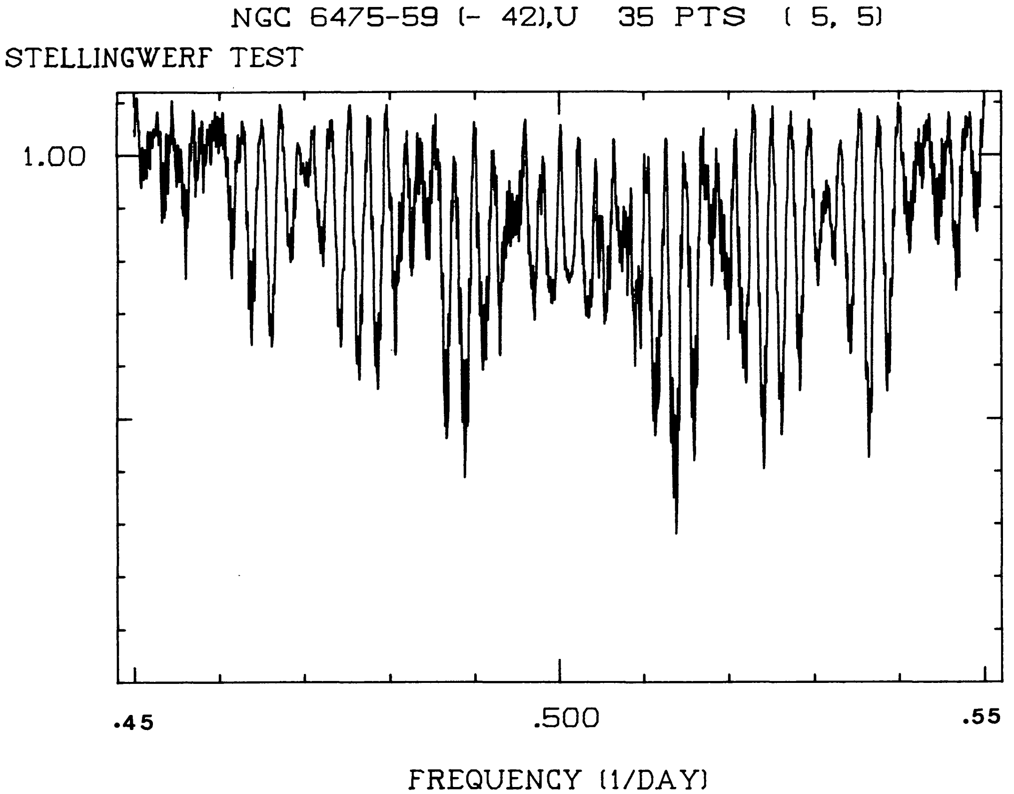


FIGURE 23b. — Details of Renson's and Stellingwerf's periodograms in the vicinity of the most probable and of the aliased frequency. The comparison shows that here the θ_1 test better discriminates the good frequency than does the phase dispersion minimization technique with a (5,5) bin structure. This is probably due to the sharp steepness of the lightcurve around phase 0.8.



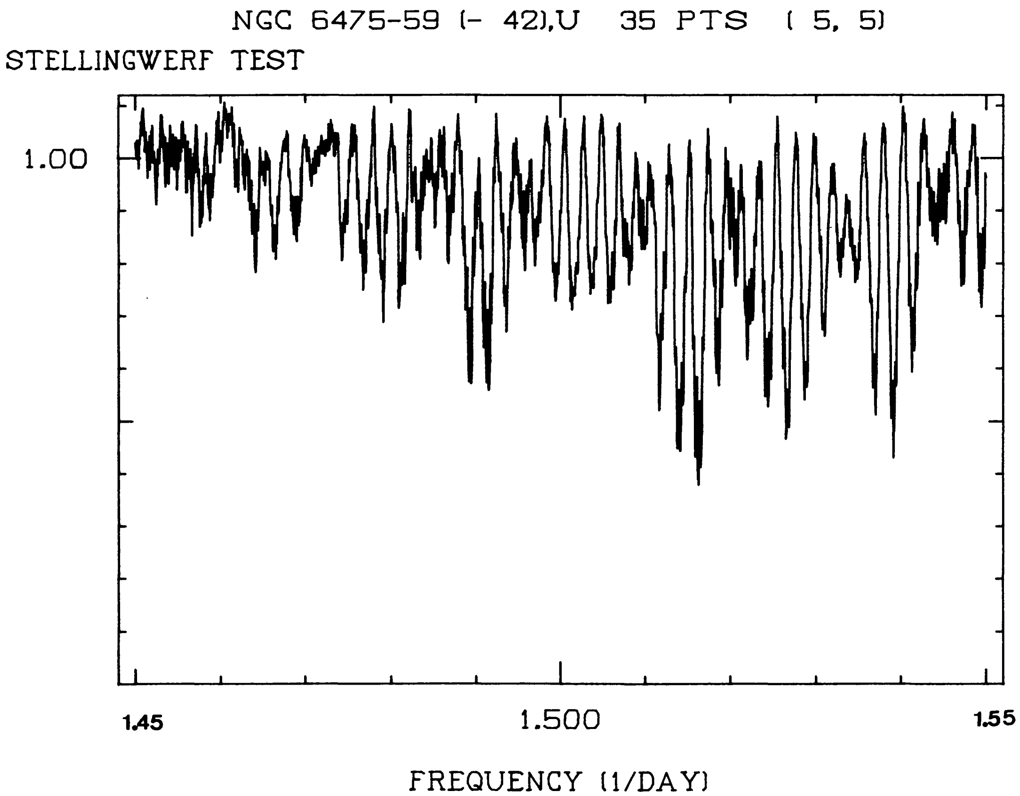
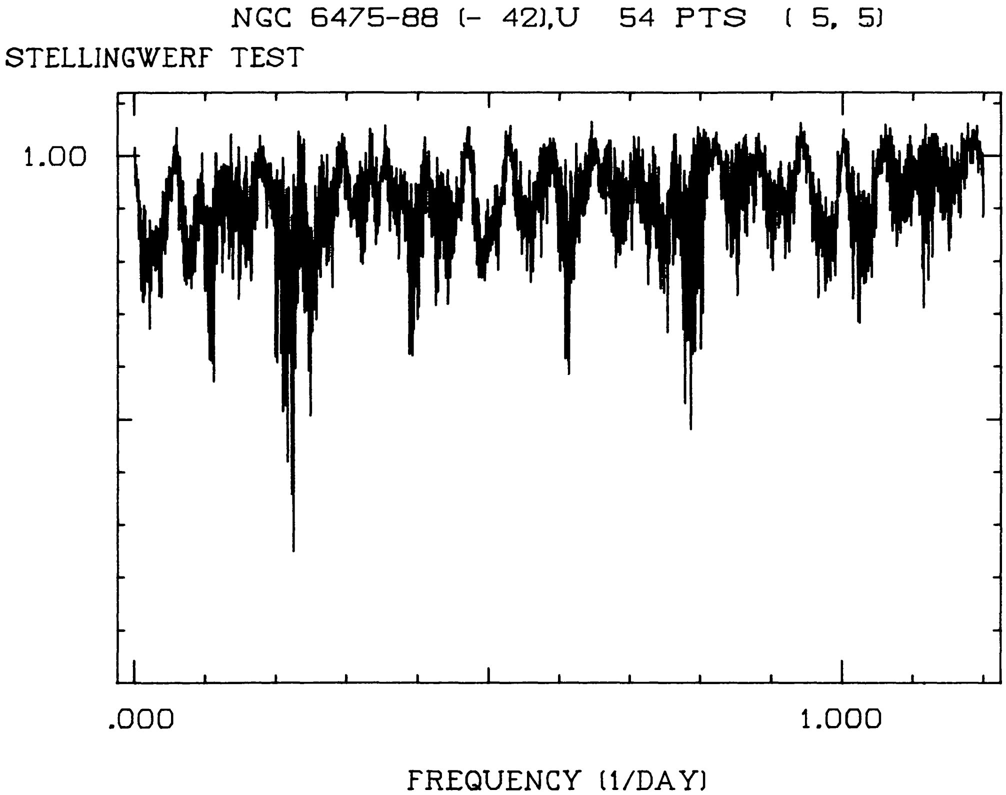


FIGURE 23b *(continued)*.



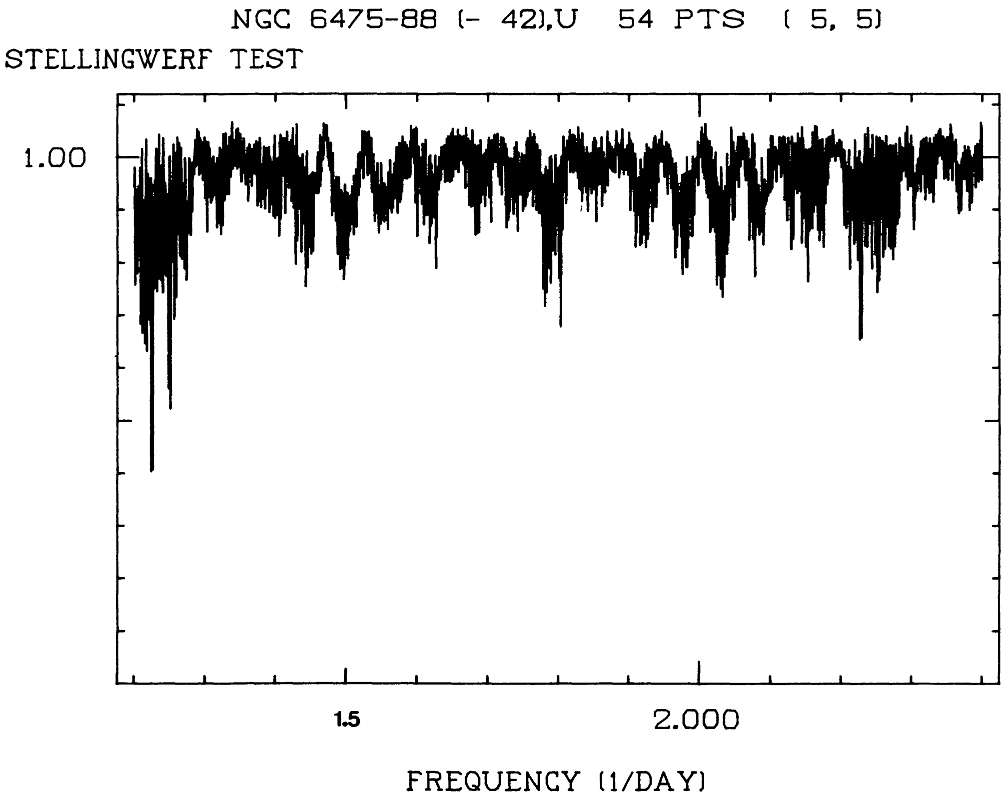
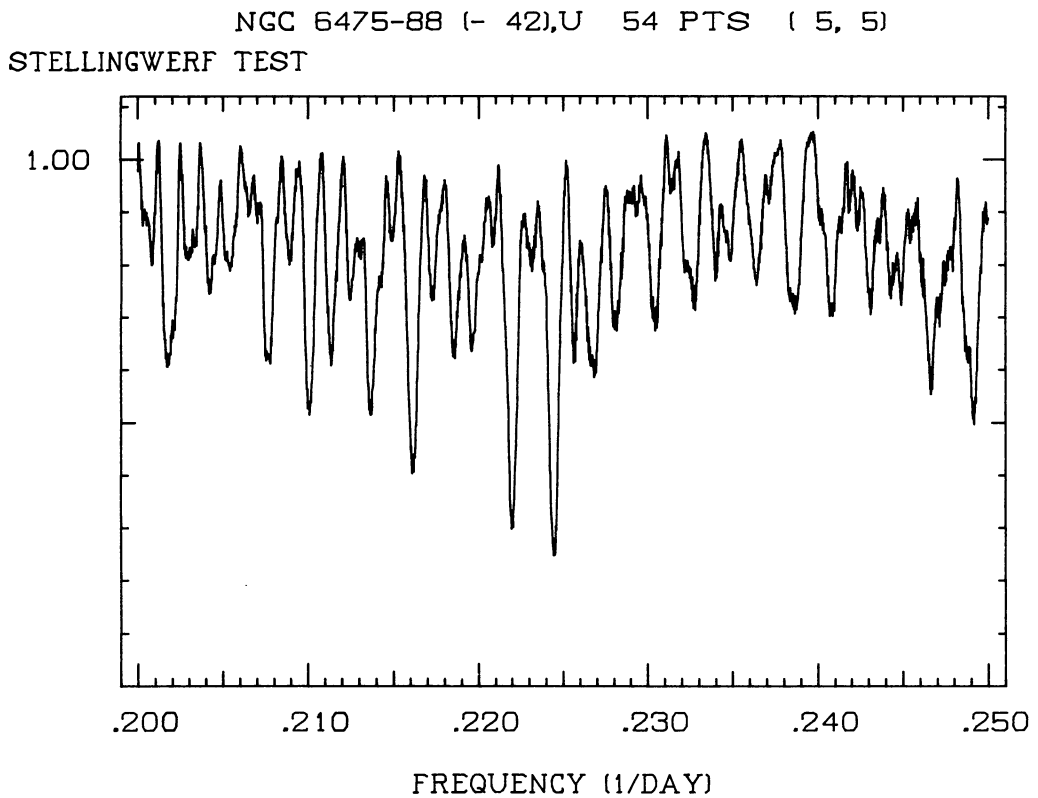


FIGURE 24a. — Stellingwerf's method applied to the differential [U] magnitudes of NGC 6475-88.



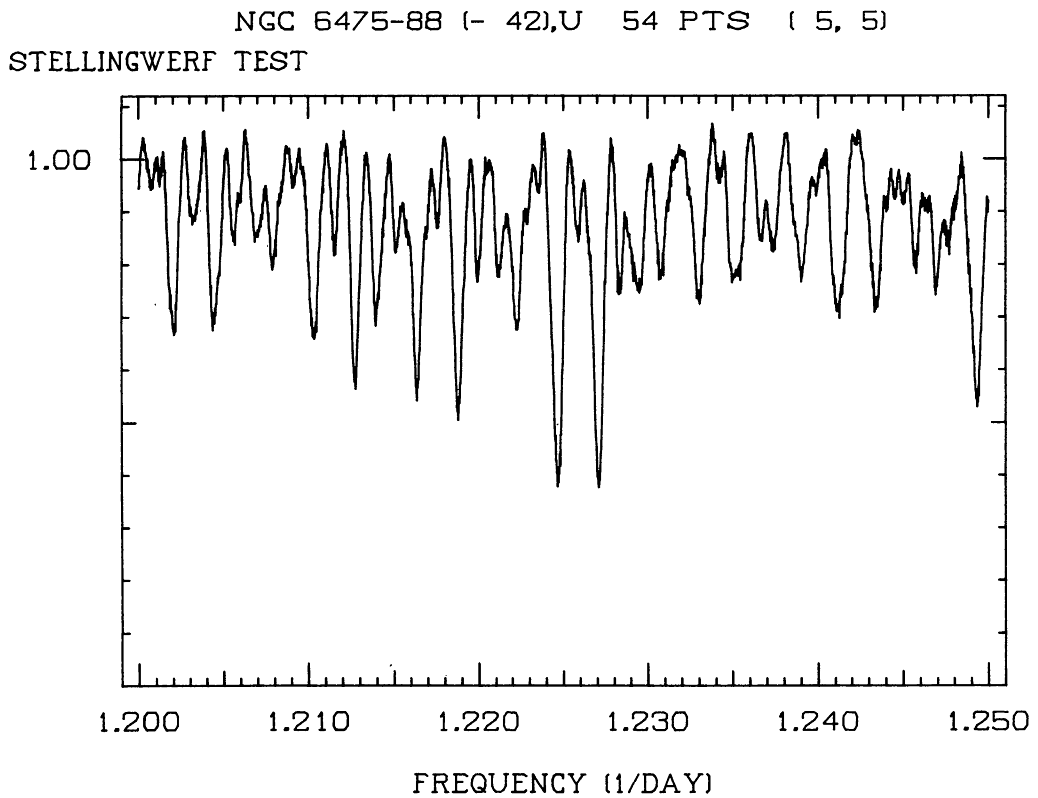


FIGURE 24b. — Detail of Stellingwerf's periodogram in the vicinity of the most probable and of the aliased frequency. The new observations made in 1983 have not been included in this diagram.

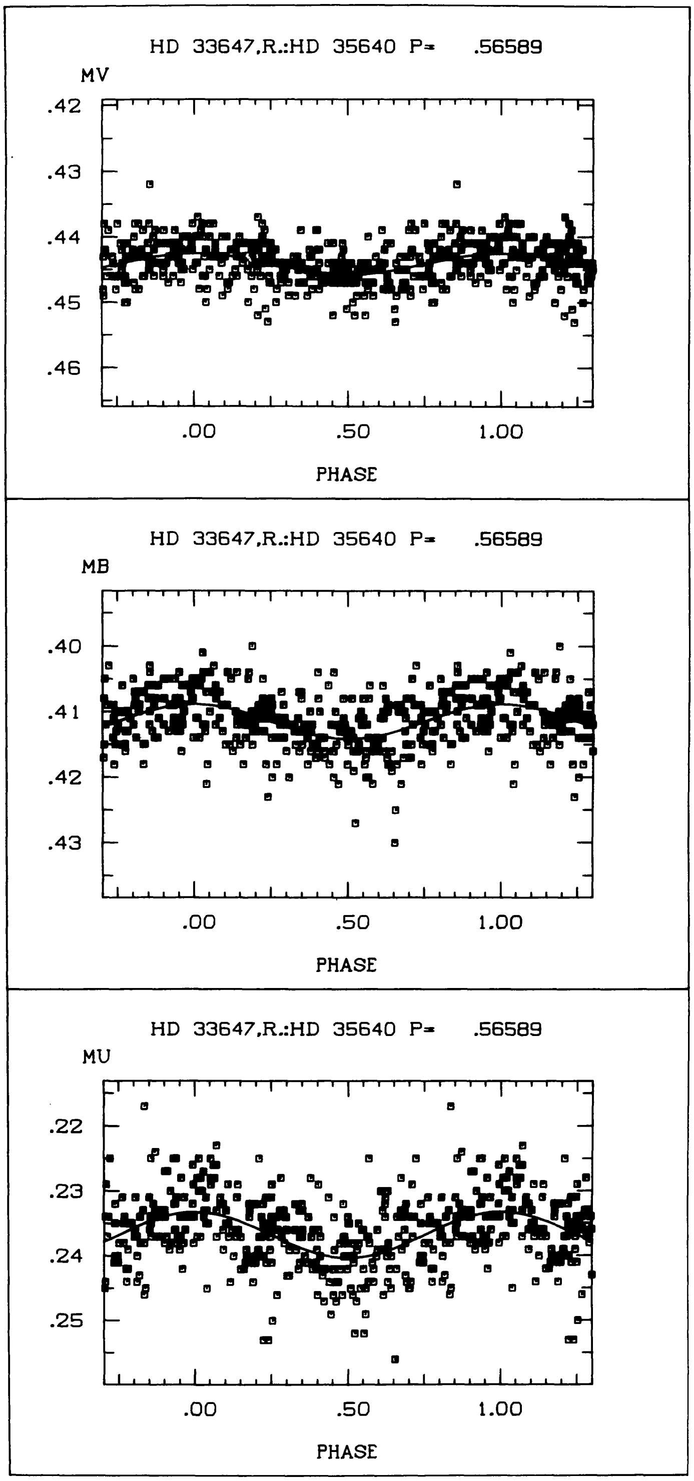


FIGURE 25. — Lightcurves of the Mn star HD 33647 in the [U], [B] and V bands. Given the extremely small signal-to-noise ratio, it was not judged useful to plot the parameters which are even noisier.

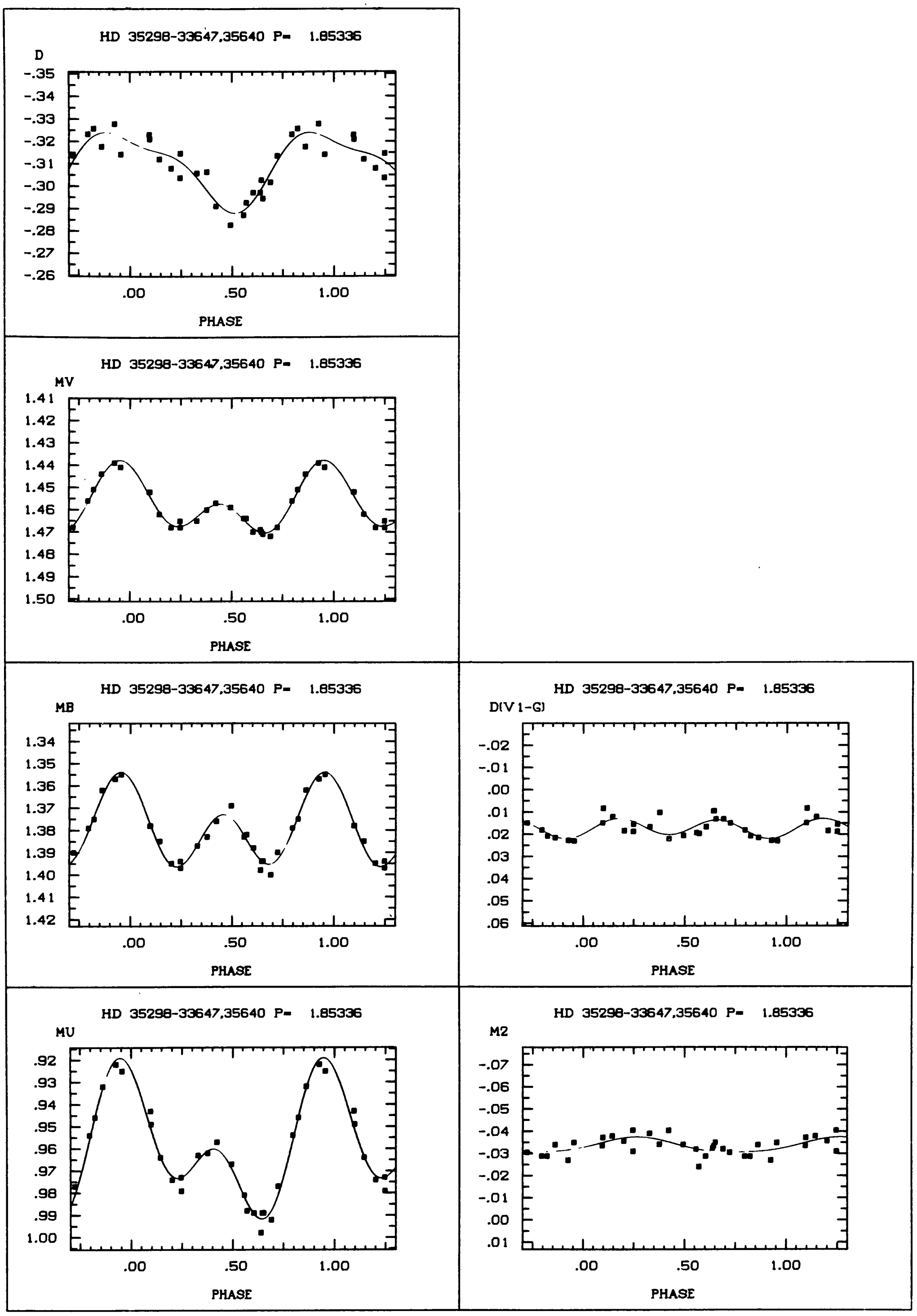


FIGURE 26. — Lightcurves of the He wk star HD 35298.

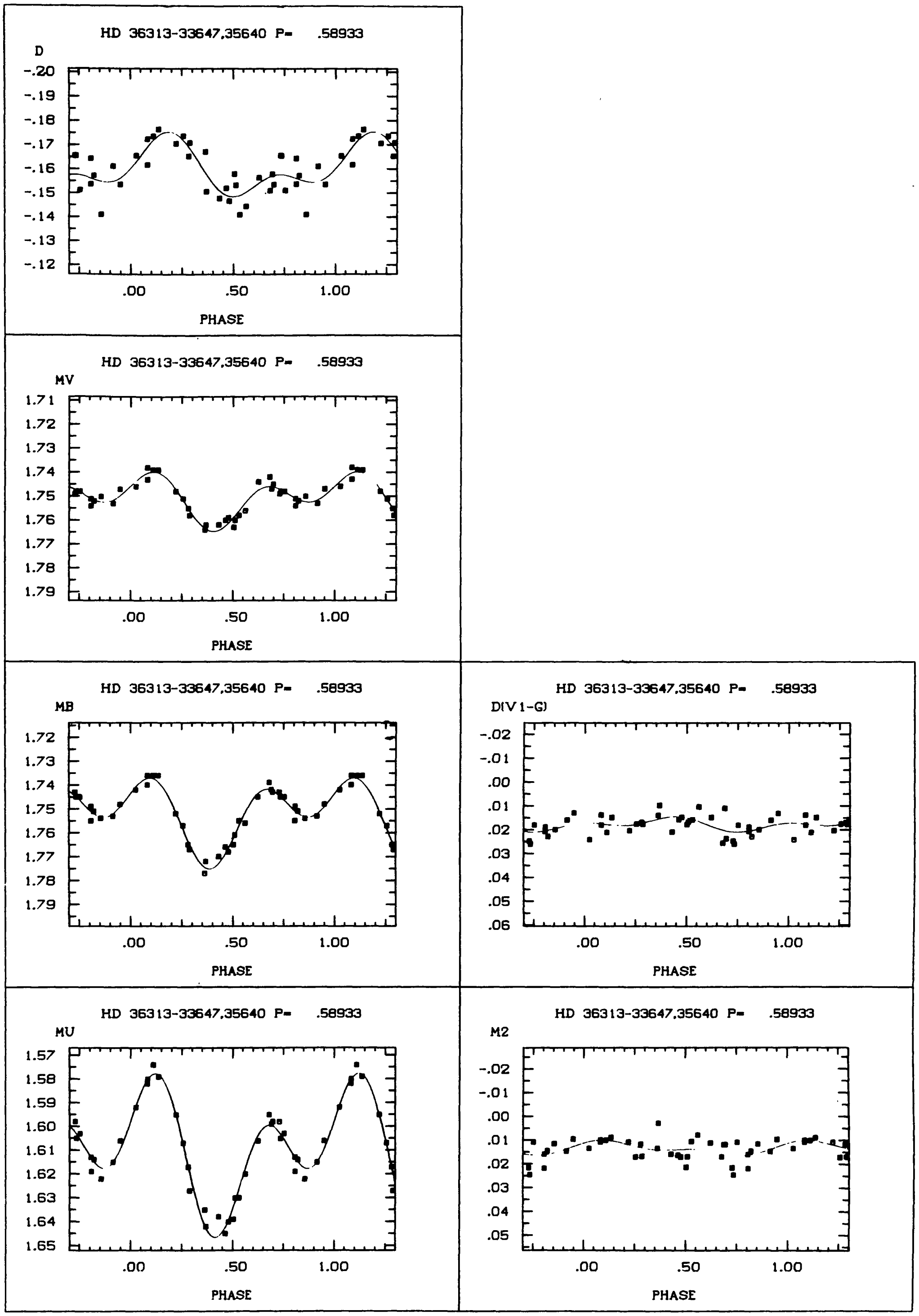


FIGURE 27. — Lightcurves of the Si star HD 36313.

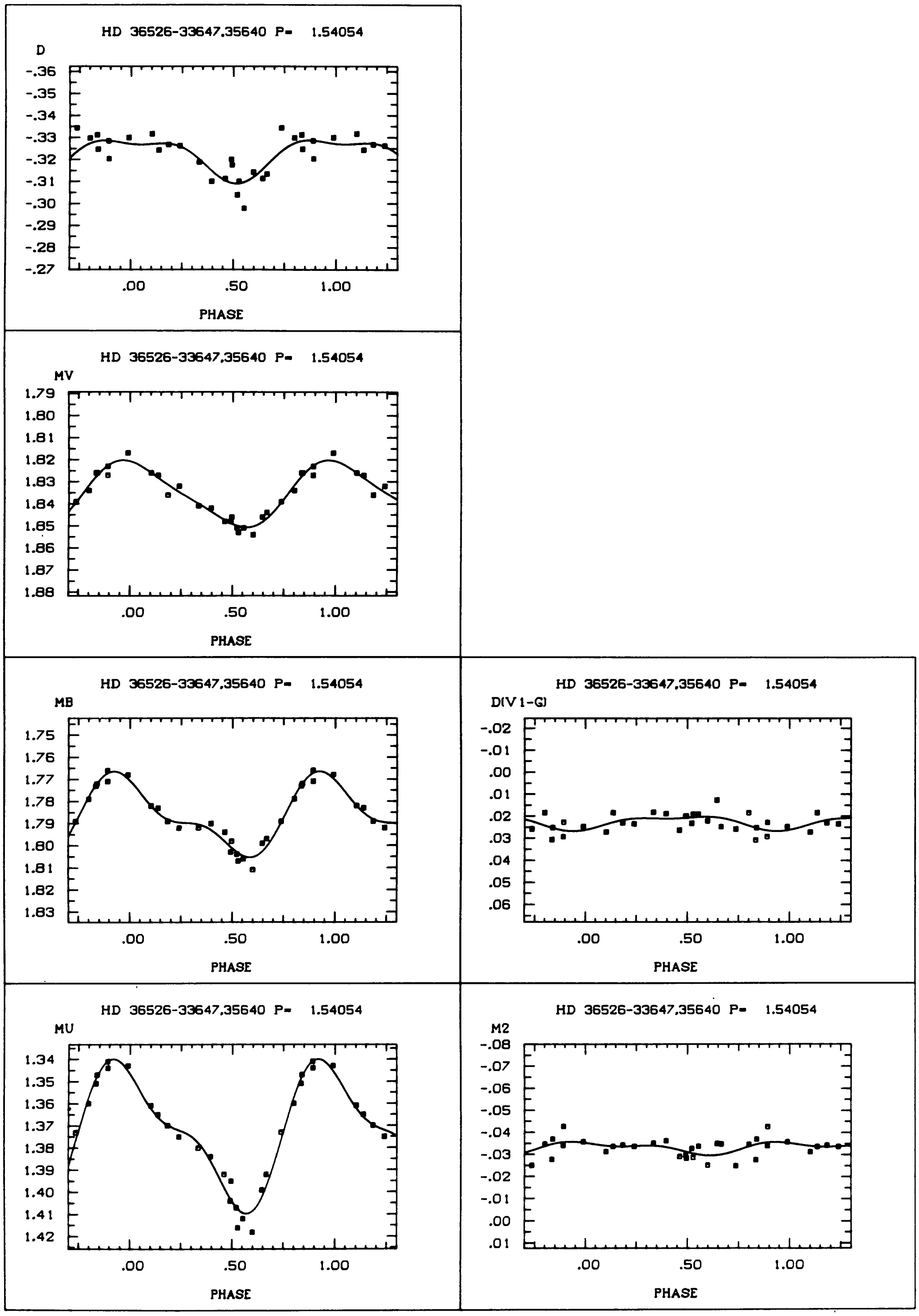


FIGURE 28. — Lightcurves of the Si Sr star HD 36526.

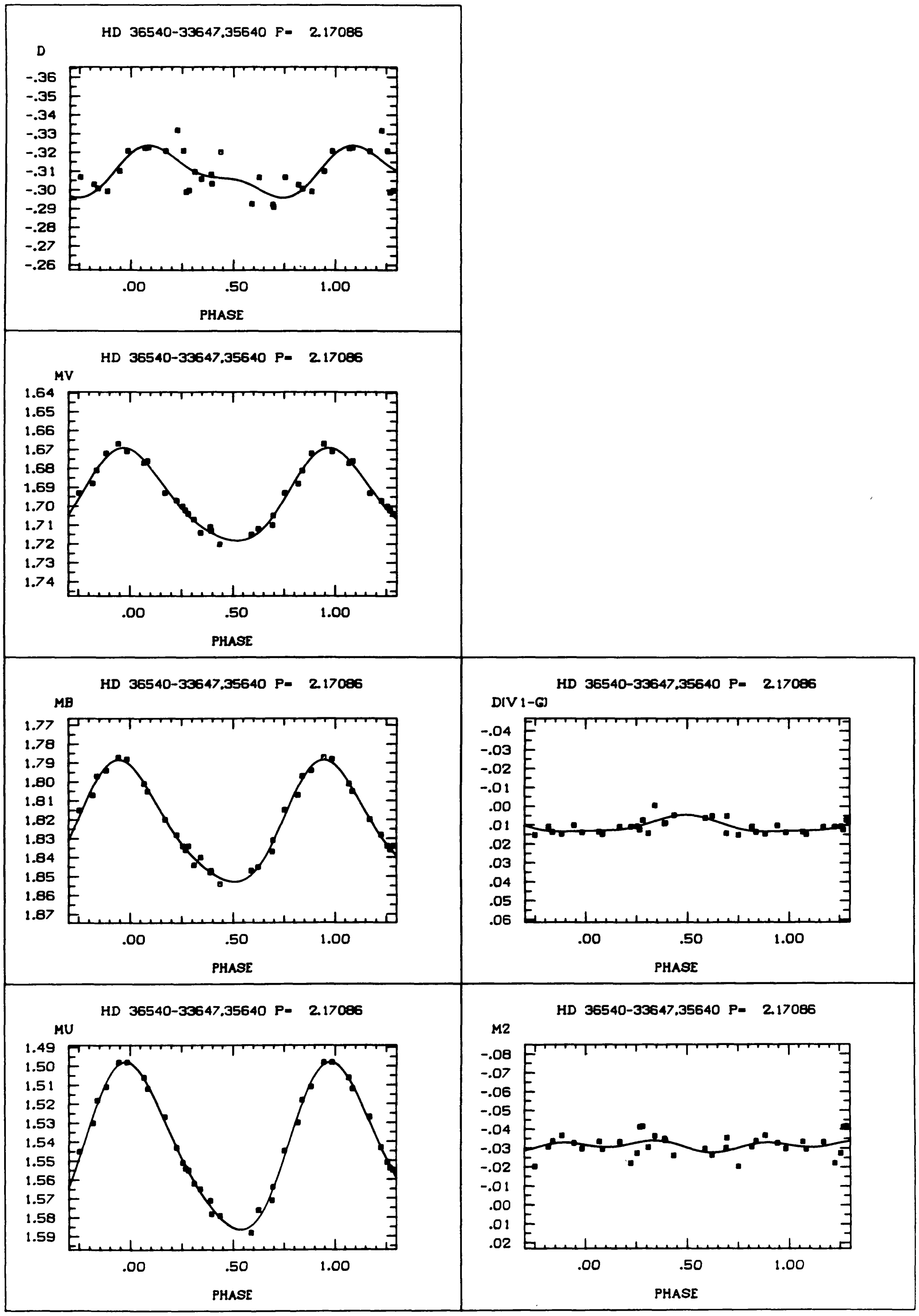


FIGURE 29. — Lightcurves of the He wk star HD 36540.

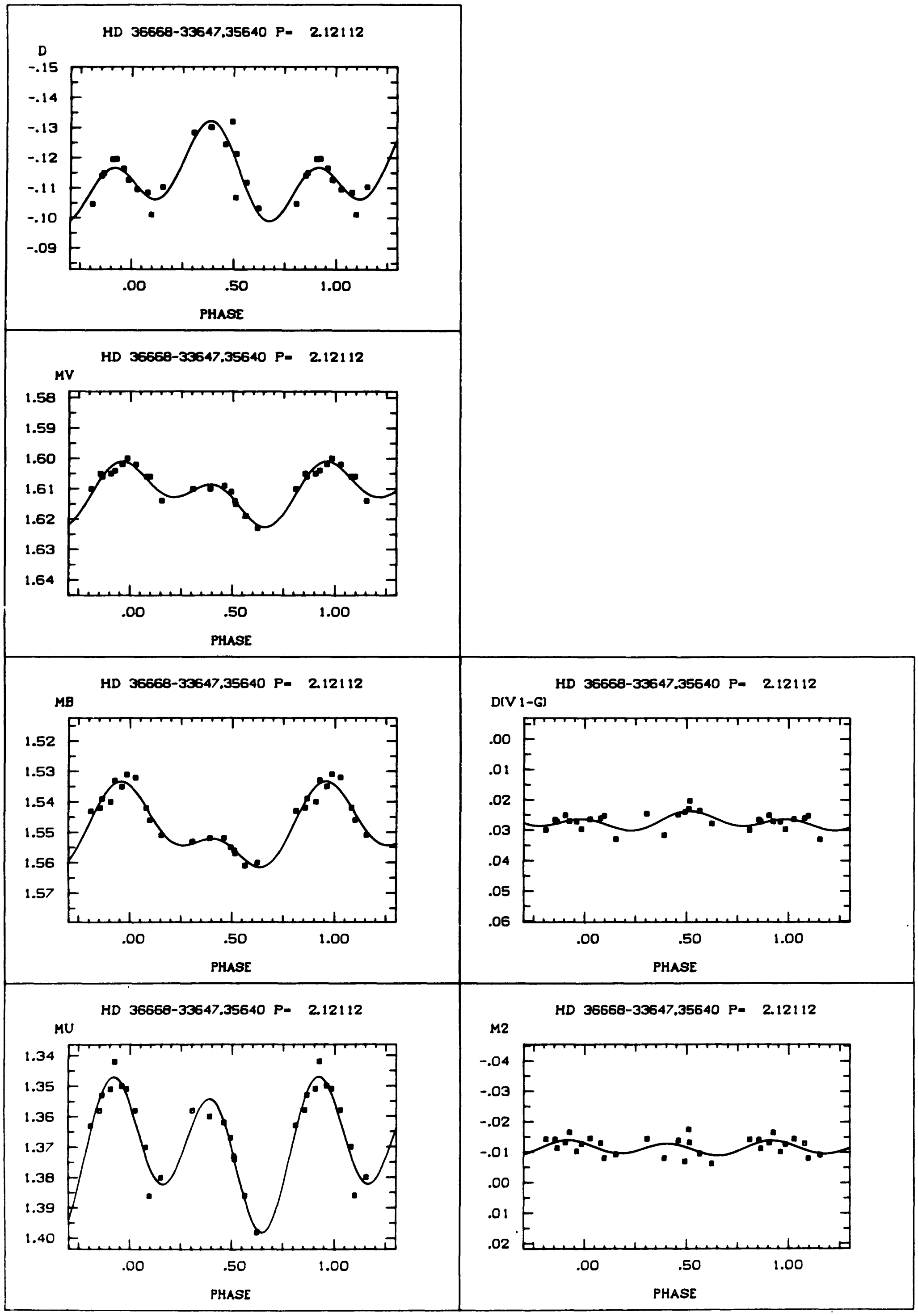


FIGURE 30. — Lightcurves of the Si star HD 36668.

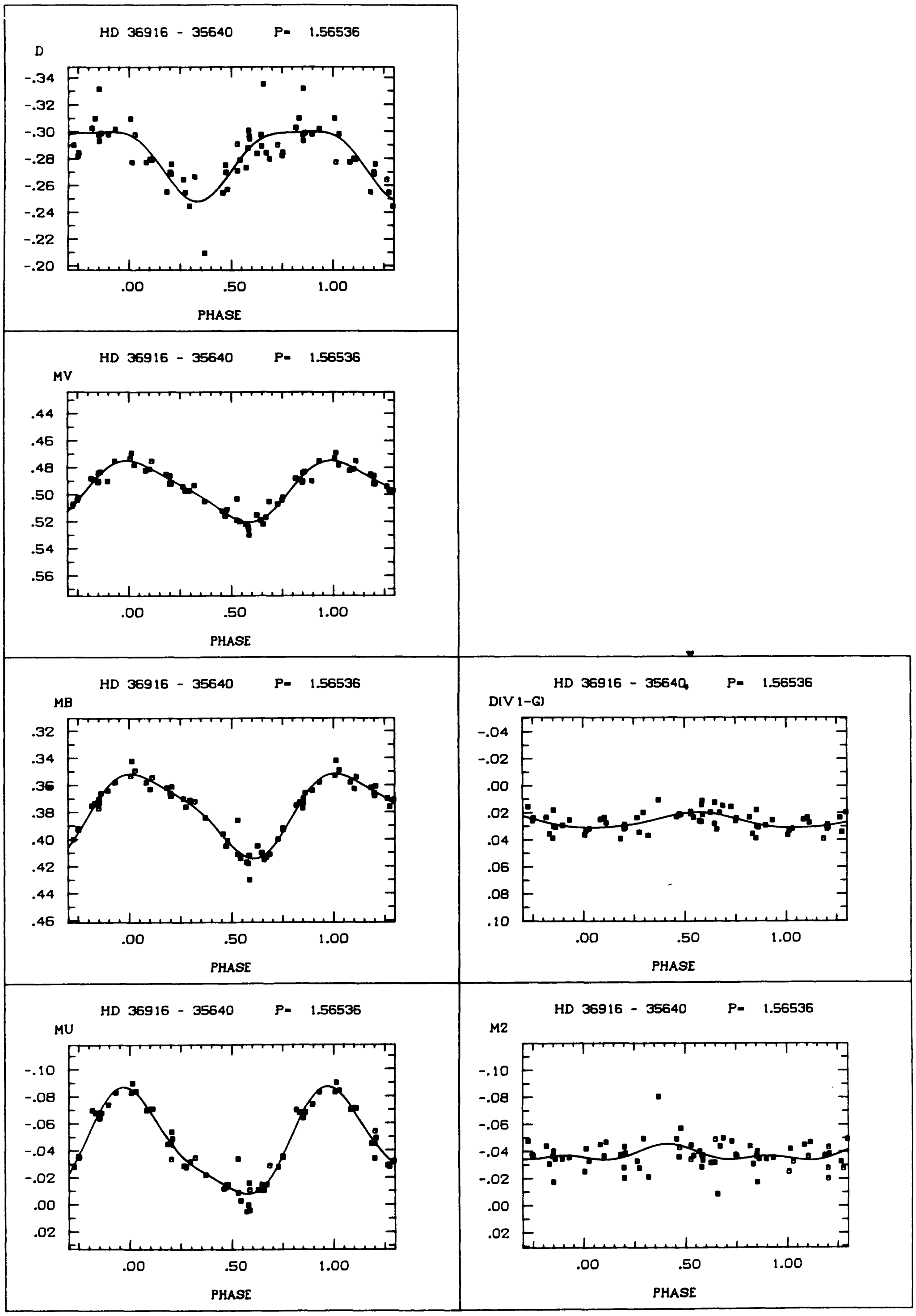


FIGURE 31. — Lightcurves of the Si star HD 36916, according to the ephemeris of table II. The measures published by Renson and Manfroid (1981), although they allowed an improvement of the period, are not represented here since they were not presented in a tabular form, but only in graphical form.

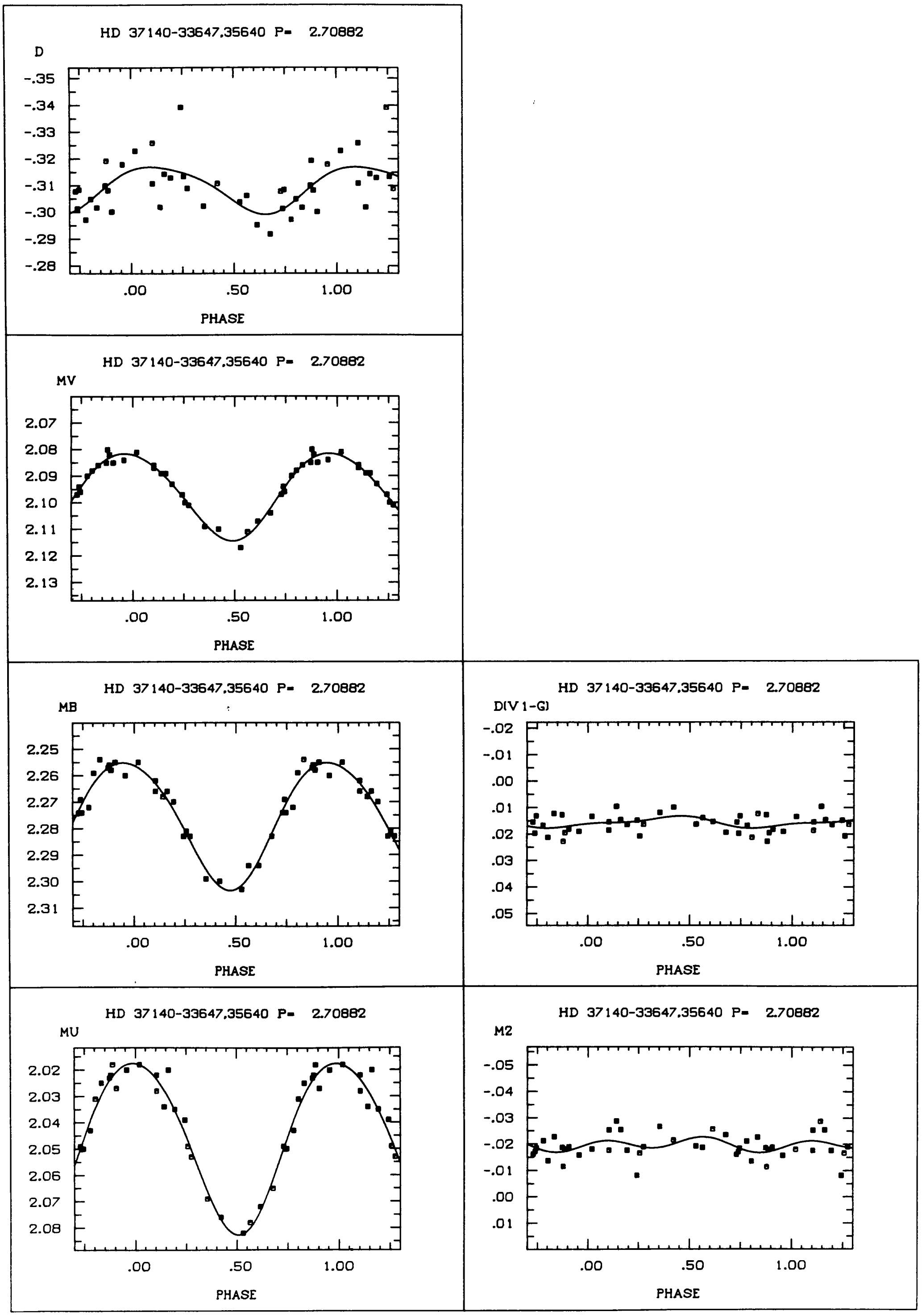


FIGURE 32. — Lightcurves of the Si Sr star HD 37140.

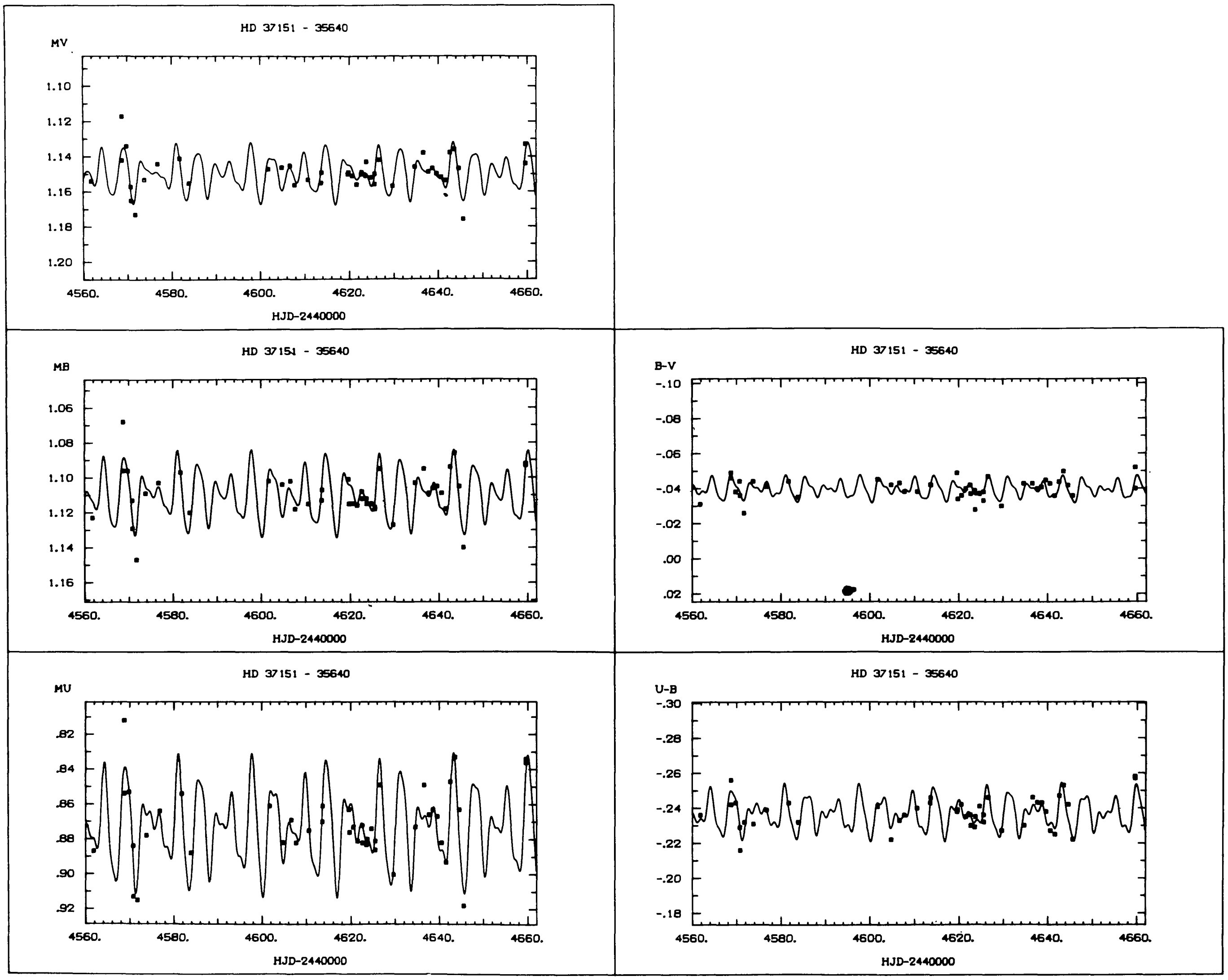


FIGURE 33a. — Possible lightcurves of HD 37151 with the two periods $P_1 = 5.67$ and $P_2 = 4.15$ d. The continuous line is a least-square fit to the data, of a function of the type $F(t) = A_0 + A_1 \cos(2\pi\nu_1 t + \phi_1) + A_2 \cos(4\pi\nu_1 t + \phi_2) + B_1 \cos(2\pi\nu_2 t + \phi_1') + B_2 \cos(4\pi\nu_2 t + \phi_2')$.

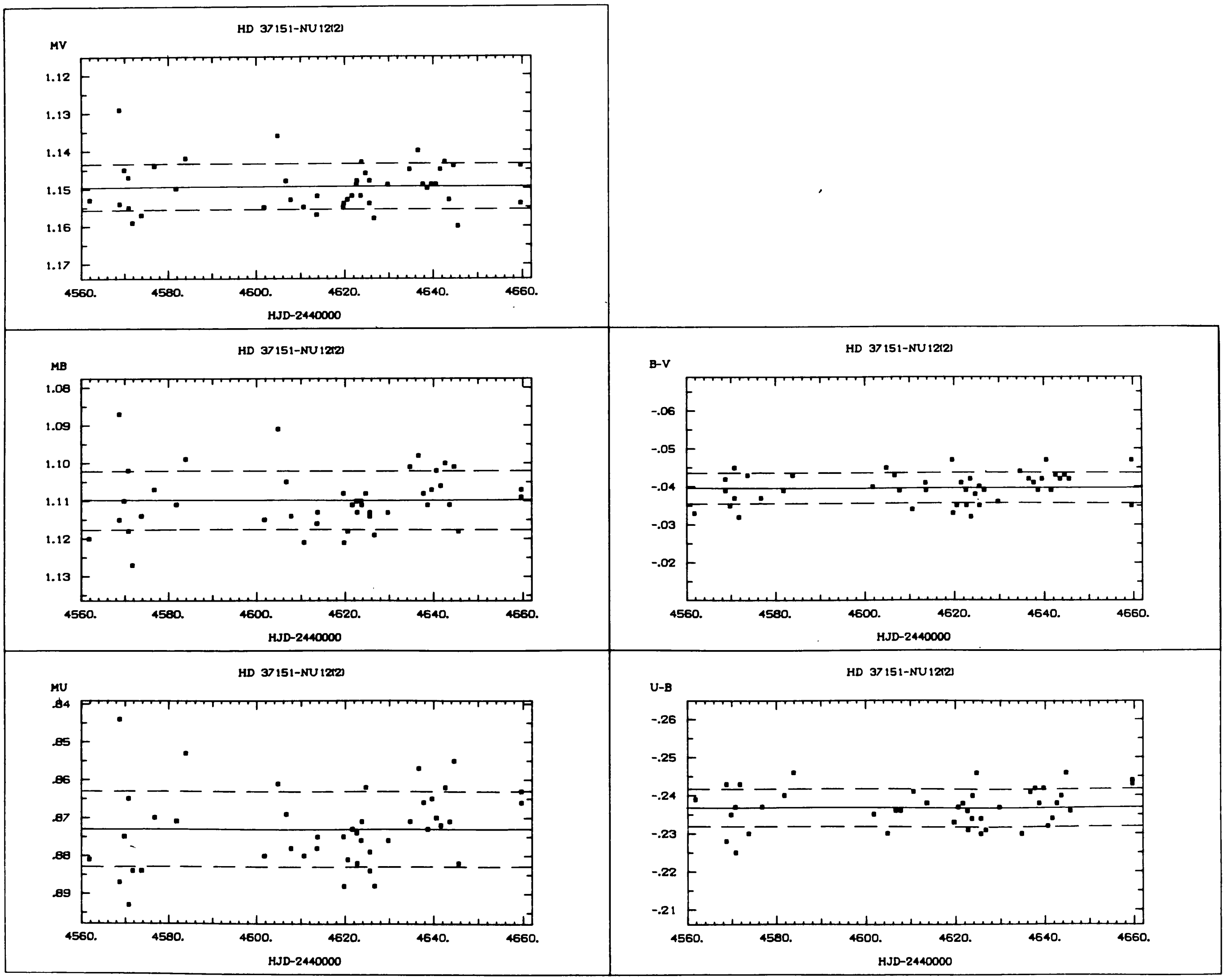


FIGURE 33b. — Residues (i.e. observations minus $F(t)$) as a function of time. The continuous line defines the A_0 value, while the broken line indicates the $\pm$ 1 σ level.

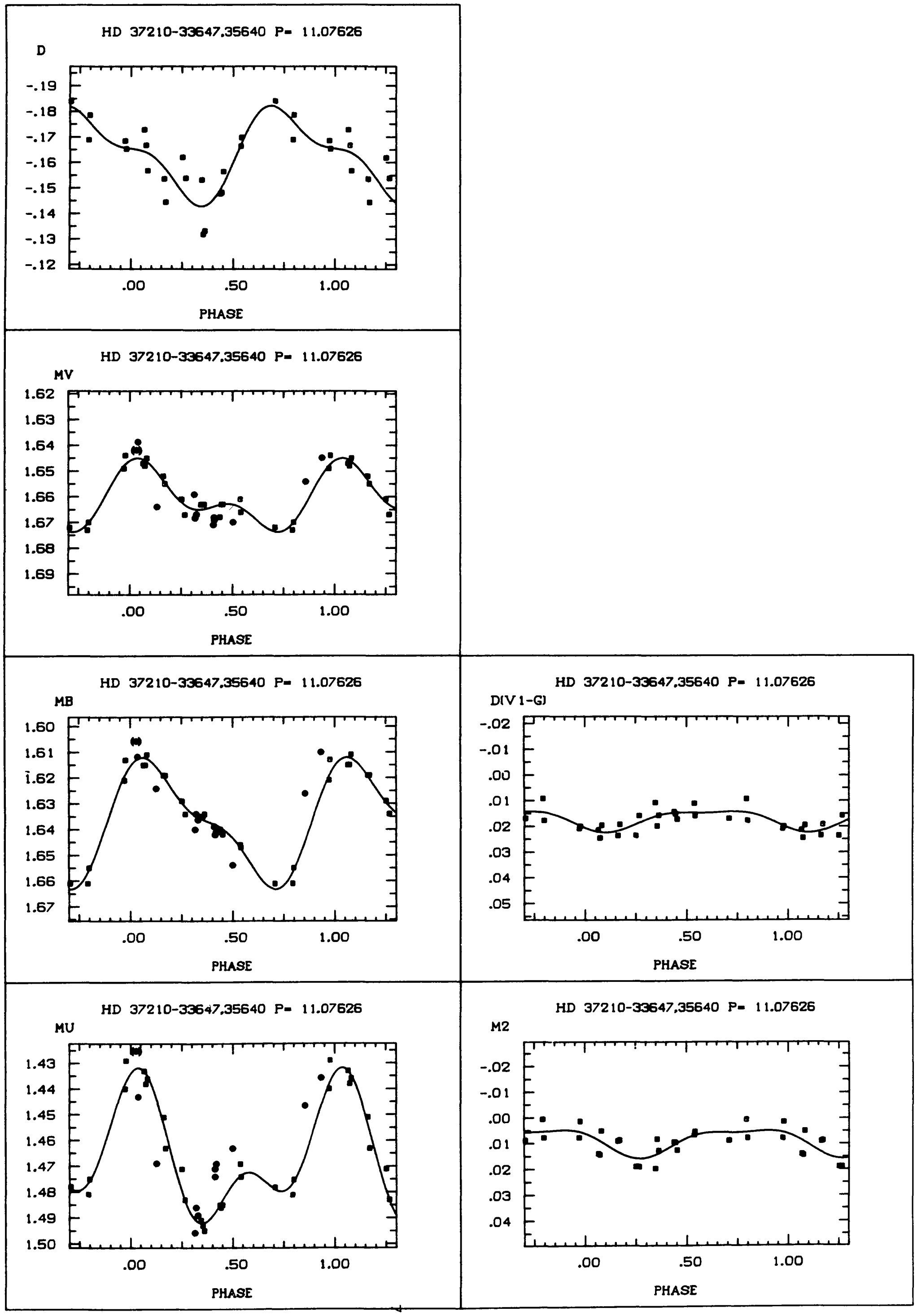


FIGURE 34. — Lightcurves of the Si star HD 37210, for the period fitted on the 1981-82 observations (open squares). The 1983 observations are indicated by full circles, the one between parentheses being doubtful. The phase shift is evident, which allows to improve the period to the value $P = 11.0494$ d.

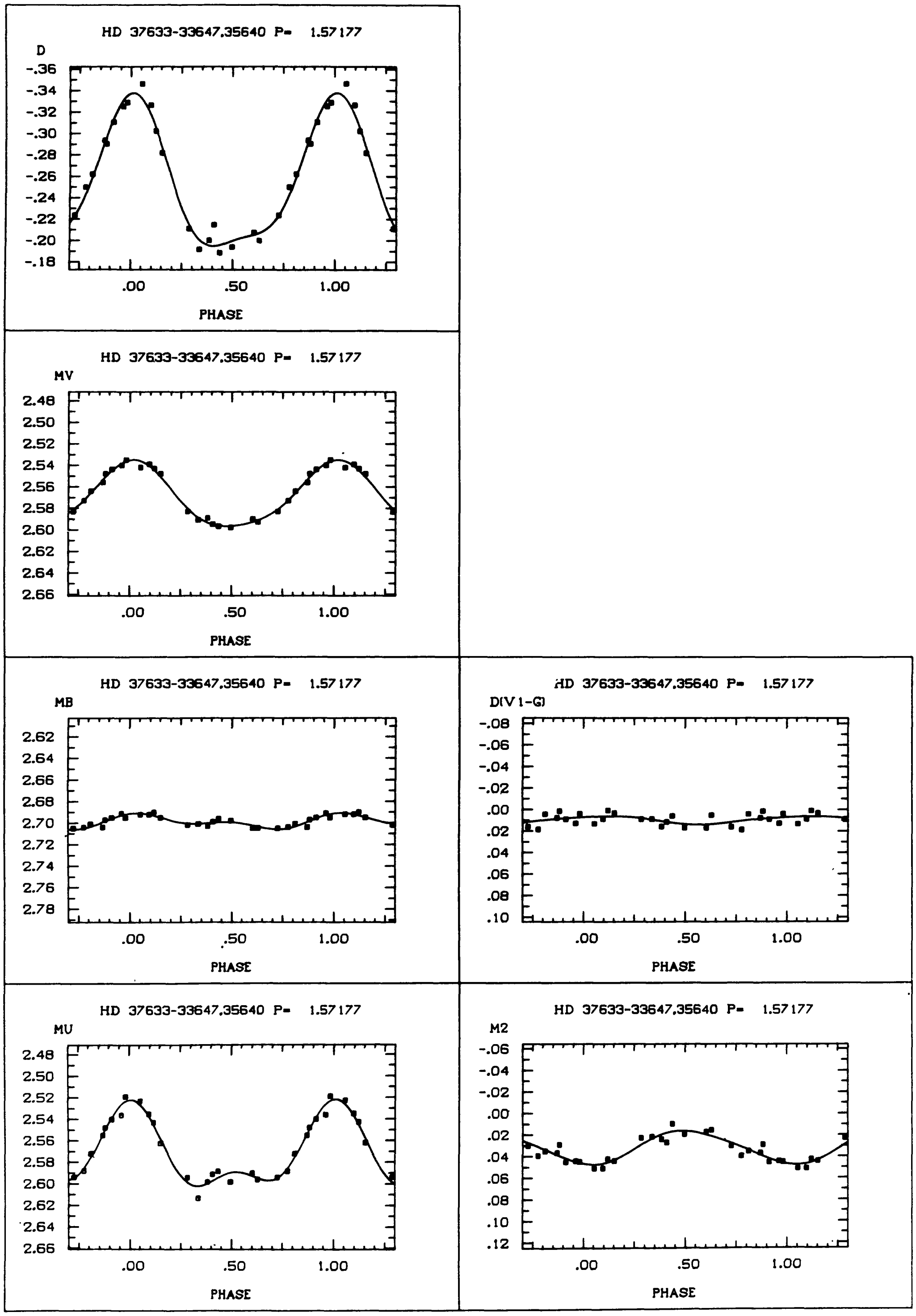


FIGURE 35. — Lightcurves of the B 9.5 p star HD 37633.

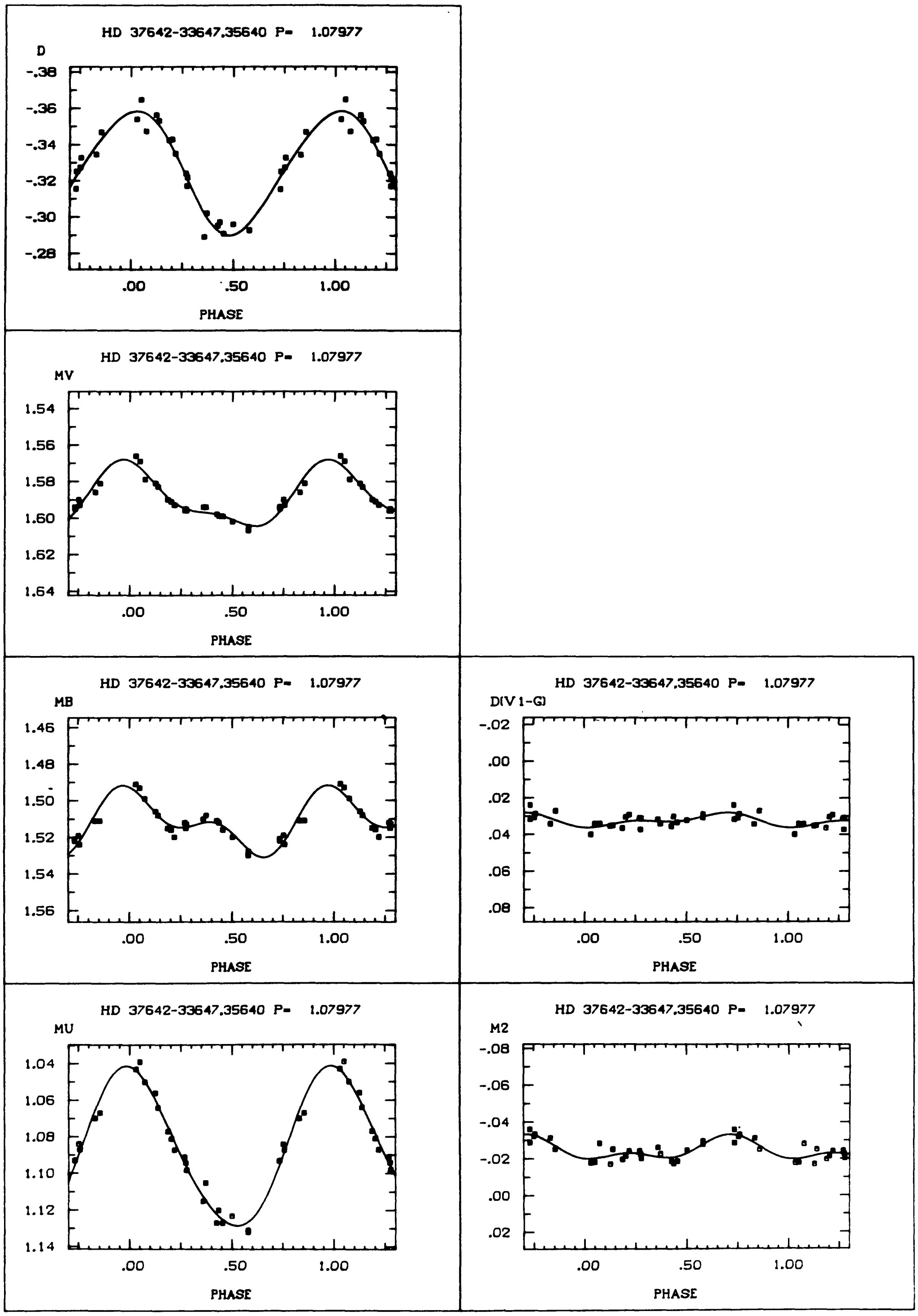


FIGURE 36. — Lightcurves of the Si star HD 37642.

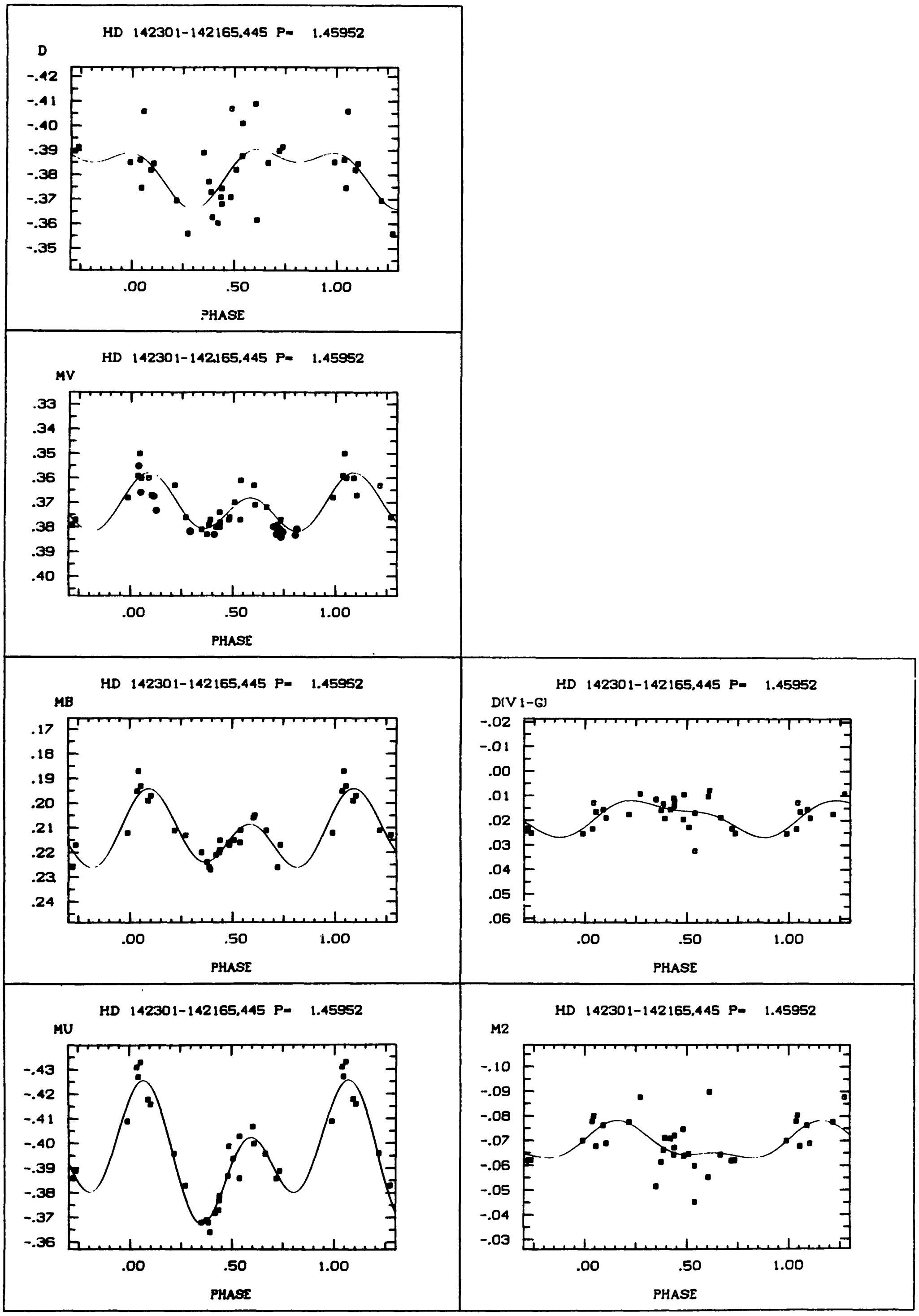


FIGURE 37. — Lightcurves of the He wk star HD 142301, according to the ephemeris of table II (open squares). The y measurements of Pedersen and Thomsen (1977) are plotted with the V magnitudes, after a correction $\Delta y = -0^{m}.018$ (full dots). A phase shift seems rather certain, which allows to improve the period to the value $P = 1.45937$ d.

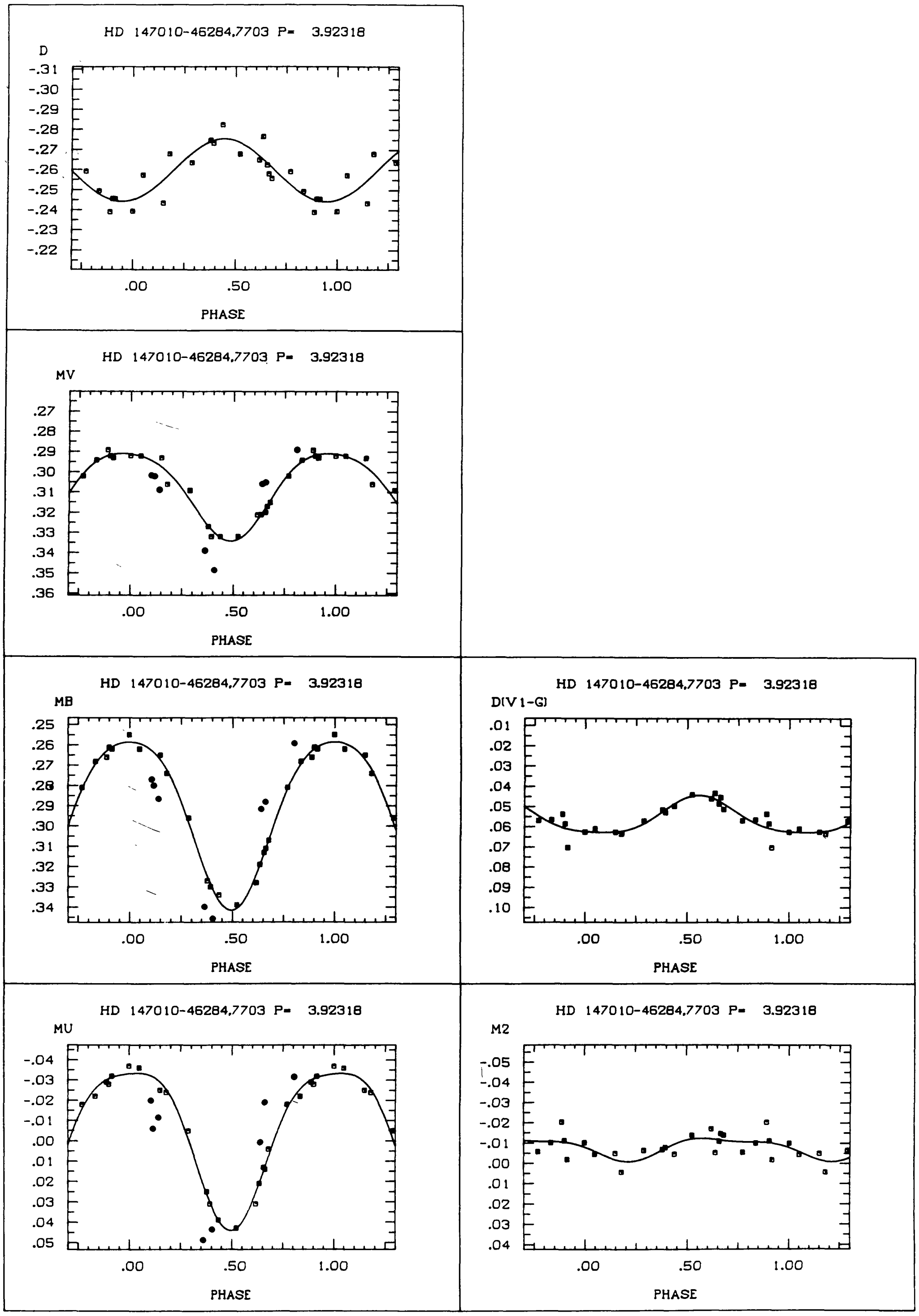


FIGURE 38. — Lightcurves of the Si Cr star HD 147010, for the period fitted on the 1981-82 observations. The 1983 observations (full dots) allow to refine the period to the value $P = 3.9210$ d.

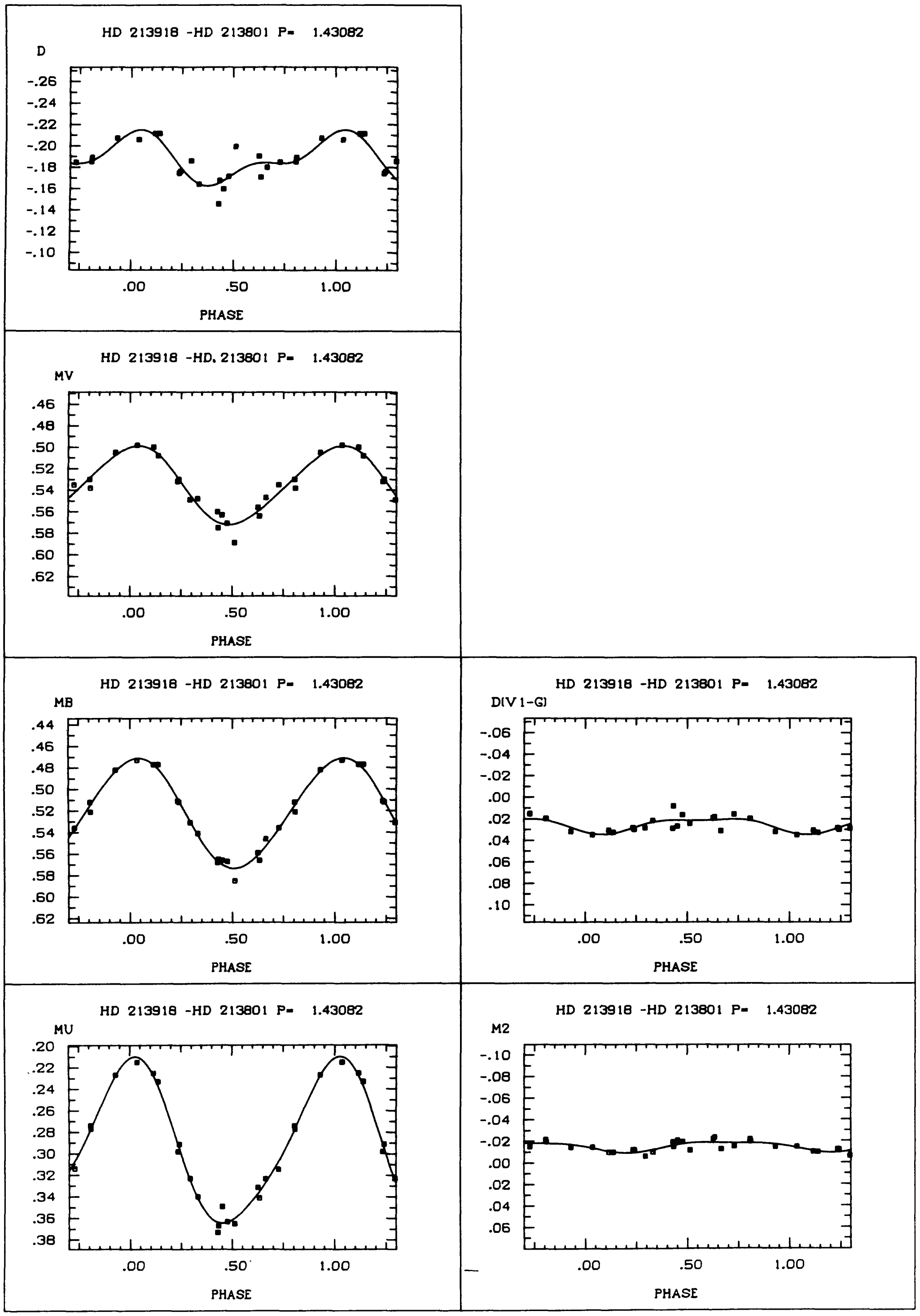


FIGURE 39. — Lightcurves of the Si star HD 213918.

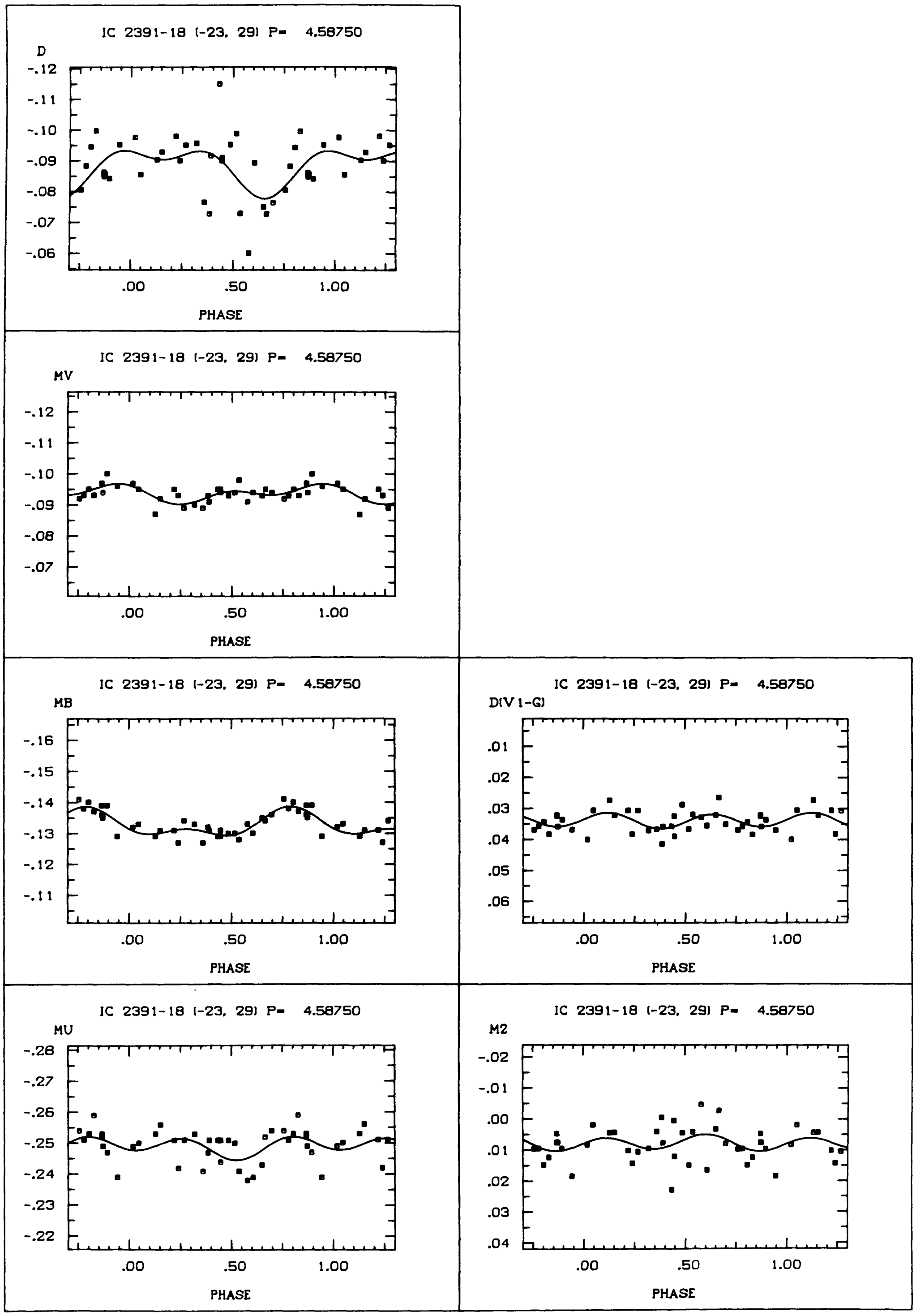


FIGURE 40. — Lightcurves of the Eu Cr (Sr) star IC 2391-18.

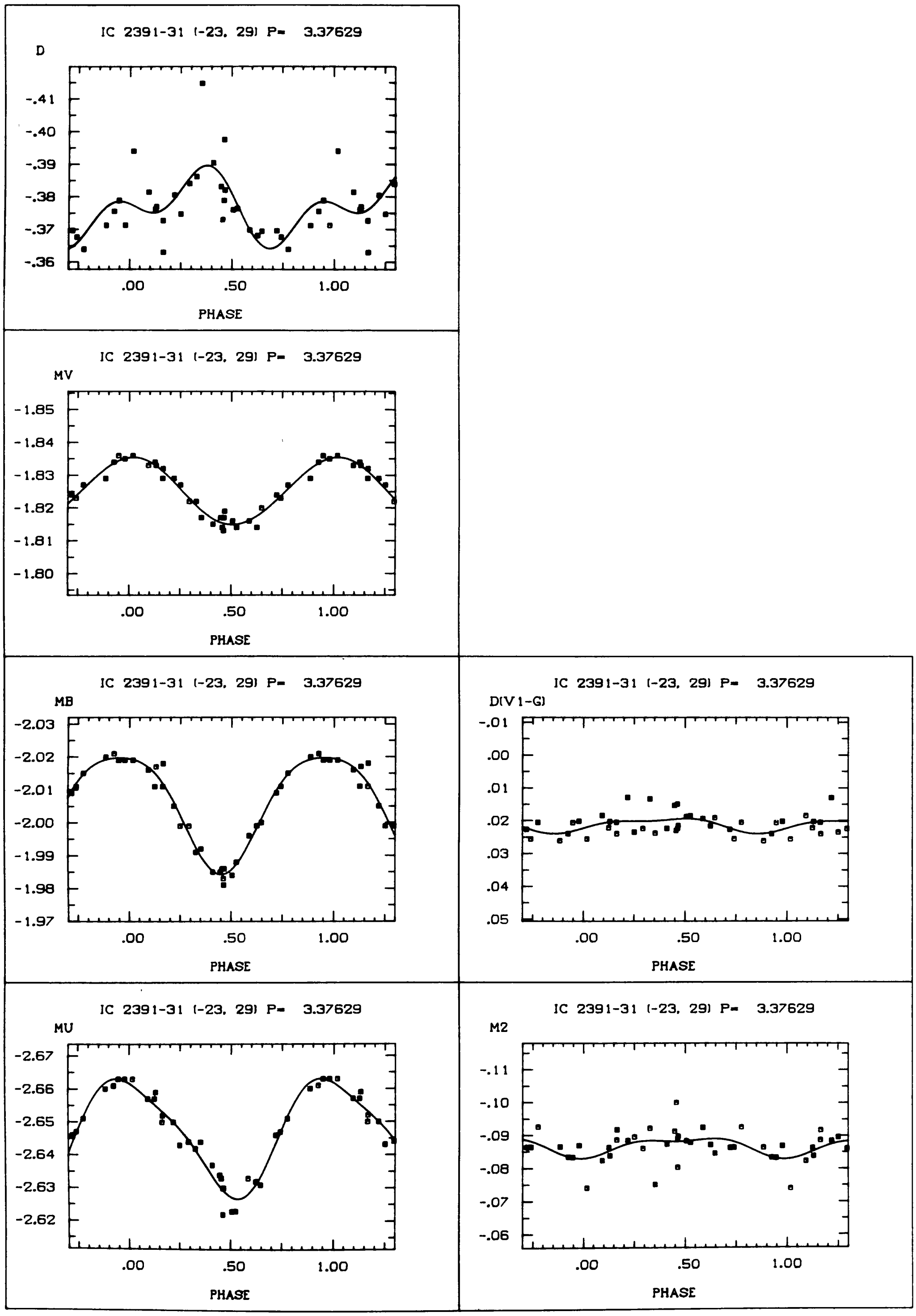


FIGURE 41. — Lightcurves of the Si star IC 2391-31.

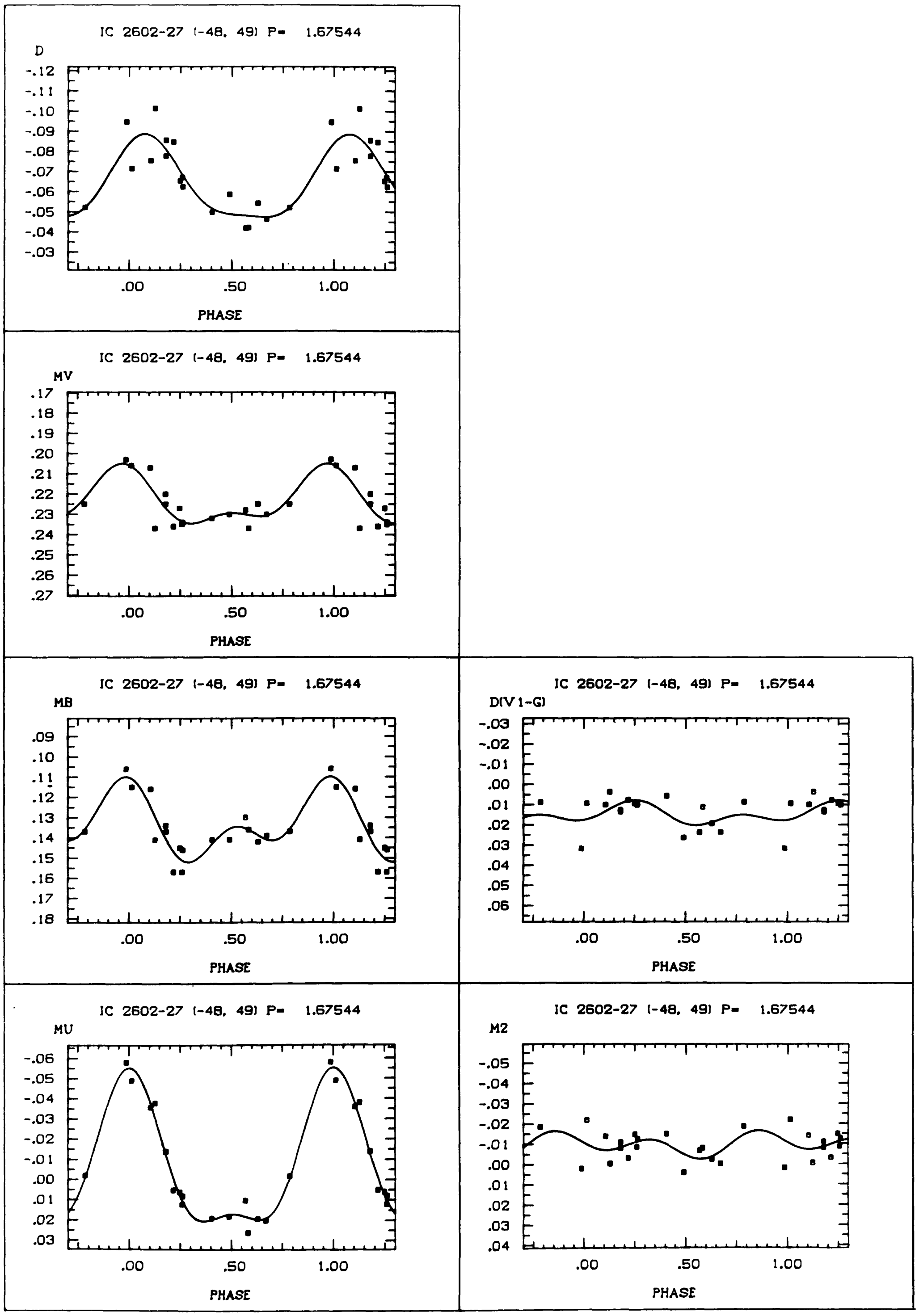


FIGURE 42. — Lightcurves of the Si star IC 2602-27.

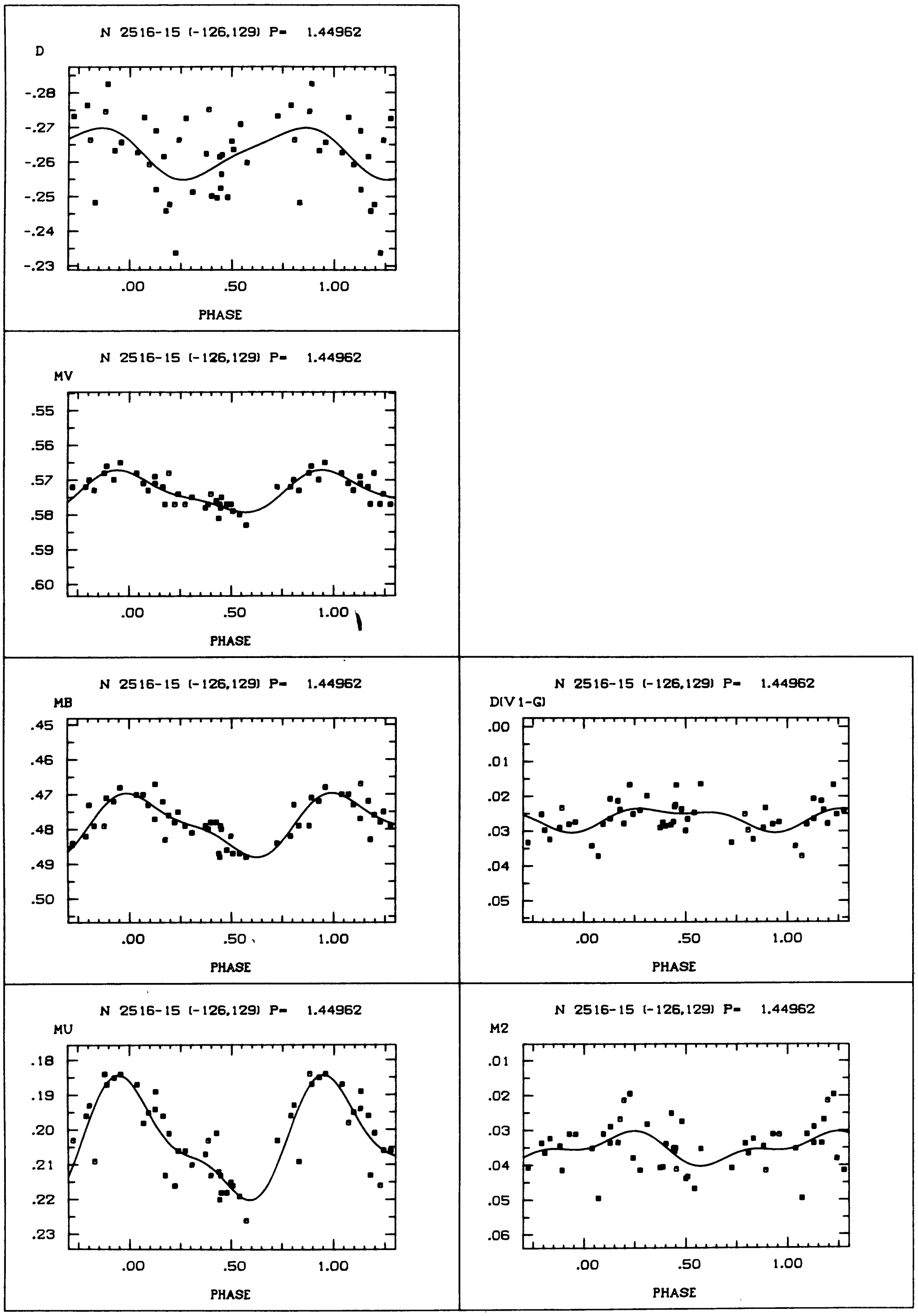


FIGURE 43. — Lightcurves of the Si star NGC 2516-15.

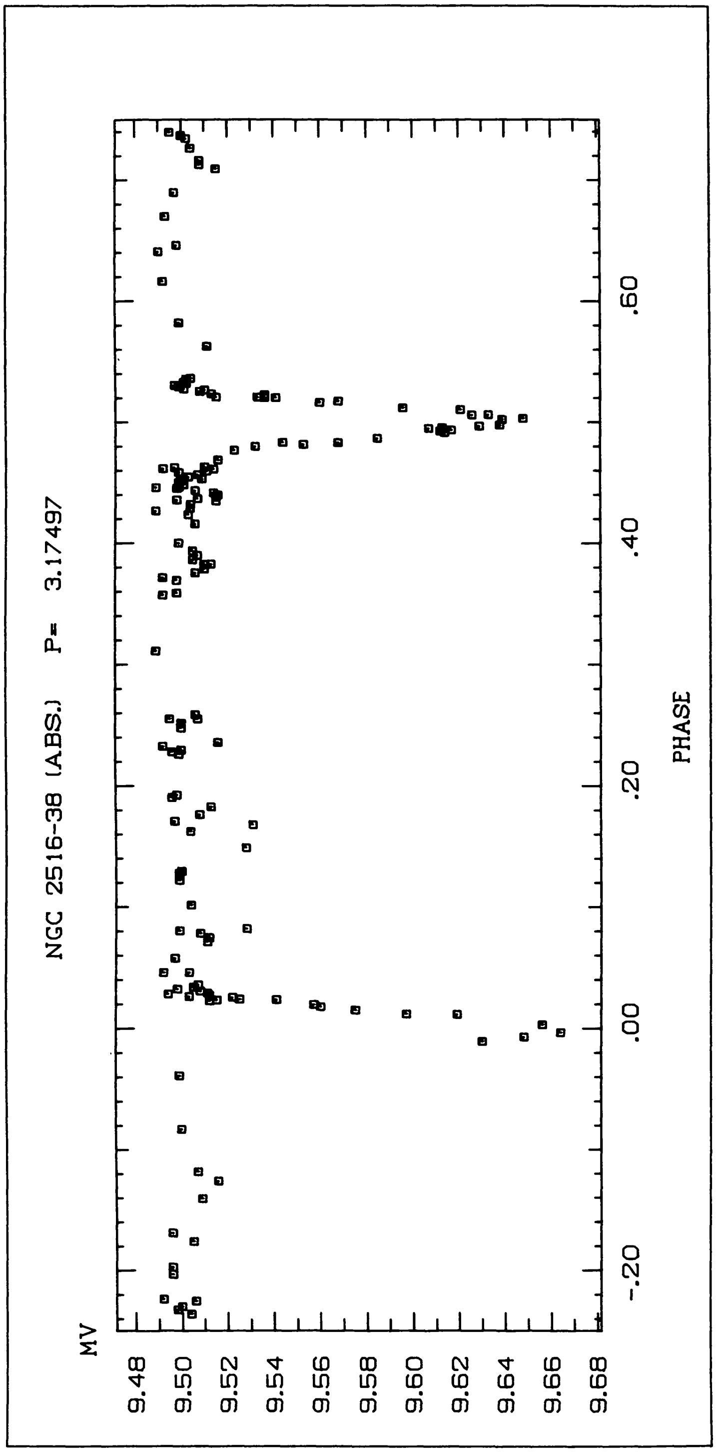


FIGURE 44. — Lightcurve of the (Sr Cr Eu) eclipsing binary NGC 2516-38 in the *V* band. All absolute measures are presented here (including some made in a differential way), including those made in early 1983.

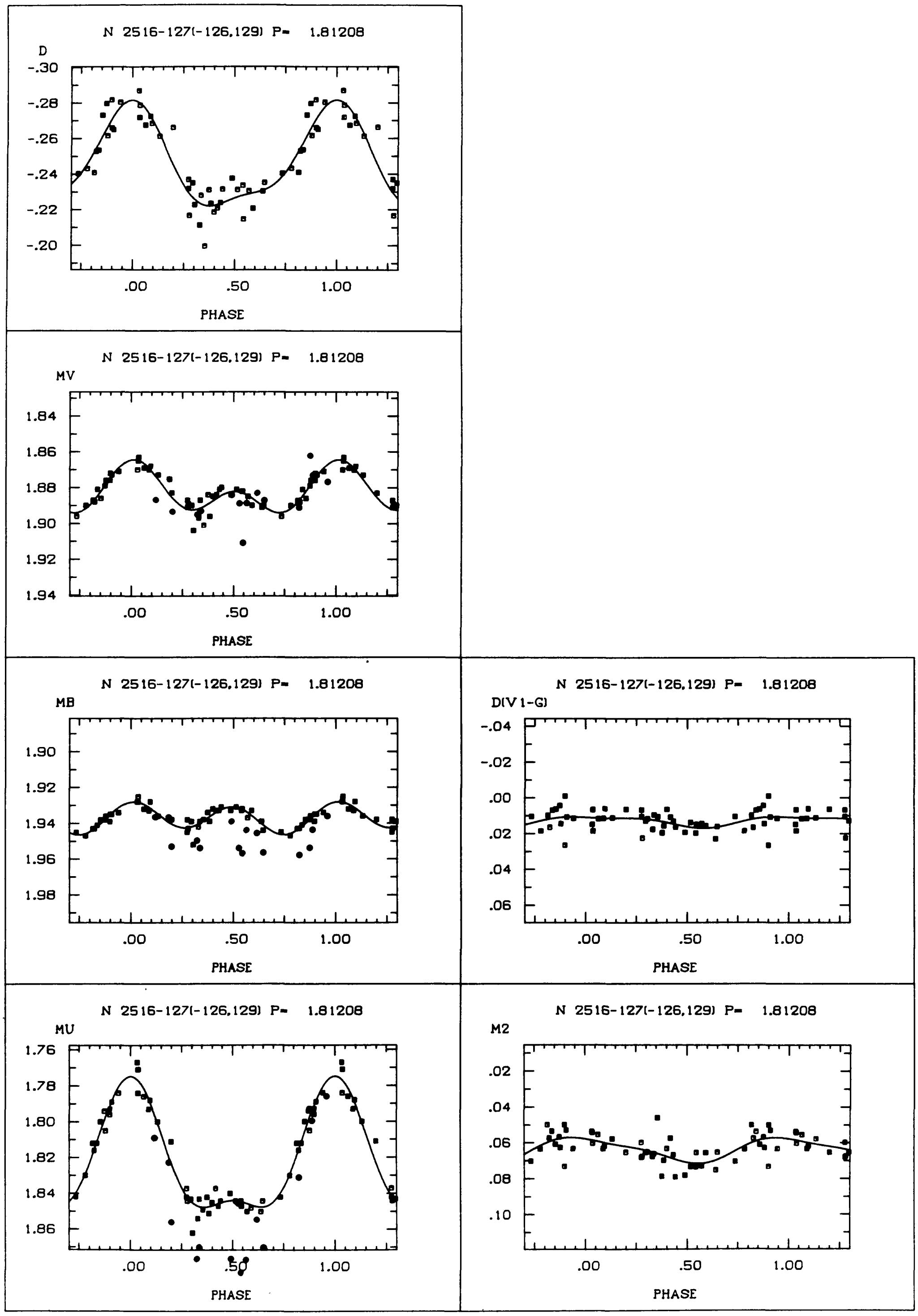


FIGURE 45. — Lightcurves of the Si star NGC 2516-c. Older, less precise measures which were not taken into account in the least-square fit and are listed in table IVb, are represented by full dots (see text).

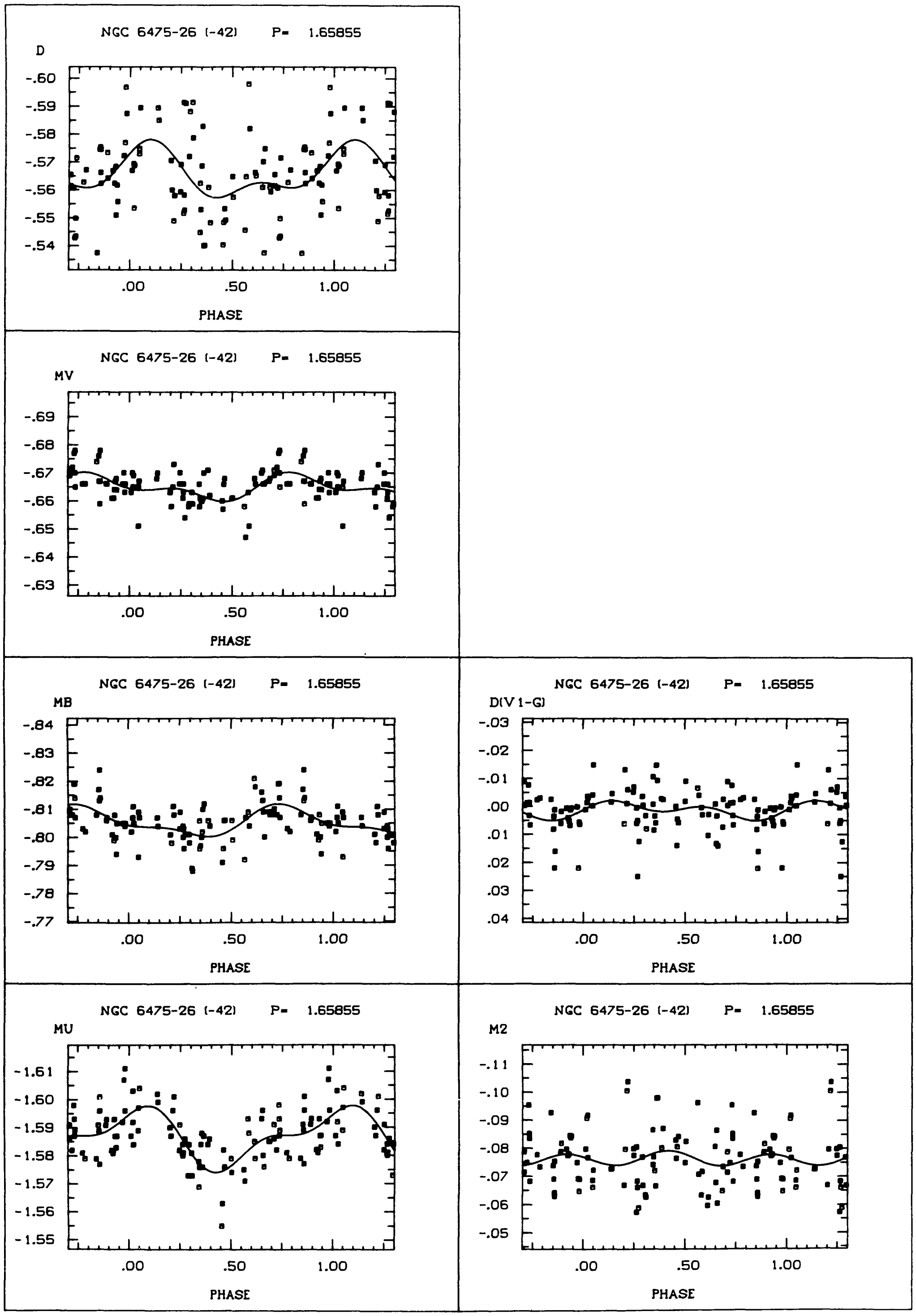


FIGURE 46. — Lightcurves of the He wk blue straggler NGC 6475-26.

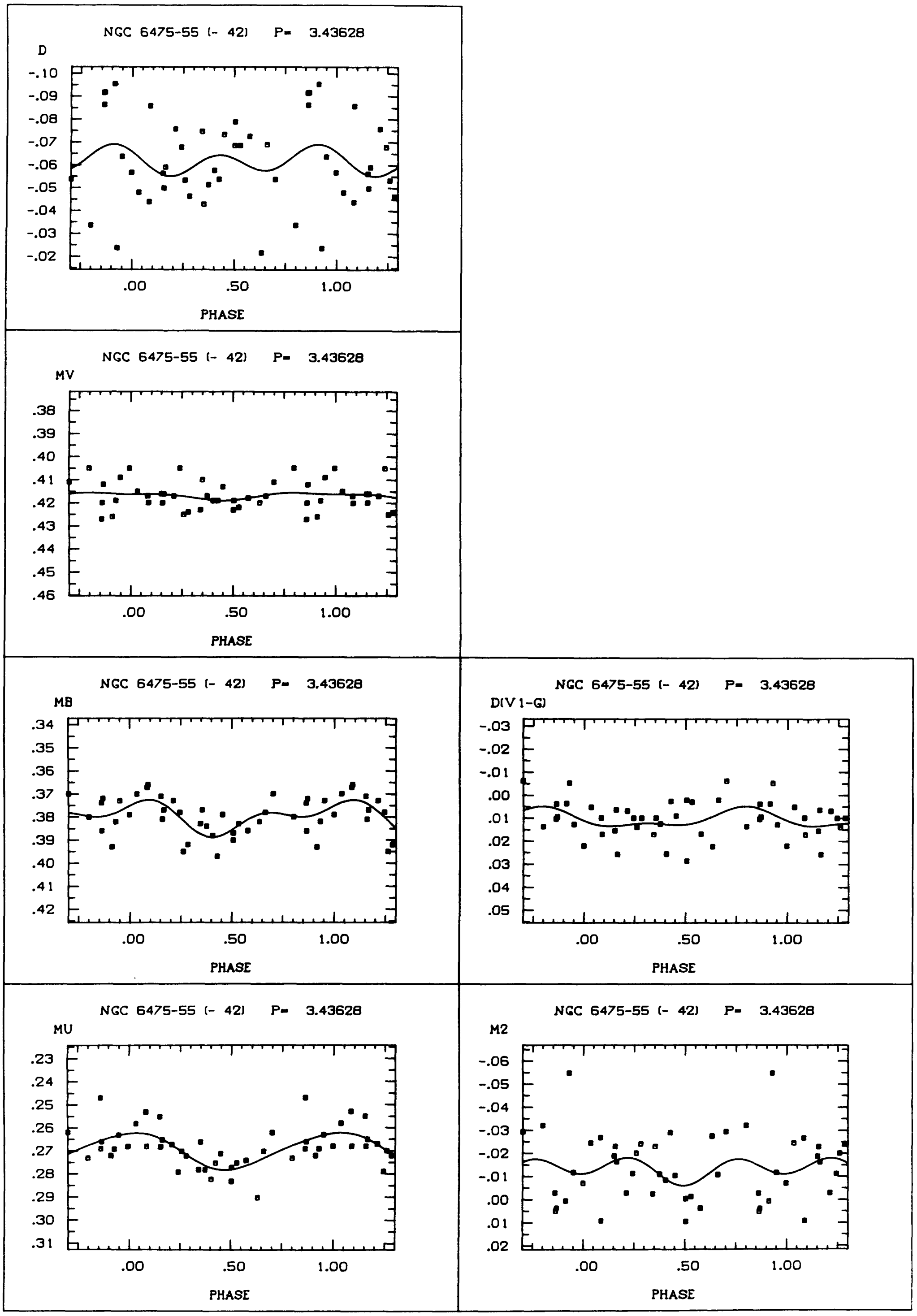


FIGURE 47. — Lightcurves of the Si Cr star NGC 6475-55.

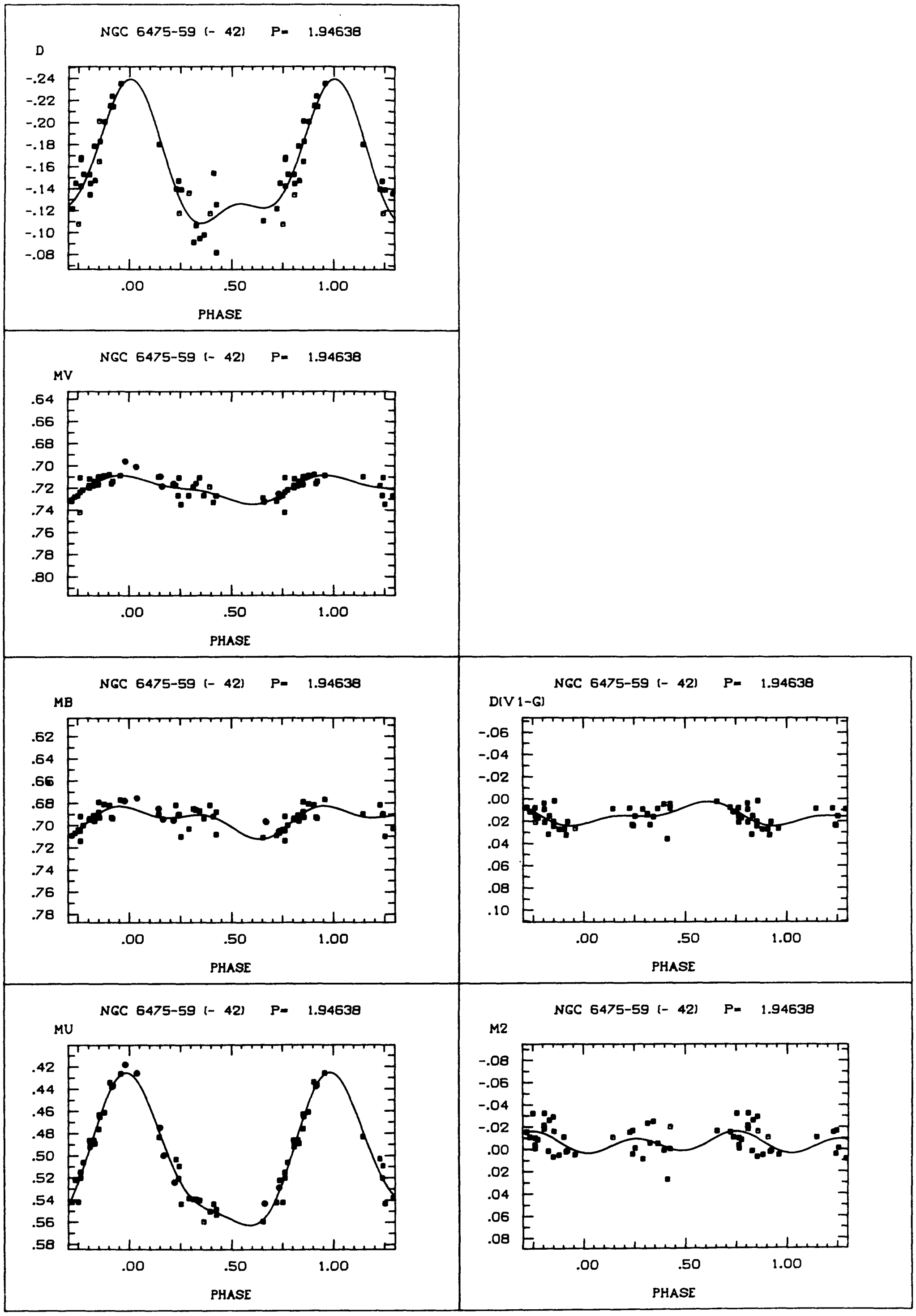


FIGURE 48. — Lightcurves of the Si star NGC 6475-59, according to the ephemeris of table II (open squares). The 1983 observations are indicated by full dots. Note the nearly perfect agreement between old and new observations, which makes useless any refinement of the period at the moment.

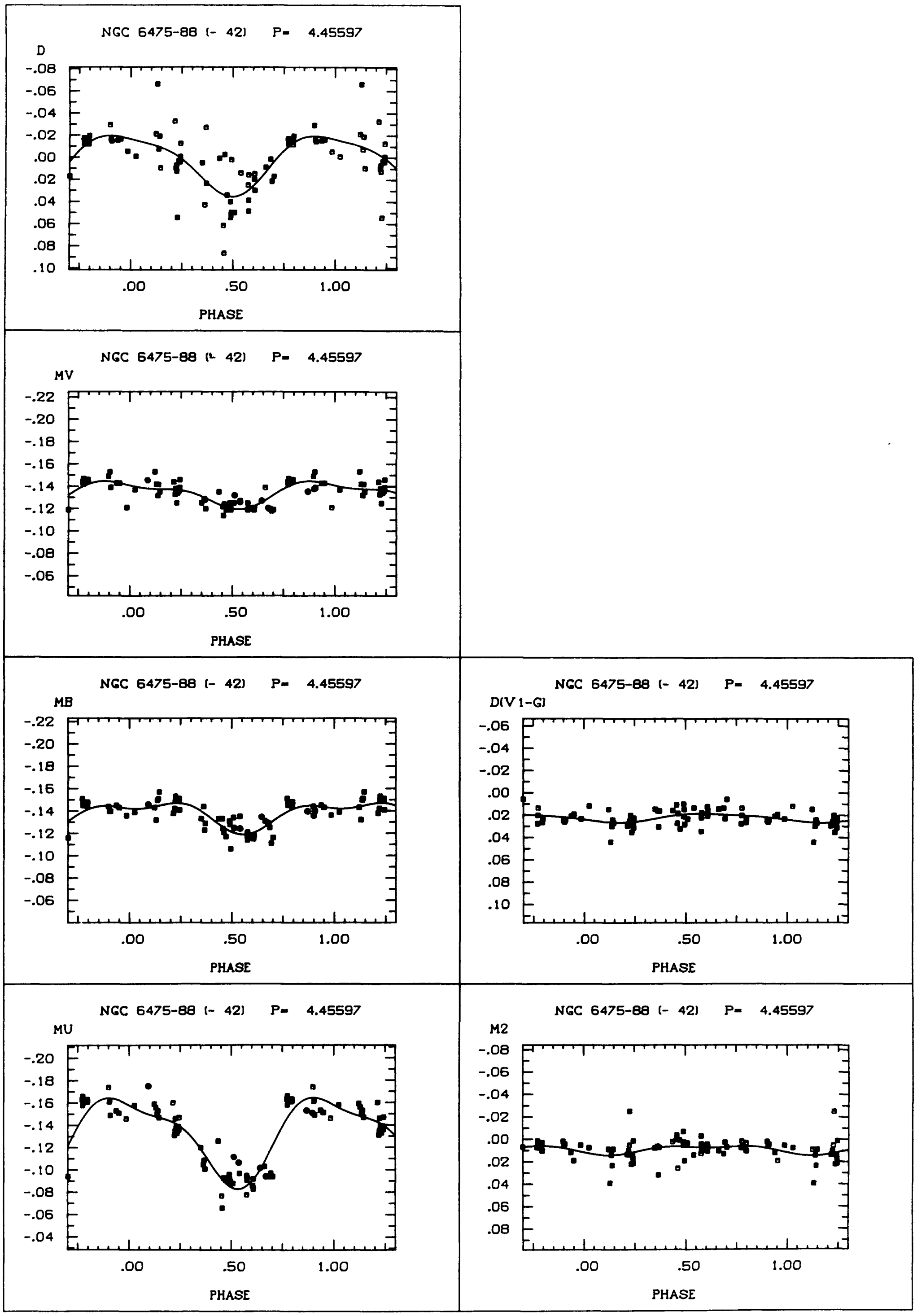


FIGURE 49. — Lightcurves of the Si Cr star NGC 6475-88, according to the ephemeris of table II (open squares). The 1983 observations are indicated by full dots. A phase shift seems probable, which allows to refine the period to the value P = 4.4588 d.