Periodicity of the variable star V3Prak

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ABSTRACT

Context. Magnitude measurements in three consecutive nights show the periodicity of the variable star V3Prak.
Aims. We examine the magnitude periodicity of the star V3Prak.
Methods. The tool Period04 is used to find the number, frequencies and amplitudes of the different oscillations in the data set.
Results. The star V3Prak has two significant periods of 8.42 and 15.17 cycles per day.
Conclusions. Origin is a surprisingly easy to use tool for graphical presentations. LATEX is undoubtedly superior to any other text processing software in the scientific field.

Key words. Astronomisches Anfängerpraktikum: Period04: V3Prak: variable star

1. Introduction

In the scope of the Astronomical Undergraduate Practical, useful tools are been studied. Optionally Windows, OS X or Linux could be used. However we prefer the Windows platform, because it is the only one, that supports Origin. With Microsoft EXCEL, an initial overview of the first night's observations is obtained. A more detailed analysis is carried out with the period finder Period04, developed at the institute. The results are presented using the powerful graphic software Origin, which can produce high quality printouts. Finally, a scientific paper is written using the LATEX A&A package, exclusively used by the *Astronomy & Astrophysics* magazine.

2. Method

A first insight is gained by a simple EXCEL plot. We estimate the major periodicity with a rough visual assessment.

A more accurate analysis of the magnitude oscillations is then performed with the period finder Period04. This software performs a Fourier analysis followed by an extended least square fit. At first, the most significant period is located and eliminated from the subsequent investigations. This process is repeated until no significant period can be observed any more.

The frequency spectrum, together with the residuals of the least square fit, are exported to a text file. This text file deals as an input for the graphic presentation software Origin 8. Origin 8 enables the creation of graphical figures exactly as required by the exercise.

3. Results

After the first overview with EXCEL, which shows a period with a frequency of approximately 8 cycles a day, Period04 reveals two significant frequencies. These frequencies, together with the related amplitudes and phases are summarized in table 1. The
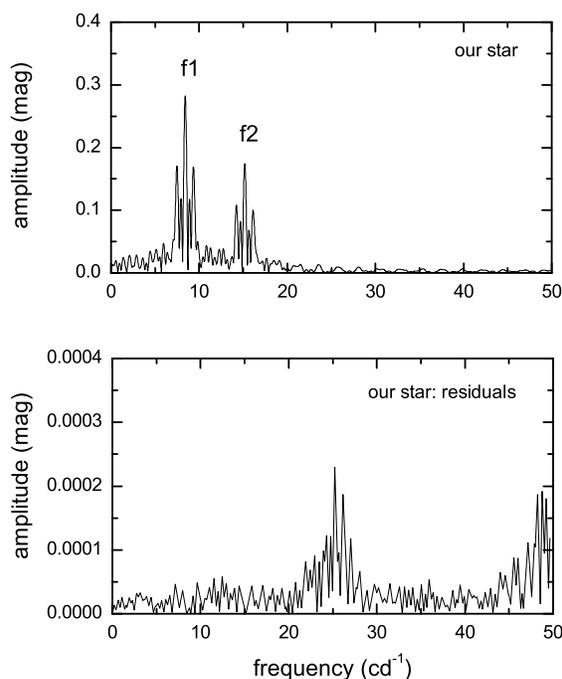
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Fig. 1. The first figure illustrates the periods of the star V3Prak. The second figure illustrates the residues after a least square fit.

signal to noise ratio at the specific positions are added to the table to provide a deeper insight of the subject.

To illustrate this result, the Fourier transformation of the data series and the residues of the least square fit are shown in Fig. 1.

4. Conclusion

Provided the observation part of the variability of a star is already done, the analysis and presentation of the periods can be eas-

Table 1. Frequencies, amplitudes, phases and snr. of the star V3Prak

frequency cd^{-1}	amplitude mag	phase	snr.
8.419	0.281	0.448	17923
15.172	0.176	0.426	7080

ily accomplished using appropriate tools. Using the right LaTeX-package, a nice paper can be produced in a short time.

References

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