



TIDAK: the updated Suhora database of O-C diagrams and elements of eclipsing binary stars

Waldemar Ogłóza¹, Greg Stachowski¹, Bartłomiej Zakrzewski¹, Michał Żejmo²

¹Mt. Suhora Astronomical Observatory
Pedagogical University of Krakow, Podchorążych 2, 30-084 Kraków, Poland

²Janusz Gil Institute of Astronomy
University of Zielona Góra, Szafrana 2, 65-417 Zielona Góra, Poland

The database of minima, O-C diagrams and linear elements of eclipsing binary stars maintained at the Mt. Suhora Observatory of the Pedagogical University of Krakow in Poland is widely referenced in eclipsing binary studies. Here we present the latest version of the database, along with a new, graphical interface including features such as interactive O-C diagrams. This is the final result of an extensive modernization program aimed at making the database more useful and convenient for researchers and observers.

Observations of the times of minima of eclipsing binary stars have long been an important tool for the study of these types of objects. Comparison of the observed times of minima with those predicted from an ephemeris (often presented as “O-C”, i.e. “observed – calculated” values plotted on an “O-C diagram”) can reveal physical effects including stellar evolution, mass transfer between the components, or gravitational interaction with a third star or, potentially, planets. For this kind of analysis it is beneficial to have records of minima times which cover as long a time as possible, in order to resolve slow changes in the binary system.

For several decades, times of minima have been collected at the Mt. Suhora Observatory of the Astronomy Department of the Pedagogical University in Krakow and used to generate up to date ephemerides and O-C diagrams of eclipsing binary stars. Previously the ephemerides and O-C diagrams were presented in the *Atlas of O-C Diagrams* [1] available in book form and online, and subsequently online [2] on the website of the Astronomy Department of the Pedagogical University. The times of minima were also available to researchers on request.

However in recent years, and especially with the growth of automated surveys, the number of stars and minima times has outgrown the technical capabilities of the underlying database. It became necessary to replace the database architecture, and at the same time the opportunity was taken to create a new online interface with more features.

The new version of the database uses PostgreSQL to store the data with an interactive website created using Django and Python. The user can find stars by searching for catalog identifiers or coordinates (SIMBAD [3] is used to interpret the query) or by constellation (Fig. 1 and 2). The individual overview page (Fig. 3) shows an O-C diagram, the ephemeris elements and a list of upcoming minima for planning observations.

New features include an interactive O-C plot (Fig. 4) where the user can explore different ephemerides and fit new elements, unlimited ephemerides for each star (previously only 3 ephemerides were stored) allowing more flexibility for analyzing trends and changes in behavior, and the possibility for users to download lists of minima and O-C values directly for themselves.

The database currently contains data for 8054 stars with 254 thousand minima, gathered from literature and from direct observations by the staff of the Mt. Suhora Observatory. New minima are continuously being added. The database can be accessed at:

<https://www.as.up.krakow.pl/tidak>

References

1. Kreiner J.M, Kim, C-H., Nha, I-S, 2001, “An Atlas of O-C Diagrams of Eclipsing Binary Stars”
2. Kreiner J.M, 2004, *Acta Astronomica*, vol. 54, pp 207-210.
3. Wenger, M. et al, 2000, *Astronomy & Astrophysics Supplement*, vol. 143, p. 9

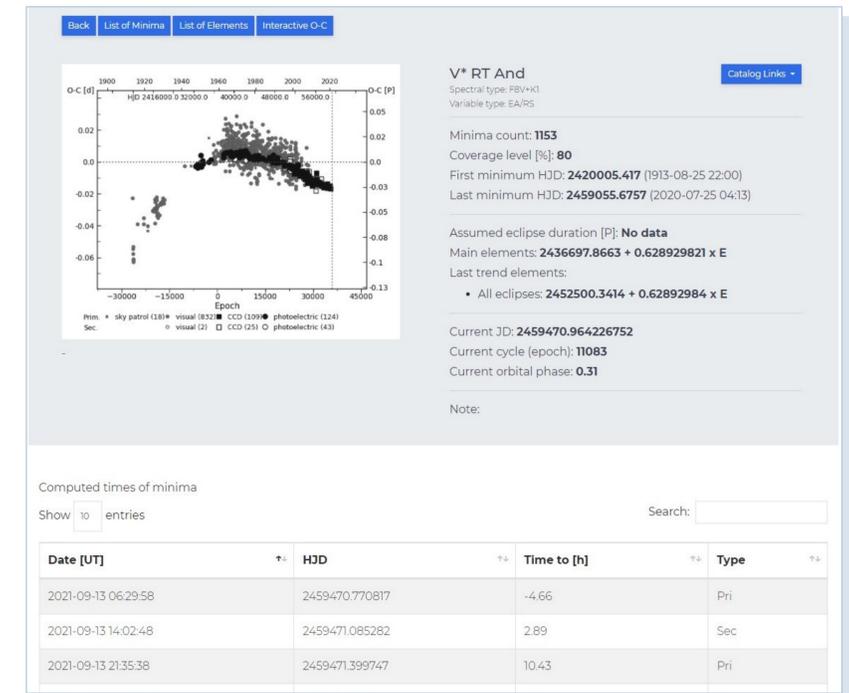


Fig. 3: Star overview page

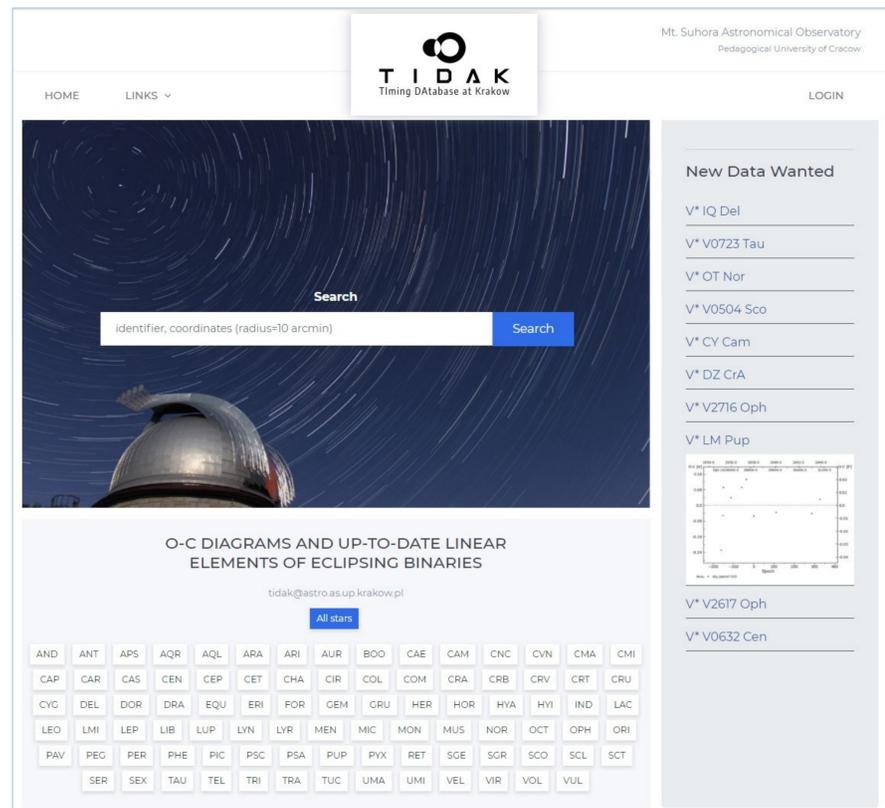


Fig. 1: Front page

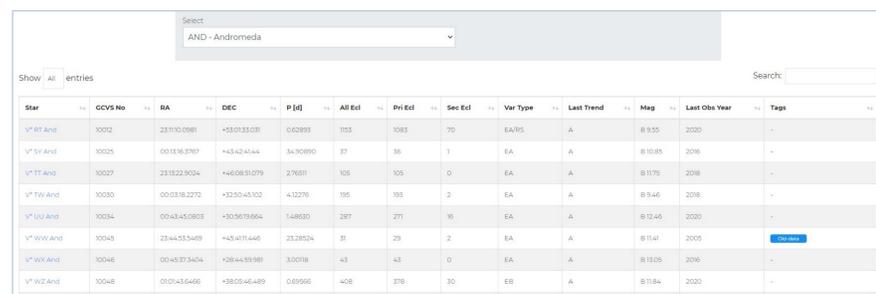


Fig. 2: Star list page for the constellation Andromeda



Fig. 4: Interactive O-C plot