Contrib. Astron. Obs. Skalnaté Pleso **55/3**, 382 – 384, (2025)
https://doi.org/10.31577/caosp.2025.55.3.382

# IGEBC - Interactive Gaia Eclipsing Binary Catalogue

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Received: November 12, 2024; Accepted: December 10, 2024

**Abstract.** We present Interactive Gaia Eclipsing Binary Catalogue (IGEBC) a web service that allows user-friendly access to light curves of eclipsing binaries and parameters from Gaia catalogues. It also aims to consolidate light curves and relevant information from other data sources, making it easier for researchers to access a comprehensive dataset of the studied object. Currently, users can search for eclipsing binaries using coordinates or Simbad-resolved names, view their light curves in different passbands, and access system parameters from the Gaia catalogues, which are also available from ASAS-SN and LAMOST.

**Key words:** eclipsing binaries – astronomical databases – astronomy web services

## 1. Introduction

The $3^{rd}$ Gaia Data Release (GDR3), available from 2022, provides not only an astrometric solution with exceptional precision, but also includes astrophysical parameters of stars, derived from low-resolution BP/RP spectra (Gaia Collaboration et al., 2023). Moreover, this release provides a photometric time series for millions of variable stars spanning approximately 34 months. (Eyer et al., 2023). These light curves were classified into 34 classes including eclipsing binaries. GDR3 contains approximately 2.1 million eclipsing binary stars and candidates. The photometric parameters of these systems were derived from their light curves in the $G$ band (Mowlavi et al., 2023).

## 2. IGEBC - Interactive Gaia Eclipsing Binary Catalogue

Data from GDR3 are available to the community through the Gaia Archive[1] or VizieR portal[2]. However, retrieving and visualizing these light curves from such services is often challenging and time consuming for users. To make Gaia

[1]https://gea.esac.esa.int/archive/
[2]https://vizier.cds.unistra.fr/viz-bin/VizieR

eclipsing binaries' light curves more accessible to the wider research community, we developed the Interactive Gaia Eclipsing Binary Catalogue - IGEBC. The main goal of these web services is to provide light curves and the basic parameters of Gaia eclipsing binaries from multiple data sources within a single web application.

The current version allows users to manipulate the Gaia and ASAS-SN light curves in the selected band (Jayasinghe et al., 2018). It also provides researchers with Gaia's base parameters, basic astrophysical parameters, and spectra from the LAMOST catalogue (Cui et al., 2012).

### 2.1. Data storage

To store data on eclipsing binaries from GDR3, we deployed a PostgreSQL database on our university server, where we stored data from the Vizier catalogues `I/358/veb`, together with light curves from `I/355/epphot` and basic parameters from the main catalogue `I/355/gaiadr3`. This local storage accelerates data handling and ensures autonomy from potential fluctuations in remote server availability. In the database, we also store parameters from the LAMOST DR9 catalogue, such as the effective temperature $T_{\rm eff}$, metallicity [Fe/H], and surface gravity $\log g$, together with the link to spectra for approximately 8,000 eclipsing binary systems available in both catalogues.

Data from the ASAS-SN survey were not stored locally because of their ongoing updates. Nevertheless, they are temporarily preserved on the disk cache to improve the retrieval speed and conserve resources. We found that the ASAS-SN database currently contains approximately 140,000 systems from the Gaia catalogue.

### 2.2. Web application overview

The IGEBC web application provides an interface for searching and exploring the data of eclipsing binaries from the Gaia catalogue. Users can search for objects by name or coordinates, or perform a cone search within a specified radius. The Aladin applet was integrated to identify stars in crowded fields. Once a star is selected, users are directed to the page with detailed information about the system, which includes links to the available light curves and spectra. Light curves can be phase-folded, unwanted points can be removed, and the resulting data can be stored in various commonly used formats.

## 3. Conclusion

The IGEBC web application provides an intuitive interface for searching and exploring eclipsing binaries in the Gaia catalogue. The web application is available at `https://skvo.science.upjs.sk/igebc`.

In the future, we plan to enhance this application by adding more tools for light-curve manipulation and integration with additional databases, both external and local. In particular, we plan to add a web application for the interactive retrieval of TESS data, with tools for their detrending.

We hope that the new database and web portal will enable researchers to work with light curves more efficiently, thereby saving time in searching and processing data. It may also assist in building training sets for supervised machine learning.

**Acknowledgements.** This work was supported by the Slovak Research and Development Agency under the contract No. APVV-20-0148. O.V. was supported by the internal grant of UPJS VVGS 2024-3080.

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