Astronomical Data Analysis Software and Systems XIII
ASP Conference Series, Vol. 314, 2004
F. Ochsenbein, M. Allen, and D. Egret, eds.

BDB - a database for all types of double stars

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Abstract. We present the general characteristics of a database for binary and multiple stars from all observational categories, specifically designed to address the awkward topics of the identification of stellar components. BDB is based on a modular architecture to allow the easy integration of data from various sources. We describe in particular the set up of connections with other double star databases through the Internet. Additional tools are being developped for the processing of image data. The implementation of standards for the connection of BDB with Virtual Observatory projects is reviewed.

1. Introduction

Why a SIMBAD-like database for double and multiple stars?

- to put together the various data of all types of double stars (Fig. 1),
- to avoid the well known difficulties specific to binaries:
  confusions between systems, components, measurements, identifiers, ...
- to show the multiple belonging of a system to the different types of binaries (Fig. 1),
- to give an easy and simultaneous access to ALL data relevant to any object.
- more than 50 % of the stars in a large neighbourhood of the Sun belong to double or multiple systems.

The number and diversity of binary stars support the need for the creation of a database that cross-refers and compiles data about the various observational categories (Oblak 2001).
What is sought through BDB is to set at the disposal of the community of stellar astronomers, the query tools necessary to retrieve numerical or image data over the Internet.
BDB has been developed since 1995.

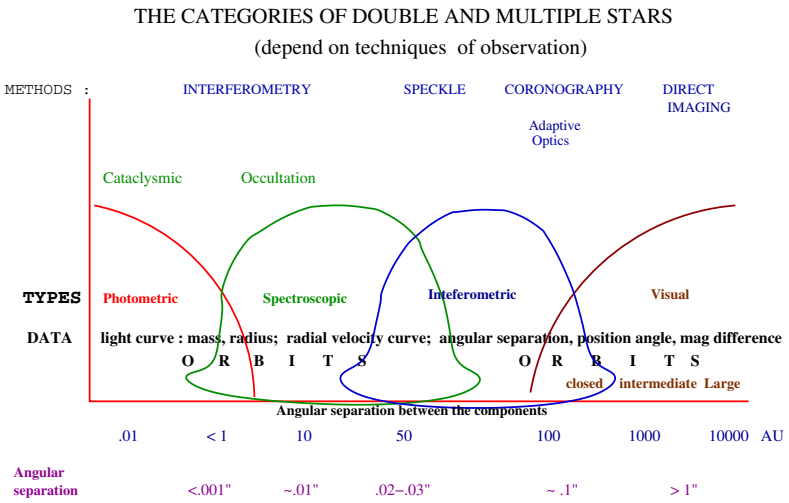

Figure 1. The categories of double stars in term of angular separation given in arcseconds and astronomical units.

2. The Computing Structure of BDB

BDB is managed through the /rdb relational data base management system. A CROSS files supplies the cross-identification between the different identifiers of a given component of a double star. An internal unique order number, called BID, is also assigned to the star.
A second file MAIN supplies the type of the binary system, the number and the 2000 equatorial coordinates (Fig. 2).
Each local or remote set of data (catalogue, images, ...) is accessed separately by the query scripts allowing easy integration of new data, updates, corrections, ...
The MAIN field gives the basic information on the stellar systems : the type of the system or the number of the components.

3. Astronomical Content of BDB

Catalogues of the following observational categories of binary stars are available through the database : visual, spectroscopic, interferometric and photometric. More detailed informations can be found on the data base web site : `http://bdb.obs-besancon.fr/`.
Photometric measurements in the three photometric systems (UBV, Strömgren and Geneva : 1995 for the moment) were also integrated in BDB.
The BDBJAVA tool has been developed to compare numerical data from several catalogues with the Digitized Sky Survey and CCD images (our own observations of a European Network) of visual binaries (Fig. 3).
Thanks to computing links with external databases, BDB gives the possibility to access data from the SIDONIE visual binary database (Observatoire de la Côte d'Azur, France), IAU's SB9 spectroscopic database (Brussels, Belgium), Cracow data base of eclipsing binaries (Poland) and the Simbad database (CDS).

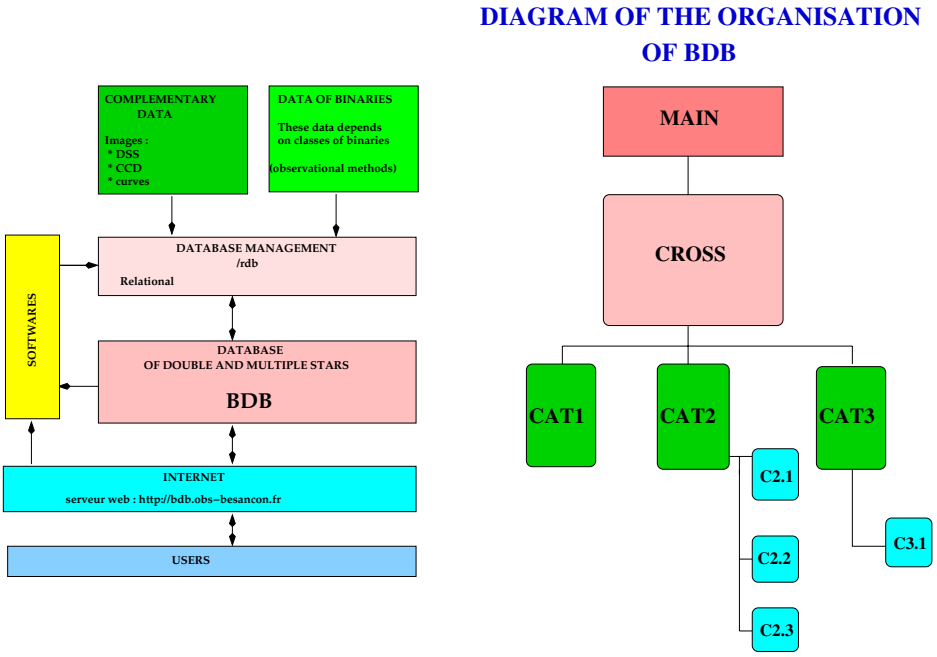

Figure 2. General computing scheme of BDB and the computing organisation of BDB. the CROSS field contains the identifiers taken from the various catalogues CAT1, CAT2, ...etc.

4. Development Perspectives

Besides the continous integration of new data specific to all observational categories, short-term developments focus on two axes:
1) interconnections with other databases
2) the output of data in XML format, especially for interoperability purposes; a first experimental implementation was made using the Astrores DTD. The work will now be turned into the new VOTable scheme (Ochsenbein et al. 2002) which was defined in the framework of developments for the Virtual Observatory initiative. Concurrently, other standards will also be considered, especially UCDs - Unified Column Descriptors - (Derrière et al. 2002).

5. Conclusions

Thanks to its structure and to its development scheme, the BDB data base allows now to raise the ambiguity that is very often met when one has to deal with binary stars. It could play a useful complementary role to CDS'SIMBAD in supplying data specific to binary stars.
BDB can turn out to be a useful tool for forthcoming projects such as GAIA.

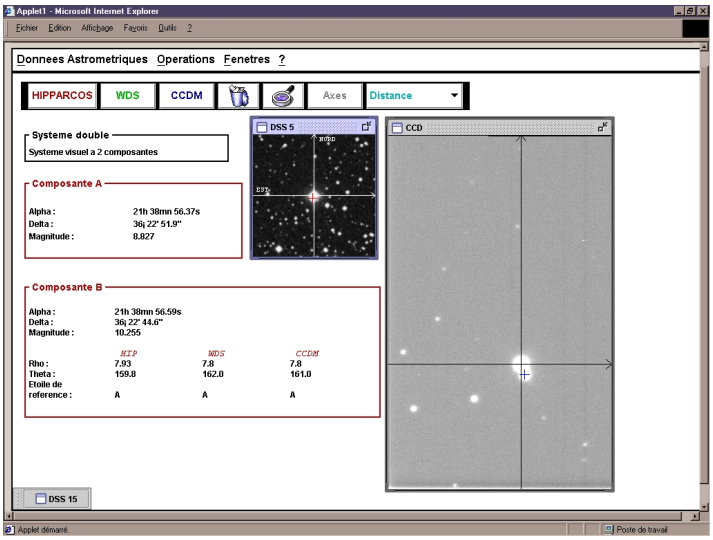

Figure 3. Example from BDBjava : comparison between numerical data and images from DSS and CCD.

References

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