



The Binary star DataBase BDB v3.0

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The Binary star DataBase (BDB, <http://bdb.inasan.ru>) is the database of binary and multiple systems of all observational types. The release of the third version of BDB is announced.

The population of binary and multiple stars is numerous and represents subject of interest to investigators of many fundamental fields, such as star formation, galactic and stellar evolution, and so on. However, data on binary and multiple stars are remarkable by non-homogenous variety and difficulty to automated processing. Binaries are being observed by various methods resulting in various datasets. There are many catalogues and databases addressing to certain observational types of binaries (e.g. eclipsing, visual, spectroscopic, etc.). However, data in these datasets are often related with different types of objects (say, with components, or with a pair as a whole), and cross identifications for the objects were often non-existent or unreliable. This prevented data aggregation for the same objects to perform comprehensive investigations of binary and multiple stars.

The Binary star DataBase (<http://bdb.inasan.ru>) is intended to join all catalogued data for binary and multiple stars of all observational types to allow user its combined analysis. BDB provides the user with synthesis of data of large variety of catalogues and databases of binaries of different types: visual, orbital, astrometric, eclipsing, spectroscopic, photometric, etc. By now, BDB contains all data from 25 catalogues on more than 100,000 stellar systems of multiplicity two and more: positional, photometric, spectroscopic, orbital and astrophysical. Organization of the information is based on the careful cross-identification of the objects.

Fig. 1a. The result of BDB query by identifier WDS 04078+6220 (part of)

IDs	Evolutionary class	Observational type	Theta (deg)	Angular separation (arcsec)	Parallax (mas)	Orbital period (days)	Semi-major axis (arcsec)	Eccentricity	Inclination (deg)	Systemic radial velocity (km/sec)	Source
SZ Cam	Detached				0.0	2.69844					Bracewicz
SZ Cam HD 25638		Eclipsing									Bracewicz+H
CCDM 04078+6220AD, ADS 2984, DM +61 676, IRT 461, USNO-B09	Detached	Visual	76.0	130.1							CCDM

Fig. 1b. Result of "Show selected data" from the previous page (part of)

IDs	Evolutionary class	Observational type	Theta (deg)	Angular separation (arcsec)	Parallax (mas)	Orbital period (days)	Semi-major axis (arcsec)	Eccentricity	Inclination (deg)	Systemic radial velocity (km/sec)	Source
SZ Cam	Detached				0.0	2.69844					Bracewicz
SZ Cam HD 25638		Eclipsing									Bracewicz+H
CCDM 04078+6220AD, ADS 2984, DM +61 676, IRT 461, USNO-B09	Detached	Visual	76.0	130.1							CCDM

Fig. 2. Query by parameter page, and (part of) result of request for pairs with mass ratio (q) 0.1 to 0.3. Clicking on any identifier results in request by identifier.

IDs	Evolutionary class	Observational type	Parallax (mas)	Orbital period (days)	Inclination (deg)	q	sum M (solar M)	Source
V453 Cyg	Semidetached	Eclipsing		3 8898128		0.1		V115
W Cyg	Semidetached		3.0	0 388081		0.1	2.3	Bracewicz
AW Uma	Semidetached		13.0	0 438732		0.1	2.6	Bracewicz
AS Eri	Semidetached		3.0	2 66415		0.11	2.0	Bracewicz
AS Eri				2 664152	79.5	0.11		V115
CK Boo	Contact		6.38	0 35515697	56.6	0.111	1.171	Pribulla

To solve problems of cross-identification for the objects in binary and multiple stars, we've created an index catalogue of binary and multiple stars, ILB, implementing specially developed designation scheme (BSDB) [1]. Each system and pair, and every component are assigned with a unique BSDB identifier. This involved development of data model for binary and multiple stars including three categories of objects, Systems, Pairs and Components, to establish correct links between objects and data [2,3]. The total number of BSDB entries exceeds 800000, as every binary star is referred by four BSDB entities (a system, a pair and two components) while multiples generate respectively more entities. Each category of objects is related with its own types of data so that objects and data are properly assigned to each other. This allows the user, in particular, to search data on binaries having certain sets of parameters within the complete catalogued data set. Management of the database involves regular updates and check-ups for ILB data. The problems to solve are controversial data from different sources, coordination between identifiers within a system before and after discoveries that change the entity (say, a component is resolved to become a pair), identifications within multiple systems.

BDB can be accessed interactively at <http://bdb.inasan.ru> via a web-interface. Until recently, BDB data could be queried using two methods: by identifier and by parameters. The new, third version introduces batch mode request option, improves search by parameter (implementing VO ConeSearch protocol), and allows new data output options. Also, a set of catalogues is added to the database, mainly addressing to the astrophysical parameters of the components of binaries and multiples [2,4], which previously lacked. Management of the project involves regular interaction with the users, and complying their requests, we change some output features.

Further development of the database includes improvement of cross identification of the objects in multiple systems; adding more minor catalogues of data for certain types of binaries that almost would not increase the number of objects but will increase the amount of data for them; implementation of "Telegram" option that would let observers add data on the object; setting links with external on-line resources on binary stars; improvement of the user interface.

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