SIMBAD : AN ASTRONOMICAL DATABASE

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ABSTRACT : SIMBAD is the astronomical database produced and updated by the Strasbourg astronomical Data Center (CDS). Some guidelines are given how to retreive the astronomical information.

1. SHORT DESCRIPTION OF SIMBAD.

It must be first noticed that SIMBAD is organized by astronomical objects. To retrieve information on astronomical subjects many tools exist like Astronomy and Astrophysics Abstracts, some online databases (INSPEC, NASA/RECON, PHYS ...) or simply a dictionary. But astronomy is often related to observations and therefore to astronomical objects. Until recently, literature references concerning individual objects were not indexed at all in any of the standard bibliographical work except if they appear in the title of the paper or in an abstract. So it is often difficult to retrieve papers and information concerning one object. This , on the contrary, is the aim of SIMBAD .

SIMBAD concerns by all astronomical objects, except the solar system. It contains about 2,500,000 designations concerning 600,000 stars and 100,000 non-stellar objects (mostly galaxies). In a near future it will contain of the order of 20 million objects. SIMBAD contains about 30 types of data, among them bibliographical references. The bibliography contains references to stars from 1950 onwards, and to all objects from 1983 onwards. SIMBAD is continuously updated at the CDS and for the bibliography also at the Institut d'Astrophysique de Paris and the Paris and Bordeaux Observatories.

2. RETRIEVAL OF INFORMATION.

SIMBAD is organized by astronomical objects. In this way, the interrogation of SIMBAD is not made by keyword but by the name of the objects or a list of objects. Thus there exist three query modes for SIMBAD : the designations of the object or the position in the sky or a combination of criteria. The two last modes gives a list of objects and then the data connected to these objects.

2.1 Retrieving by Designation.

The retrieving of information using the names of the object is hindered by the complexity of the different types of designations for the same object (cf. The First Dictionary of the Nomenclature of Celestial Objects and their Supplements : Fernandez et al. 1983, Lortet and Spite 1986) and by the fact that one object could have as many as 30 different names. For these reasons, SIMBAD contains an important number of cross-identifications.

2.1.1 Multiplicity of Designations.

To illustrate this problem, the different names used for the star Vega are :

ADS 11510A, AG+38 1711, alpha Lyr, 3 Lyr, BD+38 3238, BD+38 3238A, CEL 4636, 1E 183515+3844.3, FK4 699, GC 25466, GCRV 11085, GEN+1.00172167, GJ 721, HD 172167, HGAM 706, HR 7001, IRC+40.322, JP11 2999, LTT 15486, N30 4138, PLX 4293, ROT 2633, SAO 67174, SKY 34103, TD1 22883, UBV 15486, UBV M 23118, V* alpha Lyr.

2.1.2 Multiplicity of Format.

The multiplicity of names is complicated by the different formats which could be used for the same name. Indeed, for a standard software, the space character is important and, for the computer, the following names are different one from another:

HR 23
HR23
HR 23

or

MCG+01-23-045
MCG+1-23-45
MCG 1 - 23 - 045
MCG+01 - 023 - 0045
...

The SIMBAD's software handles most of these formats. To do this there exist two main rules :

1) There is a space between the name of the catalogue and the number in this catalogue.

2) If there is a sign (+ or -) in the name, the sign must be present.

2.1.3 Multiplicity of Catalogue's Name.

The third problem is the non-standardization of the name of a specific catalogue. For instance HR or BS designate the same catalogue and HR 23 or BS 23 designate the same star.To solve this problem the following guidelines are proposed :

1) Use the "First Dictionary of the Nomenclature of Celestial Objects" and its Supplements (Fernandez et al. 1983, Lortet and Spite 1986) to find the usual designation of the objects.

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2) Use online information on SIMBAD to find the usual designation in the database.

If you have a designation beginning with the letter "Z" you could find all catalogue beginning with "Z" which are in SIMBAD using the command : "INFO CATI Z&". Among other, you will obtain information on the catalogue of galaxies made by Zwicky. Instead of "Z" it is possible to use as many letters as necessary."INFO CATI ..." gives informations on catalogue identifiers. It is also possible to find the identifier by searching the name of the first author of the catalogue with the command "INFO CATA ..." e.g. "INFO CATA ZWICKY&" gives information on all catalogues where Zwicky is the first author. Other possibilities of the "INFO ..." command can be obtained with the command "INFO" alone which displays general information.

2.2 Retrieving by Coordinates.

It is often interesting to search information in a region of the sky, for instance to find an object for which we do not know the right name or to find objects for comparison with another. An easy way is to give accurate or approximate coordinates. Then SIMBAD makes a search in a circle around this position and gives a list of objects. The radius is of 10' but could be modified if necessary.

2.3 Retrieving by a Combination of Criteria.

Another way to obtain a list of objects is to give some criteria (eg. area in the sky, range in magnitude, existence of some specific types of data ...). The search by coordinates is just one peculiar case. There exist about 30 criteria and it is possible to combine them.

2.4 Retrieval of Bibliography.

Because the bibliography is organized in some different way which is not simply connected with the objects, it is possible to retrieve the references using :

- the name of one object quoted in the paper.
- the name of the first author.

The name could be abbreviated with the first letters. This search could also be combined with specifications of the years of publication. The command "INFO AUT 86,87 XYZ" is for a search of bibliographical references published between the years 1986 and 1987 by authors name beginning with "XYZ".

On the contrary the command "INFO REF xxx" displays the author(s), the name of the journal with the number of the volume and page and the title of the paper which has the reference number xxx in SIMBAD.

A comparison of SIMBAD's bibliography with other astronomical bibliographies is presented at another place in this conference (Dubois 1988).

3. ACCES TO SIMBAD.

SIMBAD is accessible through the public packet switching data network : TRANSPAC in France, DATEX-P in Germany, etc. A transatlantic link sponsored by the NASA is implemented in order to provide no-cost access to SIMBAD for all U.S.-based astronomers. It should be noticed that Electronic Mail network such as EARN/BITNET which do not allow remote log-in are not suitable for interactive access to SIMBAD.

The CDS will provide on request an account number for the use of SIMBAD.

REFERENCES

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