THE NEW INDEX CATALOG OF VISUAL DOUBLE STARS - WDS

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ABSTRACT: A new index catalog of visual double stars, the Washington Double Star Catalog (WDS), 1984.0, is now available in tape form. All of the double star data has been updated, as well as the notes to the catalog. This report summarizes the contents of the WDS and describes its compilation.

The U.S. Naval Observatory assumed responsibility for the maintenance, correction, updating, and dissemination, of visual double star data in 1965, when the Lick Observatory transferred its accumulated data to Washington. Two punch-card catalogs were involved. First, there was the Observation Catalog, which was a comprehensive collection of all measures published since 1927 (plus a few published earlier) totalling about 199000 records. Second was the card version of the just-published Index Catalogue (Jeffers and van den Bos, 1963) itself, numbering about 64000 cards.

The construction of a new index catalog necessarily first requires the collection of a data base of observations. Since receipt of the Lick material, we have added nearly 73000 new observations. Also, beginning in 1972, we sought to make the data base truly comprehensive by adding all the pre-1927 observations. Up to the present time approximately 144000 of these older measures have been incorporated in the data base, and our best estimate is that this task is now 75-80% complete.

In January, 1982, the entire double star data was placed on disk, so formatted that both the Index and Observation card images of each double star were sequential, and ordered by the 1900 coordinates. Availability of the material in this form enabled one of us (CEW) to edit the entire data and at the same time to create a new index catalog. In the course of editing, not only were many errors and discrepancies identified and corrected, but it was also found possible to make many judicious combinations of single observations into means in the Lick portion of the data, so that that data shrank to about 180000 records. Conse-

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quently, the new index catalog is based on about 383000 observations, of which well over half have been added in Washington in the last 18 years. We have also removed more than a thousand of the objects included in the Lick Catalog; the most common reason for removal being that the star was not certainly double. Such cases will be kept in an auxiliary file entitled "Stars Suspected of Duplicity", until such time as the individual stars can be reexamined.

The new index catalog contains approximately 74000 double stars, counting additional components, as was done in the Lick version, as separate pairs. Thus, the present catalog represents an increase of 10000 objects over its predecessor, and most of these are either the new close pairs found visually by Muller, Couteau, and Heintz in their resurveys of the northern hemisphere stars, speckle interferometer pairs found mainly by McAlister and his collaborators, and common proper motion objects found by Giclas and Luyten.

In format, the new Washington Double Star Catalog (WDS) is virtually identical to the Lick catalog (IDS). That is, the catalog remains in 80-column (card) format and maintains the epoch of the 1900 coordinates as the primary identifier. Updated data includes the dates of observation and their total number, the motion in position angle and separation, and the notes. All known corrections to position, designation, components, magnitude, and durchmusterung number have been included. These are numerous.

The Notes, which previously dealt mainly with identifications, have been extensively revised to incorporate information on orbits obtained from the new orbit catalog (Worley and Heintz, 1984), variability, and photometric and spectroscopic duplicity. They also now include the Bayer letters or Flamsteed numbers. This revision has increased the total number of notes by more than 2000.

It is our intention to maintain the WDS in a continuously updated form, so that new tape versions can be produced as needed. The most serious defect of the present catalog is the total lack of any uniform system of magnitudes, and secondarily, the primitive spectral types which lack of space forces us to use. We intend to give attention to these problems, but their solution will undoubtedly require eventual reformatting of the entire WDS, which is not trivial. We also are examining the advisability of adopting 2000 coordinates in the future; this would of course require a major resorting. The astronomical community has not as yet expressed its opinion as to the desirability of a future hard-cover publication of the WDS. For the time being, we believe that a series of tape updatings of the WDS should suffice to meet most demands, and we propose to continue our policy of supplying reasonable amounts of material from the underlying data base upon request. Distribution of the Washington Double Star Catalog, 1984.0 will be through the National Space Science Data Center and the Strasbourg Stellar Data Center.

ACKNOWLEDGEMENTS

We wish to thank Dr. Wayne Warren for supplying us with the initial machine-readable version of the IDS notes.

REFERENCES

Jeffers, H.M., and van den Bos, W.H. : 1963, "Index Catalogue of Visual Double Stars, 1961.0". Pub. Lick Obs. XXI.

Worley, C.E., and Heintz, W.D. : 1984, "Fourth Catalog of Orbits of Visual Binary Stars". Pub. U.S. Naval Obs. XXIV, Pt. 7.

Discussion:

van ALTENA: I think we all owe Charles Worley a great debt of gratitude for the time he spent in preparing this catalogue and making it available to all of us. I propose we thank him right now.
THE AUDIENCE: Strong applause.
HEINTZ: The new index catalogue project has ranked high among the desiderata of IAU Commission 26, and I have been asked to convey to you the grateful appreciation of the Commission for its completion.
van ALTENA: I understand that the catalogue of visual double star orbits is also just about to be published.
WORLEY: The new catalogue of orbits of visual binaries is in fact, in press, and will appear as Publication of the U. S. Naval Observatory Vol. XXIV, pt. 7, 1983. Dr. W. D. Heintz is co-author of this.
YE: Have you used the observations made at Shanghai?
WORLEY: In our data base we have observations made by Chinese astronomers at Shanghai. I will be happy to receive any new observations your colleagues care to send.