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A REVISION OF THE TRAPEZIUM SYSTEMS CATALOGUE

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RESUMEN

Presentamos los primeros resultados de un programa para mejorar el catálogo Trapezium Multiple Systems Catalogue (TMSC) de Salukvadze. Para hacer esto hemos hecho una identificación cruzada de datos brindados en la presente edición de TMSC (numerada como I/134 in the Strasbourg's Data Center) con los catálogos Washington Double Stars Catalogue and 2MASS, entre otras grandes compilaciones de datos. Se han detectado variaciones en ángulo de posición y separación para algunos sistemas.

ABSTRACT

We present the first results of a program conducted to improve Salukvadze's Trapezium Multiple Systems Catalogue (TMSC). In order to accomplish our goal, we have cross-identified the data presented in the current edition of the TMSC (numbered I/134 in the Strasbourg's Data Center) with the Washington Double Stars Catalogue and 2MASS, among other large compilations. Variations in both position angles and separations have been detected for some systems.

Key Words: stars: binaries: general — catalogs

1. INTRODUCTION

The idea of Trapezium-type Systems was first introduced by Ambartsumian in the mid-50's. The description of such systems is that of a group of stars in which at least three of the separations between components are of the same order. This definition was further developed by Allen & Poveda (1974) in an article where they proposed three types of Trapezium systems, namely: normal, wide and mixed. Through the years, many studies have been published concerning the dynamical evolution of the systems, their age, location, type of stars, etc. Among others, the studies by Allen, Poveda, & Worley (1974); Allen, Tapia, & Parrao (1977); Allen, Poveda, & Hernández-Alcántara (2004) and Allen & Moreno (2006) and references therein provide quite a complete view of the current knowledge of these systems.

Even though much progress has been made in the past few years for some systems and new tools are being applied to determine the position angles and separations between the members of each system, in particular the Orion Trapezium (see Sánchez-Peniche et al. 2008), the most recent version of the Trapezium Multiple Systems Catalogue (TMSC) was published 30 years ago.

The first Trapezium Systems list was compiled by Ambartsumian (Salukvadze & Javakhishvili 1988). Although some unpublished lists are mentioned in the literature, it is our understanding that the most recent and comprehensive compilation –identified as Catalogue I/134 at the CDS (*Centre de Données Astronomiques de Strasbourg*)– was presented by Salukvadze (1978). We have taken this compilation as our starting point.

2. THE CATALOGUE I/134

The current version of the TMSC, available at the CDS, lists a total of 412 objects. The main source of information for the position angles and separations was the IDS (*Index Catalogue of Visual Double Stars*), which was ordered in increasing Right Ascension for B1900, as is the TMSC. Magnitudes for each star member of the system are also given, while spectral types, ADS (*Aitken Double Stars*), and DM numbers are included when available. No epoch of observation of the astrometric parameters is mentioned.

The first inconvenience with catalogue I/134 is that no coordinates are explicitly given with the level of accurancy required nowadays by most of the observing facilities. On the other hand, that level of accuracy is present in almost every single astrometric catalogue accessible through the different tools of the Virtual Observatory (VO). The lack of accurate coordinates of the TMSC could be solved through the cross identification of different catalogues.

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It is relevant to mention that even though no coordinates are included in Catalogue I/134, they are in some way embedded in the designation of the brightest member of the system, since both –Right Ascension and Declination– are part of the designation. In other words, an approximate value for the position of the system is available.

3. THE NEW VERSION OF THE CATALOGUE

The first step in our updating process was to precess the approximate coordinates (given for B1900) present in the designation of the system, to the equinox J2000. We then compared the resulting coordinates with those quoted in the WDS (*Washington Double Stars Catalogue*). With very few exceptions, we were able to match almost all the objects listed in catalogue I/134 with double and multiple systems included in the WDS. This cross identification provided us with at least two position angles and two distances at two different epochs, which are clearly listed in the WDS. More importantly, it also provided accurate coordinates for at least the brightest star of the system.

The second step –still in progress– is the identification of each member of the system in 2MASS (Cutri et al. 2003). Once this is completed, we will search other astrometric catalogues, such as NOMAD (*Naval Observatory Merged Astrometric Dataset*) (Zacharias et al. 2004) as well as photometric and spectroscopic catalogues available through Aladin and VizieR in order to provide additional data.

This research has made use of Aladin. We have also made use of the VizieR catalogue access tool, CDS, Strasbourg, France, as well as of the Washington Double Star Catalog maintained at the U.S. Naval Observatory. This publication makes use of data products from the Two Micron All Sky Survey, which is a joint project of the University of Massachusetts and the Infrared Processing and Analysis Center/California Institute of Technology, funded by the National Aeronautics and Space Administration and the National Science Foundation. Partial support from the National Science Foundation through the Yale Southern Observatory is deeply acknowledged.

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