

NEW CATALOGUE OF OPTICALLY VISIBLE OPEN CLUSTERS AND CANDIDATES

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Abstract. We have compiled a new catalogue of open clusters in the Galaxy which updates the previous catalogues of Lyngå(1987) and of Mermilliod (1995) (included in the WEBDA database). New objects and new data, in particular, data on kinematics (proper motions, radial velocities) that were not present in the old catalogues, have been included. Virtually all the clusters (1622) presently known were included, which represents an increment of about 450 objects relative to the Lyngå(1987) catalogue. The catalogue is presented in a single table containing all the important data (positions, reddenings, distances, ages, kinematics) which makes it easy to use.

The catalogue includes mean absolute proper motions for hundreds of open clusters (Dias et al. 2001, 2002a) obtained using the Tycho2 proper motions. Unpublished mean radial velocities of several dozens of clusters are also presented in this work.

The catalogue is being constantly updated and the latest version can be accessed on line at <http://www.astro.iag.usp.br/~wilton/> were more data such as membership probabilities for individual stars can also be accessed.

1 Introduction

Open clusters have long been recognized as important tools to investigate the kinematics of star formation regions, aspects of Galactic structure such as the location of spiral arms, Galactic dynamics, or even the chemical abundance gradients in the disk. With the publication of the Hipparcos Catalogue (ESA 1997) and its sub-products, the Tycho (ESA 1997) and Tycho2 (Høg et al. 2000) catalogues, and with individual works using CCDs for photometry and/or astrometry,

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we have seen a large growth of the available data on open clusters in a short time. Among the recent results, we note the discovery of new open clusters by different authors (Platais et al. 1998; Chereul et al. 1999; Dutra & Bica 2001 and Alessi et al. 2002). Important contributions were also given by Baumgardt et al. 2000 and Dias et al. (2001, 2002a) who determined the mean absolute proper motion of more than a hundred clusters, using the Hipparcos and Tycho2 catalogues.

In this work, we introduce a new catalogue of the open clusters of our Galaxy. The main reasons that prompted us to prepare a new catalogue of open clusters, instead of simply adding newly discovered objects, were the need to have the relevant information in a single file, for ease of use, and more important, the fact that the previous catalogues did not provide open clusters' proper motions and radial velocities in a systematic way.

2 Catalogue description

In this new catalogue of open clusters, we used previous ones such as WEBDA, ESO Catalogue (Lauberts(1982)) and Lyngå(1987) as a starting point. The basic data contained in these catalogues are coordinates, age, apparent diameter, colour excess, and distance. We inserted new objects, and when available, kinematical and metallicity data. Extensive use was made of the Simbad database and of the literature to find data on the clusters or on individual stars of the clusters, to obtain radial velocities and proper motions averaged over a number of stars.

All the available basic data (reddenings, distances, ages, metallicities and kinematics) is displayed in a single easy-to-use list. The catalogue is regularly updated, and the latest version is available at <http://www.astro.iag.usp.br/~wilton/>. Since it is expected that the catalogue will be used in the selection of observational targets, an additional table of open clusters with available photometric data is also provided.

In the most recent edition, 1622 objects are given, of which 450 are not given in the catalogue compiled by Lyngå(1987). The new objects include 191 open clusters found across the literature, and 11 recently discovered open clusters with fundamental parameters determined by our group and yet unpublished (Alessi et al. 2002. See also Moitinho et al. in this workshop).

Nearly all the clusters (94.7%) have estimates of their apparent diameters. Distances, $E(B-V)$ and ages are listed for 37%. Concerning the data on kinematics, 18% have mean proper motions determinations, 12% mean radial velocities, and 9% have both information simultaneously.

3 New mean radial velocities determined

One of the major improvements over the previous catalogues was the inclusion of the yet unpublished mean radial velocities newly determined by our group (Dias & Lépine 2002).

We started by selecting probable members using the membership analysis published by Dias et al. (2001, 2002a) for 205 open clusters. Each star was searched in

several catalogues of radial velocities (eg. HIC, GCRV, WEB Catalogue of mean Radial velocities, among others). The identification of the stars was based on their coordinates and on cross-identifications obtained from Simbad. For each star, the adopted radial velocity was taken as the simple mean of the values given in each catalogue. In many cases we excluded discrepant values and did not use known double or multiple systems. The mean radial velocity of the cluster was then determined using the values obtained for the individual stars. When the number of the stars used was more than 10 we adopted a gaussian fit, when not we used a simple mean computation. For 105 clusters at least one star was identified. For 35 open clusters, that is about 35% of the sample, this is the first determination of mean radial velocity.

To check the quality of new radial velocity determinations, we compared our values with those found in the literature, such as the previous version of this catalogue (Dias et al. 2002b) and the series of investigations of red giants in open clusters, performed by Mermilliod and collaborators (eg. Mermilliod et al. 2001). For 60 clusters in common we adjusted a gaussian that provided a mean radial velocity difference of 0.8km.s^{-1} and a standard deviation of 2.0km.s^{-1} . This comparison shows that there is no systematic trend (Figure 1) and the small mean difference assures that both sets of radial velocities are in agreement. For 7 clusters larger differences were found. However, all these cases could be attributed to the dubiety of the membership probability determined from the proper motion data.

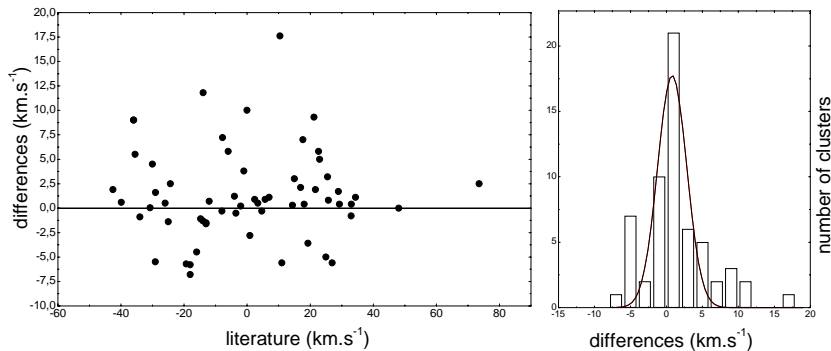


Fig. 1. Mean radial velocities differences of 60 clusters common in with literature.

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