

# Late-type members of young stellar kinematic groups – I. Single stars

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## ABSTRACT

This is the first paper of a series aimed at studying the properties of late-type members of young stellar kinematic groups. We concentrate our study on classical young moving groups such as the Local Association (Pleiades moving group, 20–150 Myr), IC 2391 supercluster (35 Myr), Ursa Major group (Sirius supercluster, 300 Myr), and Hyades supercluster (600 Myr), as well as on recently identified groups such as the Castor moving group (200 Myr). In this paper we compile a preliminary list of single late-type possible members of some of these young stellar kinematic groups. Stars are selected from previously established members of stellar kinematic groups based on photometric and kinematic properties as well as from candidates based on other criteria such as their level of chromospheric activity, rotation rate and lithium abundance. Precise measurements of proper motions and parallaxes taken from the *Hipparcos* Catalogue, as well as from the Tycho-2 Catalogue, and published radial velocity measurements are used to calculate the Galactic space motions ( $U$ ,  $V$ ,  $W$ ) and to apply Eggen’s kinematic criteria in order to determine the membership of the selected stars to the different groups. Additional criteria using age-dating methods for late-type stars will be applied in forthcoming papers of this series. A further study of the list of stars compiled here could lead to a better understanding of the chromospheric activity and their age evolution, as well as of the star formation history in the solar neighbourhood. In addition, these stars are also potential search targets for direct imaging detection of substellar companions.

**Key words:** catalogues – stars: activity – stars: chromospheres – stars: kinematics – stars: late-type – open clusters and associations: general.

## 1 INTRODUCTION

Stellar kinematic groups (SKGs) are kinematically coherent groups of stars that could share a common origin (the evaporation of an open cluster, the remnants of a star formation region, or a juxtaposition of several little star formation bursts at different epochs in adjacent cells of the velocity field). Eggen (1994) defined a ‘supercluster’ (SC) as a group of stars gravitationally unbound that share the same kinematics and may occupy extended regions in the Galaxy, and a ‘moving group’ (MG) as the part of the supercluster that enters the solar neighbourhood and can be observed all over the sky. It has long been known that in the solar vicinity there are several groups of stars that share the same space motions as well-known open clusters. The youngest and best documented groups are the Hyades supercluster (Eggen 1958a, 1960a, 1984a, 1992b, 1996, 1998b) associated with the Hyades cluster (600 Myr), and the Ursa Major group (Sirius supercluster) (Eggen 1960b, 1983a, 1992a, 1998c; Soderblom & Mayor

1993a,b) associated with the UMa cluster of stars (300 Myr). A younger kinematic group called the Local Association or Pleiades moving group seems to consist of a reasonably coherent kinematic stream of young stars with embedded clusters and associations such as the Pleiades,  $\alpha$  Per, NGC 2516, IC 2602, and Scorpius-Centaurus (Eggen 1975, 1983b,c; 1992c, 1995a). The ages of the stars of this association range from about 20 to 150 Myr. Evidence has been found that X-ray- and EUV-selected active stars and lithium-rich stars (Favata et al. 1993, 1995, 1998; Jeffries & Jewell 1993; Mullis & Bopp 1994; Jeffries 1995) are members of this association. Other two young moving groups are the IC 2391 supercluster (35–55 Myr) (Eggen 1991, 1995b) and the Castor Moving Group (200 Myr) (Barrado y Navascués 1998).

Since Olin Eggen introduced the concept of MGs and the idea that stars can maintain a kinematic signature over long periods of time, their existence (mainly the old MGs) has been rather controversial (see Griffin 1998; Taylor 2000). There are two factors that act against the persistence of an MG: the Galactic differential rotation (tends to spread the stars) and the disc heating (velocity dispersion of disc stars increase with age). However, recent studies

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**Table 1.** Young stellar kinematic groups.

| Name   | Cluster(s)   | Age<br>(Myr) | $U, V, W$<br>( $\text{km s}^{-1}$ ) | $V_T$<br>( $\text{km s}^{-1}$ ) | C.P. ( $A, D$ )<br>( $^{\circ}, ^{\circ}$ ) |
|--|--|--------------|-------------------------------------|---------------------------------|---|
| Local Association<br>(Pleiades moving group) | Pleiades, $\alpha$ Per, M34<br>$\delta$ Lyr, NGC 2516, IC2602, | 20–150       | –11.6, –21.0, –11.4                 | 26.5                            | (5.98, –35.15)                              |
| IC 2391 supercluster                         | IC 2391  | 35–55        | –20.6, –15.7, –9.1                  | 27.4                            | (5.82, –12.44)                              |
| Castor moving group                          |  | 200          | –10.7, –8.0, –9.7                   | 16.5                            | (4.75, –18.44)                              |
| Ursa Major group<br>(Sirius supercluster)    | Ursa Major   | 300          | 14.9, 1.0, –10.7                    | 18.4                            | (20.55, –38.10)                             |
| Hyades supercluster                          | Hyades, Praesepe   | 600          | –39.7, –17.7, –2.4                  | 43.5                            | (6.40, 6.50)                                |

(Chereul, Crézé & Bienaymé 1998, 1999; Dehnen 1998; Asiain et al. 1999; Skuljan, Hearnshaw & Cottrell 1999; Feltzing & Holmberg 2000; Mylläri, Flynn & Orlov 2000; Torra, Fernández & Figueras 2000) using astrometric data taken from *Hipparcos* and different procedures to detect MGs not only confirm the existence of classical young MGs (and some old MGs), but also detect finer structures in space velocity and age that in several cases can be related to kinematic properties of nearby open clusters or associations. Skuljan, Cottrell & Hearnshaw (1997) have also confirmed the Eggen’s hypothesis of MGs using *Hipparcos* astrometric data. These authors found that the use of *Hipparcos* data considerably reduces the velocity dispersions for all the Eggen MGs. However, Eggen’s membership criterion of constant  $V$  is not confirmed, and they conclude that both  $U$  and  $V$  velocity components must be used to create more realistic membership criteria. More complex structures characterized by several longer *branches* (Sirius, middle, and Pleiades branches) running almost parallel to each other across the  $UV$ -plane have been found by Skuljan et al. (1999) in their study of the velocity distribution of stars in the solar neighbourhood.

Well-known members of these moving groups are mainly early-type stars, and few studies have concentrated on late-type stars. However, evidence has been found that many young, late-type stars can be members of some young MG [X-ray- and EUV-selected active stars and lithium-rich stars (Jeffries 1995); the late-type stellar population of the Gould belt (Guillout et al. 1998; Makarov & Urban 2000)]. Identification of a significant number of late-type members of these young moving groups would be extremely important for a study of their chromospheric and coronal activity and their age evolution. This is the aim of this series of papers.

In this first paper we focus on the compilation of a preliminary list of single late-type stars, previously established members, or possible new candidates of the different young SKGs mentioned above (see Table 1). We have examined the kinematic properties of these stars using the more recent radial velocities and astrometric data available, in order to determine their membership to the different SKGs. In a companion paper (Montes et al. 2001c, hereafter Paper II) we give the list of spectroscopic binaries, some of them well-known chromospherically active binaries (for preliminary results see Montes, Latorre & Fernández-Figueroa 2000a and Montes et al. 2001a). The origin of these young SKGs will be addressed in Paper III. With this aim we have taken the most recent data available in the literature (including astrometric data from the *Hipparcos* Catalogue and the new Tycho-2 Catalogue) of the nearby young open clusters, OB associations,

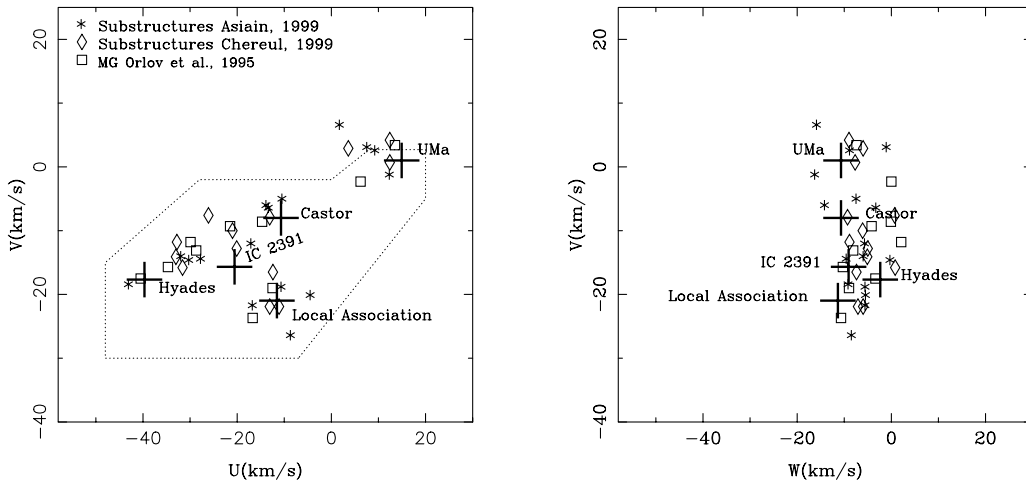
T associations, and other associations of young stars as TW Hya, in order to calculate their Galactic space motions ( $U, V, W$ ) and space coordinates ( $X, Y, Z$ ), and to study their possible association with the different young SKGs as well as with the young flattened and inclined Galactic structure known as the Gould Belt (for preliminary results see Montes 2001a,b; for a review of the evolution from OB associations and moving groups to the field population see Brown 2001).

In addition to the kinematic properties we have also compiled for each star the photometric, spectroscopic and physical properties, as well as information about activity indicators and Li abundance. For some of the candidate stars included in the list analysed in this paper we have also taken high-resolution echelle spectra in order to obtain a better determination of their radial velocity, lithium abundance, rotational velocity and the level of chromospheric activity (for preliminary results see Montes 2001b, Montes, López-Santiago & Gálvez 2001b and Montes et al. 2001d). We will use all these data in forthcoming papers to analyse in detail the membership to the different young SKGs and identified possible age subgroups (see Barrado y Navascués 1998, Barrado y Navascués et al. 1999, Song et al. 2000 and López-Santiago, Montes & Gálvez 2001).

In Section 2 we describe the young SKGs we have considered in this work. Details of the sample selection are given in Section 3. In Section 4 we analyse the membership of this sample to the different SKGs using as membership criteria the Galactic space-velocity components ( $U, V, W$ ) and the Eggen’s kinematic criteria. Finally, Section 5 gives the discussion and conclusions.

## 2 YOUNG SKGs

We focus our study here on the five youngest and best documented SKGs: the Local Association (Pleiades moving group, 20–150 Myr), IC 2391 supercluster (35 Myr), Castor moving group (200 Myr), Ursa Major group (Sirius supercluster, 300 Myr), and Hyades supercluster (600 Myr). The properties of these SKGs are summarized in Table 1. We list the name, possible open clusters associated to the group, range of age (Myr), the Galactic space-velocity components ( $U, V, W$ ), total velocity ( $V_T$ ) and the coordinates ( $A, D$ ) of the convergent point (C.P.). The velocity vectors have been calculated by us using the spherical parameters and  $V_T$  assigned to each group in the literature (Eggen 1958b; 1984c, 1991, 1992c). For the recently identified Castor MG the C.P. and  $V_T$  have been derived by us from the space-velocity components given by Barrado y Navascués (1998). In Fig. 1 we



**Figure 1.**  $(U, V)$  and  $(W, V)$  planes (Boettlinger diagram) in the region of the young disc stars. Large crosses are centred at the five young SKGs analysed in this work, as given in Table 1. Different symbols are used to plot the position of other SKGs and substructures found by other authors. The dotted line represents the boundaries that determine the young disc population as defined by Eggen (1984b, 1989).

have plotted the position of these SKGs in the  $(U, V)$  and  $(W, V)$  planes. The velocity components of the substructures found in these SKGs by Asiain et al. (1999) using statistical methods and Chereul et al. (1999) using a 3D wavelet analysis both in the density and velocity distributions are also plotted in Fig. 1. Orlov et al. (1995), using a hierarchical clustering method, have found several kinematic groups in the solar neighbourhood having velocity components close to the five young SKGs considered here. We have plotted the  $U, V, W$  components of these MGs in Fig. 1 for comparison.

### 3 SELECTION OF THE SAMPLE

The sample of late-type stars (spectral type later than F2) analysed in this work has been selected from previously established members of some of these SKGs, based on the photometric and kinematic properties, as well as from new candidates based on other criteria such as their level of chromospheric and coronal activity, rotation rate, and lithium abundance, which are spectroscopic signatures of youth.

On the one hand, the rotation rate in late-type stars moderates the dynamo mechanism which generates and amplifies the magnetic fields in the convection zone, but there is a further relationship between rotation and age. Rotation rates decline with age, because stars lose angular momentum through the coupling of the magnetic field and stellar mass loss, and thus there is an indirect trend of decreasing magnetic activity with increasing age. On the other hand, the resonance doublet of Li I at  $\lambda 6708 \text{ \AA}$  is an important diagnostic of age in late-type stars, since it is easily destroyed by thermonuclear reactions in the stellar interiors. Therefore a high level of magnetic activity, rapid rotation, and strong lithium absorption are spectroscopic signatures of youth, and the stars selected in this way are good candidates to be members of some of the young SKGs we are analysing here.

The main sources from which we have selected this late-type star sample are:

(1) the membership lists given by Eggen in his four decades of research on SKGs (Eggen 1958a,b, 1960a,b, 1975, 1983a–c, 1984a–c, 1989, 1991, 1992a–c, 1994, 1995a,b, 1996, 1998a–c), and additional lists given by Soderblom & Mayor (1993a);

(2) the study by Agekyan & Orlov (1984) and Orlov et al. (1995), which searched for kinematic groups in the solar neighbourhood (see also Popović, Ninković & Pavlović 1995);

(3) the study of ages of spotted late-type stars by Chugainov (1991);

(4) X-ray- and EUV-selected active stars and lithium-rich stars (Favata et al. 1993, 1995, 1998; Jeffries & Jewell 1993; Mullis & Bopp 1994; Tagliaferri et al. 1994; Jeffries 1995; Schachter et al. 1996; Hünsch, Schmitt & Voges 1998a,b; Hünsch et al. 1999; Cutispoto et al. 1999; 2000);

(5) single rapidly rotating stars such as AB Dor, PZ Tel, HD 197890, RE J1816+541, BD+224409 (LO Peg), HK Aqr, V838 Cen, V343 Nor and LQ Hya, previously assigned membership of the Local Association;

(6) chromospherically active late-type dwarfs in the solar neighbourhood with studied kinematic properties (Soderblom & Clements 1987; Young, Sadjadi & Harlan 1987; Uppgren 1988; Soderblom 1990; Ambruster et al. 1998);

(7) flare stars with studied kinematic properties (Poveda et al. 1996);

(8) the study of field M dwarfs with high-resolution spectra by Delfosse et al. (1998), including the recently identified M9V star DENIS 1048 – 39, which is the closest star later than M7V (Delfosse et al. 2001);

(9) other chromospherically active stars (Henry, Fekel & Hall 1995; Henry et al. 1996; Soderblom et al. 1998);

(10) late-type stars included in the list of the nearest 100 stellar systems given by the Research Consortium on Nearby Stars (RECONS<sup>1</sup>);

(11) the study of nearby young solar analogues by Gaidos (1998) and Gaidos, Henry & Henry (2000);

(12) the sample of nearby, single, solar-type stars selected as proxies for the Sun at different stages in the project the ‘Sun in Time’ by Bochanski et al. (2000);

(13) the study of nearby young X-ray-active low-mass stars with well-measured parallaxes by Wichmann & Schmitt (2001), and

(14) the active stars included in the Vienna-KPNO search for Doppler-imaging candidate stars (Strassmeier et al. 2000).

<sup>1</sup> RECONS: <http://joy.chara.gsu.edu/RECONS/>

For this selected sample we analysed here only single stars or effective single stars (wide visual binaries). The spectroscopic binaries are analysed in Paper II. We have considered only isolated stars, that is, we have excluded from the sample known members of open clusters and OB associations. However, we have included some members of other associations of young stars, such as TW Hya and the recently identified  $\beta$  Pic moving group (Barrado et al. 1999), Tucanae association (Zuckerman & Webb 2000), Horologium association (Torres et al. 2000), and HD 199143 stellar group (van den Ancker et al. 2000; van den Ancker, Pérez & de Winter 2001), which could be stream stars related with the Local Association (see López-Santiago et al. 2001 and Montes 2001a,b).

Some pre-main-sequence late-type stars [weak T Tauri stars (WTTs), and post-T Tauri stars (PTTs)] are also included in our sample as possible members of the youngest SKG, the Local Association. Oppenheimer et al. (1997) have identified two very young M dwarfs which also could be members of the Local Association. In the last few years many WTTs, PTTs and young zero-age main-sequence stars have been identified (using Li as an age criterion) with optical follow-up spectroscopy of *ROSAT* X-ray sources in and around nearby star-forming regions and OB associations. Some of these stars could be members of the Local Association, as has been suggested by Martín & Magazzù (1999) and Frink (2001), or may represent a population of Gould Belt low-mass stars (Wichmann et al. 1999, 2000). We have not included these newly identified young stars in our sample, because only a few have enough data (astrometric data and radial velocities) to analyse their kinematics, but they will be included in future work.

Our sample also includes some of the host stars of extrasolar planets discovered in the past few years by measuring their Keplerian Doppler shifts (to date more than 60; see Marcy, Cochran & Mayor 2000 and Marcy & Butler 2000). These stars are nearby late-type stars with high-precision radial velocity measurements. Although many of them have ages greater than 3 Gyr, derived using evolutionary tracks (Fuhrmann, Pfeiffer & Bernkopf 1998; Ford, Rasio & Sills 1999) or Ca II H and K fluxes (Henry et al. 2000), others are known to be younger and could therefore be possible members of some of the young SKGs analysed here.

## 4 MEMBERSHIP OF THE MOVING GROUPS

### 4.1 Galactic space-velocity components

In order to determine the membership of this sample to the different SKGs, we have studied the distribution of stars in velocity space by calculating the GALACTIC SPACE-VELOCITY COMPONENTS ( $U$ ,  $V$ ,  $W$ ) in a right-handed coordinated system (positive in the directions of the Galactic Centre, Galactic rotation, and the North Galactic Pole, respectively). We have modified the procedures in Johnson & Soderblom (1987) to calculate  $U$ ,  $V$ ,  $W$ , and their associated errors. The original algorithm (which requires epoch 1950 coordinates) is adapted here to epoch J2000 coordinates in the International Celestial Reference System (ICRS) as described in the Introduction and Guide to the Data (section 1.5) of the ‘The *Hipparcos* and *Tycho* Catalogues’ (ESA 1997). The uncertainties of the velocity components have been obtained using the full covariance matrix in order to take into account the possible correlation between the astrometric parameters. We have used the correlation coefficients provided by *Hipparcos*. It should be noted that the differences between the errors calculated in this way and those obtained by considering the covariances to be zero (as in Johnson & Soderblom 1987) are very small. These differences are

generally less than  $0.1 \text{ km s}^{-1}$ ; only for a small number of stars (eight) are the differences between  $0.2$  and  $0.5 \text{ km s}^{-1}$ , and in only one case the difference is  $1.2 \text{ km s}^{-1}$ . The largest differences are for stars with the largest errors in the input data.

PARALLAXES and PROPER MOTIONS have been taken mainly from ‘The *Hipparcos* and *Tycho* Catalogues’ (ESA 1997) and ‘The *Tycho-2* Catalogue’ (Høg et al. 2000), which supersedes the PPM (Positions and Proper Motions) Catalogue (Röser & Bastian 1991; Bastian et al. 1993; Röser, Bastian & Kuzmin 1994); ACT Reference Catalog (Urban, Corbin & Wycoff 1997), and TRC (Tycho Reference Catalogue) (Høg et al. 1998).

RADIAL VELOCITIES are taken primarily from the compilation WEB (Wilson Evans Batten) Catalogue (Duflot, Figon & Meyssonier 1995), the mean radial velocities catalogue of galactic stars (Barbier-Brossat & Figon 2000) which supplements the WEB Catalogue, the Catalogue of Radial Velocities of Nearby Stars (Tokovinin 1992), the Vienna-KPNO search for Doppler-imaging candidate stars, and from other references given in SIMBAD, and in the CNS3, Catalogue of Nearby Stars, Preliminary 3rd Version (Gliese & Jahreiß 1991) or the CNS3R (CNS3 Revised Version).<sup>2</sup> For the stars for which we have taken high-resolution echelle spectra (see Montes et al. 2001b,d) we have used the radial velocities (marked with ‘\*’ in Tables 2 to 7) obtained by us by cross-correlation with radial velocity standard stars of similar spectral types.

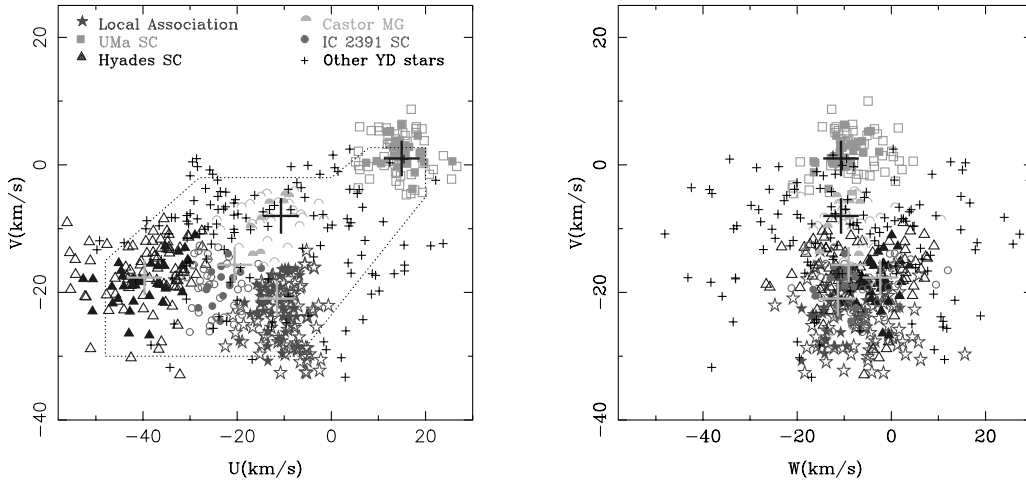
Our initial sample of more than 1000 stars was reduced to 638 stars with accurate parallaxes, proper motions and radial velocities available in the literature to calculate the Galactic space-velocity components ( $U$ ,  $V$ ,  $W$ ). As we are interested only in young MGs, we restrict this sample to the stars for which the  $U$ ,  $V$  and  $W$  components follow the criterion from Leggett (1992) for young disc stars ( $-50 < U < 20$ ;  $-30 < V < 0$ ;  $-25 < W < 10$ ), or more exactly to the stars with  $U$  and  $V$  velocity components inside or near the boundaries (dotted lines in Figs 1 and 2) that determine the young disc population as defined by Eggen (1984b, 1989, 1998a). We have found 535 stars that satisfied this restriction.

In Tables 2 to 7 we list the stellar and astrometric data we have compiled for the stars in each SKG. We give the name (HD, Henry Draper number; variable star name or other name; HIP, *Hipparcos* identifier; GJ, Gliese Catalogue number), spectral type, coordinates (ICRS J2000.0), radial velocity ( $V_r$ ) and the error in  $\text{km s}^{-1}$ , parallax ( $\pi$ ) and the error in milliarcseconds (mas), proper motions  $\mu_\alpha \cos \delta$  and  $\mu_\delta$  and their errors in mas per year ( $\text{mas yr}^{-1}$ ). The calculated  $U$ ,  $V$ , and  $W$  velocity components with their associated errors in  $\text{km s}^{-1}$  are also given in these tables.

In Fig. 2 we represent the ( $U$ ,  $V$ ) and ( $W$ ,  $V$ ) planes for this restricted star sample. The distribution of the stars in this figure shows concentrations around the central ( $U$ ,  $V$ ,  $W$ ) position corresponding to the five MGs listed in Table 1. To begin the classification, following Eggen’s membership criterion of constant  $V$ , we have considered as members only stars with small  $V$  dispersions. However, taking into account the results found by other authors (Skuljan et al. 1997, 1999), we have considered a large dispersion in the  $U$ ,  $V$  components ( $\approx 8 \text{ km s}^{-1}$ ) with respect to the central position of the MG in the ( $U$ ,  $V$ ) plane to classify a star as a possible member. In addition, we have taken into account the information provided by the  $W$  component, in the sense that stars considered as possible members for their position in

<sup>2</sup>CNS3R available only at ARI (Astronomisches Rechen-Institut Heidelberg) Database for Nearby Stars at <http://www.ari.uni-heidelberg.de/aricns/>





**Figure 2.**  $(U, V)$  and  $(W, V)$  planes as in Fig. 1 for our star sample. We plot with different symbols the stars belonging to the different stellar kinematic groups, and the other young disc stars. Filled symbols are stars that satisfied both of Eggen's criteria (peculiar velocity,  $PV$ , and radial velocity,  $\rho_c$ ), and open symbols are other possible members.

the  $(U, V)$  plane are excluded if their  $W$  component deviates considerably ( $\approx 8 \text{ km s}^{-1}$ ) with respect to the  $W$  component of the MG. Following these we have classified the stars from our sample as members of one of the MGs or as other young disc stars if their classification is not clear but is inside or near the boundaries that determine the young disc population (see Tables 2 to 7). In Fig. 2 we plot with different symbols the stars belonging to the different SKGs, and the other young disc stars. Filled symbols represent stars that, in addition, satisfied Eggen's criteria described in the next two subsections.

#### 4.2 Convergent point

The members of a moving group can be established by the degree to which their motions define a common convergent point in the sky. However, this is not a sufficient membership criterion (there might be some stars moving in the same direction, but with a significantly different speed). Eggen's criteria of membership (described in the next subsection) also take into account the magnitude of the velocity vector.

We can apply the convergent point criterion to a moving group by plotting the great circles defined by the proper motions and positions of individual stars and test whether their poles are close to the convergent point given in the literature for that moving group. We have applied this analysis to our sample of candidate members to the five MGs studied in this paper (see Fig. 3 for the case of the Hyades). We have obtained, in general, a good agreement between the position of the poles and the convergent point. However, there are some stars with clear discrepancies, which are probably not members. These deviations with respect to the convergent point will be analysed in a more quantitative way by applying Eggen's criteria, as described in next subsection.

In this convergent point analysis (following other authors) we have not corrected for the Sun's motion. It is possible that the Sun's motion induces this effect, so we need to prove that the MGs really converge towards a point independently of this effect. In fact, nearly all the convergent points of the MGs are situated close to the apex or antiapex. If we make this correction with each moving group, we obtain that in the cases of the Hyades, Ursa Major, IC 2391 and Castor MGs the trend of the candidate star members to have a common convergent point is maintained. However, in the

case of the Local Association the dispersion increases somewhat. It seems that the proper motion great circles tend to converge towards several points that are close together. This could indicate that the Local Association has several substructures, or that is a concentration of different MGs with similar space motions.

#### 4.3 Eggen's criteria

Eggen has developed several criteria during many years studying stars in MGs (see Eggen 1958a, 1995b). These criteria are based on one supposition: it is possible to treat MGs, whose stars are extended in space, like moving clusters, whose stars are concentrated in space. As in the moving cluster method, it is assumed that the total space velocities of stars in a moving group are parallel and move towards a common convergent point. Eggen's criteria try to quantify how the space motion of the stars deviates from the convergent point, and use the following parameters and relations:

- (1) The components of the absolute proper motion ( $\mu$ ) in the direction of the convergent point ( $\nu$ ) and perpendicular to it ( $\tau$ ).
- (2) The angular distance between the star and the convergent point ( $\lambda$ ).
- (3) The trigonometric parallax ( $\pi$ )
- (4) The relations between the tangential ( $V_{\text{tan}}$ ), radial ( $V_r$ ) and total ( $V_{\text{Total}}$ ) velocities in the moving cluster method:

$$V_{\text{tan}} = 4.74 \mu \pi^{-1},$$

$$V_{\text{tan}} = V_{\text{Total}} \sin \lambda; \quad V_r = V_{\text{Total}} \cos \lambda,$$

$$V_{\text{Total}} = 4.74 \mu \pi^{-1} \sin^{-1} \lambda$$

The total velocity can also be calculated from the  $U, V, W$  components as

$$V_{\text{Total}} = (U^2 + V^2 + W^2)^{1/2}.$$

The two main Eggen criteria are as follows.

##### (1) PECULIAR VELOCITY CRITERION

In the first papers Eggen used the ratio ( $\tau/\nu$ ) as a measure of how the star turns away from the convergent point, but later he defined a

Table 2. Local Association.

| Name      |                | SpT       | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{Total}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s) | $\rho_c$<br>(km/s) |        |        |        |        |       |       |         |         |        |
|-----------|----------------|-----------|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|-----------------------|-----------------|----------------|--------------------|--------|--------|--------|--------|-------|-------|---------|---------|--------|
| HD 67     | SAO 248115     | HIP 459   | G5 V                       | 0 5 28.45                            | -61 13 33.06    | 7.0            | 2.0                                    | 18.57                      | 0.95          | 83.90         | 1.30          | -77.80                | 1.30            | -10.02         | 1.07               | -28.29 | 1.62   | 1.29   | 1.70   | 30.04 | 30.79 | -12.5 N | 15.9 N  |        |
| HD 105    | IE 0003.3-4201 | HIP 490   | G0 V                       | 0 5 52.55                            | -41 45 11.04    | 3.2            | 2.0                                    | 24.85                      | 0.92          | 98.50         | 1.00          | -75.80                | 1.10            | -9.57          | 0.70               | -21.74 | 0.92   | -2.88  | 1.91   | 23.92 | 25.44 | -4.4 Y  | 10.2 N  |        |
| HD 166    | HR 8           | HIP 544   | K0 V                       | 0 6 36.78                            | 29 1 17.41      | -6.9           | 0.2                                    | 72.98                      | 0.75          | 380.50        | 0.90          | -177.90               | 0.90            | -15.00         | 0.20               | -21.60 | 0.24   | -10.04 | 0.19   | 28.15 | 27.99 | 3.4 Y   | -7.1 Y  |        |
| HD 1405   | PW And         |           | K2 V                       | 0 18 20.90                           | 30 57 22.03     | -11.0          | 0.1                                    | 32.68                      | 1.00          | 143.70        | 1.20          | -171.50               | 1.10            | -5.42          | 0.33               | -28.69 | 0.63   | -17.94 | 0.74   | 34.27 | 31.94 | -9.5 N  | 3.6 Y   |        |
| HD 1466   | SAO 248159     | HIP 1481  | F8 V                       | 0 18 26.12                           | -63 28 38.97    | 7.0            | 2.0                                    | 24.42                      | 0.68          | 89.80         | 1.30          | -58.00                | 1.30            | -8.77          | 0.86               | -20.03 | 1.08   | -1.25  | 1.62   | 21.90 | 23.36 | -6.9 N  | 12.8 Y  |        |
|           | BPM 1699       | HIP 1910  | M0 V                       | 0 24 8.98                            | -62 11 44.47    | 4.0            | 2.0                                    | 21.59                      | 2.22          | 84.10         | 6.90          | -55.30                | 6.40            | -10.18         | 2.18               | -19.95 | 2.60   | 1.69   | 1.91   | 22.46 | 24.85 | -7.6 N  | 13.7 N  |        |
|           | CT Tuc         | HIP 1993  | K7 V                       | 0 25 14.66                           | -61 30 48.33    | 7.0            | 2.0                                    | 26.69                      | 24.00         | 84.59         | 19.30         | -63.40                | 23.90           | -6.39          | 8.91               | -18.97 | 14.89  | -0.98  | 5.24   | 20.04 | 20.62 | -7.5 N  | 11.4 Y  |        |
| HD 3221   |                | HIP 2729  | K4 V                       | 0 34 51.20                           | -61 54 58.10    | -1.0           | 2.0                                    | 21.78                      | 1.01          | 88.00         | 1.80          | -50.50                | 1.70            | -12.40         | 0.99               | -17.34 | 1.32   | 5.84   | 1.67   | 22.10 | 25.41 | -7.1 N  | -14.4 N |        |
| HD 5996   | BD+68 67       | HIP 4907  | G5 V                       | 1 2 57.22                            | 69 13 37.41     | -20.0          | 0.5                                    | 38.73                      | 0.78          | 225.30        | 1.10          | -149.10               | 1.20            | -13.48         | 0.59               | -30.77 | 0.51   | -19.11 | 0.38   | 38.65 | 37.02 | -3.2 Y  | -17.0 Y |        |
| HD 9540   |                | HIP 7235  | K0 V                       | 1 33 15.81                           | -24 10 40.67    | 3.0            | 1.0                                    | 51.27                      | 0.88          | 272.70        | 1.40          | -159.40               | 1.40            | -11.27         | 0.30               | -27.11 | 0.51   | 0.27   | 0.99   | 29.36 | 34.52 | -1.4 Y  | 18.5 N  |        |
|           | BD+17 232      | HIP 7235  | K3 Ve                      | 1 37 39.42                           | 18 35 32.91     | 3.2            | 1.0                                    | 15.80                      | 5.00          | 69.90         | 1.50          | -47.50                | 1.50            | -13.28         | 3.71               | -20.09 | 6.88   | -8.56  | 2.16   | 25.56 | 25.41 | 3.2 Y   | 3.6 Y   |        |
|           | BD-07 268      | HIP 7576  | G5 V                       | 1 37 35.47                           | -6 45 37.52     | 11.6           | 0.6                                    | 42.35                      | 0.96          | 171.90        | 1.40          | -97.70                | 1.40            | -13.16         | 0.35               | -18.13 | 0.52   | -11.07 | 0.56   | 24.99 | 24.10 | 2.3 Y   | 9.8 Y   |        |
| HD 10008  |                |           | K5 V                       | 1 39 47.70                           | -56 11 34.00    | 20.9           | 0.9                                    | 148.00                     | 7.00          | 302.60        | 1.40          | -14.10                | 1.30            | -3.63          | 0.37               | -16.16 | 0.52   | -16.02 | 0.78   | 23.04 | 13.11 | -0.1 Y  | 8.8 N   |        |
| HD 10360  |                | HIP 7751  | GJ 66A                     | K5 V                                 | 1 39 47.56      | -56 11 47.34   | 19.5                                   | 1.0                        | 122.75        | 1.41          | 286.10        | 1.01                  | 16.66           | 1.41           | -5.59              | 0.21   | -15.63 | 0.48   | -15.07 | 0.86  | 22.42 | 14.88   | 1.1 Y   | 10.0 N |
| HD 10361  | V596 Cas       | HIP 9291  | GJ 82                      | dM4e -                               | 1 59 23.51      | 58 31 16.02    | -9.8                                   | 0.5                        | 83.20         | 3.68          | 322.50        | 3.20                  | -193.70         | 3.20           | -8.66              | 0.79   | -21.27 | 0.76   | -5.32  | 0.34  | 23.57 | 21.84   | 4.3 Y   | -6.0 Y |
| HD 12230  | 47 Cas         | HIP 9727  | F0 V                       | 2 5 7.38                             | 77 16 52.73     | -26.0          | 5.0                                    | 29.80                      | 0.56          | 122.70        | 2.00          | -60.20                | 2.10            | -2.53          | 2.96               | -32.26 | 3.87   | -10.09 | 1.36   | 33.90 | 24.06 | 4.5 Y   | -11.2 N |        |
| HD 15013  | BD+33 429      | HIP 11352 | G5 V                       | 2 26 9.59                            | 34 28 10.04     | -2.5           | 0.5                                    | 23.19                      | 1.21          | 115.40        | 0.90          | -49.90                | 1.00            | -13.12         | 0.88               | -22.22 | 1.19   | 0.93   | 0.28   | 25.82 | 23.25 | 11.1 N  | -1.8 Y  |        |
| HD 16765  | 84 Cet         | HIP 12530 | F7 IV                      | 2 41 14.00                           | 0 41 44.36      | 7.8            | 1.0                                    | 46.24                      | 1.31          | 222.40        | 0.90          | -127.10               | 0.90            | -12.66         | 0.66               | -24.14 | 0.76   | -2.67  | 0.81   | 27.39 | 30.41 | 5.8 Y   | 16.4 N  |        |
| HD 17925  | EP Eri         | HIP 13402 | GJ 117                     | K1 V                                 | 2 52 32.23      | -12 46 10.97   | 17.5                                   | 0.1                        | 96.33         | 0.77          | 397.30        | 1.20                  | -189.90         | 1.30           | -15.01             | 0.10   | -21.80 | 0.18   | -8.68  | 0.11  | 27.85 | 28.86   | 4.1 Y   | 19.5 Y |
| HD 19668  | BD-10 626      | HIP 14684 | G0 V                       | 3 9 42.29                            | -9 34 46.59     | 14.6           | 0.7                                    | 24.90                      | 1.28          | 88.00         | 1.20          | -113.30               | 1.10            | -5.11          | 0.51               | -28.77 | 1.48   | -10.27 | 0.58   | 30.97 | 37.05 | -5.6 Y  | 25.6 N  |        |
|           | IE 0318.5-19.4 |           | K7 V                       | 3 20 49.50                           | -19 16 10.00    | 20.8           | 1.0                                    | 37.00                      | 5.00          | 90.80         | 1.80          | -43.80                | 4.90            | -12.69         | 0.74               | -17.27 | 1.66   | -11.85 | 1.09   | 24.49 | 20.72 | 1.6 Y   | 16.3 Y  |        |
| HD 21845  | V577 Per       | HIP 16563 | K2 -                       | 3 33 13.49                           | 46 15 26.54     | -2.0           | 1.0                                    | 29.61                      | 1.40          | 67.00         | 1.10          | -176.00               | 1.10            | -8.91          | 1.01               | -23.90 | 1.22   | -16.20 | 0.83   | 30.22 | 29.86 | -4.3 Y  | -1.2 Y  |        |
| HD 25457  | BD-00 632      | HIP 18859 | GJ 159                     | F6 V                                 | 4 2 36.74       | 0 16 81.13     | 18.1                                   | 0.9                        | 52.00         | 0.75          | 150.70        | 0.90                  | -252.00         | 0.90           | -8.25              | 0.72   | -28.76 | 0.44   | -12.21 | 0.55  | 32.32 | 38.34   | -1.8 Y  | 27.5 N |
| HD 25665  | BD+69 238      | HIP 19422 | GJ 161                     | G5 -                                 | 4 9 35.04       | 69 32 29.01    | -13.7                                  | 0.2                        | 54.17         | 0.79          | 73.60         | 1.00                  | -298.80         | 1.10           | -7.42              | 0.31   | -23.82 | 0.27   | -17.04 | 0.24  | 30.21 | 27.73   | -4.3 Y  | -7.9 Y |
| HD 29883  | BD+27 688      | HIP 21988 | GJ 176.2                   | K5 V                                 | 4 43 35.44      | 27 41 14.65    | 17.4                                   | 0.6                        | 44.74         | 0.99          | 54.60         | 0.80                  | -264.90         | 0.80           | -17.23             | 0.58   | -23.43 | 0.59   | -16.68 | 0.34  | 33.53 | 31.41   | -2.6 Y  | 13.1 Y |
| HD 36705A | AB Dor         | HIP 25647 | K0 V                       | 5 28 44.85                           | -65 26 54.97    | 28.0           | 1.0                                    | 66.92                      | 0.54          | 48.90         | 1.30          | 137.60                | 1.20            | -7.75          | 0.15               | -25.56 | 0.84   | -13.32 | 0.55   | 29.85 | 20.13 | -1.3 Y  | 17.3 N  |        |
| HD 36869  | BD-15 1082     |           | G3 V                       | 5 34 9.16                            | -15 17 3.18     | 24.1           | 2.0                                    | 28.60                      | 7.10          | 25.60         | 1.30          | -22.30                | 1.20            | -14.86         | 1.56               | -18.31 | 1.62   | -7.52  | 1.00   | 24.75 | 13.17 | 3.2 N   | 12.3 N  |        |
| HD 37572  | UY Pic         | HIP 26373 | K0 V                       | 5 36 56.85                           | -47 57 52.87    | 32.4           | 1.7                                    | 41.90                      | 1.74          | 24.60         | 1.10          | 1.20                  | 1.10            | -7.55          | 0.40               | -27.97 | 1.39   | -14.78 | 0.91   | 32.52 | 4.56  | -2.6 N  | 4.4 N   |        |
| HD 37394  |                | HIP 26779 | GJ 211                     | K1 V                                 | 5 41 20.34      | 53 28 51.81    | 0.3                                    | 0.2                        | 81.69         | 0.83          | 3.50          | 1.10                  | -523.60         | 1.10           | -12.89             | 0.23   | -23.35 | 0.27   | -14.55 | 0.18  | 30.38 | 30.34   | -1.7 Y  | 0.7 Y  |
| HD 233153 |                | HIP 26801 | M0.5 -                     | 5 41 30.73                           | 53 29 23.28     | 1.9            | 1.0                                    | 80.13                      | 1.67          | 3.16          | 1.61          | -517.26               | 1.04            | -14.44         | 0.95               | -22.94 | 0.63   | -14.32 | 0.39   | 30.66 | 30.56 | -1.7 Y  | 0.7 Y   |        |
| HD 43989  | V1358 Ori      | HIP 30030 | F9 V                       | 6 19 8.06                            | -3 26 20.38     | 19.1           | 2.4                                    | 20.10                      | 0.99          | 10.60         | 0.90          | -43.70                | 1.00            | -10.12         | 2.03               | -18.62 | 1.37   | -5.32  | 0.46   | 21.85 | 18.59 | -3.9 N  | 15.8 Y  |        |
| HD 45081  | A0 Men         | HIP 29964 | K5 -                       | 6 18 28.21                           | -7 2 41.43      | 16.2           | 1.0                                    | 25.99                      | 1.02          | -8.50         | 1.50          | 75.70                 | 1.45            | -10.50         | 0.66               | -16.38 | 0.88   | -8.76  | 0.53   | 21.34 | 23.09 | 0.1 Y   | 18.4 Y  |        |
| HD 261557 | V57 Men        | HIP 30920 | GJ 234A                    | M4 -                                 | 6 29 23.40      | -2 48 50.32    | 15.0                                   | 0.5                        | 242.88        | 2.64          | 694.66        | 3.00                  | -618.55         | 2.48           | -3.92              | 0.43   | -22.69 | 0.32   | 4.95   | 1.12  | 23.55 | 17.01   | -15.7 N | 14.0 Y |
| HD 48189  | BD+03 1342     | HIP 31849 | K3 V                       | 6 39 31.36                           | 3 19 10.65      | 11.3           | 0.3                                    | 16.60                      | 1.75          | -30.70        | 1.30          | -64.40                | 1.30            | -3.73          | 0.73               | -16.08 | 1.20   | -16.44 | 1.78   | 23.30 | 31.19 | 4.4 Y   | 24.0 N  |        |
|           | BD+20 1790     |           | G1.5 V                     | 6 38 0.39                            | -61 32 0.20     | 32.3           | 1.0                                    | 46.15                      | 0.64          | -26.00        | 3.80          | 72.40                 | 3.40            | -7.20          | 0.40               | -28.87 | 0.92   | -14.85 | 0.56   | 33.25 | 17.33 | -0.3 Y  | 15.4 N  |        |
|           | BD+02 1729     | HIP 37288 | GJ 281                     | K5 Ve                                | 7 23 44.00      | 20 25 60.00    | 9.3                                    | 1.0                        | 31.60         | 5.00          | -55.50        | 5.00                  | -238.00         | 5.00           | -5.23              | 1.09   | -32.61 | 4.79   | -18.40 | 3.41  | 37.81 | 42.36   | -4.6 Y  | 21.7 N |
|           | YZ CMi         | HIP 37766 | GJ 285                     | K7 -                                 | 7 39 23.04      | 21 1 1.18      | 18.5                                   | 5.0                        | 67.27         | 1.51          | -147.60       | 1.60                  | -247.30         | 1.50           | -10.99             | 3.94   | -21.47 | 2.92   | -13.13 | 1.09  | 27.46 | 29.14   | 0.3 Y   | 20.9 Y |
| HD 64725  | BD+37 1804     | HIP 38825 | K0 III                     | M4.5 -                               | 7 44 40.17      | 3 33 8.96      | 26.0                                   | 0.5                        | 168.59        | 2.67          | -348.50       | 1.80                  | -446.90         | 1.90           | -19.27             | 0.40   | -22.24 | 0.31   | -8.00  | 0.27  | 30.50 | 21.97   | 2.1 Y   | 15.3 N |
|           | FP Cen         | HIP 39896 | GJ 1108A                   | K7 -                                 | 8 8 56.39       | 32 49 11.41    | 11.3                                   | 1.0                        | 48.26         | 3.16          | -30.00        | 3.77                  | -217.20         | 2.50           | -10.74             | 0.88   | -21.76 | 1.38   | -1.64  | 0.79  | 24.32 | 21.09   | -7.1 N  | 5.6 Y  |
|           | BD+07 1919     | HIP 39721 | GJ 9251A                   | K8 -                                 | 8 7 9.09        | 7 23 13.13     | 20.3                                   | 5.0                        | 24.85         | 3.92          | -1.30         | 3.30                  | -138.00         | 3.10           | -5.53              | 4.19   | -32.52 | 4.38   | -4.13  | 2.55  | 33.24 | 38.00   | -14.3 N | 17.2 Y |
|           | BD+07 1919B    |           | GJ 9251B                   | K5 -                                 | 8 7 8.78        | 7 22 58.39     | 20.3                                   | 5.0                        | 35.40         | 6.00          | -3.00         | 3.30                  | -131.20         | 3.20           | -9.01              | 4.02   | -25.29 | 3.64   | -0.63  | 2.19  | 26.85 | 18.85   | -9.3 N  | 11.6 N |
| HD 70146  | BD+22 1914     | HIP 40920 | G5 III                     | K0 III                               | 8 21 4.91       | 22 1 54.15     | 4.5                                    | 0.2                        | 3.92          | 1.08          | -10.60        | 0.90                  | -17.40          | 0.90           | -6.64              | 1.26   | -19.25 | 5.31   | -14.58 | 5.09  | 25.04 | 26.89   | 0.0 Y   | 10.8 N |
| HD 70573  | BD+02 1951     |           | G6 V                       | 8 22 49.95                           | 1 51 33.55      | 19.5           | 1.0                                    | 21.90                      | 5.00          | -50.50        | 1.30          | -49.00                | 1.30            | -14.67         | 0.77               | -18.78 | 1.64   | -6.66  | 3.15   | 24.74 | 19.72 | 1.9 Y   | 12.7 N  |        |
| HD 77407  | BD+38 1993     | HIP 44458 | G0 -                       | 9 3 27.09                            | 37 50 27.52     | 4.4            | 0.2                                    | 33.24                      | 9.91          | -80.20        | 1.20          | -168.00               | 1.30            | -10.10         | 0.30               | -23.91 | 0.70   | -7.12  | 0.38   | 26.91 | 26.19 | -5.0 Y  | 2.5 Y   |        |
| HD 82443  | DX Leo         | HIP 46843 | GJ 354.1                   | K0 V                                 | 9 32 43.76      | 26 59 18.71    | 8.1                                    | 0.1                        | 56.35         | 0.89          | -147.80       | 1.40                  | -246.70         | 1.30           | -9.91              | 0.15   | -22.83 | 0.36   | -5.61  | 0.23  | 25.51 | 24.11   | -4.6 Y  | 4.2 Y  |
| HD 82939  | BD+38 2052     | HIP 47110 | G5 V                       | 9 36 4.28                            | 37 33 10.36     | -1.0           | 1.0                                    | 33.26                      | 1.14          | -99.10        | 1.10          | -90.80                | 1.10            | -10.94         | 0.61               | -17.47 | 0.80   | -12.79 | 0.62   | 24.26 | 24.12 | 2.5 Y   | -0.7 Y  |        |
|           | BD-21 2961     |           | K -                        | 9 59 8.42                            | -22 39 34.61    | 27.7           | 1.0                                    | 27.50                      | 5.00          | -65.00        | 4.30          | -22.00                | 3.70            | -11.36         | 1.38               | -27.79 | 1.10   | 2.40   | 1.86   | 30.12 | 14.57 | 1.9 Y   | 8.7 N   |        |
|           | DK Leo         | HIP 50156 | GJ 2079                    | K7 -                                 | 10 14 19.18     | 10 14 19.18    | 10.0                                   | 1.0                        | 48.95         | 1.71          | -137.70       | 1.40                  | -167.10         | 1.40           | -10.33             | 0.55   | -20.68 | 0.73   | -2.32  | 0.89  | 23.23 | 20.92   | -3.0 Y  | 2.7 N  |
| HD 89744  | BD+41 2076     | HIP 50786 | GJ 9326                    | F7 V                                 | 10 22 10.56     | 41 13 46.31    | -6.5                                   | 1.3                        | 25.65         | 0.70          | -119.50       | 0.90                  | -138.60         | 1.00           | -10.41             | 0.84   | -29.62 |        |        |       |       |         |         |        |

Table 2. – *continued*

| Name       | SpT          | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{\text{Total}}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s) | $\rho_c$<br>(km/s) |        |      |        |      |        |      |       |       |         |         |
|------------|--------------|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|------------------------------|-----------------|----------------|--------------------|--------|------|--------|------|--------|------|-------|-------|---------|---------|
| HD 140901  | HR 5864      | HIP 77358                  | GJ 599A                              | G6 V            | 15 47 29.10    | -37 54 58.71                           | -5.2                       | 2.0           | 65.60         | 0.77          | -414.90                      | 1.20            | -213.70        | 1.40               | -18.94 | 1.80 | -27.80 | 0.84 | 5.74   | 0.47 | 34.12 | 27.81 | 19.8 N  | -5.2 Y  |
| HD 141272  | BD+02 3001   | HIP 77408                  | GJ 3917                              | G8 V            | 15 48 9.46     | 1 34 18.26                             | -27.2                      | 0.3           | 46.84         | 1.05          | -176.50                      | 1.10            | -165.80        | 1.00               | -19.58 | 0.24 | -27.61 | 0.57 | -13.97 | 0.24 | 36.62 | 34.13 | 3.6 Y   | -24.0 Y |
| HD 141714  | del CrB      | HIP 77512                  |                                      | G3.5 III        | 15 49 35.65    | 26 4 6.21                              | -19.1                      | 0.9           | 19.71         | 0.73          | -78.10                       | 0.90            | -64.30         | 0.90               | -5.12  | 0.50 | -30.09 | 0.94 | -5.01  | 0.80 | 30.93 | 48.66 | -5.6 Y  | -42.5 N |
| HD 142361  | 1E15520-2338 |                            |                                      | G3 IV           | 15 54 59.87    | -23 47 18.16                           | -0.3                       | 1.0           | 14.00         | 5.00          | -42.20                       | 1.10            | -65.30         | 1.10               | -3.20  | 1.39 | -25.50 | 9.14 | -5.73  | 2.07 | 26.33 | 28.72 | 2.5 Y   | -11.8 N |
| HD 147379B | BD+67 935B   | HIP 79762                  | GJ 617B                              | M3 -            | 16 16 45.33    | 67 15 22.52                            | -19.4                      | 0.8           | 93.14         | 1.38          | -477.40                      | 2.00            | 91.60          | 2.10               | -9.82  | 0.24 | -29.72 | 0.65 | 2.99   | 0.56 | 31.44 | 32.03 | -16.4 N | -26.1 N |
|            | V2306 Oph    | HIP 80824                  | GJ 628                               | M3.5 -          | 16 30 18.06    | -12 39 45.38                           | -22.0                      | 0.1           | 234.52        | 1.82          | -89.70                       | 1.70            | -1184.80       | 2.00               | -13.67 | 0.11 | -20.94 | 0.16 | -20.87 | 0.11 | 32.57 | 28.80 | -7.7 N  | -17.7 Y |
| HD 160934  | RE J1738+611 | HIP 86346                  | GJ 4020A                             | K7 -            | 17 38 39.63    | 61 14 16.01                            | -26.7                      | 0.1           | 40.75         | 12.10         | -21.80                       | 3.00            | 43.70          | 3.00               | -5.06  | 1.59 | -23.88 | 0.45 | -12.22 | 0.69 | 27.30 | 12.25 | -1.7 Y  | -11.0 N |
| HD 162283  | BD-06 4663   | HIP 87322                  | GJ 696                               | M0 -            | 17 50 34.03    | -6 3 1.03                              | -21.0                      | 2.0           | 45.67         | 2.06          | -24.80                       | 1.90            | -131.50        | 2.20               | -13.99 | 1.86 | -19.27 | 0.96 | -8.18  | 0.51 | 25.18 | 20.85 | 2.0 Y   | -15.7 Y |
|            | BD+18 3497   | HIP 87768                  | GJ 698A                              | K5 -            | 17 55 44.89    | 18 30 1.37                             | -29.2                      | 1.0           | 43.40         | 2.21          | -45.94                       | 1.74            | -47.79         | 1.69               | -15.69 | 0.73 | -24.48 | 0.74 | -7.72  | 0.42 | 30.08 | 18.85 | 4.8 N   | -18.1 N |
| HD 166348  | SAO 228799   | HIP 89211                  | GJ 707                               | M0 V            | 18 12 21.39    | -43 26 41.43                           | -2.0                       | 1.3           | 77.18         | 1.23          | 133.10                       | 1.10            | -415.40        | 1.00               | -9.05  | 1.26 | -17.92 | 0.38 | -17.86 | 0.40 | 26.87 | 26.40 | 6.9 N   | -5.2 Y  |
| HD 171488  | V889 Her     | HIP 91043                  |                                      | G2 V            | 18 34 20.10    | 18 41 24.23                            | -24.3                      | 1.5           | 26.87         | 0.89          | -20.71                       | 0.66            | -50.90         | 0.66               | -8.67  | 1.02 | -24.06 | 1.12 | -5.52  | 0.34 | 26.16 | 21.54 | -7.0 N  | -20.5 Y |
| HD 174429  | PZ Tel       | HIP 92680                  |                                      | K0 V            | 18 53 5.87     | -50 10 49.89                           | -0.1                       | 2.0           | 20.14         | 1.18          | 15.80                        | 1.10            | -84.10         | 1.10               | -7.64  | 1.88 | -16.35 | 1.12 | -8.96  | 0.95 | 20.15 | 20.18 | -0.2 Y  | -1.3 Y  |
| HD 180809  | let Yr       | HIP 94713                  |                                      | K0 III          | 19 16 22.09    | 38 8 1.43                              | -29.7                      | 0.3           | 4.24          | 0.49          | -2.00                        | 0.70            | 1.40           | 0.80               | -10.61 | 0.86 | -27.66 | 0.44 | -3.47  | 0.89 | 29.83 | 7.68  | 1.8 N   | -7.4 N  |
| HD 181327  | SAO 246056   | HIP 95270                  |                                      | F6 V            | 19 22 58.94    | -54 32 16.98                           | -0.5                       | 2.0           | 19.77         | 0.81          | 24.10                        | 1.40            | -82.90         | 1.40               | -9.84  | 1.77 | -16.29 | 0.94 | -8.15  | 1.00 | 20.70 | 20.70 | 1.5 Y   | -0.5 Y  |
| HD 189245  | HR 7631      | HIP 98470                  | GJ 773.4                             | F7 V            | 20 0 20.25     | -33 42 12.43                           | -8.2                       | 5.0           | 47.90         | 1.06          | 130.70                       | 1.20            | -289.50        | 1.10               | -13.49 | 4.37 | -26.13 | 0.81 | -13.80 | 2.40 | 32.48 | 32.61 | -0.6 Y  | -8.7 Y  |
| HD 196982  | AT Mic       | HIP 102141                 | GJ 799A                              | dM4.5e -        | 20 41 51.15    | -32 26 6.73                            | -3.7                       | 3.0           | 97.80         | 4.65          | 269.32                       | 6.55            | -365.69        | 4.65               | -9.61  | 2.40 | -16.88 | 0.94 | -11.00 | 1.91 | 22.32 | 22.50 | 1.2 Y   | -4.8 Y  |
|            |              |                            | GJ 799B                              | M4 -            | 20 41 48.00    | -32 24 60.00                           | -2.7                       | 3.0           | 97.80         | 4.65          | 269.32                       | 6.55            | -365.69        | 4.65               | -8.81  | 2.40 | -16.72 | 0.93 | -11.60 | 1.90 | 22.18 | 22.50 | 1.2 Y   | -4.8 Y  |
| HD 197481  | AU Mic       | HIP 102409                 | GJ 803                               | M0 -            | 20 45 9.53     | -31 20 27.24                           | -3.3                       | 2.0           | 100.59        | 1.35          | 278.80                       | 1.60            | -360.00        | 1.60               | -9.15  | 1.57 | -16.21 | 0.42 | -11.17 | 1.22 | 21.71 | 21.96 | 1.5 Y   | -4.9 Y  |
| HD 197890  | BO Mic       | HIP 102626                 |                                      | K0 V            | 20 47 45.01    | -36 35 40.83                           | -6.5                       | 1.0           | 22.52         | 1.64          | 18.40                        | 1.20            | -80.00         | 1.20               | -7.11  | 0.82 | -17.02 | 1.27 | -0.81  | 0.77 | 18.46 | 16.32 | -6.1 N  | -2.3 Y  |
| HD 199065A |              | HIP 103438                 |                                      | G2 V            | 20 57 22.44    | -59 4 33.46                            | 11.0                       | 2.0           | 9.63          | 1.87          | 25.40                        | 2.00            | -54.90         | 1.90               | -7.12  | 3.44 | -28.52 | 5.14 | -11.98 | 1.87 | 31.74 | 29.80 | -5.7 Y  | 5.8 Y   |
| HD 199065B |              |                            |                                      | G5 V            | 20 57 21.86    | -59 4 34.23                            | 11.0                       | 2.0           | 9.63          | 1.87          | 16.70                        | 5.90            | -57.00         | 5.70               | -4.60  | 3.46 | -29.69 | 5.81 | -8.56  | 2.60 | 31.24 | 28.09 | -9.8 N  | 5.5 Y   |
| HD 202575  | BD+08 4638   | HIP 105038                 | GJ 824                               | K2 -            | 21 16 32.47    | 9 23 37.80                             | -18.0                      | 1.0           | 61.83         | 1.06          | 143.40                       | 1.60            | -116.70        | 1.60               | -10.60 | 0.47 | -19.77 | 0.79 | -4.67  | 0.52 | 22.91 | 18.03 | -0.3 Y  | -11.2 N |
| HD 202917  | SAO 246975   | HIP 105388                 |                                      | G5 -            | 21 20 49.96    | -53 2 3.16                             | -1.0                       | 2.0           | 21.81         | 1.17          | 30.30                        | 1.50            | -96.50         | 1.70               | -7.91  | 1.47 | -20.53 | 1.25 | -0.67  | 1.40 | 22.01 | 20.58 | -8.3 N  | -3.0 Y  |
| HD 202947  | BS Ind       | HIP 105404                 |                                      | K0 -            | 21 20 59.81    | -52 28 40.03                           | 6.0                        | 2.0           | 21.72         | 1.45          | 35.40                        | 1.50            | -101.20        | 2.00               | -3.81  | 1.55 | -23.01 | 1.65 | -6.28  | 1.42 | 24.15 | 22.16 | -8.1 N  | 3.1 Y   |
|            | LO Peg       | HIP 106231                 |                                      | K6 -            | 21 31 1.71     | 23 20 7.37                             | -17.4                      | 1.0           | 39.91         | 1.18          | 135.00                       | 1.10            | -144.10        | 1.10               | -5.20  | 0.29 | -23.86 | 0.94 | -16.01 | 0.78 | 29.20 | 30.07 | -7.9 N  | -20.4 Y |
|            | BPM 14269    | HIP 107345                 |                                      | M1 -            | 21 44 30.12    | -60 58 38.88                           | 2.0                        | 2.0           | 23.66         | 2.85          | 41.20                        | 2.50            | -91.61         | 1.66               | -7.74  | 1.73 | -18.66 | 2.34 | -1.01  | 1.43 | 20.23 | 19.59 | -7.2 N  | 5.6 Y   |
| HD 206860  | HN Peg       | HIP 107350                 | GJ 836.7                             | G0 V            | 21 44 31.33    | 14 46 18.98                            | -16.9                      | 2.0           | 54.37         | 0.85          | 231.20                       | 1.20            | -113.90        | 1.10               | -14.60 | 0.63 | -21.38 | 1.66 | -10.98 | 1.00 | 28.12 | 27.49 | 2.6 Y   | -16.1 Y |
| HD 207485  | BD+69 1195   | HIP 107457                 |                                      | G5 V            | 21 45 52.64    | 70 20 53.03                            | -19.1                      | 0.5           | 26.33         | 0.59          | 118.60                       | 1.20            | 80.60          | 1.30               | -18.63 | 0.62 | -25.09 | 0.50 | -7.40  | 0.27 | 32.11 | 34.46 | 7.0 N   | -23.9 Y |
| HD 207129  |              | HIP 107649                 | GJ 838                               | G0 V            | 21 48 15.75    | -47 18 13.01                           | -6.5                       | 1.3           | 63.95         | 0.78          | 165.40                       | 0.90            | -294.50        | 0.80               | -13.27 | 0.85 | -22.20 | 0.32 | 0.30   | 0.99 | 25.87 | 24.41 | -6.3 N  | -3.0 Y  |
| HD 207377  | SAO 247196   | HIP 107806                 |                                      | G6 -            | 21 50 23.79    | -58 18 18.18                           | 13.5                       | 2.0           | 24.46         | 1.02          | 49.10                        | 1.30            | -92.90         | 1.20               | -0.63  | 1.34 | -22.09 | 1.00 | -10.41 | 1.45 | 24.43 | 20.06 | -6.3 N  | 5.2 N   |
| HD 207575  | SAO 255093   | HIP 107947                 |                                      | F6 -            | 21 52 9.72     | -62 3 8.50                             | 3.0                        | 2.0           | 22.18         | 0.80          | 43.80                        | 1.30            | -90.20         | 1.30               | -8.05  | 1.32 | -20.04 | 1.02 | -1.34  | 1.41 | 21.64 | 21.01 | -7.7 N  | 6.5 Y   |
| HD 208313  | BD+31 4574   | HIP 108156                 | GJ 840                               | K0 V            | 21 54 45.04    | 32 19 42.86                            | -13.9                      | 0.4           | 49.21         | 0.93          | 209.30                       | 1.60            | -233.30        | 1.50               | -2.72  | 0.17 | -22.04 | 0.42 | -24.73 | 0.59 | 33.24 | 35.75 | -14.0 N | -23.7 N |
| HD 209458  | BD+18 4917   | HIP 108859                 |                                      | G0 V            | 22 3 10.77     | 18 53 3.57                             | -14.8                      | 0.0           | 21.24         | 1.00          | 28.90                        | 1.01            | -18.37         | 0.97               | -5.69  | 0.29 | -15.64 | 0.21 | 0.58   | 0.41 | 16.65 | 9.22  | -0.3 Y  | -5.2 N  |
|            | V383 Lac     |                            |                                      | K1 V            | 22 20 7.03     | 49 30 11.76                            | -20.2                      | 0.1           | 36.30         | 5.00          | 93.40                        | 1.20            | 5.00           | 1.20               | -7.06  | 1.43 | -22.19 | 0.34 | -3.90  | 0.86 | 23.61 | 15.90 | 2.5 Y   | -10.5 N |
|            | Wolf 1225    | HIP 110526                 | GJ 856A                              | M0 Ve           | 22 23 29.09    | 32 27 33.47                            | -24.0                      | 3.0           | 62.18         | 10.00         | 251.26                       | 9.72            | -207.57        | 18.50              | -6.62  | 1.66 | -30.94 | 3.17 | -13.86 | 4.05 | 34.54 | 29.34 | -7.3 N  | -17.2 N |
| HD 213845  | ups Aqr      | HIP 111449                 | GJ 863.2                             | F7 V            | 22 34 41.64    | -20 42 29.56                           | -1.9                       | 0.9           | 43.97         | 0.75          | 221.40                       | 0.70            | -145.50        | 0.70               | -15.08 | 0.46 | -20.62 | 0.45 | -12.93 | 0.81 | 28.63 | 28.43 | 3.4 Y   | -2.0 Y  |
|            | BD+17 4799   |                            |                                      | K0 V/IV         | 22 44 41.54    | 17 54 18.30                            | -2.5                       | 1.0           | 26.30         | 5.00          | 83.50                        | 1.00            | -79.40         | 1.00               | -5.28  | 0.99 | -13.45 | 2.32 | -15.13 | 3.21 | 20.92 | 22.39 | -4.5 Y  | -9.5 N  |
|            | IL Aqr       | HIP 113020                 | GJ 876                               | M4 -            | 22 53 16.73    | -14 15 49.34                           | -1.9                       | 0.0           | 212.69        | 2.10          | 960.20                       | 1.60            | -672.10        | 1.70               | -12.54 | 0.13 | -19.90 | 0.21 | -11.51 | 0.14 | 26.19 | 26.17 | 1.4 Y   | -2.1 Y  |
| HD 217014  | 51 Peg       | HIP 113357                 | GJ 882                               | G2.5 IVa        | 22 57 27.98    | 20 46 7.79                             | -33.3                      | 0.0           | 65.10         | 0.76          | 207.90                       | 0.70            | 59.80          | 0.60               | -15.18 | 0.20 | -29.72 | 0.04 | 15.61  | 0.06 | 36.84 | 11.89 | 11.4 N  | -4.8 N  |
|            |              | HIP 114066                 | GJ 9809                              | M0 -            | 23 6 4.85      | 63 55 34.41                            | -23.5                      | 1.3           | 40.09         | 1.48          | 175.90                       | 3.30            | -58.90         | 3.40               | -6.85  | 0.87 | -27.04 | 1.24 | -15.99 | 0.75 | 32.15 | 26.75 | -4.7 Y  | -16.0 N |
| HD 220140  | V368 Cep     | HIP 115147                 |                                      | G9 V            | 23 19 26.64    | 79 0 12.67                             | -16.7                      | 0.1           | 50.65         | 0.64          | 202.70                       | 1.00            | 72.10          | 1.10               | -10.16 | 0.25 | -23.48 | 0.16 | -5.45  | 0.10 | 26.16 | 23.80 | 6.1 N   | -14.1 Y |
| HD 221503  |              | HIP 116215                 | GJ 898                               | K5 -            | 23 32 49.40    | -16 50 44.30                           | -0.2                       | 1.0           | 71.70         | 1.36          | 343.30                       | 1.80            | -218.60        | 1.70               | -13.31 | 0.36 | -21.25 | 0.53 | -9.78  | 0.95 | 26.91 | 26.95 | 1.4 Y   | 2.1 Y   |
| HD 222259  | DS Tuc       | HIP 116748                 |                                      | G5 V            | 23 39 39.49    | -69 11 44.88                           | 7.7                        | 2.5           | 21.64         | 1.32          | 82.10                        | 1.60            | -88.30         | 1.90               | -9.28  | 1.43 | -25.85 | 1.90 | 1.65   | 1.90 | 27.51 | 26.96 | -12.7 N | 13.9 N  |

Table 3. Hyades supercluster.

| Name      |                   | SpT | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas)          | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s)   | $W$<br>(km/s) | $V_{Total}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s)   | $\rho_e$<br>(km/s) |                  |              |                  |              |        |       |       |        |         |        |
|-----------|-------------------|-----|----------------------------|--------------------------------------|-----------------|-------------------------|--|----------------------------|---------------|-----------------|---------------|-----------------------|-----------------|------------------|--------------------|------------------|--------------|------------------|--------------|--------|-------|-------|--------|---------|--------|
| HD 1237   | SAO 258219        | HIP | 1292                       | GJ 3021                              | G6 V            | 0 16 12.68              | -79 51 4.25                            | -5.8                       | 0.0           | 56.76           | 0.53          | 433.88                | 0.53            | -57.91           | 0.48               | -33.11           | 0.29         | -16.38           | 0.19         | 2.36   | 0.04  | 37.02 | 36.55  | -4.4 N  | -4.3 Y |
| HD 1835   | BE Cet            | HIP | 1803                       | GJ 17.3                              | G3 V            | 0 22 51.79              | -12 12 33.98                           | -6.8                       | 2.0           | 49.05           | 0.91          | 393.90                | 1.10            | 61.00            | 1.00               | -35.60           | 0.70         | -15.76           | 0.63         | 3.84   | 1.92  | 39.12 | 38.50  | 1.7 Y   | -1.1 Y |
| HD 4568   | 61 Psc            | HIP | 3730                       |                                      | F8 V            | 0 47 54.83              | 20 55 31.25                            | 1.0                        | 2.0           | 17.41           | 0.87          | 160.10                | 1.00            | 14.80            | 0.90               | -38.63           | 2.16         | -20.56           | 1.71         | 1.73   | 1.36  | 43.79 | 44.18  | 1.0 Y   | 6.1 Y  |
| HD 4747   | SAO 166607        | HIP | 3850                       | GJ 36                                | G9 V            | 0 49 26.77              | -23 12 44.90                           | 5.0                        | 2.0           | 53.09           | 1.02          | 518.80                | 1.40            | 124.70           | 1.40               | -45.14           | 0.94         | -15.38           | 0.40         | -4.59  | 2.00  | 47.91 | 47.53  | 4.2 Y   | 2.7 Y  |
|           | V388 Cas          | HIP |                            | GJ 51                                | M5 -            | 1 3 12.00               | 62 21 54.00                            | 4.4                        | 5.0           | 95.50           | 7.30          | 721.00                | 5.00            | 95.00            | 5.00               | -31.87           | 3.61         | -16.35           | 4.41         | 6.31   | 0.55  | 36.37 | 35.72  | 8.2 N   | 6.4 Y  |
| HD 5848   | HR 285            | HIP | 5372                       |                                      | K2 III          | 1 8 44.87               | 86 15 25.53                            | 8.5                        | 0.9           | 10.43           | 5.00          | 79.80                 | 0.30            | -10.70           | 0.30               | -35.31           | 1.58         | -12.77           | 1.17         | 1.36   | 4.00  | 47.57 | 36.83  | 2.0 Y   | 4.6 Y  |
| HD 7788A  | kap Tuc<br>UV Cet | HIP | 5896                       | GJ 55.3A<br>GJ 65A                   | F6 V<br>K7 -    | 1 15 46.15<br>1 39 1.00 | -68 52 33.50<br>-17 56 60.00           | 9.2<br>2.0                 | 2.0<br>2.0    | 48.94<br>381.00 | 0.53<br>6.00  | 404.90<br>3321.00     | 3.30<br>0.00    | 108.30<br>-43.00 | 3.00<br>0.75       | -33.77<br>-19.25 | 0.84<br>0.31 | -22.15<br>-10.08 | 1.21<br>1.50 | -10.08 | 1.50  | 41.63 | 40.61  | 0.4 Y   | 1.0 N  |
| HD 11507  |                   | HIP | 8768                       | GJ 79                                | dM5.5e -        | 1 52 49.17              | -22 26 54.46                           | 14.8                       | 1.3           | 90.17           | 1.37          | 845.30                | 1.80            | 0.40             | 1.80               | -36.64           | 0.62         | -28.92           | 0.46         | -3.85  | 1.27  | 46.84 | 45.04  | -11.5 N | 13.7 Y |
| HD 13382  | BD+20 341         | HIP | 10117                      |                                      | G5 V            | 2 10 8.03               | -31 4 11.52                            | 19.4                       | 0.4           | 30.76           | 0.98          | 273.10                | 0.80            | -12.60           | 0.70               | -32.16           | 0.92         | -32.92           | 0.92         | -5.80  | 0.56  | 46.39 | 41.02  | -16.3 N | 13.2 N |
| HD 17051  | iot Hor           | HIP | 12653                      | GJ 108                               | G0 V            | 2 42 33.47              | -50 48 1.05                            | 15.5                       | 1.3           | 58.00           | 0.55          | 333.60                | 0.90            | 219.90           | 0.90               | -31.27           | 0.31         | -16.44           | 0.69         | -7.67  | 1.11  | 36.15 | 33.89  | 0.8 Y   | 9.1 N  |
|           | VX Ari            | HIP | 12781                      | GJ 109                               | M3 -            | 2 44 15.21              | 25 31 24.15                            | 30.0                       | 1.0           | 132.41          | 2.48          | 862.50                | 2.50            | -360.70          | 2.50               | -39.91           | 0.84         | -16.81           | 0.70         | -12.03 | 0.53  | 49.95 | 39.54  | -7.3 N  | 22.3 N |
| HD 17922  | BD+42 646         | HIP | 13528                      |                                      | F5 -            | 2 54 14.11              | 42 35 19.64                            | 25.5                       | 2.0           | 19.45           | 1.04          | 201.40                | 1.00            | -80.90           | 1.00               | -51.15           | 2.34         | -28.83           | 2.61         | -1.03  | 0.67  | 58.72 | 62.03  | 0.6 Y   | 32.4 N |
| HD 18404  | 47 Ari            | HIP | 13834                      |                                      | F5 IV           | 2 58 5.22               | 20 40 7.44                             | 28.1                       | 2.0           | 31.41           | 0.84          | 234.70                | 0.60            | -32.00           | 0.60               | -41.55           | 1.65         | -18.34           | 0.95         | -2.20  | 1.16  | 45.47 | 45.51  | 0.3 Y   | 28.2 Y |
| HD 18632  | BZ Cet            | HIP | 13976                      |                                      | G5 -            | 3 0 2.81                | 7 44 59.10                             | 28.4                       | 0.2           | 42.66           | 1.22          | 330.60                | 1.50            | 19.30            | 1.50               | -42.43           | 0.72         | -18.98           | 0.77         | -0.87  | 0.63  | 46.49 | 47.62  | 0.8 Y   | 30.2 Y |
| HD 19290  | BD+16 389         | HIP |                            |                                      | G0 -            | 3 6 42.60               | 17 28 40.79                            | 25.0                       | 1.0           | 13.00           | 5.00          | 100.20                | 1.10            | -21.60           | 1.10               | -42.16           | 8.69         | -12.73           | 7.21         | 9.07   | 8.98  | 44.96 | 46.67  | 12.0 N  | 30.4 Y |
| HD 19787  | del Ari           | HIP | 14838                      |                                      | K2 III          | 3 11 37.77              | 19 43 36.03                            | 24.7                       | 0.9           | 19.44           | 1.23          | 154.50                | 0.30            | -9.90            | 0.30               | -39.94           | 1.47         | -20.49           | 1.75         | 4.49   | 1.25  | 45.11 | 50.20  | 3.5 Y   | 33.3 N |
| HD 19902  | BD+32 582         | HIP | 14976                      |                                      | G5 V            | 3 13 2.79               | 32 53 47.20                            | 26.9                       | 0.4           | 23.73           | 1.18          | 183.30                | 1.10            | -63.10           | 1.10               | -42.00           | 1.03         | -21.43           | 1.64         | -0.64  | 0.53  | 47.16 | 49.47  | 0.7 Y   | 30.8 Y |
| HD 20678  | BD+32 608         | HIP | 15609                      |                                      | K0 V            | 3 20 59.45              | 33 13 6.00                             | 34.2                       | 0.4           | 25.21           | 1.06          | 169.90                | 1.00            | -111.60          | 0.10               | -45.41           | 0.77         | -21.39           | 1.48         | -10.56 | 1.18  | 51.29 | 48.85  | -7.6 N  | 30.1 Y |
| HD 21531  | BD - 20 643       | HIP | 16134                      | GJ 142                               | K7 V            | 3 27 52.41              | -19 48 16.15                           | 35.0                       | 1.3           | 79.26           | 2.25          | 535.00                | 1.40            | 304.10           | 1.50               | -46.59           | 1.09         | -19.09           | 0.49         | -6.64  | 1.22  | 50.79 | 47.52  | 1.8 Y   | 30.1 Y |
| HD 21663  | BD+19 547         | HIP | 16329                      | GJ 3230A                             | G5 V            | 3 30 30.43              | 20 44 11.78                            | 25.2                       | 0.4           | 21.61           | 1.48          | 162.40                | 0.70            | -59.20           | 0.80               | -36.09           | 1.09         | -27.75           | 2.33         | -0.57  | 8.09  | 45.53 | 53.83  | -5.5 N  | 38.6 N |
| HD 22001  | kap Ret           | HIP | 16245                      | GJ 143.2A                            | F5 V            | 3 29 22.68              | -62 56 15.09                           | 12.2                       | 0.9           | 46.65           | 0.88          | 382.70                | 0.90            | 374.10           | 0.90               | -50.74           | 0.56         | -22.96           | 0.64         | -2.12  | 0.65  | 55.73 | 55.82  | -0.8 Y  | 12.6 Y |
| HD 22496  |                   | HIP | 16711                      | GJ 146                               | K5 V            | 3 35 0.94               | -48 25 8.89                            | 19.5                       | 2.0           | 74.81           | 0.48          | 404.40                | 1.10            | 309.20           | 1.10               | -31.65           | 0.43         | -19.97           | 1.21         | -4.37  | 1.58  | 37.68 | 35.05  | -3.2 Y  | 14.1 Y |
| HD 23556  | BD - 19 733       | HIP | 17420                      |                                      | K2 V            | 3 43 55.34              | -19 6 39.24                            | 25.3                       | 0.5           | 71.17           | 0.91          | 308.70                | 1.50            | 156.70           | 1.40               | -30.50           | 0.36         | -14.88           | 0.21         | -4.52  | 0.43  | 34.24 | 31.50  | -0.9 Y  | 21.5 Y |
| HD 24357  | HR 1201           | HIP | 18170                      |                                      | F4 V            | 3 53 10.50              | 17 19 37.51                            | 35.0                       | 5.0           | 35.00           | 5.00          | 144.60                | 0.60            | -37.98           | 4.52               | -11.99           | 2.34         | -6.19            | 2.71         | 40.31  | 32.21 | 0.1 Y | 25.3 N |         |        |
| HD 25893  | V491 Per          | HIP | 19255                      | GJ 160.1                             | -               | 4 7 34.35               | 38 4 28.36                             | 26.5                       | 2.0           | 48.59           | 1.17          | 174.40                | 2.40            | -230.90          | 2.40               | -33.18           | 1.86         | -17.57           | 0.96         | -9.48  | 0.45  | 38.72 | 38.94  | -7.8 N  | 27.9 Y |
| HD 25998  | V582 Per          | HIP | 19335                      | GJ 161.1                             | F7 V            | 4 8 36.62               | 38 2 23.04                             | 24.8                       | 2.0           | 46.87           | 0.77          | 166.80                | 1.20            | -203.10          | 1.30               | -31.32           | 1.86         | -16.78           | 0.81         | -7.71  | 0.39  | 36.36 | 37.23  | -6.2 N  | 26.8 Y |
| HD 27282  | BD+17 707         | HIP | 20146                      |                                      | G8 V            | 4 19 8.01               | 17 31 29.12                            | 37.9                       | 0.4           | 21.24           | 1.32          | 111.10                | 1.10            | -27.40           | 1.10               | -41.60           | 0.57         | -18.90           | 1.33         | -0.93  | 0.92  | 45.70 | 47.63  | 1.0 Y   | 40.2 Y |
| HD 27604  | HR 1365           | HIP | 20109                      |                                      | F7 V            | 4 18 40.03              | -52 51 36.34                           | 20.7                       | 2.0           | 13.49           | 0.52          | 47.10                 | 1.10            | 74.20            | 1.00               | -32.05           | 1.28         | -17.45           | 1.45         | -7.08  | 1.45  | 37.17 | 34.04  | 1.3 Y   | 44.4 Y |
| HD 27685  | BD+16 585         | HIP | 20441                      |                                      | G4 V            | 4 22 44.78              | 16 47 27.74                            | 39.3                       | 0.4           | 26.96           | 1.40          | 173.30                | 1.150           | 4.67             | 10.20              | -45.91           | 1.43         | -17.78           | 3.31         | 7.04   | 3.28  | 49.73 | 55.98  | 9.0 N   | 47.8 N |
| HD 27989  | BD+18 636         | HIP | 20686                      |                                      | G5 V            | 4 25 51.73              | 18 51 50.62                            | 39.2                       | 0.4           | 23.88           | 1.22          | 108.20                | 1.00            | -34.90           | 1.00               | -41.91           | 0.48         | -17.91           | 1.10         | -2.20  | 0.70  | 45.63 | 44.95  | 0.6 Y   | 38.4 Y |
|           |                   | HIP |                            | GJ 195A                              | M1-             | 5 17 23.73              | 45 50 22.97                            | 31.2                       | 0.5           | 72.00           | 4.00          | 58.50                 | 5.00            | -410.00          | 4.80               | -37.84           | 0.66         | -13.73           | 1.32         | -9.82  | 0.76  | 41.43 | 39.02  | -8.0 N  | 29.0 Y |
| HD 35171  | 111 TauB          | HIP | 25220                      | GJ 201                               | K2-             | 5 23 38.38              | 17 19 26.84                            | 37.1                       | 2.0           | 69.76           | 1.50          | 253.34                | 1.21            | -4.66            | 0.76               | -37.58           | 1.95         | -14.41           | 1.34         | 7.30   | 49.40 | 49.40 | 45.80  | 9.5 N   | 43.5 N |
| HD 35296  | V1119 Tau         | HIP | 25278                      | GJ 202                               | F8 V            | 5 24 25.46              | 17 23 07.72                            | 36.5                       | 2.0           | 68.19           | 0.94          | 250.90                | 0.80            | -7.20            | 0.80               | -36.94           | 1.95         | -14.63           | 0.30         | 7.63   | 1.42  | 40.46 | 46.74  | 9.6 N   | 44.4 N |
| HD 37070  | 22 Cam            | HIP | 26587                      | GJ 161.1                             | F5-             | 5 39 5.40               | 56 21 36.15                            | 20.0                       | 5.0           | 16.64           | 0.79          | 9.90                  | 1.00            | -132.30          | 1.00               | -35.17           | 4.52         | -21.56           | 2.47         | -11.27 | 1.39  | 42.76 | 48.10  | -6.7 N  | 30.5 N |
|           |                   | HIP |                            | GJ 3379                              | M4-             | 6 0 4.80                | 2 42 23.00                             | 30.0                       | 0.1           | 186.30          | 6.20          | 299.00                | 1.00            | 23.00            | 1.00               | -26.70           | 0.09         | -15.59           | 0.12         | 1.59   | 0.23  | 30.96 | 54.62  | -3.6 Y  | 54.2 N |
| HD 41700  | HR 2157           | HIP | 28764                      | GJ 9200                              | G0 V            | 6 4 24.50               | -45 2 11.77                            | 25.8                       | 2.0           | 37.46           | 0.50          | -82.40                | 0.70            | 247.10           | 0.70               | -37.81           | 0.69         | -10.41           | 1.71         | -14.64 | 0.21  | 41.86 | 38.17  | 13.7 N  | 23.6 Y |
| HD 43931  | BD+13 1199        | HIP | 30051                      |                                      | F7 V            | 6 19 25.41              | 13 26 21.17                            | 39.0                       | 5.0           | 11.60           | 0.97          | 20.40                 | 1.40            | -10.50           | 1.30               | -34.99           | 4.78         | -19.02           | 1.80         | 4.75   | 0.92  | 40.11 | 45.67  | 7.5 N   | 45.3 N |
| HD 45609  | SAO 171781        | HIP | 30733                      |                                      | K0 V            | 6 27 24.10              | -25 44 4.28                            | 24.9                       | 0.4           | 22.53           | 2.38          | 1.40                  | 1.25            | 87.80            | 1.40               | -28.98           | 1.62         | -11.02           | 0.96         | 0.08   | 0.82  | 31.00 | 34.59  | 0.8 Y   | 29.3 Y |
| HD 52265  | BD - 05 1910      | HIP | 33719                      |                                      | G0 V            | 7 0 18.04               | -5 22 17.72                            | 53.8                       | 0.0           | 35.63           | 0.84          | -114.80               | 1.30            | 81.50            | 1.20               | -52.32           | 0.27         | -20.63           | 0.34         | -9.08  | 0.29  | 56.97 | 69.46  | -5.5 Y  | 67.1 N |
| HD 53532  | BD+22 1569        | HIP | 34271                      |                                      | G0 V            | 7 6 16.80               | 22 41 0.56                             | 41.9                       | 0.4           | 22.77           | 1.03          | -92.00                | 1.00            | -77.80           | 0.90               | -43.26           | 0.42         | -17.93           | 0.47         | -13.87 | 1.12  | 48.84 | 73.61  | 6.9 Y   | 69.5 N |
| HD 58895A | SAO 235171        | HIP | 35910                      |                                      | G3 IV           | 7 24 9.39               | -58 29 31.01                           | 19.7                       | 2.0           | 20.61           | 0.53          | -87.79                | 0.58            | 137.52           | 0.51               | -36.88           | 0.97         | -16.19           | 1.89         | -13.19 | 0.68  | 42.38 | 39.41  | -10.5 N | 16.0 Y |
| HD 62576  | 1 Pup             | HIP | 37648                      |                                      | K5 III          | 7 43 32.39              | -28 24 39.18                           | 32.7                       | 0.9           | 3.34            | 0.59          | -13.90                | 3.10            | 29.70            | 2.80               | -56.10           | 8.91         | -9.06            | 4.44         | 2.50   | 4.61  | 56.88 | 72.15  | 5.5 Y   | 55.4 Y |
| HD 65523  | BD+13 1810        | HIP | 39068                      |                                      | G5 V            | 7 59 35.63              | 12 58 59.06                            | 32.8                       | 0.6           | 29.46           | 1.52          | -236.10               | 1.20            | -43.10           | 1.20               | -43.11           | 1.01         | -12.86           | 0.35         | -23.30 | 1.88  | 50.66 | 93.32  | 1.9 Y   | 85.0 N |
| HD 70088  | BD+34 1807        | HIP | 40942                      |                                      | G5 V            | 8 21 20.73              | 34 18 35.87                            | 32.2                       | 0.5           | 23.12           | 1.17          | -118.80               | 2.20            | -111.30          | 2.20               | -39.92           | 0.84         | -22.57           | 1.07         | -6.92  | 1.35  | 46.38 | 53.12  | -2.4 Y  | 41.4 N |
| HD 72760  | BD - 00 2024      | HIP | 42074                      | GJ 3507                              | G5 V            | 8 34 31.65              | 0 43 33.89                             | 34.6                       | 0.5           | 45.95           | 1.01          | -197.50               | 1.00            | 18.90            | 0.90               | -35.15           | 0.45         | -19.38           | 0.35         | -2.24  | 0.42  | 40.20 | 36.90  | -2.7 Y  | 30.8 Y |
| HD 73522  | BD - 16 2525      | HIP | 42281                      |                                      | K1 V            | 8 37 15.54              | -17 29 40.71                           | 27.3                       | 0.3           | 27.02           | 1.18          | -115.20               | 1.50            | 59.70            | 1.30               | -31.61           | 0.88         | -15.82           | 0.43         | -3.72  | 0.54  | 35.54 | 34.71  | -2.3 Y  | 26.3 Y |
| HD 73171  | HR 3408           | HIP | 42452                      |                                      | K1 III          | 8 39 17.62              | 52 42 41.                              |                            |               |                 |               |                       |                 |                  |                    |                  |              |                  |              |        |       |       |        |         |        |



Table 3. – continued

| Name      |            | Spt | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{\text{Total}}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s) | $\rho_c$<br>(km/s) |        |       |        |       |        |       |       |       |         |         |
|-----------|------------|-----|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|------------------------------|-----------------|----------------|--------------------|--------|-------|--------|-------|--------|-------|-------|-------|---------|---------|
| HD 120136 | DT Vir     | HIP | 63510                      | GJ 494Aa                             | M2 Ve           | 13 0 46.57     | 12 22 32.55                            | -10.1                      | 5.0           | 87.50         | 1.51          | -640.10                      | 1.50            | -25.10         | 1.40               | -29.74 | 1.00  | -18.54 | 1.03  | -8.85  | 4.83  | 36.15 | 34.40 | -6.4 N  | -4.5 Y  |
| HD 120780 | tau Boo    | HIP | 67275                      | GJ 527A                              | F6 IV           | 13 47 15.74    | 17 27 24.84                            | -16.1                      | 0.5           | 64.12         | 0.70          | -480.80                      | 0.40            | 50.40          | 0.40               | -33.51 | 0.35  | -19.03 | 0.22  | -7.18  | 0.49  | 39.20 | 37.22 | -4.3 N  | -11.3 Y |
| HD 126535 | BD-18 3821 | HIP | 67742                      | GJ 531                               | K1 V            | 13 52 35.86    | -50 55 18.18                           | -25.0                      | 2.0           | 60.86         | 0.95          | -596.40                      | 1.10            | -45.90         | 1.00               | -51.41 | 1.44  | -12.05 | 1.52  | 2.81   | 0.40  | 52.88 | 48.64 | 7.3 N   | -15.8 N |
| HD 131023 | BD+10 2752 | HIP | 70608                      |                                      | K1 V            | 14 26 34.70    | -18 49 12.20                           | -19.9                      | 0.3           | 22.29         | 1.46          | -186.70                      | 0.90            | 1.80           | 0.90               | -40.39 | 1.80  | -18.36 | 1.76  | 2.11   | 1.04  | 44.42 | 46.22 | 3.0 Y   | -23.8 Y |
| HD 134319 | BD+64 1046 | HIP | 72634                      | GJ 3868A                             | K0 V            | 14 51 2.31     | 9 43 25.19                             | -36.0                      | 1.0           | 36.73         | 1.26          | -217.50                      | 1.20            | 54.60          | 1.30               | -40.60 | 0.94  | -15.71 | 0.53  | -15.45 | 0.99  | 46.19 | 35.13 | -0.4 Y  | -19.9 N |
| HD 149028 | BD+12 3031 | HIP | 73869                      | GJ 577                               | G5 -            | 15 5 49.90     | 64 2 49.94                             | -6.5                       | 0.1           | 22.59         | 0.68          | -123.30                      | 1.10            | 110.10         | 1.20               | -32.45 | 1.05  | -13.59 | 0.35  | -2.82  | 0.20  | 35.29 | 35.24 | 1.2 Y   | -6.4 Y  |
| HD 152178 | V2253 Oph  | HIP | 75011                      |                                      | K0 V            | 15 19 40.14    | 31 50 33.04                            | -26.6                      | 0.4           | 22.27         | 1.23          | -181.20                      | 1.40            | 141.20         | 1.40               | -52.69 | 2.45  | -17.89 | 0.53  | -1.38  | 1.24  | 55.66 | 57.24 | 4.4 Y   | -30.1 Y |
| HD 152260 | SAO 257449 | HIP | 83247                      |                                      | G V             | 16 31 37.07    | 12 25 17.58                            | -32.5                      | 0.5           | 20.62         | 1.21          | -85.50                       | 0.80            | 56.40          | 0.90               | -36.86 | 0.93  | -15.86 | 0.36  | -0.68  | 1.17  | 40.13 | 42.39 | 0.3 Y   | -35.3 Y |
| HD 158972 | V647 Her   | HIP | 84794                      | GJ 669A                              | G8/K0 Vp        | 16 52 56.01    | -26 45 2.34                            | -34.8                      | 0.5           | 2.12          | 1.24          | 0.90                         | 1.30            | -13.10         | 1.30               | -32.24 | 1.37  | -19.17 | 13.58 | -25.81 | 11.98 | 45.53 | 34.09 | -24.0 N | -29.6 Y |
| HD 168603 | BD+44 2721 | HIP | 85639                      |                                      | K0 V            | 17 30 5.33     | 44 31 9.95                             | -29.7                      | 0.4           | 25.28         | 0.81          | -13.20                       | 0.90            | 133.90         | 1.00               | -32.60 | 0.83  | -18.15 | 0.39  | -11.26 | 0.31  | 38.97 | 31.20 | 5.0 N   | -19.0 N |
| HD 168603 | BD+33 3073 | HIP | 89771                      |                                      | K0 V            | 18 19 8.82     | 33 13 52.55                            | -34.0                      | 0.5           | 27.21         | 0.86          | 5.90                         | 1.40            | 134.80         | 1.60               | -36.39 | 0.77  | -18.79 | 0.54  | -5.61  | 0.40  | 41.34 | 36.65 | 1.8 Y   | -28.2 Y |
| HD 171759 | zet Pav    | HIP | 91792                      |                                      | K0 III          | 18 43 2.14     | -71 25 41.20                           | -16.3                      | 0.9           | 15.55         | 0.55          | 1.10                         | 0.70            | -156.80        | 0.60               | -43.00 | 1.31  | -26.42 | 1.37  | -1.84  | 0.53  | 50.50 | 52.55 | -4.0 Y  | -22.2 Y |
| HD 177720 | SAO 245938 | HIP | 94051                      |                                      | G0 -            | 19 8 51.12     | -54 2 17.52                            | -30.0                      | 2.0           | 14.60         | 1.20          | 2.50                         | 1.30            | -65.80         | 1.60               | -34.49 | 1.90  | -10.90 | 1.80  | 6.99   | 1.02  | 36.84 | 27.88 | -4.7 Y  | -18.5 N |
| HD 177996 | BD+57 1961 | HIP | 94050                      | GJ 4096                              | K1 V            | 19 8 50.49     | -42 25 41.19                           | -32.0                      | 2.5           | 31.48         | 1.97          | 23.70                        | 1.00            | -121.50        | 0.90               | -34.44 | 2.35  | -13.29 | 1.04  | 2.95   | 1.06  | 37.03 | 30.51 | -2.5 Y  | -24.3 N |
| HD 180161 | HR 7291    | HIP | 94346                      | GJ 1233                              | G8 V            | 19 12 11.36    | 57 40 19.13                            | -27.9                      | 0.4           | 50.00         | 0.54          | 217.50                       | 0.90            | 408.60         | 0.90               | -44.04 | 0.49  | -22.74 | 0.38  | -15.75 | 0.18  | 52.01 | 46.85 | -11.2 N | -19.9 N |
| HD 181943 | V4371 Sgr  | HIP | 94645                      | GJ 749                               | F8 V            | 19 15 33.23    | -24 10 45.66                           | -25.5                      | 0.5           | 36.97         | 0.80          | 116.60                       | 0.90            | -101.70        | 0.90               | -27.43 | 0.48  | -12.86 | 0.23  | -11.22 | 0.44  | 32.31 | 52.80 | 4.1 Y   | -49.1 N |
| HD 183870 | BD-11 5030 | HIP | 95266                      |                                      | K1 V            | 19 22 57.26    | -14 15 32.04                           | -32.1                      | 1.0           | 12.91         | 1.28          | 58.30                        | 1.40            | -7.80          | 1.30               | -35.57 | 1.17  | -8.45  | 0.75  | -12.65 | 2.15  | 38.69 | 72.17 | 7.0 Y   | -69.2 N |
| HD 187565 | BD+29 3760 | HIP | 96085                      | GJ 1240                              | K2 V            | 19 32 6.71     | -11 16 29.79                           | -49.6                      | 0.5           | 55.50         | 0.90          | 236.70                       | 1.10            | 18.60          | 1.20               | -51.19 | 0.46  | -15.04 | 0.27  | -4.98  | 0.32  | 53.59 | 63.86 | 6.6 N   | -60.9 N |
| HD 189087 | HR 7749    | HIP | 97543                      |                                      | F8 V            | 19 49 31.64    | 29 22 29.93                            | -23.0                      | 10.0          | 10.32         | 0.93          | 40.30                        | 1.40            | 34.50          | 1.30               | -30.43 | 4.61  | -11.09 | 9.13  | -8.59  | 1.02  | 33.51 | 35.42 | -6.8 N  | -26.6 Y |
| HD 192886 | HR 8191    | HIP | 98192                      | GJ 773.2                             | K1 V            | 19 57 13.41    | 29 49 26.52                            | -29.9                      | 0.5           | 39.24         | 0.97          | 96.00                        | 1.30            | 242.60         | 1.20               | -40.39 | 0.78  | -15.16 | 0.56  | 5.12   | 0.23  | 43.44 | 45.15 | 7.6 N   | -33.2 Y |
|           | HU Del     | HIP | 100184                     |                                      | F5 V            | 20 19 17.85    | -47 34 49.04                           | -30.8                      | 2.0           | 33.91         | 0.87          | 190.60                       | 1.10            | -182.50        | 1.00               | -44.32 | 1.72  | -17.47 | 0.64  | -6.29  | 1.30  | 48.05 | 49.46 | 3.9 Y   | -33.2 Y |
|           | BD+33 3930 | HIP | 101227                     | GJ 791.2A                            | M4.5            | 20 29 49.00    | 9 41 30.00                             | -29.0                      | 0.5           | 113.80        | 1.90          | 674.00                       | 5.00            | 121.00         | 5.00               | -35.60 | 0.46  | -15.76 | 0.42  | -11.78 | 0.42  | 40.68 | 47.49 | -7.8 N  | -38.8 N |
|           | SAO 246651 | HIP | 101636                     |                                      | K0 V            | 20 31 7.77     | 33 32 34.52                            | -25.2                      | 0.4           | 22.38         | 1.16          | 65.00                        | 1.40            | 101.80         | 1.40               | -31.54 | 1.35  | -16.89 | 0.55  | 3.08   | 0.34  | 35.91 | 32.79 | 4.6 N   | -21.0 Y |
| HD 195818 | BD+15 4227 | HIP | 102029                     |                                      | G0 -            | 20 36 2.35     | -54 56 29.09                           | -22.5                      | 2.0           | 15.16         | 1.20          | 49.90                        | 1.60            | -82.70         | 1.80               | -32.93 | 2.02  | -18.10 | 2.06  | 2.53   | 1.54  | 37.66 | 36.22 | -5.3 N  | -20.7 Y |
| HD 197039 | BD+45 3371 | HIP | 102859                     | GJ 816.1A                            | F5 -            | 20 40 35.31    | 15 38 35.70                            | -32.5                      | 2.0           | 14.36         | 0.88          | 91.40                        | 0.80            | 46.90          | 0.90               | -43.66 | 2.02  | -16.03 | 1.82  | -6.59  | 1.16  | 46.97 | 52.20 | -2.1 Y  | -39.7 N |
| HD 200560 | BD-14 5936 | HIP | 104239                     | GJ 819A                              | K2 -            | 21 2 40.75     | 45 53 5.17                             | -14.5                      | 0.2           | 51.65         | 0.72          | 396.10                       | 0.80            | 141.00         | 0.80               | -34.50 | 0.48  | -12.94 | 0.20  | -18.48 | 0.28  | 41.22 | 39.15 | -16.4 N | -17.7 Y |
| HD 202605 | BD-01 4138 | HIP | 105066                     |                                      | K1 V            | 21 7 10.38     | -13 55 22.50                           | -33.2                      | 0.4           | 56.67         | 1.18          | 382.30                       | 0.90            | -39.90         | 0.80               | -42.29 | 0.52  | -17.96 | 0.21  | -5.04  | 0.58  | 46.22 | 49.23 | 0.2 Y   | -37.3 Y |
| HD 203842 | HR 8191    | HIP | 105695                     |                                      | K0 V            | 21 17 2.13     | -1 4 38.73                             | -23.2                      | 0.3           | 23.33         | 1.32          | 160.50                       | 0.80            | -23.30         | 0.80               | -32.98 | 1.21  | -19.16 | 0.35  | -13.02 | 1.49  | 40.30 | 45.89 | -9.4 N  | -33.3 N |
| HD 205067 | BD-05 5715 | HIP | 106438                     |                                      | F5 III          | 21 24 24.56    | 10 10 27.31                            | -33.2                      | 2.0           | 9.47          | 0.78          | 72.20                        | 1.40            | 20.60          | 1.40               | -45.33 | 3.01  | -21.00 | 1.70  | -4.30  | 2.16  | 50.14 | 50.59 | -1.7 Y  | -33.9 Y |
|           | 34 Peg     | HIP | 109388                     | GJ 849                               | G2 V            | 21 33 30.98    | -27 53 24.93                           | -26.6                      | 20.0          | 21.19         | 0.95          | 200.70                       | 1.70            | -63.50         | 1.60               | -47.27 | 13.04 | -22.84 | 4.79  | -12.99 | 14.57 | 54.08 | 61.78 | -1.0 Y  | -40.0 N |
| HD 212754 |            | HIP | 110785                     |                                      | M3.5 -          | 22 9 40.35     | -4 38 26.62                            | -15.3                      | 0.5           | 113.97        | 2.10          | 1136.10                      | 1.80            | -21.80         | 2.10               | -43.40 | 0.73  | -17.44 | 0.34  | -16.75 | 0.63  | 49.68 | 56.61 | -4.8 Y  | -31.5 N |
|           |            | HIP | 111766                     | GJ 865                               | F7 V            | 22 26 37.39    | 4 23 37.54                             | -17.8                      | 2.0           | 25.34         | 1.66          | 291.50                       | 1.10            | 50.70          | 1.10               | -54.30 | 3.33  | -17.19 | 1.42  | -11.71 | 2.09  | 58.15 | 62.96 | 0.0 Y   | -30.0 N |
| HD 215274 | BD+29 4742 | HIP | 112219                     |                                      | M3.5 -          | 22 38 29.75    | -65 22 42.62                           | -11.0                      | 10.0          | 67.44         | 6.47          | 833.29                       | 5.04            | -160.20        | 6.28               | -55.39 | 7.23  | -19.54 | 4.85  | -15.12 | 7.59  | 60.65 | 61.15 | 11.2 N  | -17.5 Y |
| HD 217382 | BD+83 640  | HIP | 113116                     |                                      | G5 V            | 22 43 40.47    | 30 5 33.07                             | -9.8                       | 0.4           | 22.27         | 0.97          | 241.10                       | 1.20            | 25.90          | 1.10               | -45.84 | 2.06  | -20.28 | 0.63  | -15.74 | 0.93  | 52.54 | 52.89 | -11.5 N | -16.3 N |
| HD 222143 | BD+45 4288 | HIP | 116613                     | GJ 4351                              | K4 III          | 22 54 24.96    | 84 20 46.24                            | 2.9                        | 0.9           | 8.35          | 0.48          | 98.00                        | 0.30            | 23.80          | 0.40               | -52.07 | 2.96  | -20.72 | 1.52  | -12.06 | 0.87  | 57.32 | 56.67 | -9.2 N  | 4.3 Y   |
| HD 222422 | BD-19 6489 | HIP | 116819                     |                                      | G3/4 V          | 23 37 58.49    | 46 11 57.97                            | 2.0                        | 0.8           | 43.26         | 0.80          | 356.90                       | 1.20            | -12.00         | 1.20               | -34.40 | 0.72  | -13.82 | 0.79  | -12.69 | 0.34  | 39.18 | 37.90 | -10.0 N | 2.1 Y   |
| HD 223252 | 20 Psc     | HIP | 117375                     |                                      | G5 V            | 23 40 37.85    | -18 59 20.04                           | 10.6                       | 0.4           | 38.11         | 1.00          | 303.50                       | 1.30            | -43.60         | 1.10               | -28.72 | 0.84  | -17.19 | 0.57  | -21.13 | 0.48  | 39.58 | 38.33 | -7.2 N  | 8.2 Y   |
|           | BD+45 4378 | HIP | 118212                     | GJ 913                               | G8 III          | 23 47 56.54    | -2 45 41.76                            | -6.9                       | 2.0           | 11.19         | 0.85          | 96.50                        | 0.50            | 5.40           | 0.50               | -36.98 | 2.83  | -18.65 | 1.53  | -2.95  | 1.89  | 41.52 | 41.43 | -2.1 Y  | -6.7 Y  |
|           |            | HIP |                            |                                      | M0-             | 23 58 43.49    | 46 43 44.97                            | 3.6                        | 1.0           | 57.62         | 2.82          | 646.70                       | 1.30            | -4.70          | 1.30               | -47.76 | 2.32  | -20.40 | 1.46  | -12.10 | 0.62  | 53.33 | 52.48 | -8.7 N  | 0.4 Y   |

**Table 4.** Ursa Major moving group.

| Name      |            |     |       | SpT       | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' '') | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{\text{Total}}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s) | $\rho_c$<br>(km/s) |        |        |       |       |       |         |         |
|-----------|------------|-----|-------|-----------|----------------------------|---------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|------------------------------|-----------------|----------------|--------------------|--------|--------|-------|-------|-------|---------|---------|
| HD 745    | BD+08 13   | HIP | 954   | G5 III    | 0 11 47.53                 | 9 8 23.86                             | -1.8 0.3        | 7.81           | 0.96                                   | -34.70                     | 1.30          | -18.40        | 1.40          | 23.79                        | 3.10            | 1.44           | 0.91               | -1.93  | 0.76   | 23.91 | 24.10 | 7.7 N | -8.5 N  |         |
| HD 2410   | 46 Psc     | HIP | 2213  | gG7 -     | 0 27 58.47                 | 19 30 50.53                           | 8.3 2.0         | 6.12           | 0.79                                   | -22.20                     | 0.80          | -18.80        | 0.80          | 18.05                        | 2.85            | 5.98           | 1.42               | -14.66 | 1.86   | 24.01 | 22.75 | 2.6 N | 4.1 Y   |         |
| HD 11131  | khi CetB   | HIP | 8486  | GJ 9061B  | G0 -                       | 1 49 23.34                            | -10 42 12.73    | -4.2 0.2       | 43.47                                  | 4.48                       | -150.00       | 0.90          | -91.10        | 0.90                         | 19.31           | 1.86           | 2.07               | 0.29   | -2.59  | 0.70  | 19.59 | 19.73 | 1.9 Y   | -5.1 Y  |
| HD 11171  | khi CetA   | HIP | 8497  | GJ 9061A  | F3 III                     | 1 49 35.10                            | -10 41 11.09    | -0.9 1.5       | 42.35                                  | 0.87                       | -148.10       | 0.70          | -95.70        | 0.70                         | 18.74           | 0.66           | 1.91               | 0.18   | -5.95  | 1.40  | 19.75 | 20.39 | 1.4 Y   | -5.3 Y  |
| HD 13594  | HR 647     | HIP | 10403 |           | F4 V                       | 2 14 2.43                             | 47 29 3.35      | -8.1 1.5       | 24.07                                  | 0.96                       | -77.30        | 1.60          | -53.30        | 1.50                         | 15.75           | 1.17           | 0.42               | 1.06   | -12.62 | 0.79  | 20.19 | 20.23 | -1.3 Y  | -8.3 Y  |
| HD 13959  | BD+05 307  | HIP | 10552 | GJ 91.1   | K4 V                       | 2 15 53.39                            | 6 37 34.83      | 0.2 0.1        | 26.37                                  | 3.69                       | -111.30       | 1.70          | -56.00        | 1.60                         | 17.98           | 2.69           | 5.67               | 1.01   | -12.09 | 1.80  | 22.40 | 21.94 | 4.5 N   | 0.3 Y   |
| HD 14274  | BD+33 406  | HIP | 10820 |           | G5 III                     | 2 19 17.03                            | 34 1 57.94      | -5.9 0.2       | 3.41                                   | 1.10                       | -8.10         | 1.40          | 2.30          | 1.50                         | 11.67           | 2.91           | 5.79               | 3.80   | 1.47   | 2.18  | 13.11 | 7.86  | 9.0 N   | -2.4 Y  |
| HD 24160  | g Eri      | HIP | 17874 |           | G9 III                     | 3 49 27.24                            | -36 12 0.88     | 2.0 1.0        | 15.54                                  | 0.58                       | -51.20        | 0.70          | -53.60        | 0.80                         | 19.74           | 0.89           | 0.38               | 0.57   | -11.19 | 0.87  | 22.69 | 22.80 | -2.0 Y  | 3.6 Y   |
| HD 24916  | BD-01 565  | HIP | 18512 | GJ 157A   | K4 V                       | 3 57 28.70                            | -1 9 34.04      | 4.3 0.9        | 63.41                                  | 2.00                       | -181.90       | 1.00          | -141.90       | 1.00                         | 7.40            | 0.79           | 0.34               | 0.17   | -16.16 | 0.73  | 17.78 | 17.90 | 0.7 Y   | 4.9 Y   |
| HD 26913  | V891 Tau   | HIP | 19855 |           | G8 V                       | 4 15 25.79                            | 6 11 58.75      | -7.1 0.1       | 47.86                                  | 1.15                       | -102.60       | 1.00          | -112.80       | 1.10                         | 13.89           | 0.22           | -1.31              | 0.15   | -9.17  | 0.34  | 16.70 | 16.33 | -2.3 N  | -6.6 Y  |
| HD 26923  | V774 Tau   | HIP | 19859 |           | G0 IV                      | 4 15 28.80                            | 6 11 12.71      | -7.1 0.1       | 47.20                                  | 1.08                       | -111.10       | 1.40          | -106.30       | 1.40                         | 14.02           | 0.23           | -0.29              | 0.18   | -9.60  | 0.35  | 16.99 | 16.83 | -1.2 Y  | -6.8 Y  |
| HD 28495  | BD+64 458  | HIP | 21276 | GJ 3295   | G0 V                       | 4 33 54.26                            | 64 37 59.51     | -11.0 0.3      | 36.32                                  | 1.07                       | -80.00        | 1.70          | 40.70         | 1.70                         | 14.44           | 0.35           | 2.99               | 0.43   | -6.38  | 0.31  | 16.07 | 16.12 | 3.8 N   | -11.7 Y |
| HD 29697  | V834 Tau   | HIP | 21818 | GJ 174    | K3 V                       | 4 41 18.85                            | 20 54 5.44      | 0.4 0.3        | 74.13                                  | 1.24                       | -233.90       | 0.90          | -254.30       | 0.80                         | 5.71            | 0.31           | -3.60              | 0.09   | -21.04 | 0.37  | 22.09 | 26.98 | -5.6 N  | 16.5 N  |
|           | alf CaeB   | HIP | 21776 | GJ 174.1B | G2 V                       | 4 40 33.71                            | -41 51 49.51    | -0.6 0.9       | 49.67                                  | 0.53                       | -141.18       | 0.53          | -74.95        | 0.49                         | 10.07           | 0.30           | 5.93               | 0.62   | -9.82  | 0.61  | 15.26 | 14.42 | 5.2 N   | -1.5 Y  |
| HD 31000  | BD+36 958  | HIP | 22770 |           | G5 V                       | 4 53 56.21                            | 36 45 26.76     | -6.2 0.4       | 35.14                                  | 1.12                       | 7.60          | 1.10          | 11.90         | 1.20                         | 6.03            | 0.39           | -0.73              | 0.20   | 2.28   | 2.00  | 6.49  | 2.20  | 1.2 N   | -1.6 Y  |
| HD 33564  | BD+79 169  | HIP | 25110 | GJ 196    | F6 V                       | 5 22 33.53                            | 79 13 52.13     | -9.9 0.9       | 47.66                                  | 0.52                       | -78.50        | 0.70          | 161.00        | 0.70                         | 19.25           | 0.59           | 5.65               | 0.62   | -3.59  | 0.35  | 20.38 | 21.96 | 8.7 N   | -15.5 Y |
| HD 38393  | gam LepA   | HIP | 27072 | GJ 216A   | F6 V                       | 5 44 27.79                            | -22 26 54.18    | -9.7 0.9       | 111.49                                 | 0.60                       | -292.43       | 0.46          | -368.46       | 0.41                         | 18.35           | 0.57           | 4.59               | 0.60   | -11.68 | 0.38  | 22.23 | 20.92 | 1.7 Y   | -6.4 Y  |
|           | gam LepB   | HIP | 27072 | GJ 216B   | K2 V                       | 5 44 26.54                            | -22 25 18.77    | -9.7 0.9       | 111.49                                 | 0.60                       | -303.70       | 2.60          | -358.00       | 2.60                         | 18.00           | 0.57           | 5.07               | 0.60   | -11.95 | 0.39  | 22.19 | 20.81 | 2.3 Y   | -6.3 Y  |
| HD 41593  | V1386 Ori  | HIP | 28954 | GJ 227    | K0 V                       | 6 6 40.48                             | 15 32 31.58     | -9.8 0.1       | 64.71                                  | 0.91                       | -120.10       | 1.00          | -103.00       | 1.10                         | 10.55           | 0.10           | 0.25               | 0.10   | -10.91 | 0.20  | 15.18 | 18.30 | 0.3 Y   | -14.2 Y |
| HD 56168  | BD+67 483  | HIP | 35628 |           | K0 V                       | 7 21 6.73                             | 67 39 42.60     | -9.1 0.5       | 39.10                                  | 1.15                       | -70.80        | 1.00          | 69.50         | 1.10                         | 8.49            | 0.39           | 5.38               | 0.40   | -11.25 | 0.33  | 15.09 | 22.12 | -3.6 N  | -18.9 N |
| HD 59747  | BD+37 1738 | HIP | 36704 |           | G5 V                       | 7 33 0.58                             | 37 1 47.46      | -16.2 0.4      | 50.80                                  | 1.29                       | -49.60        | 1.40          | 10.00         | 1.40                         | 13.07           | 0.37           | 2.70               | 0.17   | -10.33 | 0.24  | 16.88 | 21.32 | 1.7 Y   | -20.9 Y |
| HD 60491  | BD-06 2184 | HIP | 36827 |           | K2 V                       | 7 34 26.17                            | -6 53 48.04     | -9.7 0.7       | 40.32                                  | 1.26                       | -80.90        | 1.10          | -42.50        | 1.10                         | 5.99            | 0.51           | 5.97               | 0.50   | -11.75 | 0.40  | 14.48 | 10.11 | 7.8 N   | -6.9 Y  |
| HD 61606  | BD-03 2001 | HIP | 37349 | GJ 282A   | K2 V                       | 7 39 59.33                            | -3 35 51.01     | -18.5 0.4      | 70.44                                  | 0.94                       | 71.70         | 1.20          | -276.10       | 1.30                         | 25.52           | 0.35           | -2.23              | 0.34   | -7.40  | 0.13  | 26.66 | 24.22 | -9.5 N  | -17.6 Y |
| HD 63433  | BD+27 1490 | HIP | 38228 |           | G5 IV                      | 7 49 55.06                            | 27 21 47.45     | -15.7 20.0     | 45.84                                  | 0.89                       | -9.20         | 1.20          | -12.50        | 1.10                         | 13.62           | 17.76          | 2.29               | 4.19   | -7.63  | 8.18  | 15.78 | 6.62  | 0.0 Y   | -6.4 N  |
| HD 64942  | BD-09 2287 | HIP | 38747 |           | G5 V                       | 7 55 58.23                            | -9 47 49.94     | -8.1 0.8       | 20.69                                  | 1.15                       | 23.40         | 1.30          | -24.90        | 1.20                         | 11.18           | 0.68           | 1.30               | 0.69   | 0.43   | 0.36  | 11.26 | 6.28  | -6.2 N  | -4.1 Y  |
| HD 71974  | BD+35 1834 | HIP | 41820 |           | G5 V                       | 8 31 35.03                            | 34 57 58.44     | -15.4 0.6      | 34.83                                  | 1.37                       | -5.90         | 1.40          | 16.90         | 1.50                         | 12.03           | 0.50           | 4.03               | 0.24   | -9.06  | 0.38  | 15.59 | 40.44 | 1.0 Y   | -40.4 N |
| HD 72905  | pii UMa    | HIP | 42438 | GJ 311    | G1.5 Vb                    | 8 39 11.70                            | 65 1 15.27      | -14.4 0.1      | 70.07                                  | 0.71                       | -28.90        | 1.00          | 88.50         | 1.00                         | 11.24           | 0.09           | -10.10             | 0.10   | -10.99 | 0.09  | 15.72 | 13.00 | 2.0 Y   | -11.6 Y |
| HD 75605  | HR 3512    | HIP | 43352 |           | G5 III                     | 8 49 51.50                            | -32 46 49.89    | -7.8 1.5       | 14.26                                  | 1.25                       | 0.50          | 1.10          | -48.00        | 1.00                         | 13.78           | 1.18           | 3.18               | 1.49   | -10.74 | 0.97  | 17.76 | 16.85 | -0.8 Y  | -5.5 Y  |
| HD 75935  | SAO 80487  | HIP | 43670 |           | G8 V                       | 8 53 49.94                            | 26 54 47.69     | -19.0 0.6      | 24.66                                  | 1.34                       | 13.40         | 1.10          | -5.30         | 1.10                         | 16.08           | 0.50           | 3.68               | 0.27   | -9.83  | 0.44  | 19.20 | 8.85  | 2.1 N   | -8.7 N  |
| HD 76218  | BD+36 1888 | HIP | 43852 |           | G5 V                       | 8 55 55.68                            | 36 11 46.27     | -12.8 0.5      | 38.21                                  | 1.00                       | -24.70        | 1.20          | -13.00        | 1.30                         | 7.84            | 0.40           | -0.26              | 0.17   | -10.69 | 0.35  | 13.26 | 24.66 | -2.7 N  | -24.6 N |
| HD 80388  | BD+79 305  | HIP | 46298 |           | G1 V                       | 9 26 28.76                            | 78 26 16.09     | -12.0 5.0      | 19.20                                  | 0.88                       | 29.70         | 1.10          | 26.20         | 1.10                         | 14.70           | 2.91           | -1.71              | 3.01   | -4.55  | 2.81  | 15.48 | 12.66 | -5.2 N  | -9.6 Y  |
| HD 81659  | BD-13 2855 | HIP | 46324 |           | G6/G8 V                    | 9 26 42.83                            | -14 29 26.67    | -16.8 0.5      | 25.07                                  | 1.00                       | 37.20         | 1.10          | -129.70       | 1.10                         | 25.68           | 0.86           | 0.57               | 0.69   | -16.53 | 0.50  | 30.55 | 31.46 | 1.3 Y   | -18.5 Y |
| HD 85444  | 39 Hya     | HIP | 48356 |           | G7 III                     | 9 51 28.69                            | -14 50 47.80    | -13.5 1.5      | 11.92                                  | 0.81                       | 17.80         | 0.80          | -25.30        | 0.70                         | 15.01           | 1.00           | 6.36               | 1.30   | -8.24  | 0.81  | 18.27 | 14.21 | 3.5 N   | -7.9 Y  |
| HD 85512  | SAO 221544 | HIP | 48331 | GJ 370    | K-M V                      | 9 51 7.05                             | -43 30 10.01    | -9.6 2.0       | 89.67                                  | 0.82                       | 461.60        | 1.10          | -469.90       | 1.10                         | 34.36           | 0.34           | 10.00              | 1.98   | -4.95  | 0.29  | 36.13 | 30.61 | 17.0 N  | -3.5 N  |
|           | BD+03 2316 | HIP | 49544 | GJ 378.2  | K7 -                       | 10 6 56.86                            | 2 57 51.90      | -15.7 0.5      | 44.77                                  | 1.96                       | -67.60        | 1.50          | -96.00        | 1.50                         | 5.15            | 0.26           | 0.47               | 0.54   | -19.35 | 0.55  | 20.03 | 8.40  | -11.1 N | -6.3 N  |
| HD 88355  | 34 Leo     | HIP | 49929 |           | F6 V                       | 10 11 38.21                           | 13 21 18.42     | -16.0 2.0      | 14.49                                  | 0.84                       | 37.80         | 0.80          | -35.20        | 0.80                         | 21.64           | 1.26           | -0.72              | 1.05   | -8.53  | 1.56  | 23.27 | 30.52 | 2.9 Y   | -25.6 N |
| HD 88654  | BD-07 2985 | HIP | 50061 |           | G5 V                       | 10 13 16.43                           | -8 26 43.98     | -7.0 0.4       | 10.80                                  | 0.96                       | 23.00         | 0.90          | -30.00        | 0.90                         | 16.97           | 1.46           | -1.51              | 0.76   | -5.83  | 0.46  | 18.01 | 20.53 | 3.6 N   | -12.6 Y |
| HD 89025  | zet Leo    | HIP | 50335 |           | F0 III                     | 10 16 41.42                           | 23 25 2.32      | -15.0 1.5      | 12.56                                  | 0.78                       | 19.84         | 0.98          | -7.30         | 0.50                         | 14.37           | 0.93           | 3.13               | 0.49   | -8.51  | 1.27  | 16.99 | 16.84 | 2.7 N   | -15.1 Y |
| HD 91480  | 37 UMa     | HIP | 51814 |           | F1 V                       | 10 35 9.69                            | 57 4 57.49      | -10.4 0.5      | 37.80                                  | 0.61                       | 65.65         | 0.45          | 37.11         | 0.38                         | 12.40           | 0.30           | 3.25               | 0.18   | -5.77  | 0.40  | 14.06 | 20.42 | -0.1 Y  | -18.1 N |
| HD 95650  | DS Leo     | HIP | 53985 | GJ 410    | dM2e -                     | 11 2 38.34                            | 21 58 1.70      | -13.9 2.0      | 85.76                                  | 1.36                       | 141.10        | 1.20          | -51.50        | 1.20                         | 12.43           | 0.68           | 3.51               | 0.54   | -9.76  | 1.81  | 16.19 | 13.68 | 2.2 N   | -11.1 Y |
| HD 98712  | SZ Cr1     | HIP | 55454 | GJ 425A   | K4/5 V                     | 11 21 26.67                           | -20 27 13.61    | 3.7 5.0        | 76.00                                  | 1.70                       | 181.70        | 1.40          | -117.50       | 1.40                         | 13.73           | 0.52           | -2.57              | 3.94   | 0.88   | 3.06  | 14.00 | 13.16 | 5.3 N   | 4.4 Y   |
| HD 100043 | BD-12 3442 | HIP | 56154 |           | F2 V                       | 11 30 38.77                           | -13 3 0.96      | -1.8 0.0       | 15.56                                  | 0.82                       | 31.40         | 1.10          | -52.00        | 1.20                         | 15.93           | 0.97           | -4.69              | 0.45   | -8.36  | 0.50  | 18.59 | 20.16 | -1.9 Y  | -8.2 N  |
| HD 100310 | BD+53 1497 | HIP | 56337 |           | K0 V                       | 11 32 57.06                           | 52 31 25.37     | -9.6 0.4       | 22.33                                  | 1.22                       | 60.60         | 0.80          | -9.60         | 0.90                         | 15.73           | 0.70           | 0.61               | 0.29   | -3.74  | 0.45  | 16.18 | 22.37 | -3.5 N  | -18.5 N |
| HD 102070 | zeta Cr1   | HIP | 57283 |           | G8 IIIa                    | 11 44 45.78                           | -18 21 2.46     | -2.6 1.5       | 9.31                                   | 0.81                       | 29.60         | 0.40          | -28.40        | 0.50                         | 19.46           | 1.82           | 0.22               | 1.13   | -8.02  | 1.18  | 21.05 | 21.71 | 3.0 N   | -6.6 Y  |
|           | FI Vir     | HIP | 57548 | GJ 447    | M4 -                       | 11 47 44.40                           | 0 48 16.43      | -13.0 5.0      | 299.59                                 | 2.20                       | 605.66        | 2.29          | -1219.32      | 1.68                         | 17.71           | 0.14           | -3.96              | 2.53   | -17.43 | 4.31  | 25.16 | 24.17 | -6.5 N  | -12.8 Y |
| HD 238087 | BD+59 1428 | HIP | 59496 | GJ 457    | K5 -                       | 12 12 5.21                            | 58 55 35.12     | -14.2 10.0     | 35.24                                  | 1.24                       | 96.40         | 1.70          | 13.80         | 1.80                         | 15.79           | 3.65           | 1.92               | 3.99   | -10.96 | 8.43  | 19.32 | 20.24 | 0.4 Y   | -15.4 Y |
|           | BD+19 2531 | HIP | 59152 |           | K2 V                       | 12 7 50.92                            | 18 56 55.82     | -5.5 0.4       | 25.27                                  | 1.40                       | 119.70        | 1.00          | -72.80        | 1.10                         | 26.61           | 1.49           | -0.25              | 0.24   | -3.60  | 0.41  | 26.85 | 34.19 | 1.4 Y   | -21.9 N |
| HD 238090 | BD+55 1519 | HIP | 59514 | GJ 458A   | M0 -                       | 12 12 20.86                           | 54 29 8.71      | -13.9 5.0      | 65.29                                  | 1.47                       | 233.10        | 1.50          | 91.50         |                              |                 |                |                    |        |        |       |       |       |         |         |

Table 4. – *continued*

| Name       |            | SpT        | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{\text{Total}}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s) | $\rho_c$<br>(km/s) |       |       |      |        |      |       |       |        |         |
|------------|------------|------------|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|------------------------------|-----------------|----------------|--------------------|-------|-------|------|--------|------|-------|-------|--------|---------|
| HD 110463  | BD+56 1618 | HIP 61946  | GJ 3743                    | K3 V                                 | 12 41 44.52     | 55 43 28.83    | -9.7                                   | 0.3                        | 43.06         | 0.82          | 122.50        | 1.40                         | -5.60           | 1.40           | 14.45              | 0.29  | 2.87  | 0.23 | -7.71  | 0.27 | 16.63 | 19.35 | 0.2 Y  | -13.9 Y |
| HD 111456  | BD+61 1320 | HIP 62512  | GJ 9417                    | F6 V                                 | 12 48 39.46     | 60 19 11.61    | -12.0                                  | 1.5                        | 41.39         | 3.20          | 108.70        | 1.30                         | -1.10           | 1.40           | 14.17              | 0.96  | 1.15  | 0.88 | -9.84  | 1.26 | 17.29 | 17.61 | 0.0 Y  | -12.5 Y |
| HD 112196  | BD+22 2522 | HIP 63008  |                            | F8 V                                 | 12 54 40.02     | 22 6 28.55     | -8.0                                   | 0.0                        | 29.19         | 1.60          | 52.10         | 0.90                         | -33.90          | 0.90           | 9.61               | 0.61  | 0.59  | 0.17 | -8.56  | 0.04 | 12.88 | 11.95 | -0.2 Y | -6.4 Y  |
| HD 113139  | 78 UMa     | HIP 63503  |                            | F2 V                                 | 13 0 43.70      | 56 21 58.82    | -9.8                                   | 0.5                        | 40.06         | 0.60          | 108.36        | 0.50                         | 2.67            | 0.51           | 12.88              | 0.22  | 3.25  | 0.25 | -9.16  | 0.44 | 16.14 | 17.42 | 1.8 N  | -11.9 Y |
| HD 114723  | BD+32 2327 | HIP 64405  |                            | F8 -                                 | 13 12 2.02      | 32 5 7.88      | -12.7                                  | 2.0                        | 12.82         | 1.48          | 15.30         | 2.00                         | -6.40           | 1.80           | 5.78               | 1.15  | -0.12 | 0.81 | -12.87 | 1.99 | 14.11 | 7.37  | 0.5 Y  | -4.1 N  |
| HD 115043  | BD+57 1425 | HIP 64532  | GJ 503.2                   | G2 V                                 | 13 13 37.01     | 56 42 29.76    | -9.3                                   | 0.3                        | 38.92         | 0.67          | 112.80        | 0.90                         | -19.50          | 1.00           | 14.52              | 0.26  | 2.19  | 0.21 | -8.08  | 0.27 | 16.76 | 18.61 | -0.2 Y | -12.3 Y |
| HD 238224  | BD+58 1441 | HIP 65327  | GJ 509.1                   | M0 V                                 | 13 23 23.29     | 57 54 21.99    | -6.6                                   | 5.0                        | 39.84         | 1.44          | 118.50        | 1.60                         | -19.50          | 1.70           | 13.98              | 1.20  | 3.71  | 2.38 | -6.21  | 4.27 | 15.74 | 18.76 | 0.1 Y  | -12.1 Y |
|            |            | HIP 66077  | GJ 516A                    | M2.5 -                               | 13 32 44.59     | 16 48 39.05    | -1.8                                   | 0.0                        | 72.66         | 40.60         | 252.95        | 40.90                        | -221.83         | 23.30          | 20.82              | 12.48 | -1.47 | 2.69 | -7.03  | 3.10 | 22.02 | 23.53 | -2.4 N | -8.8 N  |
| HD 125451  | 18 Boo     | HIP 69989  | GJ 3841                    | F5 IV                                | 14 19 16.28     | 13 0 15.47     | -3.0                                   | 1.5                        | 38.33         | 0.81          | 106.10        | 0.70                         | -32.70          | 0.70           | 10.14              | 0.69  | 5.35  | 0.17 | -8.13  | 1.37 | 14.05 | 13.14 | 4.7 N  | -2.4 Y  |
| HD 128311  | BD+10 2710 | HIP 71395  | GJ 3860                    | K0 -                                 | 14 36 0.56      | 9 44 47.46     | -9.6                                   | 0.4                        | 60.35         | 0.99          | 204.50        | 1.10                         | -250.10         | 1.10           | 16.87              | 0.43  | -4.49 | 0.13 | -20.77 | 0.41 | 27.13 | 24.84 | -5.7 N | -2.3 N  |
| HD 129798  | DL Dra     | HIP 71876  |                            | F2 V                                 | 14 42 3.25      | 61 15 42.87    | -6.8                                   | 1.0                        | 23.47         | 0.57          | 76.40         | 1.30                         | -33.20          | 1.50           | 15.73              | 0.50  | 3.08  | 0.68 | -8.51  | 0.81 | 18.15 | 19.78 | -0.3 Y | -10.4 Y |
| HD 131156A | ksi BooA   |            | GJ 566A                    | G8 V                                 | 14 51 23.10     | 16 9 2.00      | 3.0                                    | 0.9                        | 149.26        | 0.76          | 152.81        | 0.64                         | -71.28          | 0.70           | 5.75               | 0.40  | 2.14  | 0.17 | 0.07   | 0.79 | 6.14  | 5.28  | 1.8 N  | 0.8 Y   |
|            | CE Boo     | HIP 72944  | GJ 569A                    | dM2 -                                | 14 54 29.00     | 16 6 3.69      | -7.2                                   | 0.5                        | 101.91        | 1.67          | 277.70        | 1.90                         | -132.70         | 1.90           | 8.17               | 0.32  | 2.91  | 0.14 | -13.48 | 0.45 | 16.03 | 14.05 | 3.1 N  | -1.4 Y  |
| HD 134083  | o Boo      | HIP 73996  | GJ 578                     | F5 V                                 | 15 7 18.07      | 24 52 9.11     | -7.3                                   | 2.0                        | 50.70         | 0.76          | 184.81        | 0.90                         | -163.51         | 0.53           | 17.70              | 0.89  | -1.17 | 0.61 | -16.46 | 1.73 | 24.20 | 23.30 | -1.4 Y | -3.6 Y  |
| HD 139194  | BD+36 2621 | HIP 76330  |                            | K0 V                                 | 15 35 30.16     | 36 12 34.64    | -14.0                                  | 0.3                        | 33.37         | 0.88          | 118.80        | 1.10                         | -92.50          | 1.30           | 14.47              | 0.55  | -3.18 | 0.24 | -20.84 | 0.37 | 25.57 | 21.79 | 0.6 Y  | -4.2 N  |
| HD 141003B | beta SerB  |            |                            | dK3 -                                | 15 46 11.26     | 15 25 18.57    | 1.4                                    | 0.3                        | 21.31         | 0.86          | 68.54         | 1.48                         | -41.31          | 0.68           | 13.63              | 0.57  | 4.06  | 0.30 | -10.80 | 0.57 | 17.86 | 17.56 | 3.2 N  | 1.3 Y   |
| HD 147513  | SAO 207622 | HIP 80337  | GJ 620.1A                  | G5 V                                 | 16 24 1.29      | -39 11 34.73   | 13.0                                   | 0.1                        | 77.69         | 0.86          | 72.30         | 0.70                         | 3.30            | 0.70           | 13.61              | 0.10  | -1.13 | 0.07 | -1.37  | 0.07 | 13.73 | 5.54  | 1.7 N  | 3.7 N   |
|            |            | HIP 80459  | GJ 625                     | M1.5 -                               | 16 25 24.63     | 54 18 14.79    | -12.8                                  | 0.5                        | 151.93        | 1.11          | 434.40        | 2.60                         | -174.00         | 2.60           | 8.11               | 0.12  | -2.22 | 0.37 | -17.50 | 0.35 | 19.42 | 14.14 | 5.4 N  | -4.0 N  |
| HD 150706  | BD+80 519  | HIP 80902  | GJ 632                     | G3 V                                 | 16 31 17.58     | 79 47 23.18    | -16.8                                  | 0.3                        | 36.73         | 0.56          | 95.10         | 0.80                         | -89.20          | 0.80           | 19.34              | 0.27  | -4.32 | 0.28 | -13.15 | 0.20 | 23.78 | 19.80 | -2.2 N | -10.7 N |
| HD 152863  | 56 Her     | HIP 82780  |                            | G5 III                               | 16 55 2.16      | 25 43 50.45    | 1.1                                    | 0.9                        | 7.14          | 0.67          | 19.30         | 1.00                         | -19.10          | 1.00           | 13.30              | 1.45  | 1.37  | 0.77 | -12.14 | 1.44 | 18.06 | 18.15 | 1.6 Y  | 2.6 Y   |
| HD 155674A | BD+54 1861 | HIP 83988  | GJ 659A                    | K0 -                                 | 17 10 10.51     | 54 29 39.78    | 3.0                                    | 0.1                        | 47.14         | 1.88          | 82.50         | 1.40                         | -111.68         | 1.50           | 12.50              | 0.52  | 5.32  | 0.17 | -4.39  | 0.29 | 14.28 | 14.28 | -0.5 Y | 3.0 Y   |
| HD 155674B | BD+54 1862 | HIP 83996  | GJ 659B                    | K8 -                                 | 17 10 12.36     | 54 29 24.48    | 2.5                                    | 0.1                        | 47.86         | 3.11          | 86.90         | 1.40                         | -106.10         | 1.50           | 11.78              | 0.78  | 5.22  | 0.25 | -4.97  | 0.45 | 13.81 | 13.90 | 0.2 Y  | 3.0 Y   |
| HD 165185  | SAO 209710 | HIP 88694  | GJ 702.1                   | G5 V                                 | 18 6 23.72      | -36 1 11.25    | 15.2                                   | 0.2                        | 57.58         | 0.77          | 106.80        | 1.20                         | 7.40            | 1.20           | 14.42              | 0.20  | 3.73  | 0.14 | -9.33  | 0.17 | 17.58 | 17.10 | 2.9 N  | 14.9 Y  |
| HD 167389  | SAO 47313  | HIP 89282  |                            | F8 -                                 | 18 13 7.23      | 41 28 31.31    | -3.0                                   | 2.6                        | 29.91         | 0.59          | 51.40         | 0.80                         | -128.10         | 0.80           | 17.20              | 0.94  | -3.75 | 2.21 | -13.33 | 1.11 | 22.08 | 21.85 | -1.9 Y | -1.6 Y  |
| HD 171746  | HR 6981    | HIP 91159  |                            | G2 V                                 | 18 35 53.24     | 16 58 31.84    | 8.4                                    | 0.0                        | 29.23         | 1.54          | 49.90         | 1.70                         | -67.20          | 1.60           | 11.90              | 0.41  | 3.23  | 0.26 | -10.14 | 0.73 | 15.96 | 15.17 | 2.5 N  | 7.2 Y   |
| HD 173950  | BD+38 3292 | HIP 92122  |                            | G5 V                                 | 18 46 34.63     | 38 21 3.30     | 8.2                                    | 0.8                        | 27.01         | 0.93          | 16.20         | 1.60                         | -84.10          | 1.60           | 15.65              | 0.62  | 4.62  | 0.73 | -5.19  | 0.46 | 17.12 | 15.02 | -2.6 N | 2.5 Y   |
| HD 184960  | HR 7451    | HIP 96258  | GJ 4116                    | F7 V                                 | 19 34 19.79     | 51 14 11.84    | -0.1                                   | 0.2                        | 39.08         | 0.47          | 32.10         | 1.00                         | -187.50         | 1.10           | 19.13              | 0.28  | 1.07  | 0.20 | -12.86 | 0.21 | 23.08 | 23.06 | -0.7 Y | -0.1 Y  |
| HD 194943  | rho Cap    | HIP 101027 | GJ 791.1A                  | F3 V                                 | 20 28 51.62     | -17 48 49.41   | 18.4                                   | 2.0                        | 33.04         | 0.86          | -2.70         | 4.40                         | -16.50          | 4.20           | 15.16              | 1.62  | 5.03  | 0.98 | -9.44  | 1.14 | 18.55 | 6.77  | -0.5 Y | 6.3 N   |
| HD 199951  | gam Mic    | HIP 103738 |                            | G6 III                               | 21 1 17.46      | -32 15 27.94   | 17.6                                   | 0.9                        | 14.59         | 0.79          | -3.30         | 0.70                         | 2.00            | 0.70           | 13.75              | 0.69  | 3.47  | 0.27 | -10.50 | 0.62 | 17.65 | 1.75  | 1.2 N  | 1.7 N   |
|            | BD-05 5480 | HIP 104383 |                            | M1 -                                 | 21 8 45.47      | -4 25 36.95    | 6.6                                    | 0.5                        | 37.91         | 2.28          | -75.36        | 3.46                         | -33.09          | 1.37           | 12.10              | 0.72  | 0.61  | 0.40 | 1.67   | 0.59 | 12.23 | 10.67 | 8.3 N  | 8.8 Y   |
| HD 205435  | rho Cyg    | HIP 106481 |                            | G5 III                               | 21 33 58.85     | 45 35 30.61    | 6.9                                    | 0.9                        | 26.20         | 0.51          | -25.20        | 0.80                         | -95.00          | 0.80           | 14.92              | 0.36  | 6.31  | 0.90 | -10.07 | 0.27 | 19.07 | 17.83 | 0.9 Y  | 1.6 Y   |
| HD 211575  | BD-00 4333 | HIP 110091 |                            | F3 V                                 | 22 18 4.27      | 0 14 15.56     | 14.8                                   | 0.0                        | 24.11         | 0.92          | -40.50        | 0.90                         | -54.90          | 0.90           | 16.53              | 0.55  | 2.80  | 0.31 | -10.85 | 0.15 | 19.97 | 18.86 | 1.6 Y  | 13.4 Y  |
|            | EV Lac     | HIP 112460 | GJ 873                     | M3.5 -                               | 22 46 49.73     | 44 20 2.40     | 0.5                                    | 2.0                        | 198.07        | 2.05          | -705.60       | 1.50                         | -460.30         | 1.30           | 19.73              | 0.42  | 3.79  | 1.92 | -1.79  | 0.45 | 20.17 | 17.27 | 10.4 N | 0.7 Y   |
| HD 217813  | MT Peg     | HIP 113829 | GJ 2153                    | G1 V                                 | 23 3 4.98       | 20 55 6.88     | -2.5                                   | 1.3                        | 41.19         | 0.87          | -116.70       | 0.90                         | -27.50          | 0.90           | 13.22              | 0.31  | 0.58  | 1.06 | 4.64   | 0.76 | 14.02 | 10.32 | 9.9 N  | -3.7 Y  |

**Table 5.** IC 2391 supercluster.

| Name       |                |     | SpT    | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{\text{Total}}$<br>(km/s) | $V_r$<br>(km/s) | $PV$<br>(km/s) | $\rho_e$<br>(km/s) |        |        |        |        |       |       |       |      |       |       |   |
|------------|----------------|-----|--------|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|------------------------------|-----------------|----------------|--------------------|--------|--------|--------|--------|-------|-------|-------|------|-------|-------|---|
| HD 6288A   | 26 CetA        | HIP | 4979   | F1 V                       | 1 3 49.03                            | 1 22 0.64       | 5.6            | 2.0                                    | 17.66                      | 0.72          | 122.50        | 0.60          | -40.70                       | 0.60            | -23.61         | 1.10               | -24.52 | 1.33   | -8.55  | 1.76   | 35.10 | 36.28 | -2.9  | Y    | 11.1  | Y     |   |
| HD 8941    | BD+16 154      | HIP | 6869   | -                          | 1 28 24.36                           | 17 4 45.32      | 8.5            | 2.0                                    | 19.99                      | 0.79          | 117.54        | 0.78          | -34.32                       | 0.48            | -23.42         | 1.28               | -17.56 | 1.34   | -7.66  | 1.42   | 30.26 | 30.67 | 2.0   | Y    | 10.1  | Y     |   |
| HD 13357   | BD+13 343      | HIP | 10175  | G5 IV                      | 2 10 52.08                           | 13 40 59.79     | 25.7           | 0.5                                    | 20.41                      | 1.75          | 111.71        | 1.81          | -73.24                       | 1.46            | -28.27         | 1.19               | -19.36 | 2.52   | -21.19 | 0.53   | 40.29 | 35.26 | -5.3  | N    | 17.6  | N     |   |
| HD 14802   | kap For        | HIP | 11072  | G2 V                       | 2 22 32.55                           | -23 48 58.77    | 18.4           | 2.0                                    | 45.60                      | 0.82          | 197.34        | 0.77          | -4.39                        | 0.51            | -19.33         | 0.68               | -16.81 | 0.44   | -10.17 | 1.87   | 27.56 | 26.64 | -1.7  | Y    | 17.1  | Y     |   |
| HD 16699   | IES 0237-53.1A | HIP | 12326  | -                          | 2 38 44.29                           | -52 57 3.06     | 16.1           | 1.1                                    | 16.31                      | 1.47          | 81.30         | 2.20          | 48.60                        | 2.10            | -25.54         | 2.49               | -16.77 | 1.13   | -9.15  | 1.08   | 31.89 | 33.44 | 1.0   | Y    | 19.0  | Y     |   |
| HD 17190   | BD+25 449      | HIP | 12926  | GJ 112                     | K2 IV                                | 2 46 15.21      | 25 38 59.66    | 14.2                                   | 1.0                        | 38.95         | 1.13          | 238.70        | 1.00                         | -148.50         | 1.00           | -25.82             | 0.89   | -25.23 | 1.00   | -8.31  | 0.52  | 37.04 | 40.03 | 1.8  | Y     | 20.9  | N |
| HD 17382   | BD+26 465      | HIP | 13081  | GJ 113                     | K1 V                                 | 2 48 9.15       | 27 4 7.11      | 8.9                                    | 0.3                        | 44.71         | 1.15          | 274.50        | 1.20                         | -122.60         | 1.20           | -22.83             | 0.49   | -23.91 | 0.75   | -1.56  | 0.20  | 33.10 | 36.35 | 6.6  | N     | 18.7  | N |
| HD 18803   | 51 Ari         | HIP | 14150  | GJ 120.2                   | G8 V                                 | 3 2 26.03       | 26 36 33.27    | 10.0                                   | 1.0                        | 47.25         | 0.89          | 232.80        | 1.00                         | -167.90         | 1.00           | -19.16             | 0.84   | -22.96 | 0.63   | -5.92  | 0.48  | 30.48 | 34.59 | 1.4  | Y     | 19.2  | N |
| HD 19994   | 94 Cet         | HIP | 14954  | GJ 128                     | F8 V                                 | 3 12 46.44      | -1 11 45.98    | 18.3                                   | 0.9                        | 44.69         | 0.75          | 194.10        | 0.70                         | -69.90          | 0.70           | -19.85             | 0.63   | -19.55 | 0.34   | -6.13  | 0.68  | 28.53 | 33.78 | -0.7 | Y     | 25.7  | N |
| HD 20115   | BD+00 542      | HIP | 15058  | F8 -                       | 3 14 2.91                            | 0 44 21.27      | 23.8           | 2.0                                    | 16.27                      | 2.33          | 74.73         | 2.71          | -13.92                       | 2.13            | -26.36         | 2.10               | -17.42 | 2.72   | -7.66  | 2.09   | 31.52 | 33.49 | 3.7   | Y    | 25.4  | Y     |   |
| HD 30652   | 1 Ori          | HIP | 22449  | GJ 178                     | F6 V                                 | 4 49 50.41      | 6 57 40.60     | 24.6                                   | 0.9                        | 124.60        | 0.95          | 462.90        | 0.50                         | 11.80           | 0.50           | -26.07             | 0.81   | -14.80 | 0.18   | 4.11   | 0.37  | 30.26 | 25.00 | 14.3 | N     | 22.8  | Y |
|            | V1005 Ori      | HIP | 23200  | GJ 182                     | M1 Ve                                | 4 59 34.83      | 1 47 0.68      | 32.4                                   | 1.0                        | 37.50         | 2.56          | 38.10         | 1.50                         | -94.40          | 1.60           | -23.65             | 0.95   | -20.86 | 0.95   | -14.86 | 0.48  | 34.86 | 37.81 | -4.1 | N     | 35.8  | Y |
| HD 35112   | BD+02 934      | HIP | 25119  | G5 V                       | 5 22 37.50                           | 2 36 11.35      | 35.5           | 0.4                                    | 50.24                      | 1.52          | 69.70         | 1.30          | -152.10                      | 1.30            | -25.87         | 0.40               | -26.14 | 0.49   | -12.53 | 0.19   | 38.85 | 55.81 | 0.3   | Y    | 53.5  | N     |   |
| HD 42499   | ADS 4775AB     | HIP | 29241  | G5 V                       | 6 9 56.15                            | -25 37 32.65    | 27.6           | 2.0                                    | 19.82                      | 1.32          | -28.30        | 1.40          | 38.80                        | 1.30            | -24.05         | 1.31               | -12.92 | 1.59   | -12.19 | 0.78   | 29.90 | 45.70 | -2.9  | Y    | 44.3  | N     |   |
| HD 53143   | SAO 249700     | HIP | 33690  | GJ 260                     | K1 V                                 | 6 59 59.66      | -61 20 10.24   | 21.3                                   | 2.0                        | 54.33         | 0.54          | -161.18       | 0.54                         | 264.54          | 0.61           | -25.51             | 0.28   | -17.59 | 1.85   | -14.97 | 0.77  | 34.41 | 34.59 | -4.1 | N     | 22.0  | Y |
|            | BD+01 2063     | HIP | 40774  | G5 V                       | 8 19 19.05                           | 1 20 19.90      | 27.6           | 0.6                                    | 42.89                      | 1.32          | -163.20       | 1.10          | -53.10                       | 1.00            | -26.30         | 0.49               | -19.12 | 0.39   | -8.04  | 0.61   | 33.49 | 29.63 | 1.1   | Y    | 22.8  | Y     |   |
|            | BD+23 1978     | HIP | 42253  | K5 V                       | 8 36 55.78                           | 23 14 49.13     | 20.1           | 0.3                                    | 24.04                      | 2.97          | -108.70       | 1.70          | -106.70                      | 1.70            | -24.42         | 1.14               | -23.93 | 2.24   | -11.70 | 2.83   | 36.14 | 36.60 | -4.1  | N    | 21.3  | Y     |   |
| HD 81817   | HR 3751        | HIP | 47193  | K3 IIIa                    | 9 37 5.29                            | 81 19 34.98     | -5.1           | 2.0                                    | 3.03                       | 0.54          | -15.90        | 0.30          | -16.10                       | 0.30            | -25.39         | 5.19               | -24.36 | 4.03   | -6.43  | 1.35   | 35.77 | 35.05 | -6.8  | N    | 4.7   | Y     |   |
| HD 89388   | V337 Car       | HIP | 50371  | K3 IIIa                    | 10 17 4.98                           | -61 19 56.31    | 8.2            | 0.9                                    | 4.43                       | 0.49          | -24.20        | 0.90          | 5.60                         | 0.90            | -21.93         | 2.94               | -13.92 | 1.15   | -9.95  | 1.55   | 27.82 | 28.63 | -0.7  | Y    | 10.7  | Y     |   |
|            | BD+33 1976     | HIP | 50660  | K0 V                       | 10 20 45.93                          | 32 23 54.34     | 2.7            | 0.6                                    | 21.06                      | 1.39          | -153.20       | 1.10          | -56.70                       | 1.10            | -26.51         | 1.73               | -19.54 | 1.31   | -16.59 | 1.37   | 36.88 | 37.45 | 1.5   | Y    | 7.3   | Y     |   |
| HD 91901   | BD-13 3170     | HIP | 51931  | K2 V                       | 10 36 30.79                          | -13 50 35.82    | 18.9           | 0.3                                    | 31.63                      | 1.16          | -163.60       | 1.20          | 22.20                        | 1.10            | -24.84         | 0.86               | -18.71 | 0.30   | 1.47   | 0.45   | 31.13 | 25.35 | 6.9   | N    | 8.8   | N     |   |
| HD 93070   | w Car          | HIP | 52468  | K4 III                     | 10 43 32.29                          | -60 33 59.82    | 9.3            | 2.0                                    | 3.06                       | 0.50          | -10.00        | 1.30          | 14.30                        | 1.40            | -20.00         | 4.42               | -16.54 | 2.40   | 11.99  | 3.10   | 28.59 | 19.53 | 19.7  | N    | 6.3   | Y     |   |
| HD 101906  | BD+24 2386     | HIP | 57198  | G2 V                       | 11 43 47.04                          | 24 0 37.19      | 4.5            | 0.7                                    | 4.23                       | 0.93          | -22.30        | 1.00          | -7.60                        | 0.90            | -19.05         | 4.36               | -18.63 | 4.37   | -2.73  | 1.77   | 26.78 | 26.27 | -3.2  | N    | 1.7   | Y     |   |
| HD 105631  | BD+41 2276     | HIP | 59280  | K0 V                       | 12 9 57.26                           | 40 15 7.40      | -3.1           | 2.0                                    | 41.07                      | 0.98          | -314.02       | 0.57          | -51.34                       | 0.76            | -28.26         | 0.86               | -22.43 | 0.61   | -7.55  | 1.93   | 36.86 | 37.47 | -1.9  | Y    | -7.7  | Y     |   |
| HD 108574  | BD+45 2038     | HIP | 60831  | G5 V                       | 12 28 44.50                          | 44 47 39.50     | -1.5           | 0.5                                    | 25.51                      | 2.07          | -180.20       | 1.00          | -6.70                        | 1.10            | -27.90         | 2.32               | -18.17 | 1.49   | -4.08  | 0.53   | 33.54 | 34.79 | 0.0   | Y    | -9.3  | N     |   |
| HD 108575  | BD+45 2038B    | HIP | 60832  | K V                        | 12 28 4.80                           | 44 47 30.50     | -1.3           | 0.5                                    | 23.61                      | 3.71          | -178.20       | 0.90          | 3.50                         | 1.10            | -30.80         | 4.91               | -17.65 | 2.77   | -4.69  | 0.73   | 35.81 | 37.09 | 2.1   | Y    | -10.0 | N     |   |
|            | BD+21 2462     | HIP | 62686  | K5 -                       | 12 50 41.86                          | 20 32 5.27      | -9.3           | 5.0                                    | 27.58                      | 3.39          | -125.00       | 0.90          | -33.30                       | 0.90            | -15.52         | 1.91               | -15.52 | 2.14   | -9.96  | 4.97   | 24.10 | 23.21 | -3.2  | N    | -7.4  | Y     |   |
| HD 111813  | BD+26 2397     | HIP | 62758  | K1 V                       | 12 51 38.41                          | 25 30 31.78     | -4.8           | 0.6                                    | 26.54                      | 1.45          | -141.90       | 1.30          | -37.80                       | 1.20            | -17.67         | 1.05               | -19.34 | 1.16   | -4.97  | 0.60   | 26.66 | 27.36 | -4.5  | N    | -9.0  | Y     |   |
| HD 118100  | EQ Vir         | HIP | 66252  | K5 Ve                      | 13 34 43.20                          | -8 20 31.30     | -22.7          | 2.0                                    | 50.54                      | 0.99          | -288.70       | 1.60          | -87.40                       | 1.60            | -28.22         | 1.01               | -13.53 | 0.90   | -18.35 | 1.60   | 36.28 | 30.84 | 0.3   | Y    | -12.3 | N     |   |
| HD 120352  | BD-00 2743     | HIP | 67412  | K0 V                       | 13 48 58.19                          | -1 35 34.64     | -13.5          | 0.4                                    | 25.08                      | 1.32          | -136.40       | 0.80          | -45.20                       | 0.80            | -21.58         | 0.87               | -18.89 | 1.23   | -9.86  | 0.37   | 30.33 | 30.93 | -1.5  | Y    | -14.9 | Y     |   |
| HD 121979  | BD+67 812      | HIP | 68076  | K0 V                       | 13 56 17.76                          | 66 56 41.04     | -15.5          | 0.5                                    | 22.52                      | 0.73          | -140.90       | 1.00          | 56.80                        | 1.10            | -25.28         | 1.01               | -22.13 | 0.56   | -11.59 | 0.41   | 35.54 | 34.83 | -1.8  | Y    | -13.9 | Y     |   |
| HD 125161B |                |     |        | K1 -                       | 14 16 13.00                          | 51 22 30.00     | -18.7          | 2.0                                    | 33.54                      | 0.56          | -147.80       | 1.00          | 84.10                        | 4.80            | -22.20         | 0.87               | -15.49 | 1.19   | -13.95 | 1.79   | 30.45 | 28.18 | 3.0   | N    | -15.0 | Y     |   |
| HD 135363  | REJ1507+76     | HIP | 74045  | G5 V                       | 15 7 56.26                           | 76 12 2.64      | -17.7          | 0.5                                    | 33.97                      | 0.69          | -131.87       | 0.62          | 169.32                       | 0.79            | -23.00         | 0.62               | -20.54 | 0.40   | -16.10 | 0.34   | 34.79 | 32.33 | 2.8   | Y    | -12.5 | Y     |   |
| HD 140913  | BD+28 2469     | HIP | 77152  | G0 V                       | 15 45 7.45                           | 28 28 11.72     | -14.5          | 2.0                                    | 20.85                      | 1.04          | -88.30        | 1.40          | 37.20                        | 1.20            | -21.77         | 1.23               | -14.42 | 1.03   | 1.67   | 1.73   | 26.17 | 39.96 | 0.1   | Y    | -33.5 | N     |   |
| HD 142072  | BD-01 3109     | HIP | 77749  | G5 V                       | 15 52 33.75                          | -1 54 22.81     | -24.6          | 0.5                                    | 24.07                      | 0.99          | -114.80       | 0.90          | 8.70                         | 0.90            | -29.50         | 0.60               | -15.78 | 0.63   | 0.09   | 0.74   | 33.46 | 36.18 | 11.8  | N    | -30.6 | Y     |   |
| HD 155875  | HR 6400        | HIP | 84827  | G0.5 IV                    | 17 20 12.68                          | -70 2 43.31     | -5.0           | 0.9                                    | 25.78                      | 0.82          | -47.20        | 1.40          | -196.40                      | 1.20            | -28.16         | 1.05               | -23.16 | 1.01   | -8.66  | 0.50   | 37.47 | 37.22 | 4.1   | N    | -4.8  | Y     |   |
| HD 157750  | SAO 208819     | HIP | 85360  | G2 V                       | 17 26 34.86                          | -32 58 10.80    | -18.6          | 2.0                                    | 22.67                      | 1.48          | -29.10        | 1.40          | -118.50                      | 1.30            | -20.65         | 2.00               | -22.05 | 1.63   | -9.18  | 0.68   | 31.57 | 35.43 | 2.7   | Y    | -24.7 | N     |   |
| HD 167605  | BD+69 968      | HIP | 89005  | K2 V                       | 18 9 55.50                           | 69 40 49.79     | -8.2           | 2.0                                    | 32.30                      | 0.72          | -26.60        | 1.20          | 192.70                       | 1.20            | -26.23         | 0.74               | -13.94 | 1.74   | -0.32  | 0.98   | 29.71 | 32.92 | 6.8   | N    | -17.8 | N     |   |
| HD 168746  | BD-11 4606     | HIP | 90004  | G5 -                       | 18 21 49.78                          | -11 55 21.64    | -25.6          | 0.0                                    | 23.19                      | 0.96          | -21.90        | 1.00          | -66.20                       | 1.00            | -19.60         | 0.21               | -21.59 | 0.60   | -2.87  | 0.25   | 29.30 | 26.29 | -8.6  | N    | -23.7 | Y     |   |
| HD 175531  |                | HIP | 93096  | G9 V:                      | 18 57 56.68                          | -44 58 6.81     | -13.5          | 2.0                                    | 15.51                      | 2.18          | 26.80         | 1.20          | -80.10                       | 1.40            | -20.80         | 2.20               | -17.69 | 2.83   | -10.16 | 2.23   | 29.13 | 29.96 | -0.5  | Y    | -15.2 | Y     |   |
| HD 191869A | SAO 246498     | HIP | 99803  | -                          | 20 14 56.17                          | -56 58 35.26    | -16.0          | 2.0                                    | 15.32                      | 2.20          | 38.70         | 1.70          | -87.10                       | 1.70            | -27.53         | 2.71               | -19.17 | 3.50   | -0.61  | 1.84   | 33.55 | 29.68 | -6.5  | N    | -7.3  | N     |   |
| HD 191869B |                |     |        | -                          | 20 14 56.17                          | -56 58 35.26    | -18.0          | 2.0                                    | 15.32                      | 2.20          | 34.40         | 2.20          | -99.40                       | 2.10            | -29.61         | 2.75               | -22.44 | 4.02   | 1.68   | 1.73   | 37.19 | 32.00 | -9.9  | N    | -7.9  | N     |   |
|            | BD+33 3936     | HIP | 101262 | GJ 791.3                   | K5 -                                 | 20 31 32.07     | 33 46 33.12    | -27.1                                  | 1.0                        | 38.18         | 1.17          | 141.90        | 1.60                         | 13.40           | 1.50           | -18.97             | 0.50   | -23.51 | 0.96   | -11.62 | 0.48  | 32.37 | 25.28 | -1.5 | Y     | -18.6 | N |
| HD 201651  | BD+69 1148     | HIP | 104225 | K0 -                       | 21 6 56.39                           | 69 40 28.54     | -13.7          | 2.0                                    | 30.45                      | 0.72          | 109.10        | 1.10          | 65.00                        | 1.20            | -14.89         | 0.71               | -16.19 | 1.87   | -9.74  | 0.56   | 24.06 | 21.75 | -1.5  | Y    | -9.2  | Y     |   |
| HD 203030  | BD+25 4507     | HIP | 105232 | G8 V                       | 21 18 58.22                          | 26 13 49.95     | -17.3          | 0.4                                    | 24.48                      | 1.05          | 31.30         | 1.40          | 8.90                         | 1.30            | -23.41         | 0.92               | -15.89 | 0.38   | -12.19 | 0.84   | 30.81 | 32.78 | -0.6  | Y    | -20.6 | Y     |   |
| HD 209779  | BD-06 5908     | HIP | 109110 | G0 V                       | 22 6 5.33                            | -5 21 29.02     | -9.6           | 0.5                                    | 28.16                      | 1.01          | 160.40        | 0.90          | -59.30                       | 0.90            | -20.93         |                    |        |        |        |        |       |       |       |      |       |       |   |

Table 6. Castor moving group.

| Name      | SpT         | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) | $V_{\text{Total}}$<br>(km/s) | $V_T$<br>(km/s) | $PV$<br>(km/s) | $\rho_c$<br>(km/s) |        |      |        |      |        |      |       |       |        |         |
|-----------|-------------|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|------------------------------|-----------------|----------------|--------------------|--------|------|--------|------|--------|------|-------|-------|--------|---------|
| HD 7661   | BD-12 233   | HIP 5938                   |                                      | K0 V            | 1 16 24.20     | -12 5 49.21                            | 8.2                        | 0.6           | 37.71         | 1.14          | 134.80                       | 1.10            | -5.70          | 1.10               | -15.17 | 0.48 | -9.14  | 0.39 | -6.42  | 0.58 | 18.84 | 21.51 | 3.4 N  | 13.7 Y  |
| HD 12786  | BD-16 365   | HIP 9716                   | GJ 3133                              | K0 V            | 2 4 59.33      | -15 40 41.15                           | 11.1                       | 0.5           | 39.16         | 1.11          | 22.80                        | 1.20            | -44.00         | 1.20               | -2.67  | 0.24 | -6.06  | 0.25 | -10.74 | 0.47 | 12.62 | 5.89  | -4.8 N | 4.6 N   |
| HD 13507  | BD+39 496   | HIP 10321                  |                                      | G0 V            | 2 12 55.00     | 40 40 6.10                             | 5.0                        | 0.6           | 38.12         | 0.89          | 56.90                        | 1.30            | -99.20         | 1.30               | -8.21  | 0.46 | -7.10  | 0.48 | -10.46 | 0.36 | 15.07 | 15.06 | -2.2 N | 5.4 Y   |
| HD 13531  | BD+39 498   | HIP 10339                  |                                      | G0 V            | 2 13 13.34     | 40 30 27.32                            | 6.2                        | 0.6           | 39.10         | 0.91          | 57.60                        | 1.00            | -96.40         | 1.00               | -9.00  | 0.45 | -6.04  | 0.46 | -10.31 | 0.33 | 14.96 | 14.47 | -1.9 N | 5.3 Y   |
|           | AG Tri      | HIP 11437                  |                                      | K8 -            | 2 27 29.26     | 30 58 24.62                            | 6.7                        | 1.2           | 23.66         | 2.04          | 84.00                        | 2.20            | -71.80         | 2.30               | -14.37 | 1.27 | -15.93 | 1.93 | -8.65  | 0.94 | 23.13 | 25.24 | 4.2 N  | 12.8 N  |
| HD 37216  | BD+52 982   | HIP 26653                  |                                      | G5 V            | 5 39 52.35     | 52 53 50.96                            | 10.1                       | 0.4           | 35.91         | 1.12          | -10.00                       | 1.30            | -141.40        | 1.40               | -16.78 | 0.45 | -10.08 | 0.52 | -8.32  | 0.40 | 21.27 | 19.36 | -3.1 N | 5.9 Y   |
|           |             | HIP 29067                  | GJ 226.2                             | K8 V            | 6 7 55.25      | 67 58 36.57                            | 1.6                        | 5.0           | 40.12         | 1.78          | -48.80                       | 1.80            | -113.80        | 1.90               | -10.15 | 3.90 | -5.93  | 2.63 | -8.86  | 1.86 | 14.72 | 14.61 | 0.9 Y  | 0.6 Y   |
| HD 41842  | SAO 171235  | HIP 28921                  |                                      | K1 V            | 6 6 16.62      | -27 54 21.00                           | 12.4                       | 0.4           | 31.38         | 1.16          | -16.40                       | 1.50            | 34.40          | 1.40               | -11.28 | 0.35 | -5.85  | 0.37 | -5.05  | 0.26 | 13.67 | 12.00 | 3.8 N  | 11.2 Y  |
| HD 47787  | SAO 172095  | HIP 31821                  |                                      | K1 V            | 6 39 11.60     | -26 34 19.63                           | 19.1                       | 0.6           | 20.56         | 2.07          | -38.00                       | 2.60            | 24.60          | 2.40               | -16.80 | 0.88 | -9.24  | 0.88 | -10.30 | 0.86 | 21.76 | 20.98 | 3.9 N  | 18.6 Y  |
| HD 51825  | SAO 197402  | HIP 33451                  | GJ 255A                              | F8 IV-V         | 6 57 17.59     | -35 30 25.74                           | 10.1                       | 5.0           | 23.15         | 0.56          | -40.38                       | 0.50            | 19.58          | 0.53               | -9.75  | 1.99 | -4.73  | 4.42 | -8.30  | 1.25 | 13.65 | 16.46 | 0.7 Y  | 13.7 Y  |
|           | BL Lyn      | HIP 36627                  | GJ 277B                              | M3.5 -          | 7 31 57.33     | 36 13 47.41                            | 0.4                        | 1.0           | 87.15         | 4.85          | -251.90                      | 3.30            | -257.10        | 3.10               | -6.74  | 1.00 | -9.57  | 0.62 | -15.70 | 1.05 | 19.58 | 21.20 | 0.4 Y  | 8.1 N   |
|           | DX Cnc      |                            | GJ 1111                              | M6.5 V          | 8 29 48.00     | 26 46 42.00                            | 9.0                        | 0.5           | 275.80        | 3.00          | -1141.00                     | 5.00            | -602.00        | 5.00               | -17.14 | 0.42 | -9.78  | 0.17 | -13.53 | 0.34 | 23.93 | 23.36 | 2.2 Y  | 7.7 Y   |
| HD 77825  | BD-15 2685  | HIP 44526                  |                                      | K2 V            | 9 4 20.69      | -15 54 51.27                           | 3.9                        | 0.4           | 35.63         | 1.03          | -108.90                      | 1.20            | -28.20         | 1.10               | -8.95  | 0.32 | -4.98  | 0.35 | -11.59 | 0.44 | 15.47 | 16.99 | -0.5 Y | 8.1 N   |
| HD 82434  | psi Vel     | HIP 46651                  | GJ 351A                              | F3 IV           | 9 30 41.97     | -40 28 0.27                            | 8.8                        | 2.0           | 53.89         | 0.70          | -147.14                      | 0.58            | 48.65          | 0.78               | -12.84 | 0.21 | -8.81  | 1.98 | -4.57  | 0.29 | 16.23 | 14.12 | 4.9 N  | 6.1 Y   |
| HD 94765  | BD+08 2434  | HIP 53486                  | GJ 3633                              | K0 V            | 10 56 30.80    | 7 23 18.50                             | 5.4                        | 0.4           | 56.98         | 1.03          | -256.80                      | 1.30            | -77.30         | 1.30               | -16.67 | 0.35 | -14.19 | 0.32 | -6.91  | 0.41 | 22.96 | 22.39 | 0.5 Y  | 2.0 Y   |
|           |             | HIP 53767                  | GJ 408                               | M2.5 -          | 11 0 4.26      | 22 49 58.68                            | 3.2                        | 0.5           | 150.95        | 1.59          | -427.00                      | 1.50            | -280.80        | 1.50               | -9.27  | 0.20 | -12.97 | 0.20 | -3.70  | 0.46 | 16.37 | 15.55 | -4.8 N | 2.8 Y   |
| HD 103720 | BD-01 2594  | HIP 58237                  |                                      | K3 V            | 11 56 41.18    | -2 46 44.23                            | -8.1                       | 0.3           | 22.18         | 1.41          | -64.10                       | 1.10            | -42.80         | 1.10               | -8.11  | 0.59 | -8.26  | 0.88 | -14.25 | 0.57 | 18.36 | 16.65 | -3.9 N | -4.6 Y  |
| HD 119124 | BD+51 1859  | HIP 66704                  | GJ 521.2A                            | F7.7 V          | 13 40 23.23    | 50 31 9.90                             | -10.0                      | 2.0           | 39.64         | 0.71          | -124.80                      | 1.00            | 58.90          | 1.10               | -14.85 | 0.39 | -8.51  | 0.84 | -8.92  | 1.81 | 19.30 | 22.01 | 0.3 Y  | -14.6 Y |
|           | BD+24 2700  | HIP 69410                  |                                      | K0 V            | 14 12 41.56    | 23 48 51.36                            | -12.2                      | 0.4           | 30.62         | 1.16          | -41.90                       | 1.00            | -15.30         | 1.00               | -6.46  | 0.25 | -7.73  | 0.32 | -9.75  | 0.39 | 14.02 | 11.00 | -2.5 N | -8.9 Y  |
| HD 130819 | 8 Lib       | HIP 72603                  | GJ 563.4                             | F3 V            | 14 50 41.18    | -15 59 50.05                           | -23.0                      | 5.0           | 42.26         | 1.04          | -135.93                      | 0.94            | -59.47         | 0.62               | -24.33 | 3.71 | -8.67  | 1.39 | -11.78 | 3.09 | 28.39 | 21.35 | 7.3 N  | -15.2 N |
|           |             | HIP 85523                  | GJ 674                               | M2.5 -          | 17 28 39.95    | -46 53 42.69                           | -10.5                      | 1.3           | 220.43        | 1.63          | 573.70                       | 1.40            | -878.10        | 1.30               | -14.96 | 1.24 | -4.95  | 0.38 | -19.25 | 0.22 | 24.88 | 22.91 | 8.4 N  | -9.3 Y  |
| HD 161284 | BD+65 1203  | HIP 86456                  |                                      | K0 V            | 17 39 55.69    | 65 0 5.91                              | -7.3                       | 0.5           | 37.83         | 0.71          | -21.60                       | 1.00            | 109.20         | 1.10               | -13.20 | 0.30 | -8.25  | 0.43 | -2.32  | 0.29 | 15.74 | 16.56 | 6.8 N  | -11.2 Y |
| HD 230017 | V1436 Aql   | HIP 92836                  | GJ 734                               | M0 -            | 18 54 54.00    | 18 58 60.00                            | -17.0                      | 10.0          | 52.00         | 11.00         | 19.08                        | 2.91            | 118.06         | 2.13               | -19.06 | 6.57 | -6.63  | 7.74 | 0.83   | 1.53 | 20.20 | 1.80  | 10.9 N | -1.5 N  |
| HD 181321 |             | HIP 95149                  | GJ 755                               | G5 V            | 19 21 29.76    | -34 59 0.37                            | -10.2                      | 1.3           | 47.95         | 1.28          | 87.60                        | 1.20            | -86.40         | 1.30               | -13.12 | 1.22 | -6.00  | 0.25 | -6.62  | 0.57 | 15.87 | 13.38 | 0.9 Y  | -5.6 Y  |
| HD 186922 | BD+76 750   | HIP 96656                  | GJ 765.2                             | K0 -            | 19 39 6.36     | 76 25 19.27                            | -8.7                       | 2.0           | 33.28         | 0.69          | 151.00                       | 0.90            | 139.20         | 1.00               | -23.52 | 0.81 | -10.22 | 1.74 | -16.55 | 0.86 | 30.52 | 33.12 | 0.2 Y  | -15.5 N |
| HD 191285 | BD-14 5652  | HIP 99322                  | GJ 781.2                             | K3/4 V          | 20 9 36.47     | -14 17 12.85                           | -12.3                      | 5.0           | 31.49         | 1.58          | 79.50                        | 1.40            | -90.60         | 1.40               | -12.05 | 4.03 | -15.25 | 2.25 | -10.13 | 2.18 | 21.92 | 19.99 | -5.4 N | -10.0 Y |
|           |             | HIP 108467                 | GJ 842.2                             | M0.5 -          | 21 58 24.51    | 75 35 20.63                            | -11.0                      | 2.0           | 47.95         | 1.08          | 231.30                       | 2.10            | 24.90          | 2.20               | -15.03 | 0.89 | -13.89 | 1.78 | -15.21 | 0.66 | 25.50 | 24.59 | -0.2 Y | -8.7 Y  |
|           | 2RE J2201+2 | HIP 108706                 | GJ 4247                              | M4 -            | 22 1 13.12     | 28 18 24.86                            | -3.0                       | 1.0           | 111.57        | 3.19          | 372.11                       | 2.76            | 36.48          | 3.38               | -13.70 | 0.43 | -4.48  | 0.93 | -7.33  | 0.46 | 16.17 | 15.94 | 4.7 N  | -4.9 Y  |
| HD 211472 | BD+53 2831  | HIP 108926                 | GJ 4268A                             | K1 V            | 22 15 54.14    | 54 40 22.40                            | -8.6                       | 0.5           | 46.62         | 0.67          | 212.30                       | 1.10            | 69.70          | 1.20               | -19.64 | 0.36 | -13.00 | 0.49 | -5.94  | 0.17 | 24.29 | 22.08 | 9.0 N  | -7.2 Y  |
| HD 216803 | TW PsA      | HIP 113283                 | GJ 879                               | K4 V            | 22 56 24.06    | -31 33 56.02                           | 6.0                        | 5.0           | 130.94        | 0.92          | 334.00                       | 1.50            | -157.10        | 1.30               | -6.08  | 2.06 | -8.23  | 0.59 | -10.49 | 4.52 | 14.65 | 13.42 | -2.5 N | 2.8 Y   |
| HD 217107 | BD-03 5539  | HIP 113421                 |                                      | G8 IV           | 22 58 15.54    | -2 23 43.38                            | -13.6                      | 0.5           | 50.71         | 0.75          | -5.80                        | 0.70            | -15.10         | 0.80               | -1.58  | 0.12 | -8.58  | 0.29 | 10.54  | 0.40 | 13.68 | 0.07  | -1.5 N | 0.0 N   |
|           | HK Aqr      | HIP 114252                 | GJ 890                               | M2 V            | 23 8 19.55     | -15 24 35.81                           | 3.4                        | 1.0           | 45.75         | 2.60          | 107.30                       | 3.10            | -19.40         | 3.10               | -7.84  | 0.71 | -4.12  | 0.63 | -7.80  | 0.96 | 11.80 | 11.41 | 1.2 N  | 2.0 Y   |
| HD 218738 | BD+47 4058  | HIP 114379                 | GJ 4315                              | G5 Ve           | 23 9 57.36     | 47 57 29.99                            | -6.4                       | 0.6           | 39.56         | 7.67          | 149.70                       | 1.50            | -4.20          | 1.60               | -13.58 | 2.99 | -11.94 | 1.28 | -6.02  | 1.44 | 19.06 | 17.54 | 4.8 N  | -2.9 Y  |
| HD 220476 | BD-08 6103  | HIP 115527                 |                                      | G5 V            | 23 24 6.34     | -7 33 2.74                             | 4.5                        | 0.5           | 33.10         | 0.91          | 146.20                       | 0.90            | -5.00          | 0.90               | -17.26 | 0.55 | -6.12  | 0.36 | -11.13 | 0.49 | 21.43 | 20.62 | 5.6 N  | 4.1 Y   |

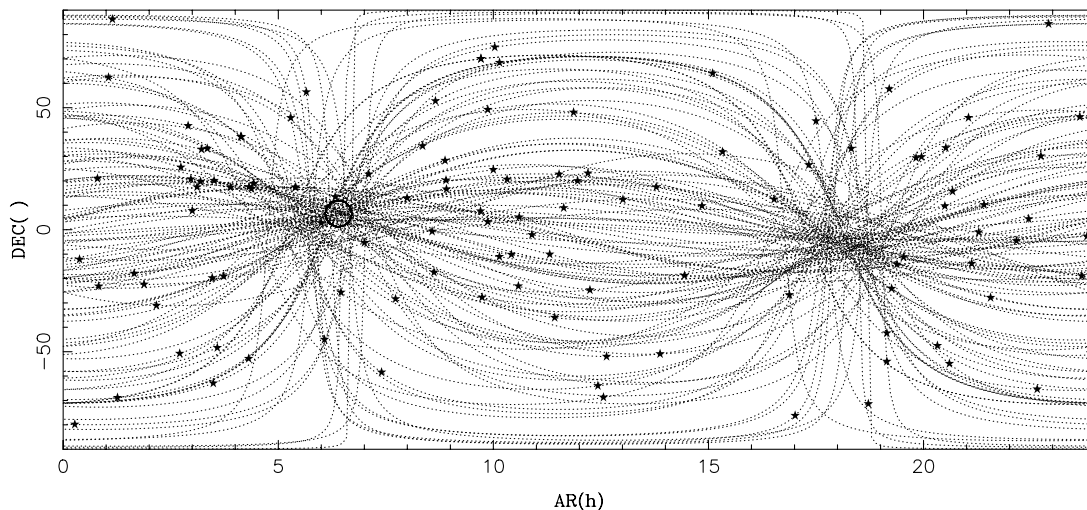


Table 7. Other young disc stars.

| Name      |                 |     | SpT   | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) |         |         |        |        |        |        |        |        |      |
|-----------|-----------------|-----|-------|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|---------|---------|--------|--------|--------|--------|--------|--------|------|
| HD 224983 | BD+10 5022      | HIP | 184   | K0 V                       | 0 2 21.54                            | 11 0 22.45      | -16.2          | 0.5                                    | 29.75                      | 1.21          | -5.00         | 0.90          | -43.50  | 0.90    | 6.41   | 0.26   | -14.17 | 0.39   | 8.32   | 0.44   |      |
| HD 691    | V344 And        | HIP | 919   | K0 V                       | 0 11 22.44                           | 30 26 58.47     | -2.8           | 0.5                                    | 29.35                      | 0.95          | 210.60        | 1.10          | -30.75  | 1.08    | -15.84 | 0.62   | -15.84 | 0.62   | 0.96   | 0.31   |      |
|           |                 | HIP | 1399  | -                          | 0 17 30.45                           | -59 57 4.19     | -4.5           | 2.0                                    | 22.54                      | 2.33          | 113.20        | 2.30          | -40.25  | 2.14    | -19.30 | 2.07   | -16.11 | 2.13   | 5.15   | 1.70   |      |
| HD 1326   | GX And          | HIP | 1475  | GJ 15A                     | M1.5 V                               | 0 18 22.89      | 44 1 22.62     | 12.0                                   | 1.0                        | 280.26        | 1.05          | 2887.50       | 1.10    | 408.90  | 1.10   | -49.23 | 0.46   | -11.90 | 0.85   | -3.54  | 0.32 |
| HD 11215  | SAO 11215       | HIP | 2232  | G0:-                       | 0 28 17.10                           | 63 44 5.93      | 9.6            | 1.5                                    | 9.04                       | 3.06          | 62.60         | 2.10          | 2.60    | 2.00    | -33.18 | 9.73   | -8.29  | 5.82   | -1.42  | 1.34   |      |
| HD 4128   | bet Cet         | HIP | 3419  | GJ 31                      | K0 III                               | 0 43 35.37      | -17 59 11.78   | 12.8                                   | 0.9                        | 34.04         | 0.82          | 232.79        | 0.83    | 32.71   | 0.54   | -30.63 | 0.75   | -11.46 | 0.38   | -12.89 | 0.89 |
| HD 4614   | eta Cas         | HIP | 3821  | GJ 34A                     | G3 V                                 | 0 49 62.99      | 57 48 54.67    | 10.0                                   | 0.1                        | 167.99        | 0.62          | 1087.07       | 0.44    | -559.73 | 0.44   | -30.32 | 0.11   | -9.26  | 0.11   | -16.89 | 0.06 |
|           | LP 467-16       | HIP |       | M5 -                       | 1 11 25.00                           | 15 26 24.00     | 4.0            | 0.1                                    | 118.00                     | 21.00         | 176.00        | 1.00          | -123.00 | 1.00    | -5.62  | 0.69   | -5.10  | 1.28   | -5.72  | 125.00 |      |
|           | Wolf 44         | HIP |       | M2 -                       | 1 19 6.00                            | 61 22 15.00     | 8.9            | 0.5                                    | 78.00                      | 8.00          | 389.00        | 1.00          | -835.00 | 1.00    | -27.95 | 2.35   | -10.83 | 1.89   | -48.11 | 4.91   |      |
|           | YZ Cet          | HIP | 5643  | GJ 54.1                    | M4.5 -                               | 1 12 30.64      | -16 59 56.28   | 28.2                                   | 5.0                        | 269.03        | 7.57          | 1209.92       | 5.21    | 646.88  | 3.91   | -28.43 | 1.11   | -0.27  | 0.52   | -23.90 | 4.91 |
| HD 9770   | BB Scl          | HIP | 7372  | GJ 60                      | K3 V                                 | 1 35 1.01       | -29 54 37.20   | 31.5                                   | 1.0                        | 42.29         | 1.47          | 73.40         | 1.40    | 33.20   | 1.40   | -12.08 | 0.42   | -6.35  | 0.27   | -29.79 | 0.99 |
| HD 14374  | BD-01 316       | HIP | 10818 | G0 V                       | 2 19 16.04                           | 0 46 47.41      | 24.6           | 0.3                                    | 25.51                      | 1.11          | 61.30         | 0.80          | -31.90  | 0.90    | -18.11 | 0.32   | -8.33  | 0.57   | -19.30 | 0.28   |      |
| HD 18445  | SAO 168180      | HIP | 13769 | GJ 102                     | M4 -                                 | 2 33 37.00      | 24 55 24.00    | -0.3                                   | 10.0                       | 129.00        | 12.00         | 37.00         | 1.00    | -689.00 | 1.00   | 4.20   | 7.36   | -16.98 | 4.44   | -18.36 | 5.63 |
|           | IE 0307.54-1424 | HIP |       | GJ 120.1C                  | K2 V                                 | 2 57 13.19      | -24 58 30.39   | 49.6                                   | 0.5                        | 38.87         | 1.50          | 15.00         | 1.20    | -32.60  | 1.30   | -17.30 | 0.27   | -17.69 | 0.29   | -43.21 | 0.45 |
|           | BD+60 637       | HIP | 14864 | GJ 3206                    | K7 -                                 | 3 10 14.20      | 14 35 47.00    | 18.6                                   | 1.0                        | 9.00          | 5.00          | -5.40         | 2.60    | -24.50  | 1.70   | -9.15  | 3.19   | -3.83  | 4.28   | -20.55 | 5.39 |
|           | kap Cet         | HIP | 15457 | GJ 137                     | G5 Vvar                              | 3 11 56.85      | 61 31 12.93    | -8.3                                   | 10.0                       | 27.13         | 3.41          | 6.20          | 3.10    | 104.30  | 3.30   | 12.43  | 7.58   | 0.32   | 6.63   | 15.73  | 2.26 |
| HD 20630  | SAO 93829       | HIP | 19781 | G5 V                       | 4 14 25.65                           | 14 37 30.12     | 38.5           | 0.4                                    | 21.91                      | 1.27          | 108.40        | 1.20          | -20.80  | 1.20    | -41.52 | 0.55   | -17.87 | 1.13   | -3.01  | 0.86   |      |
| HD 26900  | BD+36 860       | HIP | 19930 | K2 V                       | 4 16 32.66                           | 36 30 6.60      | 20.8           | 0.3                                    | 39.08                      | 1.16          | -22.80        | 1.20          | -225.60 | 1.30    | -21.15 | 0.29   | -11.52 | 0.58   | -24.68 | 0.67   |      |
| HD 27466  | BD-04 799       | HIP | 20218 | G5 V                       | 4 19 57.08                           | -4 26 19.54     | 18.0           | 0.5                                    | 27.88                      | 0.96          | -58.60        | 1.20          | -37.00  | 1.20    | -7.33  | 0.48   | -2.78  | 0.28   | -20.03 | 0.49   |      |
| HD 28100  | 73 Tau          | HIP | 20732 | G7 IIIa                    | 4 26 36.37                           | 14 42 49.63     | 31.8           | 0.9                                    | 7.17                       | 0.81          | -6.70         | 0.80          | -30.30  | 0.80    | -22.75 | 1.15   | -13.27 | 1.64   | -27.18 | 1.85   |      |
|           |                 | HIP | 22627 | M3.5 -                     | 4 52 5.73                            | 6 28 35.54      | -9.1           | 0.5                                    | 82.52                      | 3.99          | 146.09        | 4.15          | -310.14 | 2.49    | 13.35  | 0.53   | -17.07 | 0.97   | 1.05   | 0.32   |      |
|           | LHS 1723        | HIP |       | M4 -                       | 5 1 57.00                            | -6 56 48.00     | 42.0           | 0.1                                    | 163.00                     | 26.00         | -546.00       | 1.00          | -546.00 | 1.00    | -21.46 | 1.90   | -18.41 | 0.29   | -38.33 | 3.02   |      |
|           | V371 Ori        | HIP | 26081 | M2.5 -                     | 5 33 44.79                           | 1 56 43.43      | 22.1           | 1.0                                    | 59.45                      | 3.88          | -241.34       | 4.71          | -156.61 | 1.69    | -13.13 | 1.00   | -7.01  | 0.44   | -28.16 | 1.60   |      |
| HD 245409 | BD+11 878       | HIP | 26335 | GJ 208                     | K7-M0 V                              | 5 36 30.99      | 11 19 40.31    | 22.7                                   | 5.0                        | 87.90         | 1.29          | -0.70         | 1.20    | -57.50  | 1.20   | -20.68 | 4.76   | -7.88  | 1.19   | -5.92  | 0.96 |
| HD 38529  | BD+01 1126      | HIP | 27253 | G4 V                       | 5 46 34.91                           | 1 10 5.50       | 28.9           | 2.0                                    | 23.57                      | 0.92          | -79.30        | 0.90          | -140.60 | 1.00    | -12.46 | 1.85   | -24.63 | 0.98   | -33.58 | 1.18   |      |
| HD 40647  | BD+69 361       | HIP | 28902 | G5 V                       | 6 6 5.70                             | 69 28 34.08     | -14.5          | 0.5                                    | 31.30                      | 0.97          | -135.10       | 1.00          | -56.20  | 1.10    | 3.90   | 0.46   | -3.83  | 0.34   | -25.91 | 0.69   |      |
| HD 42807  | V1357 Ori       | HIP | 29525 | GJ 230                     | G2 V                                 | 6 13 12.50      | -10 37 37.71   | 6.0                                    | 1.0                        | 55.20         | 0.96          | 77.30         | 1.30    | -297.30 | 1.20   | 3.09   | 0.96   | -26.03 | 0.58   | -6.68  | 0.21 |
| HD 43162  | SAO 171428      | HIP | 29568 | GJ 3389                    | G5 V                                 | 6 13 45.30      | -23 51 42.96   | 22.0                                   | 1.0                        | 59.90         | 7.75          | -45.40        | 1.10    | 113.20  | 1.20   | -20.67 | 0.61   | -10.10 | 0.74   | -6.94  | 0.33 |
|           | G 104-37        | HIP |       | M4.5                       | 6 24 40.00                           | 23 26 18.00     | -12.0          | 0.1                                    | 112.00                     | 7.00          | 390.00        | 1.00          | -300.00 | 1.00    | 15.54  | 0.25   | -16.64 | 1.16   | 7.72   | 0.55   |      |
| HD 258857 | BD+05 1273      | HIP | 31069 | K2 V                       | 6 31 11.08                           | 5 52 36.97      | 29.4           | 0.4                                    | 32.09                      | 2.06          | -154.30       | 1.60          | -61.90  | 1.60    | -26.89 | 0.38   | -10.09 | 0.36   | -25.35 | 1.67   |      |
| HD 46375  | BD+05 1295      | HIP | 31246 | K1 IV                      | 6 33 12.63                           | 5 27 46.53      | 1.0            | 5.0                                    | 29.93                      | 1.07          | 114.24        | 0.92          | -96.79  | 0.73    | 8.50   | 4.51   | -20.27 | 2.31   | 8.96   | 0.39   |      |
| HD 46524  | SAO 171921      | HIP | 31187 | K0 V                       | 6 32 37.08                           | -29 34 56.73    | 19.0           | 0.4                                    | 23.52                      | 1.03          | -68.00        | 1.50          | -67.70  | 1.40    | -23.57 | 0.73   | -4.18  | 0.64   | -12.72 | 0.78   |      |
| HD 265866 |                 | HIP | 33226 | M3 -                       | 6 54 48.96                           | 33 16 5.40      | 22.0           | 0.1                                    | 181.31                     | 1.87          | -727.60       | 2.50          | -401.80 | 2.40    | -26.72 | 0.11   | -3.69  | 0.08   | -15.11 | 0.23   |      |
|           | LHS 1885        | HIP |       | M4.5 -                     | 6 57 58.00                           | 62 19 12.00     | 16.0           | 0.1                                    | 129.00                     | 20.00         | 332.00        | 1.00          | -395.00 | 1.00    | -17.16 | 0.64   | -10.18 | 2.58   | 14.75  | 1.26   |      |
| HD 54359  | BD-09 1858      | HIP | 34423 | GJ 267                     | K0 V                                 | 7 8 9.31        | -9 58 7.34     | 25.3                                   | 0.4                        | 34.84         | 1.37          | -200.60       | 1.20    | 29.30   | 1.20   | -29.17 | 0.54   | -5.60  | 0.57   | -22.77 | 0.91 |
|           | G 089-032       | HIP |       | M0 -                       | 7 36 25.00                           | 7 4 36.00       | 24.0           | 0.1                                    | 162.00                     | 26.00         | 265.00        | 1.00          | 351.00  | 1.00    | -20.68 | 0.15   | -5.97  | 1.01   | 16.68  | 1.80   |      |
|           | BD-21 2221      | HIP | 39222 | G0 III                     | 8 1 21.48                            | -22 19 58.58    | 38.3           | 0.3                                    | 6.58                       | 1.24          | -10.50        | 1.30          | 21.10   | 1.30    | -33.38 | 3.08   | -24.94 | 1.76   | 4.37   | 1.08   |      |
| HD 69247  | BD-10 2443      | HIP | 40465 | K5 V                       | 8 15 45.12                           | -10 26 54.40    | -3.7           | 0.4                                    | 23.07                      | 1.59          | -59.60        | 1.30          | -46.30  | 1.30    | 1.40   | 0.33   | -1.05  | 0.45   | -15.85 | 1.08   |      |
| HD 69433  | BD+65 626       | HIP | 40918 | G0 V                       | 8 21 3.78                            | 65 26 33.76     | -1.6           | 0.6                                    | 27.33                      | 0.98          | 12.20         | 1.40          | 22.00   | 1.40    | 3.92   | 0.49   | 2.47   | 0.36   | 0.40   | 0.40   |      |
| HD 74576  | SAO 199544      | HIP | 42808 | GJ 320                     | K1 V                                 | 8 43 18.03      | -38 52 56.54   | 14.3                                   | 2.0                        | 89.78         | 0.56          | -301.01       | 0.42    | 340.76  | 0.44   | -26.19 | 0.40   | -9.72  | 1.96   | -0.84  | 0.08 |
| HD 75289  | HR 3497         | HIP | 43177 | G0 -                       | 8 47 40.39                           | -41 44 12.46    | 9.3            | 0.0                                    | 34.55                      | 3.56          | -19.50        | 0.80          | -227.70 | 0.80    | 21.10  | 0.41   | -12.69 | 0.06   | -21.53 | 0.40   |      |
|           | BD+12 1944      | HIP | 43948 | GJ 330                     | M1 -                                 | 8 57 4.69       | 11 38 49.02    | -12.0                                  | 0.5                        | 60.99         | 0.45          | -29.20        | 1.40    | -324.20 | 1.40   | 15.55  | 0.55   | -15.72 | 1.27   | -17.17 | 0.67 |
| HD 81040  | BD+20 2314      | HIP | 46076 | G0 V                       | 9 23 47.09                           | 20 21 52.04     | 48.9           | 0.6                                    | 30.71                      | 1.24          | -151.90       | 0.70          | 36.30   | 0.70    | -49.77 | 0.87   | -13.31 | 0.31   | 17.83  | 0.77   |      |
|           | BD-12 2918A     | HIP |       | M3 -                       | 9 31 22.00                           | -13 29 15.60    | 7.3            | 1.3                                    | 94.95                      | 4.31          | 722.93        | 5.26          | 53.52   | 5.99    | 22.15  | 1.24   | -2.42  | 1.09   | 29.44  | 1.35   |      |
| HD 82558  | LQ Hya          | HIP | 46816 | K0 V                       | 9 32 25.57                           | -11 11 4.67     | 7.6            | 0.2                                    | 34.52                      | 0.99          | -247.50       | 1.10          | 35.50   | 1.10    | -20.36 | 0.35   | -5.45  | 0.17   | -9.28  | 0.28   |      |
| HD 82943  | BD-11 2670      | HIP | 47007 | G0                         | 9 34 50.74                           | -12 7 46.35     | 8.1            | 0.0                                    | 36.42                      | 0.84          | 2.20          | 1.20          | -172.70 | 1.30    | 10.16  | 0.36   | -19.78 | 0.33   | -8.74  | 0.35   |      |
|           | BD+28 1779      | HIP | 47176 | G5 V                       | 9 36 50.00                           | 27 58 22.41     | -11.5          | 0.4                                    | 24.23                      | 1.35          | -170.20       | 1.30          | -95.80  | 1.20    | -13.41 | 1.25   | -17.88 | 1.19   | -33.06 | 1.46   |      |
| HD 83588  | BD+58 1208      | HIP | 47547 | K2 V                       | 9 41 36.06                           | 57 29 46.58     | 22.1           | 0.4                                    | 31.02                      | 1.27          | -87.50        | 1.40          | -43.90  | 1.40    | -25.21 | 0.56   | -1.47  | 0.42   | 8.64   | 0.45   |      |
|           | BD+63 869       | HIP | 47513 | GJ 361                     | M1.5 -                               | 9 41 10.36      | 13 12 34.43    | 11.5                                   | 0.5                        | 88.06         | 1.98          | -658.70       | 2.00    | -144.70 | 1.90   | -30.04 | 0.64   | -15.25 | 0.35   | -17.76 | 0.70 |
| HD 87000  | BD+68 587       | HIP | 48714 | GJ 373                     | M0 -                                 | 9 56 8.67       | 62 47 18.45    | 13.3                                   | 0.5                        | 95.40         | 1.20          | -303.80       | 1.70    | -584.00 | 1.80   | -23.86 | 0.38   | -23.81 | 0.42   | 10.52  | 0.36 |
| HD 87884  | BD+12 2147      | HIP | 49387 | G5 V                       | 10 4 57.05                           | 67 25 21.82     | 2.0            | 0.3                                    | 24.69                      | 1.22          | -16.50        | 1.30          | -79.40  | 1.30    | -6.10  | 0.39   | -13.08 | 0.76   | 6.18   | 0.39   |      |
| HD 87884  | BD+34 2089      | HIP | 49699 | K2 V                       | 10 8 12.83                           | 11 59 48.40     | 6.3            | 4.0                                    | 44.20                      | 8.80          | -233.30       | 4.20          | 1.00    | 3.90    | -22.85 | 4.39   | -6.94  | 2.09   | -9.77  | 4.19   |      |
| HD 87883  | BD+50 1725      | HIP | 49908 | K0 V                       | 10 8 43.14                           | 34 14 32.12     | 9.1            | 0.4                                    | 55.37                      | 0.94          | -65.10        | 1.20          | -60.70  | 1.30    | -8.60  | 0.26   | -7.03  | 0.16   | 4.19   | 0.34   |      |
| HD 88230  | BD-03 2870      | HIP | 49986 | GJ 380                     | K7 -                                 | 10 11 22.14     | 49 27 15.24    | -26.0                                  | 0.1                        | 205.23        | 0.81          | -1359.80      | 1.00    | -505.70 | 1.00   | -9.16  | 0.12   | -20.62 | 0.07   | -35.92 | 0.10 |
|           | AD Leo          | HIP |       | M1.5 -                     | 10 12 17.67                          | -3 44 44.42     | 7.7            | 0.5                                    | 127.99                     | 1.53          | -150.70       | 1.40          | -245.20 | 1.50    | -2.31  | 0.17   | -12.66 | 0.36   | -2.69  | 0.35   |      |
| HD 93811  | BD+52 1514      | HIP | 53008 | GJ 3627                    | M4.5 Ve                              | 10 19 36.27     | 19 52 11.90    | 12.4                                   | 1.0                        | 213.00        | 4.00          | -500.80       | 2.00    | -46.00  | 1.90   | -14.50 | 0.50   | -7.36  | 0.35   | 3.81   | 0.82 |
|           | DEN 1048-39     | HIP |       | G5 V                       | 10 50 40.31                          | 51 47 58.82     | -0.6           | 0.5                                    | 34.77                      | 2.67          | -195.40       | 1.30          |         |         |        |        |        |        |        |        |      |

Table 7. – *continued*

| Name      |             | SpT | $\alpha$ (2000)<br>(h m s) | $\delta$ (2000)<br>( $^{\circ}$ ' ") | $V_r$<br>(km/s) | $\pi$<br>(mas) | $\mu_{\alpha} \cos \delta$<br>(mas/yr) | $\mu_{\delta}$<br>(mas/yr) | $U$<br>(km/s) | $V$<br>(km/s) | $W$<br>(km/s) |          |       |         |       |        |      |        |      |        |      |
|-----------|-------------|-----|----------------------------|--------------------------------------|-----------------|----------------|--|----------------------------|---------------|---------------|---------------|----------|-------|---------|-------|--------|------|--------|------|--------|------|
| HD 128620 | alf CenA    | HIP | 71683                      | GJ 559A                              | G2 V            | 14 39 36.50    | -60 50 2.31                            | -21.6                      | 0.5           | 742.24        | 1.40          | -3679.26 | 1.51  | 483.03  | 1.24  | -29.49 | 0.36 | 0.48   | 0.35 | 12.59  | 0.03 |
|           | alf CenB    | HIP | 71681                      | GJ 559B                              | K0 V            | 14 39 35.08    | -60 50 13.76                           | -18.1                      | 0.5           | 742.22        | 1.40          | -3601.08 | 26.10 | 953.36  | 19.70 | -25.80 | 0.38 | -0.79  | 0.37 | 15.09  | 0.16 |
| HD 129920 | BD+52 1825  | HIP | 71989                      |                                      | G2 V            | 14 43 22.33    | 51 55 5.19                             | -13.0                      | 9.0           | 20.79         | 0.70          | -60.70   | 1.20  | 120.10  | 1.30  | -29.99 | 1.06 | -1.71  | 4.84 | -14.43 | 7.60 |
| HD 130215 | BD+28 2365  | HIP | 72200                      |                                      | K2 V            | 14 46 3.07     | 27 30 44.45                            | -20.8                      | 0.4           | 37.93         | 1.10          | 18.40    | 1.00  | -40.20  | 1.00  | -1.77  | 0.25 | -7.77  | 0.19 | -19.99 | 0.37 |
| HD 130307 | BD+03 2938  | HIP | 72312                      | GJ 3867                              | G8 V            | 14 47 16.10    | 2 42 11.62                             | 13.0                       | 0.5           | 50.84         | 1.04          | -288.00  | 1.20  | -78.00  | 1.20  | -4.97  | 0.41 | -23.67 | 0.50 | 18.92  | 0.44 |
|           |             | HIP | 72896                      | GJ 568A                              | M3.5 -          | 14 53 51.47    | 23 33 20.90                            | -35.6                      | 0.5           | 97.83         | 5.99          | -715.80  | 3.80  | 106.40  | 3.70  | -38.31 | 1.55 | -28.26 | 1.25 | -15.19 | 1.11 |
|           | HO Lib      | HIP | 74995                      | GJ 581                               | M3 -            | 15 19 26.82    | -7 43 20.21                            | -9.5                       | 0.5           | 159.52        | 2.27          | -1224.55 | 3.07  | -99.51  | 1.72  | -25.06 | 0.47 | -25.63 | 0.41 | 11.76  | 0.43 |
| HD 139837 | BD+28 2454  | HIP | 76674                      |                                      | G5 V            | 15 39 25.20    | 27 37 34.73                            | -21.5                      | 0.5           | 20.65         | 1.30          | -52.50   | 1.10  | 53.30   | 1.10  | -24.38 | 1.01 | -9.27  | 0.32 | -8.78  | 0.69 |
| HD 144087 | BD-11 4057  | HIP | 78738                      | GJ 9541A                             | G8 V            | 16 4 25.92     | -11 26 57.79                           | -32.0                      | 0.5           | 35.25         | 2.56          | -61.20   | 1.40  | -22.80  | 1.40  | -29.99 | 0.47 | -7.65  | 0.60 | -11.96 | 0.41 |
| HD 144088 | BD-11 4058  | HIP | 78739                      | GJ 9541B                             | K2 V            | 16 4 26.72     | -11 26 59.56                           | -32.5                      | 0.5           | 30.89         | 6.86          | -57.20   | 1.90  | -19.40  | 1.70  | -30.66 | 0.70 | -7.94  | 1.80 | -11.79 | 0.99 |
| HD 145675 | 14 Her      | HIP | 79248                      |                                      | K0 V            | 16 10 24.31    | 43 49 3.54                             | -13.9                      | 0.0           | 55.11         | 0.59          | 132.60   | 1.00  | -297.00 | 1.10  | 23.74  | 0.32 | -12.34 | 0.09 | -16.14 | 0.10 |
| HD 149661 | V2133 Oph   | HIP | 81300                      | GJ 631                               | K2 V            | 16 36 21.45    | -2 19 28.50                            | -13.1                      | 0.1           | 102.27        | 0.85          | 455.00   | 0.70  | -308.10 | 0.70  | 0.72   | 0.13 | -0.45  | 0.05 | -28.63 | 0.20 |
| HD 150748 | BD+49 2535  | HIP | 81633                      |                                      | K V             | 16 40 35.09    | 49 9 59.23                             | -12.2                      | 0.4           | 31.34         | 0.77          | 2.00     | 1.30  | -16.30  | 1.40  | 0.19   | 0.24 | -9.44  | 0.32 | -8.11  | 0.30 |
| HD 153557 | BD+47 2415  | HIP | 83020                      | GJ 649.1A                            | K0 V            | 16 57 53.17    | 47 22 0.03                             | -6.7                       | 0.6           | 55.71         | 1.21          | -153.90  | 1.20  | 267.80  | 1.40  | -25.69 | 0.56 | -6.26  | 0.46 | 6.03   | 0.45 |
|           | BD+05 3409  | HIP | 85665                      | GJ 678.1A                            | M0 -            | 17 30 22.73    | 5 32 54.66                             | -3.2                       | 1.3           | 100.17        | 1.30          | 28.40    | 1.60  | -250.20 | 1.50  | 4.15   | 1.07 | -9.07  | 0.60 | -7.27  | 0.47 |
|           | BD+21 3245  | HIP | 87579                      | GJ 697                               | K0 -            | 17 53 29.94    | 21 19 31.05                            | -13.4                      | 0.2           | 40.22         | 1.04          | -71.40   | 1.00  | 57.00   | 0.90  | -13.47 | 0.21 | -9.66  | 0.16 | 4.56   | 0.29 |
|           | G 155-1     | HIP |                            | GJ 1224                              | M4.5 -          | 18 73 33.00    | -15 57 48.00                           | -34.0                      | 0.1           | 133.00        | 1.00          | -619.00  | 1.00  | 346.00  | 1.00  | -33.94 | 0.10 | -8.23  | 0.04 | 23.98  | 0.76 |
| HD 168442 | BD-01 3474  | HIP | 89825                      | GJ 710                               | K5 -            | 18 19 50.84    | -1 56 18.98                            | -23.3                      | 2.5           | 51.81         | 1.43          | 0.60     | 1.10  | 1.40    | 1.10  | -20.60 | 2.20 | -10.60 | 1.15 | -2.48  | 0.29 |
|           | FK Ser      | HIP | 89874                      |                                      | K5-7 V          | 18 20 22.70    | -10 11 13.56                           | -9.0                       | 1.0           | 9.42          | 6.17          | 9.44     | 8.36  | -32.59  | 5.93  | -3.76  | 3.49 | -14.44 | 8.37 | -12.24 | 9.20 |
|           | BD+45 2743  | HIP | 91128                      | GJ 720A                              | M0 -            | 18 35 18.39    | 45 44 38.62                            | -31.2                      | 0.5           | 64.61         | 1.03          | 448.80   | 1.60  | 364.20  | 1.60  | -39.38 | 0.53 | -10.02 | 0.54 | -33.48 | 0.42 |
|           |             | HIP |                            | GJ 720B                              | M3.5 -          | 18 35 27.33    | 45 45 39.50                            | -29.8                      | 10.0          | 66.90         | 2.00          | 452.00   | 1.00  | 343.00  | 1.00  | -36.57 | 2.64 | -9.54  | 8.96 | -32.81 | 3.76 |
| HD 173739 | BD+59 1915A | HIP | 91768                      | GJ 725A                              | M3 -            | 18 42 46.69    | 59 37 49.42                            | -1.0                       | 0.1           | 277.00        | 5.00          | -1315.00 | 3.10  | 1815.00 | 3.58  | -25.48 | 0.48 | -12.42 | 0.23 | 25.86  | 0.49 |
| HD 173740 | BD+59 1915B | HIP | 91772                      | GJ 725B                              | M3.5 -          | 18 42 46.90    | 59 37 36.65                            | 1.0                        | 0.1           | 284.48        | 5.01          | -1393.34 | 11.50 | 1845.53 | 12.00 | -25.00 | 0.52 | -10.86 | 0.26 | 27.26  | 0.55 |
|           | V1216 Sgr   | HIP | 92403                      | GJ 729                               | M3.5 -          | 18 49 49.37    | -23 50 10.48                           | -6.9                       | 2.0           | 336.48        | 1.82          | 644.20   | 2.90  | -192.90 | 2.70  | -8.57  | 1.93 | -0.27  | 0.39 | -7.99  | 0.36 |
| HD 175897 | SAO 245862  | HIP | 93378                      |                                      | G0 V            | 19 1 6.84      | -58 53 30.25                           | 20.7                       | 4.5           | 9.44          | 1.26          | 7.00     | 1.30  | -42.10  | 1.30  | 6.73   | 4.08 | -24.28 | 2.86 | -15.91 | 2.21 |
| HD 180134 | HR 7297     | HIP | 94858                      |                                      | F7 V            | 19 18 9.78     | -53 23 13.51                           | -23.5                      | 2.0           | 21.94         | 0.75          | 24.20    | 1.70  | -81.10  | 1.60  | -28.47 | 1.77 | -8.47  | 0.80 | 2.12   | 0.97 |
|           | BD+87 183   | HIP | 91720                      | GJ 753                               | K8 -            | 18 42 13.32    | 88 18 10.94                            | -10.4                      | 2.0           | 23.29         | 1.29          | -92.30   | 1.10  | 145.80  | 1.10  | -16.81 | 1.56 | -30.52 | 2.01 | 11.29  | 1.32 |
|           |             | HIP | 94997                      | GJ 4106                              | M2 -            | 19 19 49.66    | -53 43 14.10                           | 18.0                       | 2.0           | 16.67         | 4.34          | 24.80    | 4.80  | -107.10 | 4.40  | 2.12   | 4.06 | -30.25 | 6.94 | -19.53 | 3.61 |
| HD 183063 | BD-12 5409  | HIP | 95722                      |                                      | G8 V            | 19 28 12.30    | -12 8 41.36                            | -31.0                      | 0.5           | 26.29         | 2.19          | 0.10     | 2.10  | -9.90   | 2.10  | -26.52 | 0.48 | -14.77 | 0.43 | 6.52   | 0.40 |
| HD 184985 | BD-14 5479  | HIP | 96536                      | GJ 764.2                             | F7 V            | 19 37 34.41    | -14 18 6.48                            | -15.3                      | 1.0           | 32.36         | 0.74          | -103.80  | 0.90  | -146.20 | 0.90  | -1.09  | 0.92 | -28.98 | 0.68 | 9.10   | 0.34 |
| HD 186803 | BD-19 5596  | HIP | 97358                      |                                      | G6 V            | 19 47 18.10    | -18 44 47.96                           | -23.7                      | 0.6           | 32.32         | 0.90          | -67.90   | 1.20  | -111.30 | 1.20  | -12.69 | 0.58 | -25.42 | 0.57 | 10.97  | 0.30 |
| HD 331161 | BD+31 3767  | HIP | 97292                      | GJ 767A                              | M1 -            | 19 46 23.93    | 32 1 1.39                              | -4.4                       | 0.5           | 74.90         | 2.93          | 464.87   | 1.86  | -392.51 | 2.49  | 5.51   | 0.38 | -4.49  | 0.46 | -38.10 | 1.50 |
|           | BD+31 3767B | HIP |                            | GJ 767B                              | M2 -            | 19 46 24.20    | 32 0 57.00                             | -3.7                       | 0.5           | 73.80         | 1.90          | 464.87   | 1.86  | -392.51 | 2.49  | 5.89   | 0.30 | -3.86  | 0.46 | -38.62 | 1.00 |
| HD 187458 | HR 7550     | HIP | 97477                      |                                      | F5/6 V          | 19 48 43.81    | 35 18 41.10                            | -27.0                      | 5.0           | 14.99         | 1.04          | 73.90    | 1.10  | 63.40   | 1.10  | -36.11 | 2.56 | -14.81 | 4.75 | -12.41 | 0.92 |
| HD 187101 | SAO 246298  | HIP | 97705                      |                                      | G9 V            | 19 51 23.66    | -58 30 35.55                           | 17.5                       | 2.0           | 14.73         | 0.92          | 35.90    | 1.50  | -84.10  | 1.40  | -1.62  | 1.93 | -27.76 | 1.63 | -19.98 | 1.34 |
| HD 189733 | BD+22 3887  | HIP | 98505                      | GJ 4130                              | G5 V            | 20 0 43.71     | 22 42 39.07                            | -2.7                       | 0.5           | 51.94         | 0.87          | -2.80    | 0.90  | -250.70 | 0.90  | 15.46  | 0.39 | -12.58 | 0.47 | -11.56 | 0.23 |
| HD 190470 | BD+25 4085  | HIP | 98828                      | GJ 779.1                             | K3 V            | 20 4 10.05     | 25 47 24.83                            | -7.2                       | 0.4           | 46.28         | 0.91          | -76.20   | 1.20  | -39.30  | 1.10  | 3.74   | 0.25 | -9.57  | 0.37 | 4.83   | 0.15 |
|           |             | HIP | 101844                     |                                      | M0 -            | 20 38 19.43    | -55 36 19.74                           | -26.0                      | 2.0           | 31.24         | 2.81          | 14.43    | 2.33  | -78.78  | 1.90  | -24.09 | 1.60 | -4.95  | 1.22 | 14.79  | 1.24 |
|           |             | HIP | 102401                     | GJ 806                               | M1.5 -          | 20 45 4.10     | 44 29 56.47                            | -24.3                      | 0.5           | 80.01         | 1.57          | 433.60   | 2.60  | 268.60  | 2.40  | -30.78 | 0.59 | -21.05 | 0.50 | -10.64 | 0.27 |
| HD 198550 | BD+28 3900  | HIP | 102851                     | GJ 808.2                             | K5 V            | 20 50 10.56    | 29 23 2.91                             | -9.0                       | 0.1           | 48.38         | 1.77          | 25.70    | 1.20  | -48.30  | 1.10  | -0.80  | 0.14 | -9.87  | 0.12 | -3.41  | 0.23 |
|           |             | HIP | 103441                     | GJ 813                               | M2 -            | 20 57 25.36    | 22 21 45.86                            | -31.0                      | 0.5           | 73.24         | 3.24          | 770.70   | 1.80  | -213.00 | 1.80  | -34.27 | 1.06 | -31.76 | 0.49 | -38.16 | 2.06 |
| HD 200676 | SAO 246873  | HIP | 104256                     |                                      | K1 V            | 21 7 17.53     | -57 1 56.33                            | 22.0                       | 2.0           | 18.69         | 2.07          | 39.70    | 1.50  | -112.90 | 1.80  | 2.96   | 2.03 | -33.30 | 3.22 | -16.96 | 1.38 |
| HD 203136 | BD+03 3498  | HIP | 105208                     |                                      | K0 IIIc         | 21 18 40.38    | 50 10 56.78                            | -15.5                      | 0.3           | 4.35          | 0.69          | -0.80    | 1.50  | -3.10   | 1.60  | 3.58   | 1.98 | -15.36 | 0.31 | -1.88  | 1.93 |
|           |             | HIP | 105885                     | GJ 828.1                             | K7 -            | 21 26 42.45    | 3 44 13.68                             | -2.5                       | 1.3           | 34.92         | 2.11          | -41.50   | 1.70  | -53.50  | 1.70  | 6.63   | 0.84 | -6.64  | 0.99 | 1.66   | 0.73 |
| HD 209154 | BD-16 5998  | HIP | 108732                     |                                      | G8 III          | 22 1 32.86     | -15 36 43.28                           | 6.6                        | 0.3           | 6.43          | 1.21          | 36.40    | 0.90  | -5.70   | 1.00  | -16.28 | 3.85 | -4.78  | 1.74 | -22.21 | 3.37 |
|           |             | HIP | 108752                     | GJ 844                               | M2 -            | 22 1 49.05     | 16 28 2.80                             | -14.7                      | 0.5           | 60.94         | 1.24          | 403.50   | 1.70  | 143.60  | 1.70  | -34.48 | 1.15 | -10.82 | 0.43 | -4.51  | 0.54 |
| HD 215555 | BD-12 6343  | HIP | 112415                     |                                      | G8 IV           | 22 46 8.78     | -12 9 31.65                            | -34.8                      | 0.5           | 7.86          | 2.14          | 53.10    | 1.30  | 22.30   | 1.20  | -44.00 | 5.33 | -12.21 | 0.91 | 18.23  | 1.89 |
| HD 223154 | BD+26 4685  | HIP | 117294                     |                                      | G5 IV           | 23 46 58.85    | 27 11 13.36                            | 16.2                       | 0.2           | 6.58          | 1.06          | -7.50    | 1.20  | -46.60  | 1.20  | 15.44  | 3.51 | 0.90   | 2.23 | -34.34 | 4.41 |
| HD 223460 | OU And      | HIP | 117503                     |                                      | G1 IIIc         | 23 49 40.96    | 36 25 31.01                            | 0.7                        | 0.9           | 7.41          | 0.70          | 1.10     | 1.40  | -48.70  | 1.50  | 11.02  | 1.48 | -8.92  | 1.32 | -27.76 | 2.83 |



**Figure 3.** Spatial position (RA, Dec.) for the possible stars members of the Hyades MG. The convergent point of the MG at RA = 6.4<sup>h</sup>, Dec. = 6°5 is marked with a circle. The dotted lines represent great circles defined by the proper motions and position of each star.

parameter he called Peculiar Velocity ( $PV$ ) that is defined as  $V_{\text{tan}}$  but takes into account only the proper motion component perpendicular to the C.P. ( $\tau$ ):

$$PV = 4.74\tau\pi^{-1}.$$

The criterion compares this peculiar velocity with another parameter he called total velocity ( $V_T$ ) obtained as a real  $V_{\text{Total}}$  but takes into account only the proper motion component in the direction of the C.P. ( $v$ ):

$$V_T = 4.74v\pi^{-1}\sin^{-1}\lambda.$$

The criterion considers a star as a possible member of an MG when its peculiar velocity ( $PV$ ) is less than about 10 per cent of its total velocity ( $V_T$ ):

$$PV < 0.1V_T.$$

Taking into account the definition of  $PV$  and  $V_T$ , this condition can also be written in terms of components  $\tau$  and  $v$  as

$$\tau/v < 0.1\sin^{-1}\lambda.$$

This criterion takes into account the information provided by the proper motion of the star but not the radial velocity.

#### (2) RADIAL VELOCITY CRITERION

For the moving cluster method we can obtain a predicted radial velocity (called  $\rho_c$  by Eggen) as:

$$\rho_c = V_T \cos \lambda.$$

The criterion is based in the comparison of this predicted radial velocity with the observed radial velocity of the star. Eggen considered a star as a possible member of an MG when these two velocities differ by less than 4–8 km s<sup>-1</sup>, depending on the quality of the observed radial velocity.

We have applied both criteria ( $PV$  and  $\rho_c$ ) to our candidate stars (for the five MGs), in addition to the information provided by the Galactic velocity components ( $U$ ,  $V$ ,  $W$ ; see previous section), in order to apply more strict requirements for SC membership and to better discern their membership to the different MGs. For the peculiar velocity criterion we have used the 10 per cent of  $V_T$  for all the MGs except for the Local Association, where we have used 20

per cent of  $V_T$  to take into account the large dispersion observed in this MG. For the radial velocity criterion we have taken into account the uncertainties of the adopted radial velocity of each star. In Tables 2 to 6 we list the total velocity ( $V_{\text{Total}}$ ) and the parameters needed to apply the criteria ( $PV$ ,  $V_T$ , and  $\rho_c$ ). The results of applying the  $PV$  and  $\rho_c$  criteria are indicated in the column beside each parameter with the labels ‘Y’ (if possible member) and ‘N’ (if the star does not satisfy that criterion). Errors in  $V_T$ ,  $PV$  and  $\rho_c$  are taking into account inside criteria. In the ( $U$ ,  $V$ ) and ( $W$ ,  $V$ ) diagrams (Fig. 2) we have plotted with filled symbols the stars that satisfied both criteria.

## 5 DISCUSSION AND CONCLUSIONS

Making use of a great quantity of data from the literature (previous general kinematic studies of moving groups, many works on late-type stars, new results from X-ray surveys, etc.), the accurate astrometric data recently released by the *Hipparcos* and *Tycho-2* catalogues, and additional data obtained for our own spectroscopic observations, we were able to identify a considerable population of single late-type stars (for binaries see Paper II) that are members of young (20–600 Myr) stellar kinematic groups. We have used as membership criteria the position of the stars in velocity space ( $U$ ,  $V$ ,  $W$ ), Eggen’s kinematic criteria of deviation of the space motion of the star from the convergent point, and comparison between the observed and calculated radial velocities. Additional criteria using age-dating methods for late-type stars (Li I  $\lambda 6708$ -Å absorption line, location on the colour–magnitude diagram, and level of chromospheric and coronal activity) will be applied in the more detailed study of each SKG we have undertaken, and will be addressed in forthcoming papers.

In this paper we give the list of possible members of groups (see Tables 2 to 7); for each star we list the stellar parameters we have compiled, as well as the computed galactic space motions and the results of applying the kinematic criteria. These data are also available in tabular format and in searchable catalogue format in the web page <http://www.ucm.es/info/Astrof/skg.html> that we maintain about stellar kinematic groups.

For our extensive initial sample of single late-type stars we have found a total of 535 stars that can be considered, for their position in the velocity space ( $U$ ,  $V$ ,  $W$ ) as young disc stars. We have

classified 120 stars as possible members of the Local Association, 118 of the Hyades supercluster, 84 of the Ursa Major moving group, 53 of the IC 2391 supercluster, 34 of the Castor moving group, and 126 as other young disc stars (classification is not clear but it is inside or near the boundaries that determine the young disc population in the velocity space).

When we take into account the Eggen's kinematic criteria, in the four MGs where the convergent point is available, the number of possible members in each MG is reduced. Eliminating only the stars that do not satisfy one of the two criteria (peculiar velocity and radial velocity), we found 104 possible members of the Local Association, 96 of the Hyades supercluster, 69 of the Ursa Major MG, 43 of the IC 2391 supercluster, and 29 of the Castor MG. Considering only the stars that satisfied the peculiar velocity criterion we found 77 in the Local Association, 67 in the Hyades supercluster, 37 in the Ursa Major MG, 28 in the IC 2391 supercluster, and 10 of the Castor MG. Finally, imposing both criteria the number of possible members is reduced to 45 in the Local Association, 38 in the Hyades supercluster, 28 in the Ursa Major MG, 15 in the IC 2391 supercluster, and eight in the Castor MG.

Analysing these results with the help of the great circles defined by the proper motions (see Fig. 3), we can see that almost all stars which do not satisfied the  $PV$  criterion move clearly away from the convergent point of the MG, especially those which do not satisfy radial velocity criteria either. In the velocity space ( $U, V, W$ ) the stars which satisfied both criteria tend to have a lower dispersion with respect to the expected ( $U, V, W$ ) position of the MG (see Fig. 2), but there are some cases where this is not true. The latter are normally stars with large errors in  $U, V$  and  $W$  (due to large errors in radial velocity or in parallax).

Our results confirm the membership of several previously established members of SKGs, but in other cases the new calculated Galactic space motions indicate the membership to a different SKG or that the star should be considered only as a young disc star with no clear membership to any SKG (e.g., LQ Hya). In some cases, the new calculations even located the star outside the boundaries of the young disc population in the Boettlinger diagram.

For the late-type stars with planetary companions included in our sample we have found that some stars known to be young [GJ 3021 (Naef et al. 2000),  $\iota$  Hor (Kürster et al. 2000),  $\tau$  Boo (Henry et al. 2000), 55 Cnc (Fuhrmann et al. 1998) and HD 108147 (Mayor et al. 2000)] could be possible members of the Hyades supercluster. Some of these have been also identified by Suchkov & Schultz (2001) as stars with planetary systems with ages similar to the Hyades.

The groups of nearby late-type stars with different ages we have identified in this work will be very useful for chromospheric activity studies. High-resolution optical spectroscopic observations of these stars will provide a simultaneous analysis of the different optical chromospheric activity indicators, as well as yielding rotation speed, binarity, variability and kinematics. With all this information it will be possible to study in detail the chromosphere, discriminating between the different structures: plages, prominences, flares and microflares (see Montes et al. 2000b; 2001b,d), and to analyse the flux-flux and rotation-activity relationships and their age evolution.

A further study of the list of stars compiled here, as well as detailed analysis of the origin of these young SKG and their relation with nearby young open clusters, OB associations, T associations and other recently identified associations of young

stars, could lead to a better understanding of the star formation history in the solar neighbourhood.

Another important use of the list of late-type stars we give here is that the youngest ones (the possible members of the Local Association) can be taken as search targets for direct imaging detection of substellar companions (brown dwarfs and extrasolar giant planets). These young and nearby cool dwarfs favour the optimization of the dynamical range, and the substellar companions can be detected directly because they are considerably more luminous when undergoing the initial phases of gravitational contraction than at later stages. Until now only five brown dwarfs have been detected directly (and confirmed by both spectroscopy and proper motion) as companions to nearby stars: the T dwarf Gl 229 B (Nakajima et al. 1995), the young L dwarf G 196-3 B (Rebolo et al. 1998), the T dwarf Gl 570 D (Burgasser et al. 2000), the M9 dwarf CoD - 33° 7795 B (Neuhäuser et al. 2000b) which is a member of the TW Hya association, and the M8 dwarf HR 7329 B (Guenther et al. 2001) which is a member of the Tucanae association. The B component of the Ursa Major group member Gl 569 seems to be a triple brown dwarf system (Martín et al. 2000; Kenworthy et al. 2001). In addition, Neuhäuser et al. (2000a) have shown that direct imaging detection of extrasolar giant planets is already possible with current technology.

Radial velocity is an important parameter in the determination of the space-velocity components, and in some cases only poor-quality measurements are available in the literature, resulting in large errors in  $U, V$  and  $W$ . Good-quality spectroscopic observations are needed to confirm the membership of these stars to a SKG. We have already started a programme of high-resolution echelle spectroscopic observations (using 2-m class telescopes) of these candidate stars in order to obtain a better determination of their radial velocity, as well as other stellar parameters. We will use these new data to better establish the membership of these stars (for preliminary results see Montes 2001b and Montes et al. 2001b,d).

However, a considerable number of stars in our initial sample are too faint, and no radial velocities or accurate astrometric parameters are available in the literature. High-resolution spectroscopic observations using 4- or 8-m class telescopes will be needed to obtain the spectroscopic parameters of these stars. Accurate astrometric parameters for a huge number of stars will be available, in the future, with the space-astrometry missions *DIVA* (Double Interferometer for Visual Astrometry) and *FAME* (Full-sky Astrometric Mapping Explorer). The space mission *GAIA* (Global Astrometric Interferometer for Astrophysics) will reach a much larger distance (magnitude limit 20), and will provide both astrometric data and radial velocities.

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