

# TYCHO-2 AND HIPPARCOS: INTERCOMPARISON OF THE CATALOGUES

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ABSTRACT. The Tycho-2 catalogue of position and proper motions of 2.5 millions stars is studied. The statistical and kinematical characteristics are obtained. Unusual blue stars have been revealed.

## 1. RESULTS

Among the classical astrometric catalogues [1-4] the Tycho-2 [5-7] keeps an outstanding position since it lists more than one million stars fainter  $11^m$  (Fig. 1). The distribution of stars on magnitude has two maximums. The first one corresponds to  $B - V = 0.45$ , the second one corresponds to  $B - V = 1.0$  (probably, red giants). Unusual blue stars with  $B - V \leq -0.5$  were found. The Hipparcos catalogue does not contain such blue stars in comparison to the Tycho-2.

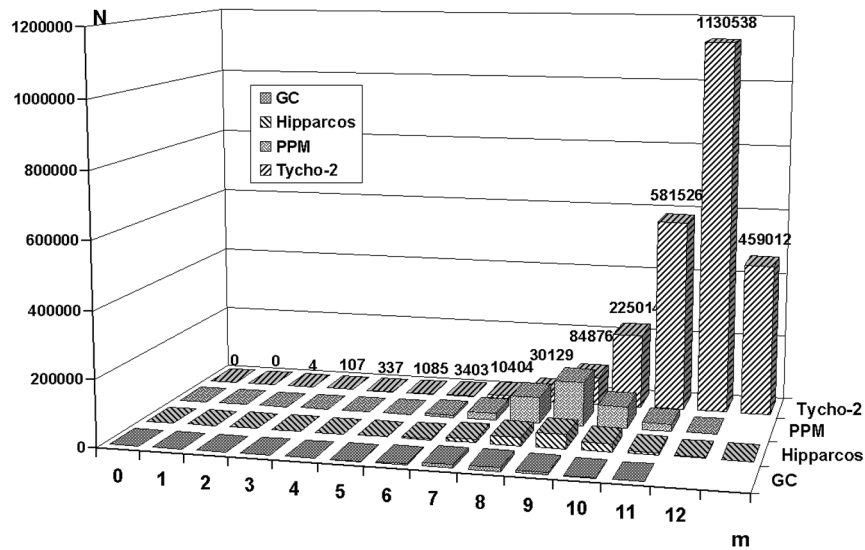


Figure 1: Stellar content of Tycho-2, PPM, Hipparcos and GC catalogues against the magnitude.

The blue stars have a tendency to concentrate in the direction of the Galactic plane, whereas the red stars show more uniform distribution. The same effects are for the Hipparcos stars. However, the Galactic concentration is observed for the most faint stars ( $m > 9^m$ ) regardless their spectral types. It is very interesting that all blue stars with  $B - V < -0.5^m$  are generally very faint stars ( $m > 11^m$ ).

The least squares technique was applied for calculating the parameters of the Oort-Linblad and Ogorodnikov-Milne models from several samples of the Tycho-2. The combined and separate solutions were made for equatorial ( $|\delta| \leq 15^\circ$ ) and non equatorial stars for the samples where the correlations between the unknowns have been found to be less than 0.4.

The Oort's parameters for faint stars were compared with the IAU recommended ones. The values of the Oort's parameters significantly depend on the properties of the samples, especially on the magnitude (Table 1) and the color index  $B - V$ .

Table 1: Dependence of the Oort's parameters  $A$  and  $B$  on magnitude

$m$	$A$	$B$
	$km/s \cdot kpc^{-1}$	$km/s \cdot kpc^{-1}$
(7, 9)	$13.9 \pm 1.0$	$-11.2 \pm 0.8$
(9, 11)	$14.5 \pm 0.2$	$-11.1 \pm 0.2$
$< 11$	$13.6 \pm 0.1$	$-10.9 \pm 0.1$

The rest of the parameters of the Ogorodnikov-Milne model are insignificant, especially for faint stars. It means that these stars being very distant satisfy the model of plane Galactic rotation.

The main conclusion is that the Tycho-2 contains a lot of more distant stars than the Hipparcos does, and the kinematics of these stars is consistent with the Oort-Linblad model of flat Galactic rotation.

## 2. ACKNOWLEDGEMENTS

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