

ASTROMETRIC PLATE REDUCTION WITH ORTHOGONAL FUNCTIONS AND MILLIARCSECONDS ACCURACY IN DEEP PROPER MOTION SURVEYS

DEVENDRA OJHA AND OLIVIER BIENAYMÉ

Observatoire de Besançon, BP 1615, F-25010 Besançon, France

We have been doing a sample survey in UBV photometry and proper motions as part of an investigation of galactic structure and evolution. The 3 fields in the direction of galactic anticentre ($l = 167^\circ$, $b = 47^\circ$), centre ($l = 3^\circ$, $b = 47^\circ$) and antirotation ($l = 278^\circ$, $b = 47^\circ$) have been surveyed. The high astrometric quality of the MAMA machine (CAI, Paris) gives access to micronic accuracy (leading to < 2 mas per year) on proper motions with a 35 years time base. The kinematical distribution of F and G-type stars have been probed to distances up to 2.5 kpc above the galactic plane. We have derived the constrain on the structural parameters of the thin and thick disk components of the Galaxy (Ojha et al. 1994abc) :

- The scale lengths of the thin and thick disks are found to be 2.6 ± 0.1 and 3.3 ± 0.5 kpc, respectively. The density laws for stars with $3.5 \leq M_V \leq 5$ as a function of distance above the plane follow a single exponential with scale height of ~ 260 pc (thin disk) and a second exponential with scale height of ~ 800 pc (thick disk) with a local normalization of 5–6 % of the disk.
- The thin disk population was found with $\langle U+W \rangle$, $\langle V \rangle = (1 \pm 4, -14 \pm 2)$ km/s and velocity dispersions $(\sigma_{U+W}, \sigma_V) = (35 \pm 2, 30 \pm 1)$ km/s. The thick disk population was found to have a rotational velocity of $V_{rot} = 177$ km/s and velocity dispersions $(\sigma_U, \sigma_V, \sigma_W) = (67, 51, 42)$ km/s. No dependence with r and z distances was found in the asymmetric drift measurements of the thick disk population.

References

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