ON THE LOCAL VELOCITY DISPERSIONS

S. NINKOVIĆ
Astronomical Observatory
Volgina 7
11050 Beograd
Yugoslavia

ABSTRACT. A new formula for the ratio of the planar velocity dispersions containing an asymmetric-drift term is proposed. It yields a good agreement with the flat rotation curve of the Galaxy.

One should bear in mind a few essential facts. Firstly, the stars of the galactic thin disc move around the galactic centre along nearly circular orbits and consequently one can derive a formula for the ratio of their planar velocity dispersions (e. g. [1]-p. 120). Secondly, the observations suggest that the ratio of the radial velocity dispersion to the transverse one is about 2.6 at the Sun (e. g. [2]). Thirdly, the galactic rotation curve seems fairly flat near the Sun (e. g. [3]).

What we measure is the deviation from the centroid velocity, not from the circular one. Therefore, the transverse residual velocity of a star must contain the asymmetric drift because on average the velocities of stars deviate systematically from the circular velocity by the amount of the asymmetric drift. If one accepts the value of about $14\,kms^{-1}$ for the local asymmetric drift concordant with the observations [2] and corrects the transverse velocity dispersion for its square, then one easily concludes that the rotation curve should be flat at the Sun.

REFERENCES

1. Binney, J. and Tremaine, S. (1987) Galactic Dynamics, Princeton University Press, Princeton, New Jersey.
2. Freeman, K. C. (1987) 'The Galactic Spheroid and Old Disk', Annual Review of Astronomy and Astrophysics 25, 603-632.
3. Fich, M., Blitz, L. and Stark, A. A. (1989) 'The Rotation Curve of the Milky Way to $2R_{\odot}$', Astrophysical Journal, 342, 272-284.