MOMENTS OF PECULIAR VELOCITIES IN STELLAR SYSTEMS WITH POINT AXIAL SYMMETRY

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In this work we study a non-cylindrical point-axial symmetric stellar system model that verifies the Chandrasekhar postulates [1]. It explains the values for the centered moments of the peculiar velocities and the galactic rotation parameters, non possible with a cylindrical model [2].

In order to enable us to check the degree of validity of our model we have deduced relations between the centered moments and the kinematical parameters in the galactic plane, where the Sun is assumed to be situated. To prove the consistency of these relations we consider two stellar samples belonging to Population I [3]: *Sample A*, composed of 361 extreme population I stars (O0-B5) with distances less than 600 pc. *Sample B*, composed of 2.154 disk stars (A0-F5), with distances less than 500pc.

In both samples the obtained second order moment $\mu_{\tilde{\omega}\theta}$ is clearly non-zero (generally with values which are of one order of magnitude greater than the error) and the fourth order moments $\mu_{\tilde{\omega}\tilde{\omega}\tilde{\omega}\theta}$, $\mu_{\tilde{\omega}\theta\theta\theta}$, $\mu_{\tilde{\omega}\theta zz}$ likewise yield non-zero values. Furthemore, according to our model, in the galactic plane the moments $\mu_{\tilde{\omega}z}$ $\mu_{\theta z}$ $\mu_{\tilde{\omega}\tilde{\omega}\tilde{\omega}z}$ $\mu_{\tilde{\omega}\tilde{\omega}\theta z}$ $\mu_{\tilde{\omega}\theta\theta z}$ $\mu_{\tilde{\omega}\theta\theta z}$ $\mu_{\theta\theta\theta z}$ $\mu_{\tilde{\omega}zzz}$ $\mu_{\theta zzz}$ can be considerated zero, since the errors are of the same magnitude than the central value. As far as the third order moments are concerned, all of them except $\mu_{\tilde{\omega}\tilde{\omega}\theta}$ $\mu_{\theta zz}$ and especially $\mu_{\theta\theta\theta}$, present values less than the double of the error. These three moments, which are not directly explained in our model, could predictably be obtained from overlapping stellar systems in the cylindrical and stationary case [4].

The relations between second and fourth order moments obtained from previous samples correspond to a Schwarzchild distribution function. Finally the results show that the C and K Oort's Constants have clearly non-zero values, according to our model.

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