



A statistical model of beginning rotation of gravitating body

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The statistical model of the gravitational interaction of particles has been proposed in [1],[2]. Within the framework of this model bodies have fuzzy outlines and are represented by means of spheroidal forms. In the work [3], it has been investigated a slowly evolving in time process of a gravitational compression of a spheroidal body close to an unstable equilibrium state. In the paper [4], the equation of motion of particles inside the weakly gravitating spheroidal body modeled by means of an ideal liquid has been obtained. Using Schwarzschild's and Kerr's metrics a consistency of the proposed statistical model with the general relativity [5] is shown. This work considers the case of gravitational compression of a spheroidal body with observable values of particles. The distribution function of particles inside a weakly rotating and gravitating spheroidal body is derived. The field potentials (including the scalar gravitational potential, the potential of centrifugal force and the potential of deformation force along the radial direction) for a gravitating spheroidal body with observable velocities of particles are considered. This work also shows that if a gravitating spheroidal body is rotating uniformly or is being at rest then distribution function of its particles satisfies the Liouville theorem. References: [1] A.M.Krot, Achievements in Modern Radioelectronics, special issue "Cosmic Radiophysics", no.8, pp.66-81, 1996 (Moscow, Russia). [2] A.M.Krot, Proc. 13th SPIE Symp. "AeroSense", Orlando, Florida, USA, 5-9 April, vol. 3710, pp. 1248-1259, 1999. [3] A.M.Krot, Proc. 14th SPIE Symp. "AeroSense", Orlando, Florida, USA, 24-29 April, vol.4038, pp.1318-1329, 2000. [4] A.M.Krot, Proc. 53rd Intern. Astronautical Congress: The World Space Congress-2002, Houston, Texas, USA, 10-19 October, Preprint IAC-02-J.P.01, pp.1-11, 2002. [5] L.D.Landau and E.M.Lifshitz, Classical Theory of Fields, Addison-Wesley, 1951.