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Becoming angular momentum density flow through nonlinear mass transfer into a gravitating spheroidal body

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A statistical theory for a cosmological body forming based on the spheroidal body model has been proposed in the works [1]–[4]. This work studies a slowly evolving process of gravitational condensation of a spheroidal body from an infinitely distributed gas-dust substance in space. The equation for an initial evolution of mass density function of a gas-dust cloud is considered here. It is found this equation coincides completely with the analogous equation for a slowly gravitational compressed spheroidal body [5].
A conductive flow in dissipative systems was investigated by I. Prigogine in his works (see, for example, [6], [7]). As it has been found in [2], [5], there exists a conductive antidiffusion flow in a slowly compressible gravitating spheroidal body. Applying the equation of continuity to this conductive flow density we obtain a linear antidiffusion equation [5]. However, if an intensity of conductive flow density increases sharply then the linear antidiffusion equation becomes a nonlinear one. Really, it was pointed to [6] analogous linear equations of diffusion or thermal conductivity transform in nonlinear equations respectively.
In this case, the equation of continuity describes a nonlinear mass flow being a source of instabilities into a gravitating spheroidal body because the gravitational compression factor G is a function of not only time but a mass density. Using integral substitution we can reduce a nonlinear antidiffusion equation to the linear antidiffusion equation relative to a new function. If the factor G can be considered as a specific angular momentum then the new function is an angular momentum density.
Thus, a nonlinear momentum density flow induces a flow of angular momentum density because streamlines of moving continuous substance come close into a gravitating spheroidal body. Really, the streamline approach leads to more tight interactions of “liquid particles” that implies a superposition of their specific angular momentums. This superposition forms an antidiffusion flow of an angular momentum density into a gravitating spheroidal body.
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