

Convergence to equilibrium for a kinetic model of cometary flows

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Abstract

A nonlinear kinetic model for wave-particle collisions in cometary flows on a bounded domain subject to specular reflection boundary conditions is considered. Similarly to the work of Desvillettes (1990) for the Boltzmann equation, convergence to an equilibrium distribution for large times is proven. The set of equilibrium distributions is infinite dimensional. A special feature of the model is that all the corresponding collision invariants except 5 (mass, momentum, energy) depend on the mean velocity of the distribution function and, thus, do not produce macroscopic conservation laws. As a consequence, the correct equilibrium distribution corresponding to given initial data is not known at present. This is also the main reason why the extension of recent work by Desvillettes and Villani on the rate of convergence remains an open problem.