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Evolution Equation of Soft Active Matter

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We develop an approach to the description of the evolution of large number of interacting active particles within the framework of the evolution of marginal observables. The description of the microscopic dynamics is based on the dynamical system of stochastic Markovian processes [1].

One of the advantage of the developed approach is the possibility to construct nonlinear kinetic equations in scaling limits, involving correlations of particles at initial time which characterize the condensed states of interacting particles modeling systems in mathematical biology. We note also that a such approach is also related to the problem of a rigorous derivation of the non-Markovian kinetic-type equations which make it possible to describe the memory effects of the kinetic evolution of active particles.

The obtained results are applied to the description of the typical macroscopic (hemokinetic) properties of the blood flows.

[1] V. I. Gerasimenko, Yu. Yu. Fedchun, On kinetic models for the evolution of many-entity systems in mathematical biology *J. Coupled Syst. Multiscale Dyn.* **1**, (2013), p. 273.