Quantitative uniform propagation of chaos for Maxwell molecules

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Abstract

The **spatially homogeneous Boltzmann equation** models the evolution of the velocity distribution of a huge number of particles in a gas, subjected to elastic random binary collisions. In this work we study the corresponding finite N-particle system in the simpler Maxwell molecules case. We are interested in the so-called **propagation of chaos** property: the convergence, as $N \to \infty$ and for each time $t \geq 0$, of the empirical measure of the system towards the solution of the Boltzmann equation. Using recent probabilistic coupling techniques, we find, under suitable moments assumptions on the initial distribution, an explicit uniform-in-time propagation of chaos rate of order almost $N^{-1/3}$ in squared 2-Wasserstein distance.