

Abstract:

An outstanding open problem in kinetic theory is to make a rigorous derivation of the Boltzmann equation starting from the dynamics of systems of real interacting particles. Although some recent results seem promising, there is still a long way to go. To better understand the key difficulties, Mark Kac invented a stochastic model retaining important aspects of a real particle system and yet allowed for a rigorous treatment. I will discuss the notion of “molecular chaos” and “propagation of chaos”, which are essential for his argument, and in particular look at variations of Kac’s original model designed to study the collective motion of self-propelling particles.