

Hypocoercivity for kinetic equations

Esther Sarah Daus

Abstract

In this talk I want to evaluate the exponential rate of convergence to stationary state of a certain class of linear kinetic equations conserving mass. This class of kinetic equations involves a symmetric dissipative collision operator and an antisymmetric transport operator, such that the interaction of these two operators leads to exponential convergence to a uniquely determined equilibrium state.

The interesting fact is that the collision operator is not coercive (i.e. it does not admit a spectral gap), so we cannot use standard entropy methods, but the collision operator possesses a huge kernel, and additional properties of the transport operator on this kernel lead to exponential convergence, which is called hypocoercivity (C. Villani 2006). These results are based on the paper "Hypocoercivity for linear kinetic equations conserving mass" (Dolbeault, Mouhot, Schmeiser 2010).

Future investigations will be to extend this technique to the nonlinear Maxwell-Stefan equations.