Some mathematical aspects of the Boltzmann equation

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Abstract

Syllabus for the course:

• The paradigm of Kinetic Theory: From N-particle systems to a one-particle description. Propagation of chaos and scaling limits. Kinetic equations.
• The Boltzmann equation: Heuristic derivation and formal properties.
• Rigorous derivation of the Boltzmann equation: Sketch of the main arguments.
• The Cauchy problem for the homogeneous Boltzmann equation: Construction of the solutions and properties.
• Perturbation of equilibrium: Sketch.
• Hydrodynamical limits and the Hilbert expansion.