Workshop on Stochastic Analysis

IMECC - Unicamp

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Boltzmann processes

Abstract

The Boltzmann equation describes the dynamics of a density in position and velocity of a rarified gas expanding in vacuum. Ludwig Eduard Boltzmann $(1844 - 1906)$ derived the Boltzmann equation, by assuming any gas molecule of a rarified gas to travel straight in vacuum until an elastic collision occurs with another molecule of the same gas. In the Boltzmann equation, only binary centered collisions are considered. In this talk we present the "Boltzmann process", i.e the process whose density evolves according to the Boltzmann equation. Using the Ito formula, we prove that this is a solution of a stochastic differential equation of McKean Vlasov type, for which we prove the existence of a weak solution.This is a joint work with Padmanabhan Sundar (Louisiana State University)