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Seminario Núcleo MESCD / Conjunto Modelamiento Estocástico

Expositor

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Titulo

Particle systems and propagation of chaos for some kinetic models

Abstract:

In this talk we will make a quick historical review of some equations arising in the classical kinetic theory of gases and related models. We will start with the Boltzmann equation, which describes the evolution of the distribution of positions and velocities of infinitely many small particles of a gas in 3-dimensional space, subjected to elastic binary collisions. We consider a finite N-particle system and introduce the important concept of propagation of chaos: the convergence, as $N\to\infty$ and for each time $t\geq 0$, of the distribution of the particles towards the solution of the equation. We present some recent quantitative propagation of chaos results for the spatially homogeneous Boltzmann equation and Kac's model. Lastly, we will introduce a relatively new class of one-dimensional kinetic equations modelling wealth redistribution in a population performing binary trades. When trades preserve wealth only on average, these models can exhibit an equilibrium distribution with heavy tails, as is seen in real-world economies. We focus on the corresponding finite N-particle system and study how the heaviness of the tails of its distribution relates to that of the limit kinetic equation. Unless wealth is preserved exactly in each trade, we find important qualitative differences between both cases.

Martes 12 de Junio a las 16:00 hrs. Sala de Seminarios John Vob Neumann, ubicada en Beauchef 851, Torre Norte, Piso 7.

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