Seminar/Talk

The structure of transport equations and the Vlasov-Poisson system

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Host:

The transport equation describes the evolution of a distribution of particles moving along the flow (characteristic curves) of a prescribed smooth vector field. An accurate description of its solutions, even when the smoothness assumption is dropped, is motivated by several applications, among which the study of kinetic equations such as the Vlasov-Poisson system.
Given a vector field in R^d, the classical Cauchy-Lipschitz theorem shows existence and uniqueness of its flow provided the vector field is sufficiently smooth; this, in turn, translates in existence and uniqueness results for the transport equation. In the last 30 years, several efforts were made in order to lower the regularity assumptions on the vector field, like in the seminal paper by Di Perna and Lions in 1989. They proved that Sobolev regularity for vector fields, with bounded divergence and a growth assumption, is sufficient to establish existence, uniqueness and stability of a generalized notion of flow, consisting of a suitable selection among the trajectories of the associated ODE. In the seminar I will go through this theory and present some recent results, obtained in collaboration with Ambrosio and Figalli.

Tuesday, January 10, 2017 09:45am - 10:45am
Raiffeisen Lecture Hall, Central Building

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