MATHEMATICS

MID ATLANTIC NUMERICAL ANALYSIS DAY 2014

A conference on numerical analysis and scientific computing for graduate students and postdocs from the Mid-Atlantic region.

Friday, 7 November 2014

Keynote Speaker

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Social Dynamics: Modeling, Analysis and Numerical Simulation

Abstract

We discuss the dynamics of systems of "agents" which are self-propelled by 'environmental averaging', namely, dynamics driven by the engagement of agents with their 'local neighbors.' Prototype examples include opinion dynamics in human networks, flocking, swarming and bacterial self-organization in biological organisms or rendezvous in mobile systems.

Two natural questions arise in this context: what happens when the time T tends to infinity and when the number of agents N tends to infinity.

The underlying issue is how different "rules of engagement" influence the formation of clusters realized as Dirac masses, and in particular, the tendency to concentrate into one cluster, reflecting a "consensus of opinions."

We shall discuss several key models, present the analysis of their large time formation of Dirac masses and describe numerical novel numerical methods, DG-based and velocity rescaling to simulate such Dirac masses.

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