

RUTGERS-CAMDEN MATH SEMINAR SERIES

12:45 PM - 1:45 PM, MARCH 13TH, 2025

ARM-121

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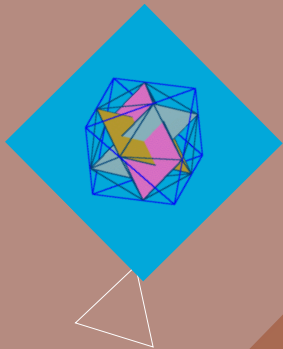
Title: Nonlocal Systems of Hyperbolic Equations

Abstract: We consider a multi-D non linear system of hyperbolic equations in conservation form with non-local terms in the flux functions. The non-local terms considered here are convolutions with smooth kernels.

The resulting model is of macroscopic type and is able to describe different behaviors typically emerging in population dynamics. Indeed different shapes of the kernel function and of the velocity vectors may result for example in an aggregation phenomenon, with the possible formation of clusters (or opinions), or in a segregation of the various populations.

An important role is played by the support of the kernel function, which corresponds to the visual range of the individuals. In this talk we present several numerical integrations together with its well posedness and some analytic qualitative properties. Moreover, we also discuss the coupling between local and non-local equations. This interplay is of a particular interest in the context of traffic flow, due to the presence of autonomous vehicles, aware of traffic conditions at a significant distance from their locations, and of standard vehicles, which typically behaves according to the traffic conditions at their locations.

These are joint works with Rinaldo M. Colombo (University of Brescia, Brescia, Italy) and Claudia Nocita (University of Milano Bicocca, Milano, Italy).



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