



Tuesday **October 22, 2019** at 14:30

Politecnico di Torino, DISMA, Aula Buzano (third floor)

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Initial Boundary Value Problems for Balance laws

Prof. Giacomo Como introduces the seminar.

Abstract

In this talk, we present some recent results on initial boundary value problems (IBVPs) for balance laws. We begin by introducing various definitions of solution to these problems, highlighting analogies and differences among them, and in particular comparing how boundary conditions are fulfilled in each case. This constitutes the key ingredient in the proof of the equivalence of the considered definitions.

We then shift the attention to the well-posedness of IBVPs, with a particular attention to stability estimates with respect to the flux. Exploiting different techniques, this estimate can be recovered in one space dimension initially for subclasses and only recently for the general problem. Concerning the multi-dimensional case, the stability estimate is available only in the special framework of linear conservation laws with homogeneous boundary conditions.

This latter result allows to prove the well-posedness of a class of system of non local conservation laws in bounded domains, a construction motivated by the modelling of crowd dynamics. The main novelty lies in the introduction of a new type of non local operator, which describes the interactions among individuals at different positions: the new operator is aware of boundaries, i.e. walls and obstacles. We present some numerical integrations, obtained through an ad hoc numerical algorithm, showing the behaviour of the model.

We then exploit the new non local operator also for the study of the IBVP for one dimensional scalar non local conservation laws.

Biography

Elena Rossi received her PhD in Pure and Applied Mathematics at University of Milano Bicocca in 2016, jointly with University of Stuttgart (Germany), under the supervision of Rinaldo M. Colombo, Christian Rohde and Veronika Schleper. She had a one-year INdAM post-doc fellowship at the University of Brescia between 2016 and 2017, then she was post-doc at Inria Sophia Antipolis-Méditerranée (France) until April 2019. She is currently doing a post-doc at University of Milano Bicocca.

Her research interest is focused on balance and conservation laws, and in particular on non local problems and initial boundary value problems.