Introduction to Hyperbolic Conservation Laws

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Timetable: 16 hrs. Torre Archimede, Room 2BC/30.

Course requirements: very basic notions of ODE and PDE theory

Examination and grading: seminar

SSD: MAT/05 - Mathematical Analysis

Aim: the course aims at providing an introduction to:
- fundamental features of the theory of hyperbolic conservation laws in one space variable;
- topics in recent research on traffic flow models and networks for this class of first order non-linear PDEs.

The course shall be of particular interest for students in Mathematical Analysis, Mathematical Physics, Numerical Analysis, especially if interested in fluid dynamics models.

Course contents:
Part 1

Part 2
Conservation laws with discontinuous flux and with point constraints. Analysis of traffic flow models via vanishing viscosity and many particle approximations (micro-macro limit).

References:

- C.M. Dafermos, Hyperbolic Conservation Laws in Continuum Physics, Fourth, ed. Springer Verlag.