Introduction to Hyperbolic Conservation Laws

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**Timetable:** 16 hrs. First lecture on May 3, 2021, 09:00 (dates already fixed, see calendar), Torre Archimede, Room 1BC/50 if in presence, otherwise at link Zoom (to be communicated).

**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 nonlinear 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.