Scalar conservation laws, shock profiles and control

Lecturer: Adi Adimurthi[1]

Date and time: 30 May – 3 June 2011, from 9:00 to 11:00

Abstract: We shall first recall the basics on viscosity solutions for Hamilton–Jacobi Equations and uniqueness results. We shall then address scalar conservation laws in one space dimension and discuss the Lax-Olenik formula and Dafermos characteristics and the fine properties of solutions they yield. Then we apply them to study the shock profile of solutions and develop criteria for the existence of an infinite number of shocks. Then, using this fine analysis we shall address control problems for scalar conservation laws with convex fluxes.

Bibliography:

[1] L.C. Evans, *Partial differential equations*. Graduate Studies in Mathematics **19**. American Mathematical Society, 1998.

[2] N.H. Risebro, An introduction to the theory of scalar conservation laws with spatially discontinuous flux functions. In "Applied wave mathematics", pp. 395–464. E. Quak and T. Soomere (eds.). Springer, 2009.

[3] C.M. Dafermos, Characteristics in hyperbolic conservation laws. In "Nonlinear analysis and mechanics: Heriot-Watt Symposium. Vol. I", pp. 1–58. R.J. Knops (ed.). Research Notes in Mathematics **17**. Pitman, 1977.

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