

Hyperbolic equations

WS 2022, V5B3.

(Advanced Topics in PDEs and Mathematical Modelling).

Juan J. L. Velázquez

The goal of this course is to study the well posedness theory for nonlinear hyperbolic systems. In particular, the methods of proving well posedness for the Cauchy Problem associated to general Symmetric Hyperbolic Systems will be described in detail. The general methods available in order to prove well posedness for these systems are based in the derivation of suitable energy estimates.

Different concepts of hyperbolicity used in the literature will be discussed. Specific examples of hyperbolic equations, including the Euler equations for compressible fluids will be studied in detail as well as some particular scaling limits for the equations.

Prerequisites: Basic knowledge of Functional Analysis and Partial Differential Equations.

Lectures: The lectures will take place on Monday at 12:00 and Friday at 12:00.

References

- [1] F. John, Partial Differential Equations, Springer, Berlin, 1984.
- [2] T. Kato, Abstract Differential Equations and Nonlinear Mixed Problems, Pisa, 1985.
- [3] A. Majda, Compressible fluid flow and systems of conservation laws in several space variables, Springer, Berlin, 1984.