Hyperbolic Conservation Laws

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(Penn State University)

3-5pm Wednesday 1,8,15 & 22 November

This short course will provide an **introduction to the theory of hyperbolic systems of conservation laws in one space dimension**.

The following topics will be covered:

1) Conservation equations: motivations, examples.
2) Hyperbolic systems. Explicit solutions in the linear, constant coefficients case. Nonlinear effects: loss of regularity and wave interactions.
3) Definition of weak solutions. Shock waves: Rankine-Hugoniot equations and admissibility conditions.
4) Genuinely nonlinear and linearly degenerate characteristic fields. Centred rarefaction waves.
5) The general solution of the Riemann problem. Wave interaction estimates.
6) Construction of weak solutions to the Cauchy problem, with initial data having small total variation. Approximations generated by the front-tracking method and by the Glimm scheme.
7) Uniqueness and continuous dependence of weak solutions.
8) A discussion of some open problems.

The course will be based on the set of lecture notes:

Hyperbolic conservation laws: an illustrated tutorial available on the web page ***http://www.math.psu.edu/bressan/LectureNotes.html***

All graduate students, post-docs faculty and visitors are welcome to come to the lectures being held in the Mathematical Institute, Oxford. If you aren't a member of the CDT please email **pde-cdt@maths.ox.ac.uk** to confirm you will be attending.

CDT PDE

EPSRC Centre for Doctoral Training in Partial Differential Equations