Hyperbolic Conservation Laws

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Introduction: Hyperbolic conservation laws arise naturally in several areas of physics and chemistry. To understand them and their consequences (shock waves, wave propagation) properly in mathematical terms requires knowledge of a broad range of topics. This course is aimed to set up the foundations of the modern theory of conservation laws describing the physical models and mathematical methods, then take to the current state of knowledge in the subject.

Although this course is designed for applied mathematics students in the first year of graduate study, it is self-contained.

The material covered is outlined in the following:
1. Introduction
2. Classical Solutions and Riemann Problems
3. Initial-Value Problems and Glimm’s Scheme
4. Viscous Conservation Laws
5. Boltzmann Equations

Reference:
1. G.B. Whitham: "Linear and Nonlinear Waves”.
2. G.I. Barenblatt: "Scaling”.
4. J. Smoller: "Shock Waves and Reaction-Diffusion Equations”

First Meeting: Sep. 22 (Wednesday, 10:10-11 AM, 3177)