NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS

Lagniappe 2006

Organized by Alexander Kurganov and Steve Rosencrans

The main goal of this seminar is to get familiar with several topics in nonlinear PDEs by going over (parts of) a new graduate text
Nonlinear Partial Differential Equations for Scientists and Engineers by Lokenath Debnath.

We will first meet and select up to 6 topics (depending on participants' research interests) from the following list:

- Nonlinear Model Equations and Variational Principles
- First-Order Quasi-Linear Equations and Method of Characteristics
- First-Order Nonlinear Equations and Their Applications
- Conservation Laws and Shock Waves
- Kinematic Waves and Real-World Nonlinear Problems
- Nonlinear Dispersive Waves and Whitham's Equations
- Nonlinear Diffusion-Reaction Phenomena
- Solitons and Inverse Scattering Transforms
- The Nonlinear Schrödinger Equation and Solitary Waves
- Nonlinear Klein-Gordon and Sine-Gordon Equations
- Asymptotic Methods and Nonlinear Evolution Equations

We will make the first two presentations, while the junior seminar participants will prepare and deliver the remaining four lectures, which are anticipated to be informal and highly interactive.

Prerequisites: basic knowledge of (linear) PDEs and analysis; a strong will to learn some fascinating mathematics.