

Summer School on

Numerics and Control of PDEs

July 22 – August 2, 2013 | Indian Institute of Science, Bangalore

The summer school will have two broad themes as detailed below. Participants selected for participation will be attending lectures in both the themes.

Theme I: Feedback stabilization of parabolic type systems – Theoretical and Numerical Approaches

Aim: The objective of the lectures in this theme is to present the theoretical and numerical foundations for the active control of parabolic type systems. Numerical experiments with MATLAB will be done during this week. The contents are therefore strongly oriented towards a unified presentation of models, algorithms and numerical tests.

Speakers:

C. Praveen (TIFR CAM)

Mythily Ramaswamy (TIFR CAM)

Jean-Pierre Raymond (University of Toulouse, France)

Contents: Introduction to control and stabilization of finite dimensional systems (systems of ordinary differential equations) – Applications to specific examples; The controlled heat equation and its numerical approximation; Stabilization of the heat equation and of convection-diffusion equations; Algorithms for determining feedback control laws and state estimators - Numerical tests.

Theme II: Numerical schemes for hyperbolic equations

Aim: The objective in this theme is to introduce hyperbolic PDE's, their basic theory and numerical approximations with some examples from traffic flow. Strong emphasis will be placed on the interplay between the mathematical foundations of the models and the discrete approximation of their solutions thanks to a comprehensive set of numerical benchmarks.

Contents: Basic theory of entropy weak solutions to hyperbolic equations and their numerical approximation via time explicit finite volume methods; salient features of the theory mainly in scalar setting and prominent numerical methods; extensions to the systems mainly on the ground of numerical simulation; a hierarchy of PDE models for traffic flow problems to permit a sustained physical picture of the underlying concepts.

Speakers:

Frederic Coquel (CNRS and Ecole Polytechnique, FRANCE)

Thierry Goudon (INRIA and Univ. Nice, FRANCE)

Prerequisites:

- Numerical sessions will be realized in MATLAB. Thus a basic knowledge of this software is necessary. Basic knowledge of C language programming (though not necessary) would be an added advantage.
- Basic knowledge of finite difference numerical schemes and finite element method are also required.
- Basic knowledge of linear partial differential equations is required.

For online registration and other details, please visit

<http://math.iisc.ernet.in/ifcam13.htm>

Interested candidates can register online or download and submit by either email or post to

**Director, Indo-French Centre for Applied Mathematics, Department of Mathematics,
Indian Institute of Science, Bangalore 560 012**

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Deadline for application: March 31, 2013

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and Technology, India.**