

Spring Lecture Series N.26

Solutions of Partial Differential Equations in Periodic Media (2001)

Principal Lecturer: Luis Caffarelli and Rafael de la Llave (University of Texas, Austin)

[A list of open problems presented: "Solutions of PDE's in Periodic Media" \(PDF file\)](#)

Invited Speakers:

Renato Iturriaga

Title: Burgers Turbulence and Random Lagrangian Dynamics

Abstract: We consider a random Lagrangian system on the \mathbb{S}^n dimensional torus and the Hamilton Jacobi equation related to it. We prove that with probability one there exists a unique minimizing trajectory for the Lagrangian system and a unique solution for the Hamilton Jacobi equation.

Jeff Viaclovsky

Title: Monge-Ampere equations on Hessian manifolds

Abstract: We study the regularity of solutions to Monge-Ampere equations on a particular class of affine flat manifolds.

Alberto Candel

Title: On the geometry of leaves

Sigurd Angenent

Title: Elliptic PDEs with periodic nonlinearities

Yanyan Li

Title: Extensions to a theorem of Jorgens, Calabi, and Pogorelov

Victor Bangert

Title: Minimizing currents and the stable norm in codimension one

Abstract: It will be shown how existence and properties of laminations by minimal hypersurfaces in compact Riemannian n -manifolds M follow naturally from a structure theory for locally minimizing closed (normal) $(n-1)$ -currents. This depends on ideas by Arnoux/Levitt on codimension one singular foliations. The results are used to investigate the stable norm on the real $(n-1)$ -homology of M .

Fang Hua Lin

Title: Ginzburg-Landau approach to the curve shortening flow

Abstract: Formally it is not hard to see that one can use the Ginzburg-Landau heat flow to study the (high codimensional) motion by mean curvature. However, there are analytical difficulties. Though it is believed that the method may work for arbitrary dimensions, I shall explain only how problem can be handled in the 3-D space.

L. C. Evans

Title: Homogenization and effective Hamiltonians

D. Burago

Title: On the geometry of periodic metrics

J. Mather

Title: Differentiability properties of the Beta Function

Contributions by:

Ivan Blank (Rutgers University), (Joint with Henrik Shahgholian)

Title: A Criteria for Compactness in Some Overdetermined Problems and Its Application to the Boundary Regularity of Contact Sets

Tiziana Giorgi (Towson University)

Title: Vortex structures for a model of high temperature superconductivity and antiferromagnetism

Diogo Gomes (IAS)

Title: Viscosity Solutions and Aubry-Mather Theory

Michael Korey (Potsdam, Germany)

Title: Forbidden Symbols without Fear: Weak Continuity and Interpolation Theory in Besov Spaces

Marianne K. Kortén (Kansas State University)

Title: "Nontangential convergence to initial data for the one-phase Stefan problem"

Ruediger Landes (University of Oklahoma)

Title: One-sidedness-condition versus angle condition for perturbations of elliptic systems

Alexei Novikov (IMA University of Minnesota)

Title: Stability of modulational perturbations of cellular flows

Panayotis Panayotaros (University of Colorado at Boulder)

Title: Amplitude equations for surface elastic waves

Mahmoud Qafsaoui (LAMFA-CNRS Amiens, France)

Title: Equivalence between the De-Giorgi estimates and heat kernel estimates for higher order elliptic operators or systems under divergence form

Enrico Valdinoci (University of Texas at Austin)

Title: Times of diffusion via Mather Theory

Claudia Valls (University of Texas at Austin)

Title: Existence of smooth quasiperiodic solutions in the Boussinesq equation

Changyou Wang (University of Kentucky)

Title: Weighted Sobolev Inequality and Removable Singularity for Some Variational PDEs

Qi Zhang (University of Memphis)

Title: Existence of ground states for semilinear elliptic equations with decaying mass: a parabolic approach

Meijun Zhu (University of Oklahoma)

Title: Some inequalities related to isoperimetric inequalities with partial free boundary