

Mathematical Sciences at University of Bath

PDE SEMINARS 2010

Fridays in the Wolfson Lecture Theatre (4 West 1.7) at 4.15 preceded by tea at 3.45

- 8th Oct: **Susana Guterrez (Birmingham)**

Self-similar solutions of 1-D cubic Schrödinger equations and related singular vortex dynamics.

ABSTRACT: Self-similar solutions of some 1D cubic Schrödinger equations are related to “self-similar” solutions of a geometric flow modeling the dynamics of a vortex filament. Our aim is to present some results on the existence of solutions of the latter geometric flow which develop a singularity in finite time, and study their properties. Our approach uses the so-called Hasimoto transformation.

- 15th Oct: Landscape - Dorothy Buck (Imperial)

- 22nd Oct: **Arghir Zarnescu (Oxford)**

Partial regularity and approximations of C^0 domains

ABSTRACT: We consider domains whose boundary can be locally represented as the graph of a continuous function and construct smooth approximations that preserve topological properties (in particular the fundamental group, for instance). The main tool for doing this is a notion of (multivalued) map of “good directions at a point”, that is a map that associates to a point in the neighbourhood of the boundary the directions along which the boundary can be locally represented as the graph of a continuous function. We study various properties of the map of good directions and also use it to show that there must be points on the the boundary of the domain, in a neighbourhood of which the domain is in fact smoother, it is locally Lipschitz. This is joint work with John M. Ball.

- 29 Oct: Landscape - Tim Hollowood (Swansea)

- 5th November : **Michel Chipot (Zürich)**

Existence results for elliptic problems in unbounded domains

ABSTRACT: It will be shown how to construct the solutions of elliptic problems in unbounded domains contained in cylinders. The technique consists in showing that the solution confined in bounded sub-domains is a Cauchy sequence which converges at an exponential rate.

- 12 Nov: Oxford PDE Morning + Colloquium by Luis Caffarelli at 4.50pm

- Bath Landscape Richard Gill (Leiden)

Programme (for Abstracts see <http://www.maths.ox.ac.uk/groups/oxpde/events/pde>)
Margaret Thatcher Centre, Somerville College, Oxford, OX2 6HD

8.45 am Registration

9.00 am Welcome and Introductions

9.15 am **Peter Topping (Warwick)**

Geometric Aspects of the Logarithmic Fast Diffusion Equation

10.00 am **Maria Esteban (Université de Paris-Dauphine)**

About Symmetry Properties of Extremal Functions in Interpolation Inequalities

10.45 am 11.15 am BREAK

11.15 am **Alfio Quarteroni (École Polytechnique Fédérale de Lausanne)**

Reduced Basis Methods for Parametrized Partial Differential Equations

12.00 pm **Laure Saint-Raymond (École Normale Supérieure)**

Semiclassical and Spectral Analysis of Oceanic Waves

P T O

4.30 Lecture Theatre 2, Mathematical Institute, Oxford

Colloquium by Luis Caffarelli (Austin)

Non linear problems involving anomalous diffusion.

ABSTRACT: Anomalous (non local) diffusion processes appear in many subjects: phase transition, fracture dynamics, game theory. I will describe some of the issues involved, and in particular, existence and regularity for some non local versions of the p -Laplacian, of non variational nature, that appear in non-local tug of war.

• **EXTRA: Wednesday 24 Nov at 4.15 in 1 WN 3.23**

Professor S. Pilipovich

Applications of Tauberian theorems for the wavelet and regularizing transforms

ABSTRACT: We present local class estimates based on Abelian and Tauberian theorems for the wavelet and regularizing transforms of Banach-valued tempered distributions having weak asymptotic behaviour or bounds. Then we apply these theorems and obtain regularity properties within distribution spaces introduced by Mayer and Boni, to regularity theory within generalized function algebras and to the asymptotic analysis of solutions to some classes of evolution equations.

Joint results of J. Vindas and S. Pilipovic

• 26th Nov: **Sergey Zelik (Surrey)**

Damped wave equations with supercritical nonlinearities

ABSTRACT: Recent progress in the theory of dissipative hyperbolic equations with fast growing nonlinearities will be discussed. Questions related with the existence and uniqueness of solutions, their asymptotic regularity and the associated attractors will be considered for several classes of such equations, including the usual damped wave equations, the so-called strongly damped wave equations, hyperbolic Cahn-Hilliard equations, etc.

• 3rd Dec: **Ari Laptev (Imperial)**

Spectral inequalities for a class of Schrödinger operators

ABSTRACT: The celebrated Lieb-Thirring inequalities for the negative spectrum of Schrödinger operators play an important role in problems of stability of matter, theory of attractors of Navier-Stokes equations, properties of continuous spectrum, embedding Sobolev theorems, etc. Some new recent results related to a class of Schrödinger operators with convex potentials will be presented.

• 10th Dec: **TWO seminars**

2.15 in Wolfson

Mitsuru Sugimoto (Nagoya University)

On some L_p -type estimates for evolution operators

ABSTRACT: Mapping properties of unimodular Fourier multiplier describing various type of evolution operators will be discussed. It is known that they are bounded on modulation spaces while not on L_p -spaces except for the case $p=2$. In this talk, the boundedness between L_p -Sobolev spaces and modulation spaces will be mainly considered. For the purpose, the inclusion relations between L_p -Sobolev spaces and modulation spaces will be determined explicitly.

No Tea Today

4.15 in Wolfson

Yuri Netrusov (Bristol)

Estimates of Entropy Numbers in Function Spaces