Singular integrals and partial differential equations

SCHEDULE AND ABSTRACTS

Aim of the workshop

As with the previous two workshops (2012 and 2015) of the same series, the general aim is to exchange some latest ideas in the analysis of singular integrals and allied topics.

In this concluding workshop of the ERC Starting Grant Analytic-probabilistic methods for borderline singular integrals, a particular but not the only emphasis is on the role of singular integrals in the theory of partial differential equations.

Organization

The workshop is organized by the Harmonic Analysis research group at the University of Helsinki.

It is funded by the European Research Council through the ERC Starting Grant “Analytic-probabilistic methods for borderline singular integrals”.

It is the third and final workshop within this project. The previous workshops were

- Singular Integrals, Randomness and Weights, 29-31 August 2012
- Frontiers of Singular Integrals, 2-5 June 2015

Plenary speakers

- Pascal Auscher (Université Paris-Sud, Orsay): The Kato square root estimate for parabolic operators
- Stefanie Petermichl (Université Paul Sabatier, Toulouse)
  1. News on multi-parameter commutators (slides)
  2. News on weighted estimates (slides)
- Igor Verbitsky (University of Missouri, Columbia):
  1. Weighted norm inequalities of (1,q)-type for integral operators and a sublinear version of Schur’s lemma (slides)
  2. Global estimates of solutions to nonlinear elliptic PDE and integral equations (slides)
- Alexander Volberg (Michigan State University, East Lansing): Bellman function approach to end-point estimates of singular integrals (slides)

Colloquium speaker

(joint with the Colloquium of the Department of Mathematics and Statistics)

- David Cruz-Uribe (University of Alabama, Tuscaloosa): The maximal operator, weights and extrapolation on variable Lebesgue spaces (slides)

Invited speakers

- Kari Astala (University of Helsinki): Non-linear Beltrami equations
• Jonathan Bennett (University of Birmingham): *Weighted norm inequalities for classes of oscillatory integrals* (slides)
• Stephan Fackler (Universität Ulm): *Operator theoretic tools for harmonic analysis and PDE*
• Riikka Korte (Aalto University, Espoo): *The space $J_{p}^{v}$*
• Vjekoslav Kova (University of Zagreb): *Norm-variation of smooth bilinear averages and several applications* (slides)
• Sylvie Monniaux (Université Aix-Marseille): *First order approach to $L^{p}$ estimates for the Stokes operator in Lipschitz domains*
• Paul F.X. Müller (Johannes Kepler Universität Linz): *Compensated compactness, interpolatory estimates, Riesz transforms, wavelet- and Haar projections* (slides)
• Maria Carmen Reguera (University of Birmingham): *Weighted theory for the Bergman projection, a theory of $B$*
• Brett Wick (Washington University, St. Louis): *Commutators, factorization, BMO and the Hardy space*
• Pavel Zorin-Kranich (University of Bonn): *Sparse domination of variational operators*

Contributing speakers

• Alex Amenta (Institut Fourier, Grenoble): *A first-order approach to elliptic BVPs with complex coefficients and fractional regularity data* (slides)
• Lashi Bandara (University of Gothenburg): *Rough metrics, the Kato square root problem, and the continuity of a flow tangent to the Ricci flow*
• Stefan Geiss (University of Jyväskylä): *Backward stochastic differential equations and harmonic analysis* (slides)
• Peter Hästö (Universities of Oulu and Turku): *Harnack's inequality in generalized Orlicz spaces* (slides)
• Richard Lechner (Johannes Kepler Universität Linz): *Factorization of the identity through operators with large diagonal* (slides)
• Olli Saari (Aalto University, Espoo): *Parabolic BMO and the forward-in-time maximal operator* (slides)