

Harmonic Analysis and Related Areas
September 24 – 28, 2017

Schedule

Ciprian Demeter (Indiana University)

Title: Decoupling beyond uniform sets

Abstract: I will explore additive energies, exponential sums and decouplings for Cantor-like sets and beyond.

Polona Durcik (California Institute of Technology)

Title: Entangled multilinear forms and applications

Abstract: We discuss L^p estimates for multilinear singular integral forms with the so-called entangled structure. As an application we show that if $1 < p < \infty$, p not equal to 2, and d is large enough, an arbitrary measurable set in $\mathbb{R}^d \times \mathbb{R}^d$ of positive upper Banach density contains corners $(x, y), (x+s, y), (x, y+s)$ such that the L^p norm of the side s attains all sufficiently large real values. Furthermore, we discuss quantitative cancellation estimates for the simplex Hilbert transform. The talk is based on joint works with V. Kovač, L. Rimanić and C. Thiele.

Ben Green (University of Oxford)

Title: The arithmetic Kakeya conjecture of Katz and Tao

Abstract: In around 2003, Katz and Tao formulated a purely arithmetic statement which, if true, would imply the Kakeya conjecture. I will report on some joint work with Imre Ruzsa in which we played around with the conjecture, coming up with various equivalent formulations as well as establishing some lower bounds for the problem and a finite field version of it.

Tom Sanders (University of Oxford)

Title: The cost of commuting

Abstract: A number of problems in additive combinatorics and allied areas are often initially asked in a commutative setting, and then recast more generally. This incurs a cost, and in this talk we shall discuss this cost in the context of the idempotent theorem from harmonic analysis. For a group G the idempotent theorem describes the structure of sets whose (indicator function has) Fourier transform has bounded L_1 -norm in a suitable sense. (Such functions occur when considering representations of $L_1(G)$, for example.) There are different quantitative aspects of this question and in this talk we shall discuss new bounds in certain aspects of the non-commutative idempotent theorem and how these difficulties relate to a lack of commutativity.

Christopher Sogge (Johns Hopkins University)

Title: On the concentration of eigenfunctions

Abstract: I shall present some results in global harmonic analysis that concern properties of eigenfunctions on compact Riemannian manifolds. Using local arguments we can show that L^p norms of eigenfunctions over the entire manifold are saturated if and only if there are small balls (if

ρ is large) or small tubular neighborhoods of geodesics (if ρ is small) on which the eigenfunctions have very large L^p mass. Neither can occur on manifolds of nonpositive curvature, or, more generally, on manifolds without conjugate points.

Josh Zahl (University of British Columbia)

Title: Breaking the $3/2$ barrier for unit distances in three dimensions

Abstract: