"DECOUPLING AND POLYNOMIAL METHODS IN ANALYSIS"

KOPP SUMMER SCHOOL (OCTOBER 1–6, 2017)

(1) **Olli Saari:** Ioan Bejenaru, *The optimal trilinear restriction estimate for a class of hypersurfaces with curvature.* Adv. Math. **307** (2017), 1151–1183.

(2) **Zeng Zhen:** Ioan Bejenaru, *The multilinear restriction estimate: a short proof and a refinement.* Preprint, 2016. arXiv:1601.03336.

(3) **Blazej Wrobel:** Jean Bourgain, *Decoupling, exponential sums and the Riemann zeta function.* J. Amer. Math. Soc. **30** (2017), no. 1, 205–224.

(4) **Daniel Eceizabarrena Perez:** Jean Bourgain, *A note on Schrödinger maximal function.* Preprint, 2016. arXiv:1609.05744.

(5) **Gianmarco Brocchi:** Dahlberg, B., and Kenig, C. *A note on the almost everywhere behavior of solutions to the Schrdinger equation. Harmonic analysis* (Minneapolis, Minn., 1981), pp. 205209, Lecture Notes in Math., 908, Springer, Berlin-New York, 1982.

   and Carleson, L. *Some analytical problems related to statistical mechanics* [Euclidean harmonic analysis, (College Park, Md., 1979), pp. 545, Lecture Notes in Math., 779, Springer, Berlin, 1980; MR0576038]

   We are intersted in the behaviour of the Schroedinger evolution for initial data in (near) $H^{1/4}$. Positive result is in Carleson a few pages near $II.3$ and negative result is in Dahlberg Kenig. This prepares for the topic on Schroedinger maximal fucntion by Bourgain and Du et al. If time allows some comments on the connections with the rest of Carleson's paper would be nice, though not required.

(6) **Yumeng Ou:** Jean Bourgain and Ciprian Demeter, *The proof of the ℓ^2 decoupling conjecture.* Ann. of Math. (2) **182** (2015), no. 1, 351–389.

(7) **Anh Nguyen:** Jean Bourgain and Ciprian Demeter, *Decouplings for surfaces in* $\mathbb{R}^4$. J. Funct. Anal. **270** (2016), no. 4, 1299–1318.

(8) **Hong Wang:** Jean Bourgain, Ciprian Demeter and Larry Guth, *Proof of the main conjecture in Vinogradov's mean value theorem for degrees higher than three.* Ann. of Math. (2) **184** (2016), no. 2, 633–682.
   Part 1: Page 633–654;

(9) **Chandan Biswas:** Jean Bourgain, Ciprian Demeter and Larry Guth, *Proof of the main conjecture in Vinogradov's mean value theorem for degrees higher than three.* Ann. of Math. (2) **184** (2016), no. 2, 633–682.

Date: May 3, 2017.

Part 2: Page 654–678.

(10) **Zane Li:** Jean Bourgain and Larry Guth, *Bounds on oscillatory integral operators based on multilinear estimates.* Geom. Funct. Anal. **21** (2011), no. 6, 1239–1295.
Part I Sections 2+3

(11) **Dario Mena:** Jean Bourgain and Larry Guth, *Bounds on oscillatory integral operators based on multilinear estimates.* Geom. Funct. Anal. **21** (2011), no. 6, 1239–1295.
Part III. Sections 5, if time allows 6

(12) **Yi Zhang:** Marcin Bownik, Pete Casazza, Adam Marcus and Darrin Speegle, *Improved bounds in Weaver and Feichtinger conjectures.* Preprint, 2015. arXiv:1508.07353v2.

(13) **Albert Sola Vilalta:** Anthony Carbery and Stefán I. Valdimarsson, *The endpoint multilinear Kakeya theorem via the Borsuk–Ulam theorem.* J. Funct. Anal. **264** (2013), no. 7, 1643–1663.

(14) **Kevin O'Neill:** Xiumin Du, Larry Guth and Xiaochun Li, *A sharp Schrödinger maximal estimate in* $\mathbb{R}^2$*.* Preprint, 2016. arXiv:1612.08946.

(15) **Zihui He:** Zeev Dvir, *On the size of Kakeya sets in finite fields.* J. Amer. Math. Soc. **22** (2009), no. 4, 1093–1097.
and
Rene Quilodrán, *The joints problem in* $\mathbb{R}^n$*.* SIAM J. Discrete Math. **23** (2009/10), no. 4, 2211–2213.

(16) **Constantin Bilz:** Larry Guth, *A short proof of the multilinear Kakeya inequality.* Math. Proc. Cambridge Philos. Soc. **158** (2015), no. 1, 147–153.

(17) **Xiumin Du:** Larry Guth, *A restriction estimate using polynomial partitioning.* J. Amer. Math. Soc. **29** (2016), no. 2, 371–413.
Part 1 : Sections 1+2

(18) **Joao Pedro Ramos:** Larry Guth, *A restriction estimate using polynomial partitioning.* J. Amer. Math. Soc. **29** (2016), no. 2, 371–413.
Part II: Sections 3+4

(19) **Marco Fraccaroli:** Larry Guth and Nets H. Katz, *On the Erdös distinct distances problem in the plane.* Ann. of Math. (2) **181** (2015), no. 1, 155–190.
Part I: Sections 1,2,5

(20) **Jose Ramon Madrid Padilla:** Larry Guth and Nets H. Katz, *On the Erdös distinct distances problem in the plane.* Ann. of Math. (2) **181** (2015), no. 1, 155–190.
Part II: Sections 3,4

(21) **Julian Weigt:** Adam Marcus, Daniel Spielman, and Nikhil Srivastava, *Interlacing families I: bipartite Ramanujan graphs of all degrees.* Ann. of Math. **182** (2015), no. 1, 307–325.

(22) **Ruixiang Zhang:** Adam Marcus, Daniel Spielman, and Nikhil Srivastava, *Interlacing families II: Mixed characteristic polynomials and the Kadison–Singer problem.* Ann. of Math. **182** (2015), no. 1, 327–350.

(23) **Itamar Oliveira:** Malabika Pramanik and Andreas Seeger, *L^p regularity of averages over curves and bounds for associated maximal operators.* Amer. J. Math. **129** (2007), no. 1, 61–103.
Part 1: Section 3, page 69–76, Section 5 and Section 6 (the last two sections are based on a result in Section 4);

(24) **David Beltran:** Malabika Pramanik and Andreas Seeger, *L^p regularity of averages over curves and bounds for associated maximal operators.* Amer. J. Math. **129** (2007), no. 1, 61–103.

Part 2: Section 4.

(25) **Michal Warchalski:**
Larry Guth and Nets H. Katz, *Algebraic methods in discrete analogs of the Kakeya problem* arXiv:0812.1043,

(26) **Dong Dong:**
Roth, K. F. *Rational approximations to algebraic numbers.* Mathematika 2 (1955), 1-20; corrigendum, 168. There are probably alternative ressources for the theorem, we'd also be happy to just hear special cases of the theorem that display the polynomial method.

(27) **Dominique Maldague:**
Stepanov, S. A. *An elementary proof of the Hasse-Weil theorem for hyperelliptic curves.* J. Number Theory 4 (1972), 118-143.
See also the first chapter of the book by Wolfgang Schmidt Equations over finite fields : an elementary approach

(28) **Sam Chow:** Trevor D. Wooley, *The cubic case of the main conjecture in Vinogradov's mean value theorem.* Adv. Math. **294** (2016), 532–561.

(29) **Houry Malkonian:**
Ruixiang Zhang *A proof of the multijoint conjecture and Carbery's generalization.* arxiv:1612.05717
For example the Kakeya papr may be the first lectures and the joints problems may be the second lecture.

(30) **Dominique Kemp:** Jean Bourgain and Larry Guth, *Bounds on oscillatory integral operators based on multilinear estimates.* Geom. Funct. Anal. **21** (2011), no. 6, 1239–1295.
Part II Section 4