

Courses 2016-17

BCAM Mazarredo 14 ,48009 Bilbao, Basque Country, Spain

February 27 - March 3, 2017, 9:30-11:30 h

(5 sessions, a total of 10 hours)

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SPARSE DOMINATION OF SINGULAR INTEGRALS BEYOND CALDERON-ZYGMUND THEORY

Singular integral operators, which are a priori signed and non-local, can be dominated in norm, pointwise, or dually, by sparse averaging operators, which are in contrast positive and localized. The most striking consequence is that weighted norm inequalities for the singular integral follow from the corresponding, rather immediate estimates for the averaging operators. In this 10 hour minicourse we present an approach to sparse domination which extends to singular integrals falling beyond the scope of classical Calderón-Zygmund theory; notably, matrix-valued kernels, rough homogeneous singular integrals and critical Bochner-Riesz means, modulation invariant multilinear singular integrals including the bilinear Hilbert transforms and variation norm Carleson operators.

The five lectures will be organized according to the following tentative plan:

- 1) Sparse domination of multilinear forms; sparse norm and weighted norm inequalities
- 2) A simple approach to sparse domination of dyadic shifts and its implications - reference <https://arxiv.org/abs/1610.01958>
- 3) An abstract sparse domination theorem and its applications to Calderon-Zygmund and rough singular integrals - reference <https://arxiv.org/abs/1612.09201>
- 4) Sparse domination of outer forms and its application to modulation invariant singular integrals - references arXiv:1603.05317 and arXiv:1612.03028
- 5) Complements and open problems (singular integrals over the integers, oscillatory integrals, maximal multilinear operators)

The lectures contain material from joint work with Amalia Culiuc and Yumeng Ou and partly with José M. Conde Alonso, Yen Do and Gennady Uraltsev.

Registration is free, but **inscription is required before 8th March**: So as to inscribe send an e-mail to roldan@bcamath.org. Student grants are available. Please, let us know if you need support for travel and accommodation expenses