Barcelona Analysis Seminar **2023–2024**

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Time: 15:00 CET

Room: CRM A1 (Universitat Autònoma de Barcelona)

Online streaming: click here to join.

On commutators along monomial curves

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The articles [5], [1], [4], [8], [2], [3] spread throughout the years 1957-2023 fully answer the question of $L^p(\mathbb{R}^n)$-to-$L^q(\mathbb{R}^n)$ boundedness and compactness of commutators

$$[b,T]f(x) := b(x)Tf(x) - T(bf)(x) : L^p(\mathbb{R}^n) \to L^q(\mathbb{R}^n), \qquad p,q \in (1,\infty)$$

of Calderón-Zygmund operators T in terms of various oscillatory testing conditions on the function b.

In this talk we discuss to what extent the above answers can be reproduced when we replace the Calderón-Zygmund operator T by

$$H_\gamma f(x) = p.v. \int_{\mathbb{R}} f(x-\gamma(t))\frac{dt}{t}$$

the Hilbert transform along a monomial curve $\gamma : \mathbb{R} \to \mathbb{R}^n$.

References

[1] R. R. Coifman, R. Rochberg, R. and G. Weiss, Factorization theorems for Hardy spaces in several variables, Ann. of Math., 1976.

[2] T. Hytönen, The L^p-to-L^q boundedness of commutators with applications to the Jacobian operator, , J. Math. Pures Appl., 2021.

[3] T. Hytönen, K. Li, J. Tao, D. Yang, The L^p-to-L^q Compactness of Commutators with $p > q$, Stud. Math., 2023.

[4] S. Janson, Mean oscillation and commutators of singular integral operators, Ark. Mat., 1978.

[5] Z. Nehari, On bounded bilinear forms, Ann. of Math., 1957.

[6] T. Oikari, Lower bound of the parabolic Hilbert commutator, Adv. Math., 2022.

[7] T. Oikari, On the L^p-to-L^q boundedness and compactness of commutators along monomial curves, arXiv preprint, not for publication, 2023.

[8] A. Uchiyama, On the compactness of operators of Hankel type, Tohoku Math. J., 1978.

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