

Approximation Theory, Function Spaces and Harmonic Analysis Théorie de l'approximation, espaces de fonctions et analyse harmonique

In this talk I will discuss recent work with my recent honours student A. Mailhot, where we recover $\|f\|_\infty$ as a limit of Orlicz norms of f defined by a one parameter family of iterated log-bump type Young functions. I will also put this work into context with recent advances with S. F. MacDonald.

MICHAEL ROYSDON, ICERM, Brown University and CRM, Concordia University

[Saturday December 3 / samedi 3 décembre, 8:30 – Scott A]

Weighted Projection Bodies

The inequalities of Petty and Zhang are affine isoperimetric inequalities, the former of which implies that classical isoperimetric inequality and is equivalent to an affine version of the Sobolev inequality for compactly support C^1 functions, while the latter is a very strong reverse isoperimetric inequality. Each of these inequalities feature a certain class of convex bodies, called projection bodies, which may be described in terms of the cosine transform of the surface area measure of a given convex body.

In this talk, we will discuss a generalization of these bodies to the weighted setting (by replacing the surface area measure with different measures satisfying mild regularity conditions) and describe how they may be used to prove strong reverse isoperimetric inequalities. And, in addition, show how these results may be used to imply a reverse form of the isoperimetric inequality for certain classes of measures on the n -dimensional Euclidean space.

This is based on a joint work with D. Langharst and A. Zvavitch.

ALEJANDRO SANTACRUZ-HIDALGO, Western University

[Saturday December 3 / samedi 3 décembre, 18:30 – Scott A]

Down spaces over a measure space with an ordered core

We consider a measure space together with a totally ordered subset of its sigma algebra called an *ordered core*. Recently, this construction was used in the context of Hardy inequalities, giving a uniform treatment of many different types of Hardy operators.

We will begin by introducing a definition of monotone functions compatible with the ordered core. This allows us to extend the down space construction, a variant of the Köthe dual restricted to positive decreasing functions, to all measure spaces. We will look at their associate spaces and their relationship with a suitable version of the least decreasing majorant construction in this more general setting. We will discuss the interpolation structure of these spaces and find strong similarities to the real line case; the down spaces corresponding to L^1 and L^∞ form an exact Calderón-Mityagin couple and as a consequence we can describe all their exact interpolation spaces in terms of the K -functional. We will also show an analogous result for the dual couple.

This talk is based on joint work with Gord Sinnamon.

ERIC SAWYER, McMaster University

[Sunday December 4 / dimanche 4 décembre, 9:30 – Scott A]

Two weight $T1$ theorems for Sobolev and L_p spaces with doubling measures and Calderón-Zygmund operators.

This is joint work with Brett Wick. We characterize two weight norm inequalities for Calderón-Zygmund operators from one weighted space to another, when the measures are doubling. We extend an earlier result of Michel Alexis, the speaker and Ignacio Uriarte-Tuero for L_2 spaces, to L_2 -Sobolev spaces of small order, and to L_p spaces. In the case p is not 2, we use variants of the quadratic Muckenhoupt conditions and weak boundedness properties introduced by Hytönen and Vuorinen. In particular, this proves their conjecture for the Hilbert transform in the case of doubling measures.

GORD SINNAMON, Western University, London, Canada

[Saturday December 3 / samedi 3 décembre, 17:00 – Scott A]

The Fourier transform in rearrangement-invariant spaces