M1 Harmonic Analysis

Organiser: Riikka Schroderus, *University of Helsinki*

1. Regularity of the local fractional maximal function

Janne Korvenpää, *Aalto University*

In this talk we consider smoothing properties of the local fractional maximal operator, which is defined in a proper subset of $\mathbb{R}^n$. Our main results include pointwise estimates for the weak gradient of the maximal function, which imply norm estimates in Sobolev spaces. This is based on a joint work with T. Heikkinen, J. Kinnunen and H. Tuominen.

2. Weights and parabolic equations

Olli Saari, *Aalto University*

In this talk, we study certain weights arising from parabolic equations. We characterize them through weighted norm inequalities and through parabolic BMO. The concept of parabolic weights gives a unifying generalization of both classical and one-sided Muckenhoupt weights. The talk is based on joint work with Juha Kinnunen.

3. Short introduction to metric dyadic analysis

Olli Tapiola, *University of Helsinki*

In this talk I will introduce some basic tools related to dyadic harmonic analysis in metric spaces and discuss some applications, obstacles and open problems related to this field.

4. Two weight L^p characterization for dyadic shifts

Emil Vuorinen, *University of Helsinki*

We consider a testing characterization of the two weight inequality for dyadic shifts in L^p, where $1 < p < \infty$. This generalizes the previous result in the case $p = 2$. When $p = 2$ and the two weights satisfy the so called two weight Muckenhoupt type A_2-condition, then a dyadic shift satisfies the two weight inequality in L^2 if and only if it satisfies the indicator testing condition. The two weight A_2-condition and the indicator testing in L^2 can be seen as special cases of a certain quadratic A_p-condition and a quadratic testing condition in L^p. With these conditions one obtains an analogous result for general exponents $1 < p < \infty$, which reduces to the previous when $p = 2$. In this talk we formulate these new quadratic conditions and state the characterization of the two weight inequality in L^p. This work has been done under supervision of Tuomas Hytönen.