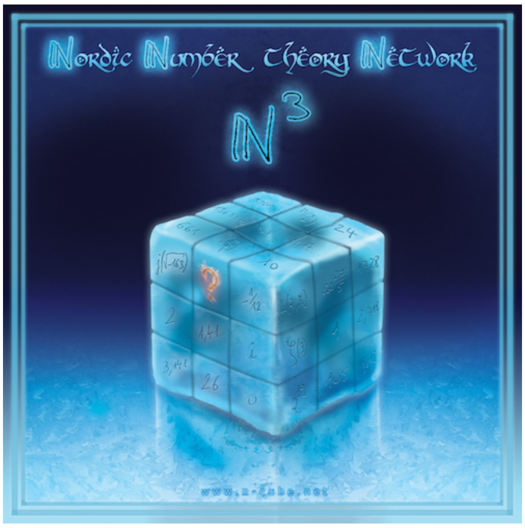
Öresund Number Theory Day

Centre for Mathematical Sciences, Lund University
Jan 28, 2020



Organisers: Oscar Marmon, Fabien Pazuki (Copenhagen), Tomas Persson

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14:00-15:00
Faustin Adiceam (Manchester)
Counting rational points near algebraic varieties.

Abstract: Counting the number of rational points with bounded height lying on an algebraic variety is a topical theory in Number Theory. A number of sharp results, effective methods (e.g., the determinant methods) and deep conjectures (e.g., Manin–Peyre's Conjectures) provide a more or less precise understanding of the features of the given algebraic variety conditioning the number of rational points it contains. By constrast, a similar theory is almost inexistant when it comes to counting the number of rational points lying near algebraic varieties (the distance to the variety being measured as a function of the height of the rational point). In this talk, we will survey the existing results (almost all obtained in the past ten years), discuss some new (partial) results and highlight the specificities of the problems arising in such considerations. This is work in progress joint with Oscar Marmon.

15:30-16:30

Diego Izquierdo (École Polytechnique, Paris)

Homogeneous spaces, algebraic K-theory and cohomological dimension of fields.

Abstract: In 1986, Kato and Kuzumaki stated a set of conjectures which aimed at giving a Diophantine characterization of the cohomological dimension of fields in terms of Milnor K-theory and points on projective hypersurfaces of small degree. Those conjectures are known to be wrong in general. In this talk, I will prove a variant of Kato and Kuzumaki's conjectures in which projective hypersurfaces of small degree are replaced by homogeneous spaces. This is joint work with Giancarlo Lucchini Arteche.

16:40-17:40

Oleksiy Klurman (MPIM Bonn)

Small discrepancy sequences over $\mathbb{F}_q[x]$.

Abstract: The famous Erdos discrepancy problem (now theorem of Tao) asserts that for any sequence $\{a_n\}_{n\geq 1} = \{\pm 1\}^{\mathbb{N}}$ we have

$$\sup_{n,d} |\sum_{k=1}^{n} a_{kd}| = \infty.$$

It was observed during the Polymath5 project that the analogous statement over the polynomial ring $\mathbb{F}_q[x]$ is false. In this talk, I will describe "corrected" form of the EDP over $\mathbb{F}_q[x]$ focusing on some features that are not present in the number field setting. In particular, I will describe the proof of the function field version of the following number field conjecture: completely multiplicative functions $f : \mathbb{N} \to \{-1, 1\}$ with the smallest possible discrepancy are the "modified characters."

This is based on a joint work with A. Mangerel (CRM) and J. Teravainen (Oxford).