UNIVERSITY OF COPENHAGEN

GANDA
GEOMETRY AND ARITHMETIC

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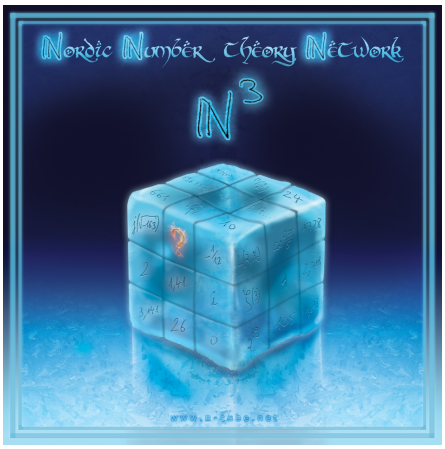
AARHUS UNIVERSITET

Nordic Number theory Network Days XV

Aarhus University,
December 13 – December 14, 2021
organised by Simon Kristensen (Aarhus) and Fabien Pazuki (Copenhagen).



Program

	Monday 13.12			Tuesday 14.12
13:00-13:10	*Foreword*	◇		
13:10-14:00	**Martin Widmer**	◇	09:10-10:00	**Jonas Bergström**
14:00-14:20	*Coffee break*	◇	10:00-10:20	*Coffee break*
14:20-15:10	**Sigrid Grepstad**	◇	10:20-11:10	**Cecília Salgado**
15:10-15:30	*Coffee break*	◇	11:10-11:30	*Coffee break*
15:30-16:20	**Mathias Løkkegaard Laursen**	◇	11:30-12:20	**Daniel Fiorilli**
16:20-16:40	*Coffee break*	◇	12:30	*Farewell*
16:40-17:30	**Francesca Bianchi**	◇		
18:30	*Social event*			

Abstracts

TIME: Monday 13, 13:10-14:00.
ROOM: Aarhus and Zoom.
SPEAKER: **Martin Widmer** (Royal Holloway, United Kingdom).
TITLE: *Northcott numbers for the house and Weil height.*
ABSTRACT: For an infinite subset S of the algebraic numbers and a function f on S, mapping to the non-negative real numbers, the Northcott number of S w.r.t f is (if it exists) the minimal t such that the subset of S that maps to real numbers smaller $t + \epsilon$ is infinite for all positive ϵ. We are interested in the case when f is the house or a (suitably normalised) Weil height, and S is the ring of integers of a field. What are the possible Northcott numbers, and how is this notion connected to decidability questions, going back to Julia Robinson? We will answer these questions. This is joint work with Fabien Pazuki and Niclas Technau.

TIME: Monday 13, 14:20-15:10.
ROOM: Aarhus and Zoom.
SPEAKER: **Sigrid Grepstad** (Trondheim, Norway).
TITLE: *Asymptotic behaviour of Sudler products for quadratic irrationals*
ABSTRACT: In this talk we consider products of the form

$$P_N(\alpha) = \prod_{r=1}^{N} 2|\sin \pi r\alpha|$$

for irrational numbers α, focusing on their asymptotic behaviour as $N \to \infty$ for quadratic irrationals α. We will discuss the connection between the asymptotic behaviour of P_N and the continued fraction expansion of α, and observe that whether or not $\liminf_{N\to\infty} P_N(\alpha) = 0$ depends on the continued fraction coefficients of α in a delicate way.

TIME: Monday 13, 15:30-16:20.
ROOM: Aarhus and Zoom.
SPEAKER: **Mathias Løkkegaard Laursen** (Aarhus, Denmark).
TITLE: *The p-adic Duffin-Schaeffer conjecture.*
ABSTRACT: In 2020, Dmitri Koukoulopoulos and James Maynard published a proof of the Duffin-Schaeffer Conjecture from 1941. The now theorem states that for an approximation function $\psi : \mathbb{N} \to [0, \infty)$, the set of numbers x between 0 and 1 with infinitely many reduced fractions a/n lying within a range of $\psi(n)$ of x will have a measure of 0 or 1, being 1 if and only if the series $\sum_{n=1}^{\infty} \varphi(n)\frac{\psi(n)}{n}$ diverges. Prior to this, Allan Haynes had proposed in 2009 a p-adic Duffin-Schaeffer conjecture and proved statements hinting at a possible equivalence between the original conjecture and the p-adic Duffin-Schaeffer Conjecture holding for all p, though this was not used in the 2020 proof. In this talk, we will see how the proof of Koukoulopoulos and Maynard of the Duffin-Schaeffer Theorem may be combined with a result of Haynes to prove the p-adic Duffin-Schaeffer Conjecture for all p. If time allows, we will then talk into a question of wording an alternative and perhaps more natural p-adic Duffin-Schaeffer conjecture than the one proposed by Haynes.

TIME: Monday 13, 16:40-17:30.
ROOM: Aarhus and Zoom.
SPEAKER: **Francesca Bianchi** (Groningen, The Netherlands).
TITLE: *Explicit quadratic Chabauty over number fields*
ABSTRACT: The quadratic Chabauty method is a p-adic approach to finding integral or rational points on certain types of curves over the rationals. In joint work with Balakrishnan, Besser and Müller, we generalised the explicit quadratic Chabauty techniques for integral points on odd degree hyperelliptic curves and for rational points on genus 2 bielliptic curves to arbitrary number fields.

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TIME: Tuesday 14, 09:10-10:00.
ROOM: Aarhus and Zoom.
SPEAKER: **Jonas Bergström** (Stockholm, Sweden).
TITLE: *Polarizations of abelian varieties over finite fields via canonical liftings.*
ABSTRACT: We show how to use a canonical lifting to characteristic 0 to describe polarizations of abelian varieties over a finite field in isogeny classes that correspond to a squarefree Weil polynomial. Using a categorical description due to Centeleghe-Stix of isomorphism classes of abelian varieties over a finite prime field we can explicitly compute isomorphism classes of polarized abelian varieties satisfying some mild conditions. We also implement algorithms to perform these computations. This is joint work with Valentijn Karemaker and Stefano Marseglia.

TIME: Tuesday 14, 10:20-11:10.
ROOM: Aarhus and Zoom.
SPEAKER: **Cecília Salgado** (Groningen, The Netherlands).
TITLE: *Large Mordell-Weil rank jumps and the Hilbert Property*
ABSTRACT: We discuss recent progress on the variation of the Mordell-Weil rank in families of elliptic curves. We show that if the underlying surface admits a conic bundle structure then the subset of fibres for which the Mordell-Weil rank is strictly larger than the generic rank is not thin, as a subset of the base of the fibration. We obtain larger rank jumps ($+2$ and $+3$) also on non-thin subsets of the line under extra hypotheses on the elliptic fibration. The results presented are based on joint work with D. Loughran (Bath) and on work in progress with R. Dias (UFRJ).

TIME: Tuesday 14, 11:10-12:20.
ROOM: Aarhus and Zoom.
SPEAKER: **Daniel Fiorilli** (Orsay, France).
TITLE: *Distribution of Frobenius elements in families of Galois extensions.*
ABSTRACT: This is joint work with Florent Jouve. I will discuss three types of results: Linnik type questions on the prime ideal of least norm with prescribed Frobenius, the generic order of magnitude of the error term in the Chebotarev density theorem, and unconditional instances of Chebyshev's bias in number fields.