UNIVERSITY OF COPENHAGEN

Danmarks Grundforskningsfond
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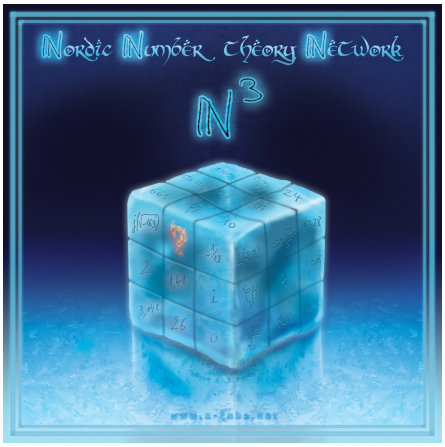
Nordic Number theory Network Days IV

University of Copenhagen,
June 3 – June 4, 2016
organised by Lars Halle, Fabien Pazuki and Sho Tanimoto,
with the support of the Niels Bohr Professorship.



Program

	Friday 3.06	Saturday 4.06
09:10-10:00		**Sofia Tirabassi**
10:00-10:30		*Coffee break*
10:30-11:20		**Tapani Matala-aho**
11:30-12:20		**Pär Kurlberg**
13:00-13:15	*Foreword*	
13:15-14:05	**Shigeyuki Kondo**	
14:15-15:05	**Dennis Eriksson**	
15:05-15:35	*Coffee break*	
15:35-16:25	**Nurdagül Anbar**	
16:35-17:25	**Giacomo Cherubini**	
18:30	*Dinner*	

Abstracts

Time: Friday 3, 13:15-14:05.
Room: Aud 10.
Speaker: **Shigeyuki Kondo** (Univ. Nagoya).
Title: *Enriques surfaces in characteristic 2 with a finite group of automorphisms.*
Abstract: Complex Enriques surfaces with a finite group of automorphisms are classified into seven types. In this talk, we discuss which types of such Enriques surfaces exist in characteristic 2.

Time: Friday 3, 14:15-15:05.
Room: Aud 10.
Speaker: **Dennis Eriksson** (Chalmers Univ., Göteborg).
Title: *Transfinite diameters and the resultant.*
Abstract: The transfinite diameter is a way of measuring the size/diameter of a set in $\mathbb{C}^n$, $\mathbb{C}_p^n$ or more generally of subsets of varieties. It has appeared in different forms in arithmetic geometry, notably in equidistribution theorems of Xinyi Yuan and Berman-Boucksom. In this talk we study them from the points of view of Deligne bundles, which we also introduce, and connect them to the resultant of polynomials and the arithmetic height of toric varieties. If time permits we also mention equidistribution results of Fekete points in the Berkovich setting. This is joint work with Sebastien Boucksom.

Time: Friday 3, 15:35-16:25.
Room: Aud 10.
Speaker: **Nurdagül Anbar** (DTU Copenhagen).
Title: *On the limits of towers over finite fields.*
Abstract: Let $\mathcal{F}/\mathbb{F}_q = (F_1, F_2, \ldots)$ be a tower of function fields defined over the finite field $\mathbb{F}_q$ of order q, where q is a power of a prime number p. There are two asymptotic notions associated to towers over $\mathbb{F}_q$, which describe the behaviour of the number of rational places $N(F_i)$ and p-rank $\gamma(F_i)$ of the function field F_i compared to its genus $g(F_i)$ as $i \to \infty$. More precisely, I talk about the *limit* $\lambda(\mathcal{F}/\mathbb{F}_q)$ and the *asymptotic p-rank* $\varphi(\mathcal{F}/\mathbb{F}_q)$ of the tower $\mathcal{F}/\mathbb{F}_q$ given by

$$\lambda(\mathcal{F}/\mathbb{F}_q) := \limsup_{i\to\infty} \frac{N(F_i)}{g(F_i)} \quad \text{and} \quad \varphi(\mathcal{F}/\mathbb{F}_q) := \liminf_{i\to\infty} \frac{\gamma(F_i)}{g(F_i)} \ .$$

In this talk, I state well-known results and recent developments about the asymptotic behaviour of towers over finite fields.

Time: Friday 3, 16:35-17:25.
Room: Aud 10.
Speaker: **Giacomo Cherubini** (Univ. Copenhagen).
Title: *On the almost-periodic aspect of the hyperbolic lattice point counting problem.*
Abstract: I will discuss the relation between the hyperbolic lattice point counting problem and the theory of almost periodic functions. I will explain a simple criterion to determine existence of asymptotic moments and limiting distribution for an almost periodic function, and apply the criterion to certain integrated versions of the error term in the problem. Finally I will mention how fractional calculus can be introduced as a natural tool to study the problem, and explain

the results one can obtain by combining the two approaches.

Time: Saturday 4, 9:10-10:00.
Room: Aud 10.
Speaker: **Sofia Tirabassi** (Univ. Bergen).
Title: *Derived category of canonical covers in positive characteristic.*
Abstract: We work over an algebraically closed field of positive characteristic. We count the number of Fourier–Mukai partners of abelian and K3 surfaces arising as canonical covers of bielliptic and Enriques surfaces extending known results for complex varieties of Sosna and Bridgeland–Maciocia. This is joint work with K. Honigs and L. Lombardi.

Time: Saturday 4, 10:30-11:20.
Room: Aud 10.
Speaker: **Tapani Matala-aho** (Univ. Oulu).
Title: *Around transcendance.*
Abstract: We will discuss on selected tools used in transcendence methods and Diophantine approximations. A particular attention will be paid on a Baker-type criterion for linear forms and a variant of Shidlovskii's lemma.

Time: Saturday 4, 11:30-12:20.
Room: Aud 10.
Speaker: **Pär Kurlberg** (KTH Stockholm).
Title: *Missing class groups and class number statistics for imaginary quadratic fields.*
Abstract: The number $F(h)$ of imaginary quadratic fields with class number h is of classical interest: Gauss' class number problem asks for a determination of those fields counted by $F(h)$. The unconditional computation of $F(h)$ for $h \leq 100$ was completed by M. Watkins, and K. Soundararajan more recently made conjectures about the order of magnitude of $F(h)$ as h tends to infinity, and determined its average order.

For odd h we refine Soundararajan's conjecture to an asymptotic formula; in a sense we obtain an adelic, or global, analog of the Cohen-Lenstra heuristic. We also consider the problem of determining the number $F(G)$ of imaginary quadratic fields with class group isomorphic to a given finite abelian group G, and make precise predictions about the asymptotic nature of the entire class group. For instance, it seems that no groups of the form $(\mathbb{Z}/p\mathbb{Z})^3$ and $p > 2$ prime occurs as a class group of a quadratic imaginary field. Numerical evidence matches quite well with our conjectures.

This is joint work with S. Holmin, N. Jones, C. McLeman, and K. Petersen.