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Συντονιστές: Π. Σπηλιώτη, Δ. Χατζάκος

Ομιλητές

Μάριος Βοσκού (Alfréd Rényi Institute of Mathematics, Budapest)

Counting and Equidistribution of Orthogeodesics in the Hyperbolic Plane

In this talk, we use the spectral theory of automorphic forms to study the distribution of orthogeodesics in the hyperbolic plane. We also present arithmetic applications concerning the distribution of pairs of ideals of linearly dependent norms in certain real quadratic number fields.

Ξένια Δημητρακοπούλου (University of Aix-Marseille)

p-adic L-functions for $U(n) \times U(n+1)$

In this talk, I will explain how we can use the resolution of the unitary Gan–Gross–Prasad conjecture to interpolate the square root of the central critical L-value of an automorphic representation of $U(n) \times U(n+1)$ and construct p-adic L-functions. In particular, I will demonstrate how to p-adically interpolate automorphic period integrals and, time allowing, how to extend this result in families.

Αριστείδης Δούμας (Εθνικό Μετσόβιο Πολυτεχνείο)

Notes on the Fibonacci–Redheffer matrix

A Redheffer-type matrix with Fibonacci entries is defined, and its determinant and spectral properties are studied. More general Redheffer-type matrices are also considered, and intriguing number-theoretic examples are presented. Furthermore, several asymptotic results are discussed.

Αγαμέμνων Ζαφειρόπουλος (TU Graz, Austria)

Random Coverings and Littlewood's Conjecture

Let $\mathcal{K} = \{\alpha \in [0,1] : \sup_{n \geqslant 1} \frac{1}{n} \log q_n(x) < \infty\}$. We show that given $\alpha \in \mathcal{K}$ and $\gamma \in \mathbb{R}$, there exists a set $\mathbb{G} = \mathbb{G}(\alpha, \gamma) \subseteq [0,1]$ of Hausdorff dimension $\dim_{\mathrm{H}} \mathbb{G} = 1$ such that for any $\beta \in \mathbb{G}$, the following holds: For any $\delta \in \mathbb{R}$, we have

$$q\|q\alpha - \gamma\|\|q\beta - \delta\| < \frac{1}{\log q} \text{ for inf. many } q \geqslant 1.$$

This is joint work with Hauke, Schubin and Stefanescu.

Χρήστος Κατσίβελος (Πανεπιστήμιο Πατρών)

The Prime geodesic theorem for Riemann surfaces

The Prime Number Theorem (PNT) describes the asymptotic behaviour of the main term in the prime numbers counting function, but the correct order of growth of the error term is closely related to the Riemann Hypothesis (RH). In this case, RH is supported by strong and classical mean value results of Cramér and Wintner.

The Prime geodesic theorem (PGT) describes an asymptotic bevaviour for the primitive closed geodesics on Riemann surfaces (and higher dimensional hyperbolic manifolds) similar to that of prime numbers. As in the case of PNT, the main open problem in PGT asks to determine the correct order of growth of the error term of the counting function. In this case, some mean value results are known by the works of Phillips, Cherubini-Guerreiro and Balog-Biró-Harcos-Maga. In this talk, I will discuss some new mean value results for the error term in PGT.

This is a joint work in progress with D. Chatzakos.

Αθανάσιος Σουρμελίδης (CNRS, Université de Lille)

An additive application of the resonance method

In this talk I will describe a way to implement the resonance method in problems of analytic number theory which are not necessarily multiplicative in nature. This extension of the method produces improved extreme results wherever Dirichelt's approximation theorem has been employed before with most notable cases being Ω-results for Dirichlet's divisor problem and Gauß' circle problem. Time permitted I will also draw the connection of this method to Bohr's and Jessen's proof of Kronecker's approximation theorem.

Ευθύμιος Σοφός (University of Rome Tor Vergata)

Averages of arithmetic functions over values of random polynomials

The question of the behavior of a function $f : \mathbb{Z} \to \mathbb{C}$ over the values of a non-linear integer polynomial encodes many problems in number theory. It is widely open due to the sparsity of the polynomial values. I will talk on joint work with Christopher Frei where we show that these averages can be estimated for typical integer polynomials equivalently when f is "equidistributed" on arithmetic progressions of small modulus.

Ιωάννης Τσόκανος (Universidade Estadual Paulista)

Φάσμα στοχαστικών μηχανών πρόσθεσης

Μια στοχαστική μηχανή πρόσθεσης είναι μια αλυσίδα Markov στο σύνολο των μη αρνητικών ακεραίων $\mathbb{Z}_+$, η οποία μοντελοποιεί τη διαδικασία της πρόσθεσης της μονάδας μέσω διαδοχικής ενημέρωσης των ψηφίων της ανάπτυξης ενός αριθμού σε ένα δεδομένο αριθμητικό σύστημα. Σε κάθε βήμα μπορεί να προκύψουν τυχαίες αστοχίες, οι οποίες διακόπτουν τη διαδικασία και την εμποδίζουν να συνεχιστεί πέρα από ένα ορισμένο σημείο.

Στην παρούσα ομιλία εξετάζουμε μια στοχαστική μηχανή πρόσθεσης βασισμένη σε ένα αριθμητικό σύστημα Cantor. Η στοχαστική αυτή διαδικασία ορίζει, με φυσικό τρόπο, έναν τελεστή μετάβασης S, καθώς και ένα μη αυτόνομο σύνολο Julia $\mathcal{E}$, το οποίο αποδεικνύεται ότι συμπίπτει με το φάσμα του S.

Στέλιος Σαχπάζης (Charles University, Prague)

Primes in arithmetic progressions under the presence of Landau-Siegel zeroes

Let $x \geqslant 1$, and assume that a and q are two coprime positive integers. As usual, $\psi(x;q,a) := \sum_{n\leqslant x, n\equiv a \bmod q} \Lambda(n)$, where Λ is the von Mangoldt function. In 2003, Friedlander and Iwaniec assumed the existence of exceptional characters corresponding to "extreme" Landau-Siegel zeroes and established a meaningful asymptotic formula for $\psi(x;q,a)$ beyond the square-root barrier of the Generalized Riemann Hypothesis. In particular, their asymptotic yields non-trivial information for moduli q up to $x^{1/2+1/231}$. In this talk, we explain how to substantially relax the extremity of the Landau-Siegel zero required in the work of Friedlander and Iwaniec and obtain a conditional asymptotic formula of $\psi(x;q,a)$ in a slightly wider range of q.

Νικόλαος Φραντζικινάκης (Πανεπιστήμιο Κρήτης)

Partition regularity of generalized Pythagorean triples

A central theme of arithmetic Ramsey theory is that any finite partition of the natural numbers contains monochromatic solutions to certain algebraic equations. While Rado's theorem completely classifies the linear case, the nonlinear setting remains largely open, most notably the partition regularity of the Pythagorean equation and its generalization $ax^2 + by^2 = cz^2$, under the necessary condition $a = c$, $b = c$, or $a + b = c$.

In joint work with Moreira and Klurman, building on earlier results with Host, we resolved partition regularity of pairs in several instances (meaning two of the three variables are monochromatic), including the Pythagorean equation, using multiplicative Fourier analysis and structure-randomness decompositions for completely multiplicative functions. For triples, however, this analytic method fails, so we turn to an ergodic-theoretic framework based on multiplicative actions, which reduces the problem to verifying a multiple recurrence property. In recent work with Mountakis, we proved this property for all pretentious multiplicative actions, providing strong evidence for the conjecture. We will outline these developments.

Δημήτριος Χατζάκος (Πανεπιστήμιο Πατρών)

The hyperbolic lattice counting problem for the modular group

Euclidean lattice counting problems have their origin in the work of Gauss and Dirichlet, whereas the study of the hyperbolic lattice counting problems was initiated by Delsarte, Selberg and Huber. In this talk I will discuss the hyperbolic analogue of Gauss's circle problem in 2 dimensions. In particular, I will present our recent improvement of Selberg's bound for the case of the modular group over Heegner points. This talk is based on our recent joint work with Giacomo Cherubini, Stephen Lester and Morten Risager.

Ραφαήλ Ψυρούκης (University of Durham)

Analytic properties of a certain Dirichlet series attached to orthogonal modular forms

Rankin-Selberg convolutions of modular forms have been extensively studied in the literature. In this talk, we will consider a certain type of Rankin-Selberg convolution, involving the Fourier-Jacobi coefficients of modular forms on orthogonal groups of signature $(2, n+2)$, $n \geqslant 1$. Our focus is to prove its analytic properties, i.e., its meromorphic continuation to $\mathbb{C}$ and its functional equation. We will begin by discussing some motivating examples, followed by key definitions of orthogonal modular forms, and conclude by explaining our approach for this case.