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Ομιλητές

Λεωνίδας Δασκαλάκης (Institute of Mathematics, Polish Academy of Sciences & University of Wrocław)

Pointwise convergence of ergodic averages along quadratic bracket polynomials

We establish a pointwise convergence result for ergodic averages modeled along orbits of the form $(n\lfloor n\sqrt{k}\rfloor)_{n\in\mathbb{N}}$, where k is an arbitrary positive rational number with $\sqrt{k} \notin \mathbb{Q}$. Namely, we prove that for every such k , every measure-preserving system $(X, \mathcal{B}, \mu, T)$ and every $f \in L^\infty_\mu(X)$, we have that

$$\lim_{N \rightarrow \infty} \frac{1}{N} \sum_{n=1}^N f(T^{n\lfloor n\sqrt{k}\rfloor} x) \quad \text{exists for } \mu - \text{a.e. } x \in X.$$

Notably, our analysis involves a curious implementation of the circle method suitable for exponential sums with phases $(\xi n\lfloor n\sqrt{k}\rfloor)_{1 \leq n \leq N}$ exhibiting arithmetical obstructions beyond rationals with small denominators, and is based on the Green and Tao's result on the quantitative behaviour of polynomial orbits on nilmanifolds. For the case $k = 2$ such a circle method was firstly employed for addressing the corresponding Waring-type problem by Neale, and their work constitutes the departure point of our considerations.

Ιωάννης Κούσεκ (University of Warwick)

Density finite sums theorems via ergodic theory

We present recent developments in ergodic Ramsey theory pertaining to the existence of complex infinite configurations in sets of integers that have positive density. Among other things, we show that for any set A of integers of positive upper density, there exists an infinite sequence $(B_n)_{n \in \mathbb{N}}$ of infinite sets, such that $B_1 + \dots + B_k \subset A$, for every $k \in \mathbb{N}$.

This talk is mostly based on joint work with F. Hernandez and T. Radic.

Ανδρέας Κουτσογιάννης (Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης)

Συστήματα Furstenberg ακολουθιών υπερπολυωνυμικής ανάπτυξης

Στην ομιλία αυτή θα παρουσιάσουμε παραδείγματα ακολουθιών που προέρχονται από Хардψ φιελδ συναρτήσεις υπερπολυωνυμικής ανάπτυξης, τη στατιστική συμπεριφορά των οποίων μπορούμε να μελετήσουμε μέσω Furstenberg-συστημάτων. Πιο συγκεκριμένα, κάνοντας χρήση εργαλείων ισοκατανομής (κυρίως εκθετικά αθροίσματα), δείχνουμε ότι τα τελευταία είναι Bernoulli. Θα δείξουμε επίσης ένα αποτέλεσμα σύγκλισης για τις εν λόγω ακολουθίες.

Κοινή πρόσφατη δουλειά με Andreu Ferré-Moragues.

Ανδρέας Μουντάκης (Northwestern University)

Recurrence for pretentious systems along generalized Pythagorean triples

We establish multiple recurrence results for pretentious measure-preserving multiplicative actions along generalized Pythagorean triples, that is, solutions to the equation $ax^2 + by^2 = cz^2$. This confirms the ergodic-theoretic form of the generalized Pythagorean partition regularity conjecture in this critical case of structured measure-preserving actions.

This is based on joint work with Nikos Frantzikinakis.

Κωνσταντίνος Τσίνας (École Polytechnique Fédérale de Lausanne)

Partition regularity for $x + y, xy^\ell$ patterns

Hindman's conjecture claims that if we partition $\mathbb{N}$ into finitely disjoint many sets $A_1, \dots, A_k$, then there exists a set A_i and a pair of positive integers x, y , such that the quadruple $\{x, y, x + y, xy\}$ is contained in A_i . A celebrated theorem of Moreira verifies the conjecture for the pattern $\{x, x + y, xy\}$. More recently, Richter showed that there exists a notion of density, such that if $A \subset \mathbb{N}$ has positive density, then A contains the pattern $\{x + y, xy\}$.

Building on the methods introduced by Richter, we discuss a non-linear version of this problem. More specifically, we show that if $\ell \in \mathbb{N}$ and $\mathbb{N} = A_1 \cup \dots \cup A_k$ is a partition into disjoint sets, then one of the sets A_i contains a pattern of the form $\{x + y, xy^\ell\}$.

This is based on joint work with Florian K. Richter.