Andreoletti Pierre (Université d'Orléans, FRANCE)

Range of random walks

My talk is about recent progresses on the asymptotic of the range of random walks, in particular, randomly biased walks on trees. It appears that, when the biased is strong enough (but not too strong !), the behavior of the cardinal of the range for these walks is similar than the one of the simple planar random walk.

Anker Jean–Philippe (Université d'Orléans, FRANCE)

Critical exponent and spectral gap of locally symmetric spaces

Let $X = \Gamma\backslash G/K$ be a locally symmetric space. In rank one, there is a close connection, observed by Elstrodt, Patterson, Sullivan and Corlette, between the critical exponent of the Poincaré series of Γ and the bottom of the L^2 spectrum of the (nonnegative) Laplacian on X. This result was extended to higher rank by Leuzinger and Weber, but their statement is less precise than in rank one. In this talk we shall slightly improve it. To this end we use, as they did, sharp heat kernel and Green function estimates on G/K, which we obtained in collaboration with L. Ji and P. Ostellari

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Conze Jean-Pierre (Université de Rennes, FRANCE)

On the values of the ergodic sums of an integer valued function

For an ergodic measure preserving dynamical system $(X, \mathcal{B}, \mu, T)$ and a measurable function f with values in $\mathbb{Z}d$, let $(S_n f(x) := \sum_{k=0}^{n-1} f(T^k x), n \geq 1)$ be the process of ergodic sums. Several natural questions can be asked about the subsets of $\mathbb{Z}^d$ that this process visits infinitely often, like the classical problem of recurrence. In the talk, I will discuss some of them.

For example, for $d = 1$, one can estimate the number of visits before time N to the set of squares in $\mathbb{Z}$ when f is integrable and $\mu(f) \neq 0$ (consequence of Bourgain's result (1989)). In particular the lower bound obtained shows that the set $\{S_n f(x), n \geq 1\}$ contains infinitely many squares for a.e. x. But there are integrable centered functions f generating "non regular" cocycles over some rotations for which this property fails, or more generally such that $\{S_n f(x), n \geq 1\}$ does not intersect a given set with unbounded gaps.

Bergelson Vitali (Ohio State University, USA)

Intersective Polynomials and the Polynomial Szemeredi theorem

Let $P = \{p_1, \ldots, p_r\} \subset \mathbb{Q}[n_1, \ldots, n_m]$ be a family of polynomials which take integer values on $\mathbb{Z}^m$. We say that the family P has the PSZ-property (Polynomial Szemeredi's property) if for any set $E \subset \mathbb{Z}$ with positive upper density there exist infinitely many $n \in \mathbb{Z}^m$ such that E contains a polynomial progression of the form $\{a, a+p_1(n), ..., a+p_r(n)\}$. In a joint paper with Alexander Leibman and Emmanuel Lesigne we proved that a polynomial family $P = \{p_1, ..., p_r\}$ has the PSZ property if and only if the polynomials $p_1, ..., p_r$ are jointly intersective, meaning that for any $k \in \mathbb{N}$ there exists $n \in \mathbb{Z}^m$ such that the integers $p_1(n), ..., p_r(n)$ are all divisible by k. In this talk we will discuss some natural generalizations of this theorem and formulateÂă pertinent open problems.

De la Rue Thierry (Université de Rouen, FRANCE)

Suspensions de Poisson et SuShis

There are two famous kinds of dynamical systems of probabilistic origins: Gaussian systems (shift of coordinates on a stationary Gaussian process) and Poisson suspensions (each point of a random Poisson distributed configuration is moved according to an infinite measure preserving transformation). Although quite different in nature, striking similarities between those two families can be highlighted.
The purpose of this talk, based on several joint works with élise Janvresse and Emmanuel Roy, is to show how the beautiful theory of GAG systems (Gaussian systems with Gaussian self-joinings) can be adapted to the world of Poisson Suspensions, giving rise to the Poissonian analog of GAGs: PAP systems (Poisson suspensions with Poisson self-joinings).
The keystone for the construction of GAGs is a rigidity result by Foias and Stratila, asserting that some spectral conditions can force a process to be Gaussian. A parallel result can be obtained in the world of Poisson suspension: if some special transformations act stationarily on a random configuration of points, then this randomness is of Poissonian nature.

Eisner Tatiana (Institute of Mathematics of Leipzig, GERMANY)

Weighted Ergodic Theorems

We present an overview on good weights for the pointwise ergodic theorem.

Frantzikinakis Nikos (University of Heraklion, GRÈCE)

Ergodic properties of multiplicative functions and applications

In recent joint work with B. Host we studied measure preserving systems naturally associated with bounded multiplicative functions and established a result that (partially) describes their structure. I will explain this result and mention two applications, one related to the Möbius disjointness conjecture of Sarnak and the other related to variants of the Erdös discrepancy problem.

Garbit Rodolphe (Université d'Angers, FRANCE)

On the exit time from a cone for random walks with drift

The counting of walks in orthants is now a classical domain in enumerative combinatorics. In this talk, I will focus my attention on the growth constant for the number of such walks and show how the general framework of random walks in cones provides -via classical probabilistic tools- a unified solution to the problem of determining this growth constant. Joint work with Kilian Raschel.

Host Bernard (Université de paris XIII, FRANCE)

A short proof of a conjecture of Erdös proved by Moreira, Richter and Robertson

We give a short proof of a sumset conjecture of Erdös, recently proved by Moreira, Richter and Robertson: every subset of the integers of positive density contains the sum of two infinite sets. The proof is written in the framework of classical ergodic theory.

Kra Bryna (Northwestern University, USA)

Ergodic properties of subshifts with low complexity

Subshifts with zero entropy exhibit different dynamical behavior than subshifts with positive entropy, and this is reflected in their algebraic, combinatorial, and ergodic properties. Within zero entropy, these properties vary with the complexity of the system, and we study how the complexity affects the ergodic properties of the system.

Lemanczyk Mariusz (University of Torun, POLOGNE)

On Ratner's property of special flows over irrational rotations

A special way of divergence of orbits of nearby points, now called Ratner's property, was discovered by Marina Ratner in the 1980th in case of horocycle flows. I will tell how, together with Krzysztof Fraczek and Emmanuel Lesigne, we discovered this property in dimension 2, for some special flows over irrational rotations, and then, briefly, what was a further development of this theory.

Mauduit Christian (Université de Marseille, FRANCE)

q-multiplicative sequences: between number theory and dynamical systems

If q is an integer greater or equal to 2, we say that a function $f : \mathbb{N} \to \mathbb{U}$ is q-multiplicative if for any $a, b, j \in \mathbb{N}$ such that $0 \leq b < qj$, we have

$$f(aqj + b) = f(aqj)f(b).$$

These sequences have been intensively studied since their introduction independently by Bellman and Shapiro (1948) and by Gelfond (1968). We will present a survey on some recent results and open problems related to these sequences.

Pène Françoise (Université de Bretagne Occidentale, FRANCE)

Functional limit theorems for billiards in domains with cusps

We are interested in the study of the stochastic properties of billiards in domains with convex scatterers and cusps. The most famous example is Machta's model which is delimitated by three isometric tangent circles. For this model, a rate of decay of correlations has been established by Chernov and Zhang and a functional limit theorem with a non standard normalization has been proved by BÃąlint, Chernov and Dolgopyat. For billiards with cusps of higher flatness, Zhang established a rate of decay of correlations depending on the flatness of the cusps. In the case of a single symmetric cusp of higher flatness, Jung and Zhang proved a non standard limit theorem (convergence to a stable random variable). We extend this result by proving a non standard functional limit theorem (convergence to a LÃľvy process) for more general billiards with cusps (allowing several cusps, with more general shape, possibly asymetric, with possibly different flatness order).

Tarrago Pierre (Sorbonne Université, FRANCE)

Central measure for random alcove paths

Random alcove paths are random walks defined on the set of alcoves associated to an affine semi-simple Lie algebra. In this talk, I will describe in the type A case the set of central measures associated to these random paths conditioned to stay in the Weyl chamber: a measure is central when the probability of a given finite path only depends on its endpoint. As a byproduct of this description, we recover Rietsch's parametrization of the space of totally non-negative unitriangular Toeplitz matrices. This is a joint work with Cédric Lecouvey.

Wierdl Mâtè (Memphis University, USA)

Some problems we worked on with Emmanuel, some we could have worked on, and some we left open

During half of our life time we have known each other with Emmanuel, we worked on several problems, many more we discussed, and I recall some of these during the talk.
