Mini-Workshop of the ANR STARS

Rapport sur les contributions

ID de Contribution: **1** Type: **Non spécifié**

Talk by Camille Male

lundi 26 juin 2023 14:00 (1 heure)

Orateur: MALE, Camille

ID de Contribution: **2**   Type: **Non spécifié**

Pitman's theorem and the quantum group SL2 in infinite curvature

jeudi 29 juin 2023 09:30 (1 heure)

Pitman's theorem states that a Brownian motion minus twice its current minimum is a Markov process. We will consider two a priori distinct approaches to this theorem: Biane's approach, using a non-commutative walk on the quantum group SL2 in the crystal regime "q=0", and Bougerol-Jeulin's approach, using Brownian motion on the hyperbolic space with infinite curvature. A unified version of these two approaches will be given via a presentation of the quantum group isolating a curvature parameter and the Planck's constant. Work in collaboration with R. Chhaibi.

Orateur: CHAPON, François

ID de Contribution: **3**   Type: **Non spécifié**

Colloquium : Some aspects of Horn's problem

vendredi 30 juin 2023 14:00 (1 heure)

Horn's problem deals with the following question: what can be said about the spectrum of eigenvalues of the sum $⬚=⬚+⬚$ of two Hermitian matrices of given spectrum ? The support of the spectrum of $⬚$ is now well understood, after a long series of works from Weyl (1912) to Horn (1952) to Klyachko (1998) and Knutson and Tao (1999). The problem has also amazing connections with group theory and the decomposition of tensor product of representations. Comparison with the same problem for real symmetric matrices and the action of the orthogonal group reveals similarities but also unexpected differences···In this talk, after a short introduction to the problem, I'll sketch the computation of the probability distribution function of the eigenvalues of $⬚$, when $⬚$ and $⬚$ are independently and uniformly distributed on their orbit under the action of the group. I'll also review some aspects of the connection with representation theory and combinatorics.

Orateur: ZUBER, Jean-Bernard

ID de Contribution: **4**   Type: **Non spécifié**

Large deviations for the top eigenvalue of deformed random matrices

mardi 27 juin 2023 09:45 (1 heure)

In recent years, the few classical results in large deviations for random matrices have been complemented by a variety of new ones, in both the math and physics literatures, whose proofs leverage connections with Harish-Chandra/Itzykson/Zuber integrals. We present one such result, focusing on extreme eigenvalues of deformed sample-covariance and Wigner random matrices. This confirms recent formulas of Maillard (2020) in the physics literature, precisely locating a transition point whose analogue in non-deformed models is not yet fully understood. Joint work with Jonathan Husson.

Orateur: MCKENNA, Benjamin

ID de Contribution: **5** Type: **Non spécifié**

Talk by Stéphane Dartois

mardi 27 juin 2023 11:15 (1 heure)

Orateur: DARTOIS, Stéphane

ID de Contribution: **6**   Type: **Non spécifié**

Martingale Theoretic Approach to Noncommutative Stochastic Calculus

mercredi 28 juin 2023 09:30 (1 heure)

Free – or more generally noncommutative – stochastic analysis is often useful for describing the large N-limit of an ensemble $X^{(N)} = \left(X_t^{(N)}\right)_{t \geq 0}$ of $N \times N$ matrix stochastic processes. We describe a flexible general theory of noncommutative stochastic calculus that is useful for describing the large-N limits of solutions to $N \times N$ matrix stochastic differential equations. Our theory generalizes the theories of Biane-Speicher for free Brownian motion and Donati-Martin for q-Brownian motion. Moreover, it unifies these theories with some aspects of the classical theory of stochastic calculus. This is joint work with D. Jekel and T. Kemp.

Orateur: NIKITOPOULOS, Vaki

ID de Contribution: **7**   Type: **Non spécifié**

Injective norm of random tensors

mercredi 28 juin 2023 11:00 (1 heure)

I will present some new results about the injective norm of random tensors. The distributions we shall consider range from the simplest Gaussian distribution to that of symmetric Gaussian tensors or random Matrix Product States, which are of interest in quantum information theory. This is joint work in progress with Cécilia Lancien

Orateur: NECHITA, Ion

ID de Contribution: **8** Type: **Non spécifié**

Dinner

mercredi 28 juin 2023 20:00 (2 heures)

ID de Contribution: **9** Type: **Non spécifié**

Talk by Issa Dabo

lundi 26 juin 2023 15:30 (1 heure)

Orateur: DABO, Issa

ID de Contribution: **10** Type: **Non spécifié**

How to estimate a covariance matrix? Hopefully in large dimensions.

vendredi 30 juin 2023 09:30 (1 heure)

Consider the basic operation of estimating the spectrum of large covariance matrices.
This estimation has an inherent "large dimensional bias", when one observes a multivariate sample whose size is comparable to the dimension.
Solving this issue amounts to understanding free multiplicative *deconvolution*.
Our work follows the footsteps of El Karoui, Arizmendi-Tarrago-Vargas and Ledoit-Péché.

After presenting their work, we will discuss the pros and cons of the methods.
Then
1) we will exhibit our own method for computable and statistically consistent estimation.
2) present a cramer-Rao lower bound

This is work in progress. Feedback from the audience will be required.

Orateur: CHHAIBI, Reda

ID de Contribution: **11**   Type: **Non spécifié**

Small cycle structure for words in conjugacy invariant random permutations

jeudi 29 juin 2023 11:00 (1 heure)

We are interested in the cycle structure of words in several random permutations.
The first part of the talk will be dedicated to recall classic results (Nica 1994) when the permutations are i.i.d uniform of size n.

In the second part, we assume that the permutations are independent and that their distribution is conjugacy invariant, with a good control on their short cycles. If, after successive cyclic simplifications, the word w still contains at least two different letters, then we get a universal limiting joint law for small cycles for the word in these permutations.

The third part will be dedicated to the discussion of some open problems.

This talk is based on a joint work with Mylène Maïda (ArXiv 2204.04759).

Orateur: KAMMOUN, Slim

ID de Contribution: **12** Type: **Non spécifié**

Between free groups and surface groups.

vendredi 30 juin 2023 11:00 (1 heure)

We shall consider free groups of arbitrary finite, even rank, and their quotient by one relator leading to surface groups. The aim of the talk is to present different families of traces on the free group, that interpolate between the regular trace on the quotient and the regular trace on the free group, while being motivated by matrix approximations. When the rank is 2, the non-commutative distribution of the generators of the free group interpolates between freely independent and classically independent Haar unitaries.

ID de Contribution: **13** Type: **Non spécifié**

Lunch

lundi 26 juin 2023 12:30 (1h 30m)

ID de Contribution: **14** Type: **Non spécifié**

Lunch

mardi 27 juin 2023 12:30 (1h 30m)

ID de Contribution: **15** Type: **Non spécifié**

Lunch

mercredi 28 juin 2023 12:30 (1h 30m)

ID de Contribution: **16** Type: **Non spécifié**

Lunch

vendredi 30 juin 2023 12:30 (1h 30m)

ID de Contribution: **17**   Type: **Non spécifié**

Lunch

jeudi 29 juin 2023 12:30 (1h 30m)