

Journée thématique autour des matrices aléatoires

Rapport sur les contributions

ID de Contribution: 1

Type: **Non spécifié**

About large deviations for the largest eigenvalue of random matrices

mardi 9 avril 2024 10:30 (1 heure)

Large deviations for the largest eigenvalue of random matrices are useful for instance to study the complexity of random functions, in particular the volume of their minima. The simplest model could be studied by Auffinger-Ben Arous -Cerny by using large deviation for the largest eigenvalue of a Gaussian matrix. To include a signal, Ben Arous, Mei, Montanari and Nica used large deviations for the largest eigenvalue of a tilted Gaussian matrix derived by Maida. In this talk I will discuss how to consider large deviations for even more sophisticated random matrices showing up in more complex models, such as random matrices with variance profile or matrices obtained as sums of a Gaussian matrix with a diagonal matrix. This talk is based on joint work with Boursier, Ben Arous, Ducatez and Husson.

Orateur: GUIONNET, Alice

ID de Contribution: 2

Type: **Non spécifié**

Zeros of conditional Gaussian analytic functions, random sub-unitary matrices and q-series

mardi 9 avril 2024 14:00 (1 heure)

I will talk about zeros of the infinite Gaussian power series $f(z) = \sum c_k z^k$ conditioned on the event that $f(0) = a$. Forrester and Ipsen 2019 showed that if the coefficients c_k are independent standard complex normals then the conditional probability law of the zero set of $f(z)$ can be obtained from that of the spectrum of random subunitary matrices. I will explain how using this connection one obtains the conditional distribution of the smallest zero of $f(z)$ in terms of q -series and discuss its dependence on the parameter a . In the realm of the extreme value theory, the modulus of the smallest zero r_{min} is realised as the smallest value of a sequence of independent random variables subject to a constraint. Although the conditional probability distribution of r_{min} is not one of the three canonical forms, it interpolates between Gumbel and a particular case of Frechet distribution which arise in scaling limits of large and small a . My talk is based on joint work with Yan Fyodorov and Thomas Prellberg.

Orateur: KHORUZHENKO, Boris

ID de Contribution: 3

Type: **Non spécifié**

Characteristic polynomial outside of the support

mardi 9 avril 2024 11:45 (1 heure)

When taking a sequence of random polynomials with independent coefficients, there may remain zeros outside of the limiting support, and the behavior of these zeros depends on the law of its coefficients.

After recalling this fact, we will see that this does not happen when the random polynomials arise as the characteristic polynomials of a family of non-Hermitian random matrices.

Moreover, some kind of universality may be observed which is linked to the universality of the fluctuations of its eigenvalues.

This is based on a joint work with Charles Bordenave and Djalil Chafaï, and a joint work with Quentin François.

Orateur: GARCÍA-ZELADA, David

ID de Contribution: 4

Type: **Non spécifié**

On the density of complex eigenvalues of sub-unitary scattering matrices.

mardi 9 avril 2024 15:15 (1 heure)

What is the density of eigenvalues for a finite-size diagonal block of a resolvent of a large random matrix, with the spectral parameter chosen in the vicinity of the real axis?

I will explain how this mathematical question is motivated by real experiments in wave-scattering systems, where due to absorption the associated scattering matrix is sub-unitary, hence moduli of its eigenvalues are nontrivial.

Then I will present the results for the mean density of those moduli in the framework of random matrix models of quantum chaotic scattering.

Relations to the density of complex eigenvalues of GUE resolvent blocks and eventually to the density of resonance poles of the scattering matrix in the complex energy plane will be discussed and exploited.

Orateur: FYODOROV, Yan