Second meeting PHC Project Galileo Transcendental dynamics from one to several complex variables

Rapport sur les contributions

https://indico.math.cnrs.fr/e/14320

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

Parabolic implosion in dimension 2 part 1

mercredi 25 juin 2025 09:00 (1h 30m)

Parabolic implosion is a tool for studying the dynamics of perturbations of a map with a fixed point tangent to the identity, or more generally with at least one eigenvalue which is a root of unity. We will start by surveying classical parabolic implosion in dimension one, and then we will explain an ongoing work on parabolic implosion of germs tangent to the identity in dimension 2.

Joint work with Lorena Lopez-Hernanz and J. Raissy.

Orateur: ASTORG, Matthieu (Université d'Orléans, IDP)

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

Dynamics of Fuchsian meromorphic connections with real periods

mercredi 25 juin 2025 11:00 (50 minutes)

An interesting class of examples of holomorphic maps tangent to the identity in several complex variables is given by the time-1 maps of homogeneous
vector fields. It is known that the study of the dynamics of these maps can be reduced to the study of the dynamics of the geodesic field of meromorphic connections on Riemann surfaces. In this talk we shall describe some recent results, obtained in collaboration with Karim Rakhimov, on the dynamics of the geodesic field for Fuchsian meromorphic connections having real periods. The main tools used are: a generalization to general Fuchsian meromorphic connections of a classical formula proved by Teichm\"uller for quadratic differentials; and the relationship between Fuchsian meromorphic connections with real periods and singular flat Hermitian metrics. In particular, we obtain a description of the possible ω-limit sets of simple geodesics that extends and makes more precise results known for the particular case of Riemann surfaces endowed with a meromorphic k-differential.

Orateur: ABATE, Marco

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

On the dynamics of tangent-like mappings part 1

mercredi 25 juin 2025 14:00 (1h 30m)

In this talk we will introduce a transcendental version of the theory of polynomial-like mappings. The model family is a one parameter family T_α of "generalized tangent maps", which are meromorphic funtions with exactly two asymptotic values, only one of which is free. A straightenning theorem will explain why we find copies of Julia sets of T_α in the dynamical plane of other maps with a free asymptotic value. Likewise, in parameter space, we find copies of the "Mandelshell", the universal object whose boundary is the bifurcation locus of the family T_α.
The concept of "tangent-like mappings" was originally defined by Galazka and Kotus in 2008.
This is joint work (in progress) with Anna Miriam Benini and Matthieu Astorg.

Orateur: FAGELLA, Núria

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

Hyperbolic components and iterated monodromy of polynomial skew-products of $\mathbb{C}^2$

mercredi 25 juin 2025 16:00 (50 minutes)

In this talk, we study the families $Sk(p,d)$ of polynomial skew-products $f(z,w)=(p(z),q(z,w))$ of degree $d>1$, where $p(z)$ is fixed and $q(z,w)$ varies.
Astorg and Bianchi proved that the notion of hyperbolic components is meaningful in this setting, and they studied these components in detail for $d=2$.

I will present my recent work on hyperbolic components in higher degrees. For the family $Sk(z^d,d)$, I will present an iterated monodromy technique, valid for every $d>1$, that associates an algebraic braid to each hyperbolic component. More precisely, for each component, the Julia set of any map in the component contains an algebraic braid whose isotopy class remains constant as the map varies in the component.

These algebraic braids define a new invariant of both algebraic and topological nature for hyperbolic components. In the quadratic case, these algebraic braids encode enough information to recover the classification results obtained by Astorg and Bianchi.

Orateur: TAPIERO, Virgile

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

Free discussions

mercredi 25 juin 2025 17:00 (1 heure)

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

Parabolic implosion in dimension 2 part 2

jeudi 26 juin 2025 09:00 (1h 30m)

Parabolic implosion is a tool for studying the dynamics of perturbations of a map with a fixed point tangent to the identity, or more generally with at least one eigenvalue which is a root of unity. We will start by surveying classical parabolic implosion in dimension one, and then we will explain an ongoing work on parabolic implosion of germs tangent to the identity in dimension 2.

Joint work with Lorena Lopez-Hernanz and J. Raissy.

Orateur: ASTORG, Matthieu (Université d'Orléans, IDP)

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

Equidistribution speed towards Green measures and currents

jeudi 26 juin 2025 11:00 (50 minutes)

Let f be a holomorphic endomorphism of a complex projective space. We study the action by pullback of the iterates of f on forms and currents. It is known from the work of Dinh-Sibony that they equidistribute towards the Green currents of f and that the speed of equidistribution is exponential when tested against Hölder continuous observables. Recently, as a key tool for the statistical study of the Green measure, Bianchi-Dinh proved that the speed is still exponential when tested against suitable log-Hölder continuous functions, which have regularity exponentially weaker than Hölder. In this talk, I will give an overview of these results and present a generalisation to forms and currents of any degree. A version of the result also holds for automorphisms of compact Kaehler manifolds.

Orateur: VERGAMINI, Marco

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

On the dynamics of tangent-like mappings part 2

jeudi 26 juin 2025 14:00 (1h 30m)

In this talk we will introduce a transcendental version of the theory of polynomial-like mappings. The model family is a one parameter family T_α of "generalized tangent maps", which are meromorphic funtions with exactly two asymptotic values, only one of which is free. A straightenning theorem will explain why we find copies of Julia sets of T_α in the dynamical plane of other maps with a free asymptotic value. Likewise, in parameter space, we find copies of the "Mandelshell", the universal object whose boundary is the bifurcation locus of the family T_α.
The concept of "tangent-like mappings" was originally defined by Galazka and Kotus in 2008.
This is joint work (in progress) with Anna Miriam Benini and Matthieu Astorg.

Orateur: FAGELLA, Núria

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

Bulging of wandering Fatou components for transcendental skew products

jeudi 26 juin 2025 16:00 (50 minutes)

The Fatou components of complex endomorphisms are subject of extensive study. Whereas the one-dimensional case admits a fairly complete classification, no such picture exists in higher dimensions. One approach towards better understanding the Fatou components of higher dimensional functions is to restrict oneself to a subclass of holomorphic functions, such as skew-products. While polynomial skew products have been studied to some degree, allowing the skew product to be transcendental entire introduces new behaviors. In particular, wandering domains can appear on the invariant fiber. In this talk, I will give a brief introduction to this setting and present some initial results.

Orateur: POTTHINK, Tom

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

Free discussions

jeudi 26 juin 2025 17:00 (1 heure)

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

Infinitely many ergodic measures with infinite entropy

vendredi 27 juin 2025 09:30 (50 minutes)

Let f be a transcendental entire function in class B with finite order of growth.
We show that we can construct infinitely many ergodic measures with infinite entropy whose support is the Julia set. This is in contrast with the rational setting in which the measure of maximal entropy is unique. This is joint work with Leandro Arosio, John Erik Fornaess and Han Peters.

Orateur: BENINI, Anna Miriam

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

Horn maps of semi-parabolic Hénon maps

vendredi 27 juin 2025 11:00 (50 minutes)

We prove that horn maps associated to quadratic semi-parabolic fixed points of Hénon maps, first introduced by Bedford, Smillie, and Ueda, satisfy a weak form of the Ahlfors island property. As a consequence, two natural definitions of their Julia set (the non-normality locus of the family of iterates and the closure of the set of the repelling periodic points) coincide. As another consequence, we also prove that there exist small perturbations of semi-parabolic Hénon maps for which the Hausdorff dimension of the forward Julia set $J+$ is arbitrarily close to 4. This is a joint work with M. Astorg.

Orateur: BIANCHI, Fabrizio