Differential Galois theory in Strasbourg

Rapport sur les contributions

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

Notions of difference closures of difference fields.

mercredi 4 septembre 2019 14:00 (1 heure)

It is well known that a differential field K of characteristic 0 is contained in a differential field which is differentially closed and has the property that it K-embeds in every differentially closed field containing K. Such a field is called a differential closure of K, and it is unique up to K-isomorphism. The difference closure is what model-theorists call a "prime model".

One can ask the same question about difference fields: do they have a difference closure, and is it unique? The immediate answer to both these questions is no, for trivial reasons: in most cases, there are continuum many ways of extending an automorphism of a field to its algebraic closure. Therefore a natural requirement is to impose that the field K be algebraically closed. Similarly, if the subfield of K fixed by the automorphism is not pseudo-finite, then there are continuum many ways of extending it to a pseudo-finite field, so one needs to add the hypothesis that the fixed subfield of K is pseudo-finite.

In this talk I will show by an example that even these two conditions do not suffice.

There are two (and more) natural strengthenings of the notion of difference closure, and we show that in characteristic 0, these notions do admit unique "closures" over any algebraically closed difference field K, provided the subfield of K fixed by the automorphism is large enough.

In characteristic p, no such result can hold.

All definitions will be introduced.

Orateur: Mlle CHATZIDAKIS, Zoé

ID de Contribution: **2**

Type: **Non spécifié**

Integration on Darbouxian foliations

jeudi 5 septembre 2019 16:20 (1 heure)

Consider a Darbouxian function $f = F_0 + \sum \lambda_i \ln F_i$ with F_i rational functions in two variables, and the foliation of curves $\mathcal{C}_h = \{f(x,y) = h\}$. We consider the problem of symbolic integration of a rational function G along $\mathcal{C}_h$. If the monodromy of the integral satisfies a differential equation in h, then it is linear with constant coefficients, and the integral can be expressed in terms of Liouvillian functions restricted to $\mathcal{C}_h$. Such situation is exceptional, but is however more general than elementary integration. We present an algorithm to test the existence of such differential equation and return the Liouvillian expression of the integral if it exists.

Orateur: M. COMBOT, Thierry

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

Ax-Lindemann-Weierstrass theorem for the genus 0 Fuchsian groups

vendredi 6 septembre 2019 09:30 (1 heure)

Orateur: M. CASALE, Guy

Differential Galoi ... / Rapport sur les contributions   Ax-Lindemann-Weierstrass theore ...

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

The asymptotic proprieties of solutions of a q-difference equation as q tends to a root of unity

vendredi 6 septembre 2019 11:00 (1 heure)

Orateur: ZHANG, Changgui

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

Quotients and equations

jeudi 5 septembre 2019 09:30 (1 heure)

Quotients are ubiquitous in Mathematics, and a general question is whether a certain category of sets allows quotients. For the category of definable sets in a given structure, the model theoretic approach is called elimination of imaginaries. For algebraically closed fields, Chevalley's theorem and the existence of a field of definition of a variety imply that a quotient of a Zariski constructible set by a Zariski constructible equivalence relation is again constructible. Similar results hold for other classes of fields, such as differentially closed fields.

In this talk, we will focus on separably closed fields and differentially closed fields of positive characteristic. In joint work with Martin Ziegler, we will provide a natural expansion of the language to achieve elimination of imaginaries, by showing that these theories are equational. Equationality, introduced by Srour, and later considered by Srour and Pillay, is a generalisation of local noetherianity. We will present the main ideas of the proof, without assuming a deep knowledge of model theory.

Orateur: MARTIN-PIZARRO, Martin

ID de Contribution: **6**

Type: **Non spécifié**

On Miyake's algorithm for formal reduction of linear differential systems

jeudi 5 septembre 2019 14:00 (1 heure)

Orateur: SAADE, Joelle

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

The Riemann-Hilbert mapping in genus two

jeudi 5 septembre 2019 11:00 (1 heure)

Orateur: HEU, Viktoria

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

Becker's conjecture on Mahler functions

jeudi 5 septembre 2019 15:00 (1 heure)

In 1994, Becker conjectured that if $F(z)$ is a k-regular power series, then there exists a k-regular rational function $R(z)$ such that $F(z)/R(z)$ satisfies a Mahler-type functional equation with polynomial coefficients where the initial coefficient satisfies $a_0(z) = 1$. In this work, we prove Becker's conjecture in the best possible form; we show that the rational function $R(z)$ can be taken to be a polynomial $zQ(z)$ for some explicit non-negative integer and such that $1/Q(z)$ is k-regular. (This is joint work with Jason P. Bell, Michael Coons, and Philippe Dumas.)

Orateur: CHYZAK, Frédéric

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

Inverse problem for germs of parabolic diffeomorphisms of the complex line

mercredi 4 septembre 2019 15:30 (1 heure)

Orateur: TEYSSIER, Loïc

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

q-Stokes phenomenon of basic hypergeometric equations

jeudi 5 septembre 2019 17:20 (1 heure)

We study connection formula on basic hypergeometric equations. Some solutions are represented by divergent power series. Some are divergent basic hypergeometric series, and others are non-hypergeometric type series. We need several q-analogues of the Laplace transformation for different types of divergent power series. This is a jointed work with Changgui Zhang.

Orateur:　OHYAMA, Yousuke