From
27
NOV.
2023
to
11
DEC.
2023

09h00
-
18h00

2023-T3 RECENT TRENDS IN COMPUTER ALGEBRA

Computer Algebra for Functional Equations in Combinatorics and Physics

Institut Henri Poincaré
Amphithéâtre Hermite / Darboux
11 rue Pierre et Marie Curie
75005 Paris

INSCRIPTION

Workshop with special week and topical day

Special week

November 27 to December 1, 2023

URL of the page: https://www.ihp.fr/en/events/computer-algebra-functional-equations-combinatori
and-physics

- Creative Telescoping (long course, Monday to Friday morning), S. Chen , M. Kauers , and C. Koutschan
- Advanced Determinant Calculus (short course, Monday and Tuesday afternoon), C. Krattenthaler
- General audience presentation, Wednesday afternoon, X. Caruso
- Special session of the Differential Seminar , Thursday and Friday afternoon

Workshop: Computer algebra for functional equations in combinatorics and physics

December 4 to 8, 2023

Organizers: A. Bostan , J. Bouttier , T. Cluzeau , L. Di Vizio , C. Krattenthaler , P. Lairez , J.-M. Maillard .

In many areas of pure and applied mathematics, as well as in computer science and in theoretical physics, functional equations form either the object of study or important tools for applications. We are currently experiencing increasingly strong interactions between theory and applications, many common actions having taken place over the past ten years. By functional equations, we mean mainly ordinary differential equations, with differences, with q-differences, Mahlerian, linear or algebraic, possibly multivariate. For instance, nonlinear algebraic differential equations emerge naturally in integrable models in physics (Painlevé equations, Schlesinger systems, KdV equations, etc., associated with Lax pairs, Yang-Baxter equations,…). All these types of functional equations have been and are still very actively studied from many points of view, using algebraic, arithmetic and geometric tools. A recent trend is that computer algebra algorithms are more and more used to solve functional equations arising in enumerative combinatorics and in statistical physics. Notable examples come from questions related to lattice walks. In combinatorics, basic objects like trees, maps, permutations, and Young tableaux can be represented by models of walks confined to cones. In physics, many objects, including polymers and queueing models, are accurately modeled by walks on lattices, particularly those evolving in cones with several boundaries. This workshop brings together representatives from the three different communities (computer algebra, combinatorics and theoretical physics) to discuss longstanding conjectures, to learn each other's techniques and to plan the directions for the future.

Invited speakers

- Arvind Ayyer , Bangalore, India
- Mireille Bousquet-Mélou , Bordeaux, France
- Jehanne Dousse , Geneva, Switzerland
- Tony Guttmann , Melbourne, Australia
- Charlotte Hardouin , Toulouse, France
- Mark van Hoeij , Tallahassee, Florida, USA
- Stephen Melczer , Waterloo, Canada
- Igor Pak , Los Angeles, USA
- Veronika Pillwein , Hagenberg, Austria
- Gleb Pogudin , Palaiseau, France
- Dan Romik , California, USA
- Carsten Schneider , Hagenberg, Austria
- Alan Sokal , London, UK
- Pierre Vanhove , Saclay, France
- Michael Wallner , Vienna, Austria
- Nicholas Witte , Wellington, New Zealand

Topical day: Elimination for Functional Equations

December 11, 2023

Organiser: G. Pogudin

Speakers: Daniel Robertz , Andre Platzer , Sonia Rueda , Hadrien Notarantonio , Alexandros Singh , Nathalie Verdière .

INSTITUT HENRI POINCARÉ

Sorbonne Université / CNRS
11 rue Pierre et Marie Curie
75231 Paris Cedex 05

TIMETABLE

The institute:
• Monday to Friday from 8:30am to 6pm,
• closed on public holidays.

The museum - Maison Poincaré :
• Monday, Tuesday, Thursday and Friday from 9:30am to 5:30pm,
• Saturday from 10am to 6pm,
• closed on Wednesday and Sunday.