Workshop on computational invariant theory of permutation groups and applications

Wednesday 13th - Friday 15th June 2001
Station Biologique de l'ENS, 1, rue Château
Foljuif (south-east of Paris), FRANCE

Organizer: Nicolas M. Thiéry - LAPCS, Université Claude Bernard Lyon 1, France

With support from the: Laboratoire de Probabilité, Combinatoire et Statistiques

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Web page: `http://www.lapcs.univ-lyon1.fr/~nthiery/workshop.html`

Scope

The invariant theory of permutation groups has potential applications in many different areas (discrete mathematics, Galois theory, differential equations, algebra, quantum mechanics, ...). However, the computations involved are very hard, and the applicability of this theory will be greatly conditioned in the future by the existence of efficient software. Theory and practice are particularly intermixed here, since the computation of non trivial examples can help in the understanding of the structure of those invariant rings, which in turn can yield better algorithms.

The goal was to gather researchers in connected areas to help define the needs and the problems and bring up exciting collaborations, especially around software development.

Topics

Specific topics included but were not limited to:

- Applications
- Algorithms and implementations
- Theoretical aspects

- Related problems of isomorphism of permutation groups

Program

The workshop consisted of lectures, short communications by the participants on their recent research, software demonstrations, and problem sessions. Plenty of time was reserved for informal discussions, and the workshop continued informally over the week-end.

Tuesday

20h30 Dinner (a cold dinner will be available for those arriving late in the evening).

Wednesday

10h-10h15 Welcome

10h15-11h15 David Wehlau: The Image of the Transfer for Permutation Representations
Related documents

11h15-12h15 Nicolas M. Thiéry: Computations in invariant rings of permutation groups
Related article

12h45 Lunch

14h30-15h15 Antoine Coste: Groups in modern physics,

15h30-16h30 Florent Hivert: Schubert polynomials: a tool for computing in the natural representation of the symmetric group on polynomials.

16h30- Problem session / informal discussion

19h Dinner

Thursday

10h-11h Jim Shank: On the invariants of the regular representation of the cyclic group of order p in characteristic p.
Related documents

11h-12h Mufit Sezer: A sharpening of Noether-Fleischmann Bound
Related article

12h30 Lunch

14h30-15h15 Ugur Madran: Lower Degree Bounds of Modular Vector Invariants of Finite Groups.

15h45- Problem session / informal discussion

19h Dinner

Friday

10h-11h Emmanuel Briand: Calcul de l'ideal des relations entre les polynômes multisymétriques élémentaires, et applications / Computation of the ideal of the relations between the elementary multisymmetric polynomials, and applications.
Bibliography about multisymmetric polynomials

11h00-12h00 Jean-Charles Faugère: Solving polynomial systems with symmetries; applications and algorithms.

12h30 Lunch

15h15-16h15 Adriano Garsia: Enumeration of reduced factorizations of permutations (video)

List of participants

- Emmanuel Briand, doctorant, IRMAR, Université de Rennes 1, FRANCE
- Antoine Coste, chargé de recherche, CNRS, Université Paris-Sud, France
- Ruth Enoch, graduate student in Purdue University, USA
- Jean-Charles Faugère, chargé de recherche, CNRS, LIP6, Université Paris VI, France
- Adriano Garsia, Professor, University of California at San-Diego, USA
- Florent Hivert, maître de conférence, Université Marne-la-Vallée, France
- Ugur Madran, graduate student, Department of Mathematics, Bilkent University, Turkey
- Ioannis Michos, Post-Doc au LIAFA, Universite Paris 7
- M.Angeles Gómez Molleda, Doctorant, Universidad de Cantabria, Spain
- Mufit Sezer, graduate student in Purdue University, USA
- Jim Shank, University of Kent at Canterbury, UK
- Nicolas M. Thiéry, maître de conférences, Université Lyon I, France
- David Wehlau, Professor, Department of Mathematics and Computer Science, Royal Military College and Department of Mathematics and Statistics, Queen's University, Canada