

Report

Research activities during INdAM fellowship

Ulrich von der Ohe

Università degli Studi di Genova

April 13, 2021

1. Courses attended

1. Methods of Convex Optimization

- Period: February 2018.
- Lecturers: E. De Vito, S. Villa, and S. Salzo.
- Place: Università degli Studi di Genova.

2. Homological and combinatorial aspects of Commutative Algebra

- Period: February–May 2018.
- Lecturers: A. Conca and M. Varbaro.
- Place: Università degli Studi di Genova.

3. Integral closure of ideals, normal Hilbert polynomials and local cohomology of Rees algebras

- Period: April–May 2018.
- Lecturer: J. K. Verma.
- Place: Università degli Studi di Genova.

4. Determinantal ideals and varieties

- Period: September–November 2018.
- Lecturer: A. Simis.
- Place: Politecnico Torino.

5. Reading course in Commutative Algebra

- Period: April 2019.

- Lecturers: A. Conca and M. Varbaro.
- Place: Università degli Studi di Genova.

2. Seminar attended

In the Algebra & Geometry seminar, Università degli Studi di Genova, I attended at least 20 talks during 2017/11–2018/11; more than ten talks during 2018/12–2019/10; and at least seven talks during 2019/10–2020/02. Titles and dates can be found online at commalge.tumblr.com/ and sites.google.com/view/ag-genova/seminar/.

3. Seminar talks given

1. “Prony’s reconstruction method for multivariate exponential sums”, Politecnico Torino, October 26, 2018.
2. “A framework for Prony’s methods”, Osnabrück University, March 25, 2019.
3. “Learning algebraic decompositions using Prony structures”, ShanghaiTech University, September 24, 2019.
4. “Introduction to algebraic decomposition of signals using Prony structures”, Università degli Studi di Genova, October 9, 2019.
5. “Algebraic decomposition of functions from evaluations”, Osnabrück University, November 26, 2019.
6. “Learning algebraic decompositions using Prony structures”, Onlineseminar Applied Algebra and Analysis, TU Braunschweig and Osnabrück University, June 12, 2020.

4. Conferences/workshops/summer schools attended

1. 2018/03/22–24: Politecnico Torino, “Ideals of Powers and Powers of Ideals”.
2. 2018/06/03–08: MPI Leipzig, “Macaulay2 Workshop 2018”.
3. 2018/09/27–28: Università degli Studi di Torino, “A two-day journey in computational algebra and algebraic geometry dedicated to Margherita Roggero”.
4. 2019/03/11–15: “Summer School and Workshop on Polytopes – Geometry, Combinatorics, Probability”, Ruhr University Bochum.
5. 2019/03/19–23: “Interactions between commutative algebra, representation theory, and algebraic geometry”, Münster University.
6. 2019/04/08: INdAM Review meeting, Roma.

7. 2019/06/03: “Giornata INdAM 2019”, Università degli Studi di Bari Aldo Moro.
8. 2019/07/01–05: “Recent developments in commutative algebra”, CIME-CIRM Course, Levico Terme.
9. 2019/07/09–13: “SIAM Conference on Applied Algebraic Geometry”, Universität Bern.
10. 2019/09/02–05: “2nd Conference on Combinatorial Structures in Geometry”, Osnabrück University.
11. 2019/09/11–13: “Algebraic Combinatorics in Genova”, Università degli Studi di Genova.
12. 2019/09/26–27: “GTM Seminar”, Università degli Studi di Genova.
13. 2019/11/08: “Math Young Researchers Meeting”, Università degli Studi di Genova.

5. Contributed talks given at conferences

1. “Learning algebraic decompositions using Prony structures”, “SIAM Conference on Applied Algebraic Geometry”, Universität Bern, July 11, 2019.
2. “Learning algebraic decompositions using Prony structures”, “2nd Conference on Combinatorial Structures in Geometry”, Osnabrück University, September 2, 2019.

6. Visiting periods to other universities

1. 2017/12: Osnabrück University. During this visit work on “Prony structures” [1] was started.
2. 2018/05/07–11: Osnabrück University (funded by MIUR-DAAD Joint Mobility Program, M. Juhnke-Kubitzke and M. Varbaro). Significant progress on Prony structures [1] was achieved during this visit.
3. 2019/03/18, 25–29, and 05/06–31: Osnabrück University; Host: T. Römer.
4. 2019/09/15–25: ShanghaiTech University; Host: M. Tsakiris.
5. 2019/11/13–30: Osnabrück University; Host: T. Römer.
6. 2020/01/20–02/15: Osnabrück University; Host: S. Kunis.

7. Publications

- [1] S. Kunis, T. Römer, and U. von der Ohe. Learning algebraic decompositions using Prony structures. *Adv. in Appl. Math*, 118:102044, 42 pages, July 2020.
- [2] U. von der Ohe. Toward a structural theory of learning algebraic decompositions. *Thesis, Università degli Studi di Genova*, 64 pages, submitted.