

Professional Experience

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| Oct. 2003 – present | Teaching and research assistant at
Lehrstuhl B für Mathematik, RWTH Aachen University |
| Aug. 2007 – July 2008 | Visiting scholar at the Department of Mathematics,
University of California, Berkeley, USA
(funded by Deutsche Forschungsgemeinschaft) |

Research Stays

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| Feb. – Apr. 2003 | Institut National de Recherche en Informatique et en
Automatique (INRIA), Sophia Antipolis, France |
| Feb. – Apr. 2004 | INRIA Sophia Antipolis, France |
| March 2005 | INRIA Sophia Antipolis, France |
| March 2007 | Institute for Mathematics and its Applications,
University of Minnesota, Minneapolis, USA
“General membership” and participation in the workshop
“Applications in biology, dynamics, and statistics” during
the annual program on Applications of Algebraic Geometry |

Publications

Journal Articles

- *Linear differential elimination for analytic functions* (with W. Plesken),
to appear in *Mathematics in Computer Science*
- *The average number of cycles* (with W. Plesken),
Archiv der Mathematik 93:5 (2009), pp. 445–449
- *Noether normalization guided by monomial cone decompositions*,
Journal of Symbolic Computation 44:10 (2009), pp. 1359–1373
- *conley: Computing connection matrices in Maple* (with M. Barakat),
Journal of Symbolic Computation 44:5 (2009), pp. 540–557
- *Elimination for coefficients of special characteristic polynomials* (with W. Plesken),
Experimental Mathematics 17:4 (2008), pp. 499–510
- *homalg: A meta-package for homological algebra* (with M. Barakat),
Journal of Algebra and Its Applications 7:3 (2008), pp. 299–317
- *Computation of bases of free modules over the Weyl algebras* (with A. Quadrat),
Journal of Symbolic Computation 42:11–12 (2007), pp. 1113–1141

- *Representations, commutative algebra, and Hurwitz groups* (with W. Plesken),
Journal of Algebra 300:1 (2006), pp. 223–247
- *Effective algorithms for parametrizing linear control systems over Ore algebras* (with F. Chyzak and A. Quadrat),
Applicable Algebra in Engineering, Communication and Computing 16:5 (2005), pp. 319–376
- *Constructing Invariants for Finite Groups* (with W. Plesken),
Experimental Mathematics 14:2 (2005), pp. 175–188
- *Janet’s approach to presentations and resolutions for polynomials and linear pdes* (with W. Plesken),
Archiv der Mathematik, 84:1 (2005), pp. 22–37

Publications in Proceedings

- *Thomas Decomposition of Algebraic and Differential Systems* (with T. Bächler, V. P. Gerdt, and M. Lange-Hegermann),
in: V. P. Gerdt, W. Koepf, E. W. Mayr, E. H. Vorozhtsov (eds.), Computer Algebra in Scientific Computing, 12th International Workshop, CASC 2010, Tsakhadzor, Armenia, Proceedings Series: Lecture Notes in Computer Science, Vol. 6244, Springer, 2010, pp. 31–54
- *Consistency of Finite Difference Approximations for Linear PDE Systems and its Algorithmic Verification* (with V. P. Gerdt),
in: S. M. Watt (ed.), Proceedings of the 2010 International Symposium on Symbolic and Algebraic Computation, TU München, Germany, 2010, pp. 53–59
- *Controllability and differential flatness of linear analytic ordinary differential systems* (with A. Quadrat),
in: Proceedings 19th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2010), Budapest, Hungary, 2010
- *Baer’s extension problem for multidimensional linear systems* (with A. Quadrat),
in: Proceedings 18th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2008), Blacksburg, Virginia (USA), 2008
- *Some Elimination Problems for Matrices* (with W. Plesken),
in: V. G. Ganzha, E. W. Mayr, E. V. Vorozhtsov (eds.), Computer Algebra in Scientific Computing, 10th International Workshop, CASC 2007, Bonn, Germany, Proceedings Series: Lecture Notes in Computer Science, Vol. 4770, Springer, 2007, pp. 350–359
- *homalg: First steps to an abstract package for homological algebra* (with M. Barakat),
Proceedings X meeting on computational algebra and its applications (EACA 2006), Sevilla (Spain), 2006, pp. 29–32
- *Constructive computation of flat outputs of a class of multidimensional linear systems with variable coefficients* (with A. Quadrat),

Proceedings 17th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2006), Kyoto (Japan), pp. 583–595

- *On the Monge problem and multidimensional optimal control* (with A. Quadrat), Proceedings 17th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2006), Kyoto (Japan), pp. 596–605
- *Computing invariants of multidimensional linear systems on an abstract homological level* (with M. Barakat), Proceedings 17th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2006), Kyoto (Japan), pp. 542–559
- *Methoden und Werkzeuge zum Entwurf mechatronischer Bewegungssysteme mit ungleichmäßig übersetzenden Getrieben* (with B. Corves, D. Abel, W. Plesken, F. Harmeling, and J. Maschuw), in: VDI/VDE (eds.), Elektrischmechanische Antriebssysteme. Innovationen – Trends – Mechatronik, VDI-Berichte 1963, Düsseldorf, VDI-Verlag (2006), pp. 557–573
- *A Maple Package for Computing Gröbner Bases for Linear Recurrence Relations* (with V. P. Gerdt), Nuclear Instruments and Methods in Physics Research, A: Accelerators, Spectrometers, Detectors and Associated Equipment 559:1 (2006), pp. 215–219
- *On the blowing-up of stably free behaviours* (with A. Quadrat), Proceedings 44th IEEE Conference on Decision and Control and European Control Conference ECC 2005, Seville (Spain), pp. 1541–1546
- *Parametrizing all solutions of uncontrollable multidimensional linear systems* (with A. Quadrat), Proceedings 16th IFAC World Congress 2005, Prague (Czech Republic)
- *OreModules: A symbolic package for the study of multidimensional linear systems* (with F. Chyzak and A. Quadrat), Proceedings 16th International Symposium on Mathematical Theory of Networks and Systems (MTNS 2004), Katholieke Universiteit Leuven (Belgium)
- *The MAPLE Package “Janet”: I. Polynomial Systems. II. Linear Partial Differential Equations* (with Y. A. Blinkov, C. F. Cid, V. P. Gerdt, W. Plesken), Proceedings 6th International Workshop on Computer Algebra in Scientific Computing 2003, University of Passau (Germany)
- *Linear Control Systems over Ore Algebras: Effective Algorithms for the Computation of Parametrizations* (with F. Chyzak and A. Quadrat), Proceedings IFAC Workshop on Time-Delay Systems 2003, INRIA Rocquencourt (France)

Book Chapters

- *Janet Bases and Applications*, in: M. Rosenkranz, D. Wang (eds.), *Gröbner Bases in Symbolic Analysis*, Radon Series on Computational and Applied Mathematics 2, de Gruyter, 2007, pp. 139–168

- *OreModules: A symbolic package for the study of multidimensional linear systems* (with F. Chyzak and A. Quadrat),
in: J. Chiasson, J.-J. Loiseau (eds.), *Applications of Time-Delay Systems*, Lecture Notes in Control and Information Sciences, Vol. 352, Springer, 2007, pp. 233–264

Theses

- *Formal Computational Methods for Control Theory*,
PhD thesis, RWTH Aachen University, 2006,
<http://darwin.bth.rwth-aachen.de/opus/volltexte/2006/1586>
- *Invarianten endlicher Gruppen: Polynome und Vektorfelder*,
Diploma thesis, RWTH Aachen University, 2003