Curriculum Vitae

Dipl.-Inf. Dr. techn. Maximilian Thomas Jaroschek
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Work

Senior postdoctoral researcher (since July 2018)

Technical University Vienna
Institute of Logic and Computation
Group: Forsyte
Vienna, Austria

Postdoctoral researcher (January 2016 – June 2018)

Technical University Vienna
Institute of Logic and Computation
Group: Forsyte
Vienna, Austria
from January 2018 to June 2018 in cooperation with
Johannes Kepler University
Institute for Algebra
Linz, Austria

Postdoctoral researcher (July 2014 – December 2015)

Max-Planck-Institute for Informatics
Group: Automation of Logic
Saarbrücken, Germany

Postdoctoral researcher (January 2014 – June 2014)

Johannes Kepler University
Research Institute for Symbolic Computation
Group: Combinatorics
Linz, Austria

Education

PhD in technical sciences (2010 – 2013)

with highest distinction
Johannes Kepler University Linz
Research Institute for Symbolic Computation
Adviser: Prof. Dr. Manuel Kauers
Thesis: Removable Singularities of Ore Operators

Diploma in computer science (2004 – 2009)

University of Passau
Department of Informatics
Adviser: Prof. Dr. Thomas Müller-Gronbach
Diploma-Thesis: Multi-Level Monte Carlo Verfahren zur Bewertung von Optionen (Multi-Level Monte Carlo Method for Option Pricing)

Qualification

Programming Skills

Extensive knowledge in programming principles, including imperative, procedural, object-oriented and functional programming. Programming experience in Sage, Python, RLisp/ Reduce, Java, C, C++, Haskell, and Mathematica.

Languages

German: native speaker
English: fluent in spoken and written
French: basic

Scientific Work

Research Interests

Symbolic computation, functional equations (difference, differential and algebraic equations), computational commutative algebra, formal verification, invariant generation.

Awarded Research Grants

Holonomic Sequences in Program Verification
FWF stand-alone project P 31427.

Refereed Publications

[1] M. A. Barkatou, M. Jaroschek. Desingularization of First Order Linear Difference Systems with Rational Function Coefficients. *Proceedings of ISSAC 2018*, 2018.

[2] A. Humenberger, M. Jaroschek, and L. Kovács, Automated generation of non-linear loop invariants utilizing hypergeometric sequences. In *Proceedings of ISSAC 2017*, pages 221–228, 2017.

[3] M. A. Barkatou, M. Jaroschek, and S. S. Maddah. Formal solutions of completely integrable Pfaffian systems with normal crossings. *Journal of Symbolic Computation*, 81:41–68, 2017.

[4] M. Jaroschek, P. F. Dobal, and P. Fontaine. Adapting real quantifier elimination methods for conflict set computation. In *Frontiers of Combining Systems*, pages 151–166, 2015.

[5] M. Kauers, M. Jaroschek, and F. Johansson. Ore polynomials in Sage. In Jaime Gutierrez, Josef Schicho, and Martin Weimann, editors, *Computer Algebra and Polynomials*, volume 8942 of *Lecture Notes in Computer Science*, pages 105–125, 2014.

[6] M. Jaroschek. *Removable Singularities of Ore Operators*. PhD thesis, RISC, Johannes Kepler University Linz, November 2013.

[7] S. Chen, M. Jaroschek, M. Kauers, and M. Singer. Desingularization explains order-degree curves for Ore operators. In *Proceedings of ISSAC 2013*, pages 157–164, 2013.

[8] M. Jaroschek. Improved polynomial remainder sequences for Ore polynomials. *Journal of Symbolic Computation*, 58:64–76, 2013.

Posters, Talk-Only, and Non-Reviewed Work

[9] A. Humenberger, M. Jaroschek, and L. Kovács, Polynomial invariant generation of multi-path loops. Presentation at SC^2 Workshop 2, Kaiserslautern, Germany, 2017.

[10] M. Jaroschek. Radicals of Ore polynomials. Presentation at ACA, New York, USA,2014.

[11] M. Jaroschek. Improved polynomial remainder sequences for Ore polynomials. Poster at ISSAC, Grenoble, France, 2012.

Software

Contributor to *Redlog*. http://www.redlog.eu.

Co-developer of the *Ore algebra package for Sage*. https://www.risc.jku.at.

Invited Talks

How Not to Define Desingularization
Workshop on Computer Algebra in Combinatorics, Erwin Schrödinger International Institute for Mathematics and Physics, Vienna, Austria, 2017.

WHILE (looking for invariants) DO algebra;
RISE Seminar, http://arise.or.at, Vienna, Austria, 2017.

Desingularization of First Order Linear Difference Systems with Rational Function Coefficients.
ACA 2016, Kassel, Germany, 2016.

Desingularization of First Order Linear Difference Systems with Rational Function Coefficients.
RIMS workshop on Algebraic Statistics and Symbolic Computation, Kyoto, Japan, 2016.

Adapting Real Quantifier Elimination Methods for Conflict Set Computation.
Dagstuhl Seminar 15471, Schloss Dagstuhl, Wadern, Germany, 2015.

Improved Polynomial Remainder Sequences for Ore Polynomials.
ASCM 2012, Beijing, China. 2012.

Other Talks and Conferences

Attendee of the SC^2 workshop 2, Kaiserslautern, Germany, 2017.

Automated Generation of Non-Linear Loop Invariants Utilizing Hypergeometric Sequences.
ISSAC 2017, Kaiserslautern, Germany, 2017.

Automated Generation of Non-Linear Loop Invariants Utilizing Hypergeometric Sequences.
FELIM 2017, Limoges, France, 2017.

Quantifier Elimination Over The Reals.
Tutorial on SMT and Polynomial Arithmetic, Chalmers University, Gothenburg, Sweden, 2016.

Adapting Real Quantifier Elimination Methods for Unsatisfiable Core Computation.
TheProSE - Project Kick-off Workshop, Chalmers University, Gothenburg, Sweden, 2015.

Computing Formal Solutions of Completely Integrable Pfaffian Systems With Normal Crossings.
ACA 2015, Kalamata, Greece, 2015.

Adapting Real Quantifier Elimination Methods for Unsatisfiable Core Computations.
FroCoS 2015, Wroclaw, Poland, 2015.

SMArT – Combining VeriT and Redlog.
VeriDis Retreat, Trier, Germany, 2015.

Formal Reduction of a Class of Pfaffian Systems in Several Variables.
FELIM 2015, Limoges, France, 2015.

Adapting Quantifier Elimination Methods for SMT-Solving.
CDZ Workshop, Beijing, China, 2014.

Radicals of Ore polynomials.
ACA 2014, New York City, New York, USA. 2014.

Radicals of Ore polynomials.
EACA 2014, Barcelona, Spain. 2014.

Desingularization Explains Order-Degree Curves for Ore Operators.
University of Lyon, Lyon, France, 2013.

Desingularization Explains Order-Degree Curves for Ore Operators.
SIAM Conference on Applied Algebraic Geometry, Fort Collins, Colorado, USA. 2013.

Improved Polynomial Remainder Sequences for Ore Polynomials.
University of Waterloo, Waterloo, Ontario, Canada. 2013.

Desingularization Explains Order-Degree Curves for Ore Operators.
ISSAC 2013, Boston, Massachusetts, USA. 2013.

Teaching

Introduction to Computer Algebra.
Masters course, summer semester 2017, TU Vienna, Vienna, Austria.

Seminar on Formal Methods.
Seminar for Master students, summer semester 2017, TU Vienna, Vienna, Austria.

Number sequences.
August 2012, Nesin Mathematics Village, Şirince Turkey.

Fast algorithms for polynomial arithmetic. August 2011, Nesin Mathematics Village, Şirince, Turkey.

Exercise class: Formal methods in commercial information technology.
Summer semester 2014, Johannes Kepler University, Linz, Austria.

Exercise class: Analysis for computer scientists.
Winter semester 2011/2012, Johannes Kepler University, Linz, Austria.

Exercise class: Analysis for computer scientists.
Winter semester 2010/2011. Johannes Kepler University, Linz, Austria.

Other Scientific Activities

Organization

Gröbner Bases, Resultants and Linear Algebra 2. Co-organizer. Special session at ACA, Kalamata, Greece, 2015. http://www.singacom.uva.es/ACA2015/

Gröbner Bases, Resultants and Linear Algebra. Co-organizer. Workshop, Research Institute for Symbolic Computation, Johannes Kepler University, Linz, Austria, 2013. http://www.risc.jku.at/conferences/gbrela2013/

Reviewing Activity

Journals: Journal of Symbolic Computation, Advances in Applied Mathematics.

Conferences: Computer Algebra in Scientific Computing (CASC), Conference on Computer Aided Verification (CAV), Certified Programs and Proofs (CPP), International Symposium on Symbolic and Algebraic Computation (ISSAC), Mathematical Aspects of Computer and Information Sciences (MACIS), International Conference on Tests and Proofs (TAP), Static Analysis Symposium (SAS), Symposium on Theoretical Aspects of Computer Science (STACS), International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI).