

Curriculum Vitae

Personal Data

Full name Priv.-Doz. Dipl.-Inf. Dr. Christoph Bernhard Koutschan
Date of birth 12.12.1978
Place of birth Dillingen an der Donau, Germany
Nationality German
Marital status Married, two children

Contact

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Education and Work Experience

05/2017 Habilitation in Mathematics, Johannes Kepler University Linz, Austria.
Thesis: *Quod Erat Demonstrandum: Proofs by Computer*
(evaluation committee: James H. Davenport, Christian Krattenthaler,
Marko Petkovšek, Bruno Salvy, Carsten Schneider, Nobuki Takayama)

09/2012 – Research scientist at the Johann Radon Institute for Computational and
Applied Mathematics (RICAM), Linz, Austria.

09/2011 – 08/2012 Postdoctoral researcher at Institut National de Recherche en Informatique
et en Automatique (INRIA), MSR-INRIA Joint Centre, Orsay, France.

09/2010 – 08/2011 Postdoctoral researcher at the Research Institute for Symbolic Computa-
tion (RISC), Linz, Austria.

10/2009 – 06/2010 Postdoctoral researcher at Tulane University, New Orleans, USA.

10/2005 – 09/2009 Ph.D. studies in symbolic computation at RISC, Johannes Kepler Univer-
sity Linz, Austria.
Ph.D. thesis: *Advanced Applications of the Holonomic Systems Approach*
(advisor: Univ.-Prof. Dr. Peter Paule)

- 10/1999 – 07/2005 Undergraduate studies in computer science (minor subject: mathematics), Friedrich-Alexander University of Erlangen-Nürnberg, Germany.
Diploma thesis: *Regular Languages and Their Generating Function: The Inverse Problem* (advisor: Prof. Dr. Volker Strehl)
- 07/1998 – 07/1999 Civil Service
- 06/1998 High school graduation (Abitur) in Coburg, Germany.

Career-Related Activities

- ▷ program committee member at DART8 (2017)
- ▷ guest editor for Mathematics in Computer Science
- ▷ program committee member at ISSAC 2017
- ▷ session organizer at ACA 2017
- ▷ employee representative at RICAM
- ▷ session organizer at the Workshop on Symbolic Computation and Algebraic Statistics (Kyoto, 2016)
- ▷ session organizer at the International Congress on Mathematical Software (Berlin, 2016)
- ▷ poster committee member at ISSAC 2016
- ▷ co-organizer (with I. Georgieva, C. Hofreither, V. Pillwein, R. Uluchev) of the Workshop on Approximation Theory, CAGD, Numerical Analysis, and Symbolic Computation (Linz, 2015)
- ▷ co-organizer (with H. Hauser, G. Rond) of the Workshop on Approximation and Combinatorics (CIRM, Luminy, France, 2015)
- ▷ help with conference organization (ISSAC 2008, ACA 2008, FPSAC 2009)
- ▷ conduct one-week workshops for high school students (2007, 2008, 2009)
- ▷ member of DMV and ÖMG
- ▷ reviewer for Zentralblatt MATH and Mathematical Reviews
- ▷ contribute to the Online Encyclopedia of Integer Sequences (OEIS)

Awards

- ▷ 2016 David P. Robbins Prize of the American Mathematical Society (together with M. Kauers and D. Zeilberger)
- ▷ 2016 Distinguished Software Presentation Award at ISSAC

Third-Party Funding

- ▷ Certificate-free Summation and Integration (SFB project part F 5011-N15, 2017–2021, 345,539 EUR)
- ▷ Algebraic Statistics and Symbolic Computation (FWF stand-alone project P 29467-N32, 2016–2018, 155,904 EUR)

Patents

- ▷ Joachim Schöberl, Christoph Koutschan, Peter Paule. *Verfahren, Vorrichtung und Computerprogrammprodukt zur Bestimmung eines elektromagnetischen Nahfeldes einer Feldanregungsquelle eines elektrischen Systems (Method, device and computer program product for determining an electromagnetic near field of a field excitation source for an electrical system)*. European Patent EP2378444, US patent US8868382, 2015.

Publications

- [56] Shaoshi Chen, Mark van Hoeij, Manuel Kauers, Christoph Koutschan. *Reduction-based creative telescoping for fuchsian D -finite functions*. *Journal of Symbolic Computation* **85**, pp. 108–127, 2018. DOI: [10.1016/j.jsc.2017.07.005](https://doi.org/10.1016/j.jsc.2017.07.005), arXiv: [1611.07421](https://arxiv.org/abs/1611.07421).
- [55] Christoph Koutschan, Peter Paule. *Holonomic tools for basic hypergeometric functions*. In *Frontiers in Orthogonal Polynomials and q -Series*, 2018. World Scientific, ISBN 978-981-3228-87-0. To appear. DOI: [10.1142/10677](https://doi.org/10.1142/10677), arXiv: [1602.00454](https://arxiv.org/abs/1602.00454).
- [54] Christoph Koutschan, Yi Zhang. *Desingularization in the q -Weyl algebra*. Technical report no. 2017-47 in the RICAM Reports Series, 2017. Submitted for publication. arXiv: [1801.04160](https://arxiv.org/abs/1801.04160).
- [53] Georg Grasegger, Christoph Koutschan, Elias Tsigaridas. *Lower bounds on the number of realizations of rigid graphs*. Technical report no. 2017-35 in the RICAM Reports Series, 2017. Submitted for publication. arXiv: [1710.08237](https://arxiv.org/abs/1710.08237).
- [52] Christoph Koutschan, Thotsaporn Thanatipanonda. *A curious family of binomial determinants that count rhombus tilings of a holey hexagon*. Technical report no. 2017-30 in the RICAM Reports Series, 2017. Submitted for publication. arXiv: [1709.02616](https://arxiv.org/abs/1709.02616).
- [51] Jose Capco, Matteo Gallet, Georg Grasegger, Christoph Koutschan, Niels Lubbes, Josef Schicho. *Computing the number of realizations of a Laman graph*. *Electronic Notes in Discrete Mathematics (Proceedings of Eurocomb 2017)* **61**, pp. 207–213, 2017. DOI: [10.1016/j.endm.2017.06.040](https://doi.org/10.1016/j.endm.2017.06.040), arXiv: [1707.03633](https://arxiv.org/abs/1707.03633).
- [50] Mariemi E. Alonso, Francisco J. Castro-Jiménez, Herwig Hauser, Christoph Koutschan. *Echelons of power series and Gabrielov’s counterexample to nested linear Artin approximation*. Submitted for publication, 2017.
- [49] Johannes Middeke, David J. Jeffrey, Christoph Koutschan. *Common factors in fraction-free matrix decompositions*. Technical report no. 2017-42 in the RICAM Reports Series, 2017. Submitted for publication.
- [48] Jose Capco, Matteo Gallet, Georg Grasegger, Christoph Koutschan, Niels Lubbes, Josef Schicho. *The number of realizations of a Laman graph*. *SIAM Journal on Applied Algebra and Geometry*, 2017. To appear. arXiv: [1701.05500](https://arxiv.org/abs/1701.05500).
- [47] Matteo Gallet, Christoph Koutschan, Zijia Li, Georg Regensburger, Josef Schicho, Nelly Villamizar. *Planar linkages following a prescribed motion*. *Mathematics of Computation* **86**, pp. 473–506, 2017. DOI: [10.1090/mcom/3120](https://doi.org/10.1090/mcom/3120), arXiv: [1502.05623](https://arxiv.org/abs/1502.05623).
- [46] Thomas Cluzeau, Christoph Koutschan, Alban Quadrat, Maris Tõnso. *Effective algebraic analysis approach to linear systems over Ore algebras*. Technical report no. 2017-12 in the RICAM Reports Series, 2017. Submitted for publication.
- [45] Christoph Koutschan. *Motion polynomials and planar linkages*. *ACM Communications in Computer Algebra* **50**(3), pp. 109–112, 2016. DOI: [10.1145/3015306.3015315](https://doi.org/10.1145/3015306.3015315).
- [44] Christoph Koutschan, Martin Neumüller, Cristian-Silviu Radu. *Inverse inequality estimates with symbolic computation*. *Advances in Applied Mathematics* **80**, pp. 1–23, 2016. DOI: [10.1016/j.aam.2016.04.005](https://doi.org/10.1016/j.aam.2016.04.005), arXiv: [1602.01304](https://arxiv.org/abs/1602.01304).

- [43] Shaoshi Chen, Manuel Kauers, Christoph Koutschan. *Reduction-based creative telescoping for algebraic functions*. In *Proceedings of the International Symposium on Symbolic and Algebraic Computation (ISSAC)*, pp. 175–182, 2016. ACM, New York, USA, ISBN 978-1-4503-4380-0. DOI: [10.1145/2930889.2930901](https://doi.org/10.1145/2930889.2930901), arXiv: [1602.00424](https://arxiv.org/abs/1602.00424).
- [42] Saoud Hassani, Christoph Koutschan, Jean-Marie Maillard, Nadjah Zenine. *Lattice Green functions: the d -dimensional face-centred cubic lattice, $d = 8, 9, 10, 11, 12$* . *Journal of Physics A: Mathematical and Theoretical* **49**(16), 164003, 2016. DOI: [10.1088/1751-8113/49/16/164003](https://doi.org/10.1088/1751-8113/49/16/164003), arXiv: [1601.05657](https://arxiv.org/abs/1601.05657).
- [41] Constantin Siriteanu, Akimichi Takemura, Christoph Koutschan, Satoshi Kuriki, Donald St. P. Richards, Hyundong Shin. *Exact ZF analysis and computer-algebra-aided evaluation in rank-1 LoS Rician fading*. *IEEE Transactions on Wireless Communications* **15**(8), pp. 5245–5259, 2016. DOI: [10.1109/TWC.2016.2555796](https://doi.org/10.1109/TWC.2016.2555796), arXiv: [1507.07056](https://arxiv.org/abs/1507.07056).
- [40] Christoph Koutschan, Erwin Suazo, Sergei K. Suslov. *Fundamental laser modes in paraxial optics: from computer algebra and simulations to experimental observation*. *Applied Physics B: Lasers and Optics* **121**(3), pp. 315–336, 2015. DOI: [10.1007/s00340-015-6231-9](https://doi.org/10.1007/s00340-015-6231-9), arXiv: [1407.0730](https://arxiv.org/abs/1407.0730).
- [39] Shaoshi Chen, Christoph Koutschan. *Proof of the Wilf–Zeilberger conjecture for mixed hypergeometric terms*. Technical report no. 2015-15 in the RICAM Reports Series, 2015. Submitted for publication. arXiv: [1507.04840](https://arxiv.org/abs/1507.04840).
- [38] Christoph Koutschan, Helene Ranetbauer, Georg Regensburger, Marie-Therese Wolfram. *Symbolic derivation of mean-field PDEs from lattice-based models*. In *Proceedings of the 17th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC)*, pp. 27–33, 2015. IEEE Computer Society Conference Publishing Services (CPS), ISBN 978-1-5090-0461-4. DOI: [10.1109/SYNASC.2015.14](https://doi.org/10.1109/SYNASC.2015.14), arXiv: [1506.08527](https://arxiv.org/abs/1506.08527).
- [37] Manuel Kauers, Christoph Koutschan. *Integral D -finite functions*. In *Proceedings of the International Symposium on Symbolic and Algebraic Computation (ISSAC)*, pp. 251–258, 2015. ACM, New York, USA, ISBN 978-1-4503-3435-8. DOI: [10.1145/2755996.2756658](https://doi.org/10.1145/2755996.2756658), arXiv: [1501.03691](https://arxiv.org/abs/1501.03691).
- [36] Constantin Siriteanu, Akimichi Takemura, Satoshi Kuriki, Hyundong Shin, Christoph Koutschan. *MIMO zero-forcing performance evaluation using the holonomic gradient method*. *IEEE Transactions on Wireless Communications* **14**(4), pp. 2322–2335, 2015. DOI: [10.1109/TWC.2014.2385075](https://doi.org/10.1109/TWC.2014.2385075), arXiv: [1403.3788](https://arxiv.org/abs/1403.3788).
- [35] Shaoshi Chen, Manuel Kauers, Christoph Koutschan. *A generalized Apagodu-Zeilberger algorithm*. In *Proceedings of the International Symposium on Symbolic and Algebraic Computation (ISSAC)*, pp. 107–114, 2014. ACM, New York, USA, ISBN 978-1-4503-2501-1. DOI: [10.1145/2608628.2608641](https://doi.org/10.1145/2608628.2608641), arXiv: [1402.2409](https://arxiv.org/abs/1402.2409).
- [34] Christoph Koutschan, Peter Paule, Sergei K. Suslov. *Relativistic Coulomb integrals and Zeilberger’s holonomic systems approach II*. In *Algebraic and Algorithmic Aspects of Differential and Integral Operators*, Lecture Notes in Computer Science **8372**, pp. 135–145, 2014. Springer-Verlag, Berlin Heidelberg, ISBN 978-3-642-54478-1. DOI: [10.1007/978-3-642-54479-8_6](https://doi.org/10.1007/978-3-642-54479-8_6), arXiv: [1306.1362](https://arxiv.org/abs/1306.1362).
- [33] Christoph Koutschan. *Holonomic functions in Mathematica*. *ACM Communications in Computer Algebra* **47**(4), pp. 179–182, 2013. DOI: [10.1145/2576802.2576831](https://doi.org/10.1145/2576802.2576831).
- [32] Christoph Koutschan. *Creative telescoping for holonomic functions*. In Carsten Schneider, Johannes Blümlein (editors): *Computer Algebra in Quantum Field Theory: Integration, Summation and Special Functions*, Texts & Monographs in Symbolic Computation, pp. 171–194, 2013. Springer, Wien, ISBN 978-3-7091-1615-9. DOI: [10.1007/978-3-7091-1616-6_7](https://doi.org/10.1007/978-3-7091-1616-6_7), arXiv: [1307.4554](https://arxiv.org/abs/1307.4554).

- [31] Stefan Gerhold, Manuel Kauers, Christoph Koutschan, Peter Paule, Carsten Schneider, Burkhard Zimmermann. *Computer-assisted proofs of some identities for Bessel functions of fractional order*. In Carsten Schneider, Johannes Blümlein (editors): *Computer Algebra in Quantum Field Theory: Integration, Summation and Special Functions*, Texts & Monographs in Symbolic Computation, pp. 75–96, 2013. Springer, Wien, ISBN 978-3-7091-1615-9. DOI: [10.1007/978-3-7091-1616-6_3](https://doi.org/10.1007/978-3-7091-1616-6_3), arXiv: [1305.4818](https://arxiv.org/abs/1305.4818).
- [30] Stavros Garoufalidis, Christoph Koutschan. *Irreducibility of q -difference operators and the knot 7_4* . *Algebraic & Geometric Topology* **13**(6), pp. 3261–3286, 2013. DOI: [10.2140/agt.2013.13.3261](https://doi.org/10.2140/agt.2013.13.3261), arXiv: [1211.6020](https://arxiv.org/abs/1211.6020).
- [29] Christoph Koutschan. *Lattice Green's functions of the higher-dimensional face-centered cubic lattices*. *Journal of Physics A: Mathematical and Theoretical* **46**(12), 125005, 2013. DOI: [10.1088/1751-8113/46/12/125005](https://doi.org/10.1088/1751-8113/46/12/125005), arXiv: [1108.2164](https://arxiv.org/abs/1108.2164).
- [28] Christoph Koutschan, Thotsaporn Thanatipanonda. *Advanced computer algebra for determinants*. *Annals of Combinatorics* **17**(3), pp. 509–523, 2013. DOI: [10.1007/s00026-013-0183-8](https://doi.org/10.1007/s00026-013-0183-8), arXiv: [1112.0647](https://arxiv.org/abs/1112.0647).
- [27] Irina Georgieva, Clemens Hofreither, Christoph Koutschan, Veronika Pillwein, Thotsaporn Thanatipanonda. *Harmonic interpolation based on Radon projections along the sides of regular polygons*. *Central European Journal of Mathematics* **11**(4), pp. 609–620, 2013. DOI: [10.2478/s11533-012-0160-1](https://doi.org/10.2478/s11533-012-0160-1).
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- [25] Larry Glasser, Karen T. Kohl, Christoph Koutschan, Victor H. Moll, Armin Straub. *The integrals in Gradshteyn and Ryzhik. Part 22: Bessel- K functions*. *SCIENTIA Series A: Mathematical Sciences* **22**, pp. 129–151, 2012.
- [24] Herwig Hauser, Christoph Koutschan. *Multivariate linear recurrences and power series division*. *Discrete Mathematics* **312**(24), pp. 3553–3560, 2012. DOI: [10.1016/j.disc.2012.08.009](https://doi.org/10.1016/j.disc.2012.08.009).
- [23] Thierry Combot, Christoph Koutschan. *Third order integrability conditions for homogeneous potentials of degree -1* . *Journal of Mathematical Physics* **53**(8), 082704, 2012. DOI: [10.1063/1.4746691](https://doi.org/10.1063/1.4746691), arXiv: [1111.5971](https://arxiv.org/abs/1111.5971).
- [22] Masao Ishikawa, Christoph Koutschan. *Zeilberger's holonomic ansatz for Pfaffians*. In *Proceedings of the International Symposium on Symbolic and Algebraic Computation (ISSAC)*, pp. 227–233, 2012. ACM, New York, USA, ISBN 978-1-4503-1269. DOI: [10.1145/2442829.2442863](https://doi.org/10.1145/2442829.2442863), arXiv: [1201.5253](https://arxiv.org/abs/1201.5253).
- [21] Stavros Garoufalidis, Christoph Koutschan. *Twisting q -holonomic sequences by complex roots of unity*. In *Proceedings of the International Symposium on Symbolic and Algebraic Computation (ISSAC)*, pp. 179–186, 2012. ACM, New York, USA, ISBN 978-1-4503-1269. DOI: [10.1145/2442829.2442857](https://doi.org/10.1145/2442829.2442857), arXiv: [1201.3353](https://arxiv.org/abs/1201.3353).
- [20] Tewodros Amdeberhan, Christoph Koutschan, Victor H. Moll, Eric S. Rowland. *The iterated integrals of $\ln(1 + x^n)$* . *International Journal of Number Theory* **8**(1), pp. 71–94, 2012. DOI: [10.1142/S1793042112500042](https://doi.org/10.1142/S1793042112500042), arXiv: [1012.3429](https://arxiv.org/abs/1012.3429).
- [19] Christoph Koutschan, Christoph Lehrenfeld, Joachim Schöberl. *Computer algebra meets finite elements: an efficient implementation for Maxwell's equations*. In Ulrich Langer, Peter Paule (editors): *Numerical and Symbolic Scientific Computing: Progress and Prospects*, Texts & Monographs in Symbolic Computation, pp. 105–121, 2012. Springer, Wien, ISBN 978-3-7091-0793-5. DOI: [10.1007/978-3-7091-0794-2_6](https://doi.org/10.1007/978-3-7091-0794-2_6), arXiv: [1104.4208](https://arxiv.org/abs/1104.4208).

- [18] Frédéric Chyzak, James H. Davenport, Christoph Koutschan, Bruno Salvy. *On Kahan's rules for determining branch cuts*. In *Proceedings of the 13th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC)*, pp. 47–51, 2011. IEEE Computer Society Conference Publishing Services (CPS), ISBN 978-0-7695-4630-8. DOI: [10.1109/SYNASC.2011.51](https://doi.org/10.1109/SYNASC.2011.51), arXiv: [1109.2809](https://arxiv.org/abs/1109.2809).
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- [16] Stavros Garoufalidis, Christoph Koutschan. *The \mathfrak{sl}_3 Jones polynomial of the trefoil: a case study of q -holonomic sequences*. *Advances in Applied Mathematics* **47**(4), pp. 829–839, 2011. DOI: [10.1016/j.aam.2011.04.001](https://doi.org/10.1016/j.aam.2011.04.001), arXiv: [1011.6329](https://arxiv.org/abs/1011.6329).
- [15] Christoph Koutschan, Manuel Kauers, Doron Zeilberger. *Proof of George Andrews's and David Robbins's q -TSPP conjecture*. *Proceedings of the National Academy of Sciences* **108**(6), pp. 2196–2199, 2011. DOI: [10.1073/pnas.1019186108](https://doi.org/10.1073/pnas.1019186108), arXiv: [1002.4384](https://arxiv.org/abs/1002.4384).
- [14] Christoph Koutschan, Victor H. Moll. *The integrals in Gradshteyn and Ryzhik. Part 18: some automatic proofs*. *SCIENTIA Series A: Mathematical Sciences* **20**, pp. 93–111, 2011.
- [13] Christoph Koutschan, Doron Zeilberger. *The 1958 Pekeris-Accad-WEIZAC groundbreaking collaboration that computed ground states of two-electron atoms (and its 2010 redux)*. *The Mathematical Intelligencer* **33**(2), pp. 52–57, 2011. DOI: [10.1007/s00283-010-9192-1](https://doi.org/10.1007/s00283-010-9192-1), arXiv: [1006.0200](https://arxiv.org/abs/1006.0200).
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- [11] Christoph Koutschan. *Eliminating human insight: an algorithmic proof of Stembridge's TSPP Theorem*. In Tewodros Amdeberhan, Luis A. Medina, Victor H. Moll (editors): *Gems in Experimental Mathematics*, *Contemporary Mathematics* **517**, pp. 219–230, 2010. American Mathematical Society, ISBN 978-0-8218-4869-2. DOI: [10.1090/conm/517](https://doi.org/10.1090/conm/517), arXiv: [0906.1018](https://arxiv.org/abs/0906.1018).
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- [9] Christoph Koutschan. *HolonomicFunctions (user's guide)*. Technical report no. 10-01 in the RISC Report Series, Johannes Kepler University, Linz, Austria, 2010.
- [8] Christoph Koutschan. *Advanced applications of the holonomic systems approach*. *ACM Communications in Computer Algebra* **43**(3/4), pp. 119–119, 2009. DOI: [10.1145/1823931.1823954](https://doi.org/10.1145/1823931.1823954).
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- [6] Manuel Kauers, Christoph Koutschan, Doron Zeilberger. *A Proof of George Andrews' and Dave Robbins' q -TSPP conjecture (modulo a finite amount of routine calculations)*. The personal journal of Shalosh B. Ekhad and Doron Zeilberger, 2009.
- [5] Manuel Kauers, Christoph Koutschan, Doron Zeilberger. *Proof of Ira Gessel's lattice path conjecture*. *Proceedings of the National Academy of Sciences* **106**(28), pp. 11502–11505, 2009. DOI: [10.1073/pnas.0901678106](https://doi.org/10.1073/pnas.0901678106), arXiv: [0806.4300](https://arxiv.org/abs/0806.4300).
- [4] Manuel Kauers, Christoph Koutschan. *A Mathematica package for q -holonomic sequences and power series*. *The Ramanujan Journal* **19**(2), pp. 137–150, 2009. DOI: [10.1007/s11139-008-9132-2](https://doi.org/10.1007/s11139-008-9132-2).
- [3] Christoph Koutschan, Viktor Levandovskyy. *Computing one of Victor Moll's irresistible integrals with computer algebra*. *Computer Science Journal of Moldova* **16**(1(46)), pp. 35–49, 2008.

- [2] Christoph Koutschan. *Regular languages and their generating functions: the inverse problem*. Theoretical Computer Science **391**(1-2), pp. 65–74, 2008. DOI: [10.1016/j.tcs.2007.10.031](https://doi.org/10.1016/j.tcs.2007.10.031).
- [1] Christoph Koutschan. *Regular languages and their generating functions: the inverse problem*. Master thesis (Diplomarbeit), Friedrich-Alexander-Universität, Erlangen-Nürnberg, Germany, 2005.

Talks at Conferences

- 51. *Symbolic evaluation of determinants and rhombus tilings of holey hexagons*. Invited talk at the Workshop on Computer Algebra in Combinatorics, Erwin Schrödinger Institut (ESI), Vienna, Austria, November 16, 2017.
- 50. *Computer Algebra in the q -Calculus*. Invited talk at the Combinatorics meeting on the occasion of Johann Cigler’s 80. birthday, University of Vienna, Austria, October 25, 2017.
- 49. *Symbolic evaluation of determinants and rhombus tilings of holey hexagons*. Invited talk at the ALEA in Europe Workshop, Technical University of Vienna, Austria, October 12, 2017.
- 48. *Reduction-based creative telescoping for D -finite functions*. Invited talk at Lattice walks at the Interface of Algebra, Analysis and Combinatorics, Banff International Research Station, Canada, September 19, 2017.
- 47. *Computing the number of realizations of Laman graphs*. Invited talk at the Workshop on Computational Mathematics and Approximation Theory (CMAPT), RICAM, Linz, Austria, September 8, 2017.
- 46. *Constructing linkages for drawing plane curves*. Invited talk at ACA (23rd Conference on Applications of Computer Algebra), Jerusalem College of Technology, Jerusalem, Israel, July 21, 2017.
- 45. *Two facets of computational mathematics: numerics and symbolics*. Invited talk at the ERCOM Meeting, RICAM, Austria, April 28, 2017.
- 44. *Reduction-based creative telescoping for algebraic functions*. Invited talk at the Workshop on Algebraic Statistics and Symbolic Computation, Research Institute for Mathematical Sciences (RIMS), Kyoto University, Japan, July 28, 2016.
- 43. *Inverse inequality estimates with symbolic computation*. Invited talk at the Waterloo Workshop on Computer Algebra, Wilfrid Laurier University, Waterloo, Canada, July 23, 2016.
- 42. *Motion polynomials and planar linkages*. Software presentation at ISSAC (41st International Symposium on Symbolic and Algebraic Computation), Wilfrid Laurier University, Waterloo, Canada, July 20, 2016.
- 41. *Minimally rigid graphs*. Invited talk at MICA (Milestones in Computer Algebra — Celebrating the Research of Erich Kaltofen), University of Waterloo, Canada, July 16, 2016.
- 40. *Effective algebraic analysis approach to linear systems over Ore algebras*. Invited talk at ICMS (5th International Congress on Mathematical Software), Zuse Institute Berlin, Germany, July 12, 2016.
- 39. *Inverse inequality estimates with symbolic computation*. Invited talk at the Workshop on Analysis and Advanced Numerical Methods for Partial Differential Equations, Strobl, Austria, July 8, 2016.
- 38. *Symbolic determinant evaluation*. Invited talk at the Workshop on Algebra, Geometry and Proofs in Symbolic Computation, Fields Institute, Toronto, Canada, December 15, 2015.
- 37. *Planar linkages following a prescribed motion*. Invited talk at the Workshop on Approximation Theory, CAGD, Numerical Analysis, and Symbolic Computation, Linz, Austria, August 25, 2015.

36. *Pushing forward the dimension of fcc lattices*. Invited talk at the Sixth International Workshop on Differential Algebra and Related Topics (DART-VI, embedded conference of ICIAM), China National Convention Center, Beijing, China, August 10, 2015.
35. *Computer-algebra-based MIMO performance analysis*. Invited talk at the SIAM Conference on Applied Algebraic Geometry, National Institute for Mathematical Sciences (NIMS), Daejeon, South Korea, August 7, 2015.
34. *Pushing forward the dimension of fcc lattices*. Invited talk at SIAM-OPSFA (13th International Symposium on Orthogonal Polynomials, Special Functions & Applications), National Institute of Standards and Technology (NIST), Gaithersburg, USA, June 2, 2015.
33. *Multivariate D -finite and holonomic functions*. Invited talk at the Workshop on Approximation and Combinatorics, Centre international de rencontres mathématiques (CIRM), Luminy, France, April 23, 2015.
32. *Planar linkages following a prescribed motion*. Invited talk at the Computer Algebra Seminar, Kobe University, Japan, March 8, 2015.
31. *Software demo: the HolonomicFunctions package*. Invited talk at the Workshop on computational and algebraic methods in statistics, University of Tokyo, Japan, March 3, 2015.
30. *q -shift operators in knot theory*. Invited talk at the Symbolic Analysis Workshop at FoCM (Foundations of Computational Mathematics), Universidad de la República, Montevideo, Uruguay, December 16, 2014.
29. *Creative telescoping*. Invited talk at the Workshop on geometric control and related fields, RICAM, Linz, Austria, November 17, 2014.
28. *Symbolic computation in knot theory*. Invited talk at the Workshop on Approximation Theory, CAGD, Numerical Analysis, and Symbolic Computation, Sozopol, Bulgaria, August 27, 2014.
27. *A generalized Apagodu-Zeilberger algorithm*. Contributed talk at ISSAC (39th International Symposium on Symbolic and Algebraic Computation), Kobe University, Japan, July 23, 2014.
26. *On the AJ conjecture of connected sums of knots*. Invited talk at the Programme on Combinatorics, Geometry, and Physics, Erwin Schrödinger Institut (ESI), Vienna, Austria, July 17, 2014.
25. *A rational perspective on holonomic functions*. Invited talk at CASTA (Computational Algebraic Statistics, Theories and Applications), Kyoto, Japan, January 22, 2014.
24. *A glimpse of noncommutative Gröbner bases*. Invited talk at the conference Gröbner Bases, Resultants and Linear Algebra, RISC, Johannes Kepler University Linz, Austria, September 6, 2013.
23. *Holonomic functions in Mathematica*. Software presentation at ISSAC (38th International Symposium on Symbolic and Algebraic Computation), Northeastern University, Boston, Massachusetts, USA, June 27, 2013.
22. *Holonomicity and properness are equivalent*. Contributed talk at LARD (Linz Algebra Research Day), Johannes Kepler University Linz, Austria, June 19, 2013.
21. *Zeilberger's holonomic ansatz for Pfaffians*. Contributed talk at ISSAC (37th International Symposium on Symbolic and Algebraic Computation), University of Grenoble, France, July 24, 2012.
20. *Twisting q -holonomic sequences by complex roots of unity*. Contributed talk at ISSAC (37th International Symposium on Symbolic and Algebraic Computation), University of Grenoble, France, July 23, 2012.
19. *Twisting q -holonomic sequences by complex roots of unity*. Invited talk at ACA (18th International Conference on Applications of Computer Algebra), Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, Sofia, Bulgaria, June 28, 2012.
18. *The face-centered cubic lattice*. Invited talk at FELIM (Functional Equations in LIMoges), Faculty of Sciences and Techniques of the University of Limoges, France, March 5, 2012.

17. *Advanced computer algebra for evaluating determinants*. Contributed talk at JNCF (Journées Nationales de Calcul Formel), CIRM Luminy (Marseille), France, November 16, 2011.
16. *Lattice Green's functions of the higher-dimensional face-centered cubic lattices*. Invited talk at the Conference on Applied Algebraic Geometry (Minisymposium "Symbolic Combinatorics"), North Carolina State University, Raleigh, North Carolina, USA, October 6, 2011.
15. *Lattice Green's functions of the higher-dimensional face-centered cubic lattices*. Invited talk at CSASC (Joint Mathematical Conference of the Austrian Mathematical Society together with the Catalan, Czech, Slovak, and Slovenian Mathematical Societies, Minisymposium "Combinatorics and Graph Theory"), Donau-Universität Krems, Austria, September 27, 2011.
14. *Lattice Green's functions*. Invited talk at ACA (17th International Conference on Applications of Computer Algebra), Lamar University, Houston, Texas, USA, June 28, 2011.
13. *Software for special functions*. Invited talk at ICASF (International Conference on Asymptotics and Special Functions), City University of Hong Kong, China, June 1, 2011.
12. *Computer algebra tools for summation and integration*. Invited talk at CMIC (Chiang Mai International Conference), Chiang Mai University, Thailand, January 6, 2011.
11. *Algorithmic combinatorics: symbolic summation and integration*. Tutorial at CMIC (Chiang Mai International Conference), Chiang Mai University, Thailand, January 4–5, 2011.
10. *Proof of the q -TSP Conjecture*. Contributed talk at SLC 65 (Séminaire Lotharingien de Combinatoire), Strobl, Austria, September 13, 2010.
9. *Proof of George Andrews' and David Robbins' q -TSP Conjecture*. Contributed talk at the Conference in Honor of Doron Zeilberger's 60th Birthday, Rutgers University, New Jersey, USA, May 27, 2010.
8. *Holonomic Functions*. Software presentation at FPSAC (21st International Conference on Formal Power Series and Algebraic Combinatorics), RISC, Johannes Kepler University Linz, Austria, July 22, 2009.
7. *Think Big (or how to tackle hard problems with the holonomic systems approach)*. Invited talk at the Summation Workshop, RISC, Johannes Kepler University Linz, Austria, July 19, 2009.
6. *Algorithmic proving of special function identities in Mathematica*. Invited talk at ACA (15th International Conference on Applications of Computer Algebra), École de technologie supérieure, Montréal, Canada, June 26, 2009.
5. *A difference operators attack on hard combinatorial problems*. Invited talk at ACA (15th International Conference on Applications of Computer Algebra), École de technologie supérieure, Montréal, Canada, June 25, 2009.
4. *How to prove the q -TSP Conjecture?* Invited talk at the AMS Joint Mathematics Meeting, Washington DC, USA, January 5, 2009.
3. *Proof of Ira Gessel's lattice path conjecture*. Contributed talk at SLC 61 (Séminaire Lotharingien de Combinatoire), Curia, Portugal, September 24, 2008.
2. *Holonomic function identities*. Invited talk at ACA (14th International Conference on Applications of Computer Algebra), RISC, Johannes Kepler University Linz, Austria, July 27, 2008.
1. *Proof of Ira Gessel's lattice path conjecture*. Invited talk at SNSC (4th International Conference on Symbolic and Numerical Scientific Computing), RISC, Johannes Kepler University Linz, Austria, July 25, 2008.

Peer-Reviewing Activities

For each journal and conference the number of completed reviews is given in parentheses.

- ▷ ISSAC (14)
- ▷ Journal of Physics A: Mathematical and Theoretical (6)
- ▷ Journal of Symbolic Computation (6)
- ▷ Journal of Mathematical Analysis and Applications (4)
- ▷ Advances in Applied Mathematics (2)
- ▷ CASC (2)
- ▷ Acta Physica Polonica A (1)
- ▷ Ain Shams Engineering Journal (1)
- ▷ Ars Mathematica Contemporanea (1)
- ▷ Applicable Algebra in Engineering, Communication and Computing (1)
- ▷ Electronic Journal of Combinatorics (1)
- ▷ European Journal of Combinatorics (1)
- ▷ Fluctuation and Noise Letters (1)
- ▷ Foundations of Computational Mathematics (1)
- ▷ FPSAC (1)
- ▷ International Journal of Computer Mathematics (1)
- ▷ International Journal of Theoretical Physics (1)
- ▷ Inventiones Mathematicae (1)
- ▷ Journal of Combinatorial Theory, Series A (1)
- ▷ Journal of Computer and System Sciences (1)
- ▷ Journal of Integer Sequences (1)
- ▷ Journal of Number Theory (1)
- ▷ Journal of the London Mathematical Society (1)
- ▷ Lecture Notes in Computer Science (1)
- ▷ L'Enseignement Mathématique (1)
- ▷ Mathematical Methods in the Applied Sciences (1)
- ▷ Reports on Mathematical Physics (1)
- ▷ SIGMA (1)
- ▷ Theoretical Computer Science (1)
- ▷ Transactions of the AMS (1)

Teaching

Semester	School	Type	Title
W 2017	JKU	Lecture	Mathematik 1 für Mechatronik, Kunststofftechnik, Elektronik und Informationstechnik
	FHH	Lecture	Logische und formale Grundlagen der Informatik
S 2017	JKU	Exercises	Algebra für InformatikerInnen
	FHH	Lecture	Mathematik 1 – Algebra
W 2016	FHH	Lecture	Logische und formale Grundlagen der Informatik
S 2016	JKU	Exercises	Lineare Algebra und Analytische Geometrie 2
	FHH	Lecture	Mathematik 1 – Algebra

W 2015	JKU	Exercises	Lineare Algebra und Analytische Geometrie 1
	JKU	Exercises	Mathematik und Logik für Wirtschaftsinformatiker
	FHH	Lecture	Logische und formale Grundlagen der Informatik
S 2015	FHH	Lecture	Mathematik 1 – Algebra
W 2014	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2013	JKU	Lecture	Knot Theory and Computer Algebra
	JKU	Exercises	Analysis (Mathematik 2 für Informatiker)
	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2012	JKU	Exercises	Analysis (Mathematik 2 für Informatiker)
	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2011	FHH	Lecture	Logische und formale Grundlagen der Informatik
W 2010	JKU	Lecture	Computer Algebra Systems
	JKU	Exercises	Analysis (Mathematik 2 für Informatiker)
	FHH	Exercises	Logische und formale Grundlagen der Informatik
W 2008	JKU	Lecture	Computer Algebra Systems
	JKU	Exercises	Analysis für Informatiker
W 2007	JKU	Exercises	Berechenbarkeit und Komplexität
S 2007	JKU	Exercises	Analysis für Informatiker
W 2006	JKU	Exercises	Formale Grundlagen 2
S 2005	FAU	Exercises	Einführung in die Theoretische Informatik II
S 2004	FAU	Exercises	Einführung in die Theoretische Informatik III
W 2003	FAU	Exercises	Einführung in die Theoretische Informatik II
	FAU	Exercises	Mathematik für Ingenieure I
S 2003	FAU	Exercises	Einführung in die Theoretische Informatik III
W 2002	FAU	Exercises	Mathematik für Ingenieure III
	FAU	Exercises	Organisation und Technologie von Rechensystemen I
S 2002	FAU	Exercises	Mathematik für Ingenieure II
W 2001	FAU	Exercises	Mathematik für Ingenieure I

FAU = Friedrich-Alexander-Universität Erlangen-Nürnberg

FHH = Fachhochschule Hagenberg

JKU = Johannes Kepler Universität Linz

Software

- ▷ **LamanGraphs**, a Mathematica package and C++ implementation for constructing Laman graphs and for computing their embedding numbers.
- ▷ **PlanarLinkages**, a Mathematica package for constructing and visualizing planar linkages that follow a prescribed curve (or motion), including arithmetic and factorization of motion polynomials.
- ▷ Member of the development team of DDMF (Dynamic Dictionary of Mathematical Functions), see <http://ddmf.msr-inria.inria.fr>.
- ▷ **GradshteynRyzhik**, a package for extracting all formulas from the book by Gradshteyn and Ryzhik, and for translating them into the Mathematica language.

- ▷ `HolonomicFunctions`, a Mathematica package for dealing with multivariate holonomic functions and sequences, in particular for executing closure properties, evaluating sums and integrals involving special functions, finding relations for a given function, etc.
- ▷ `qGeneratingFunctions`, a Mathematica package for manipulations of univariate q -holonomic functions and sequences.
- ▷ `RLangGFun`, a Maple implementation of the inverse Schützenberger methodology (a constructive version of Soittola’s Theorem).

Personal Interests

- ▷ Music: piano lessons (1986 – 1992), lessons in church organ (1992 – 2005), degrees D-diploma (1998) and C-diploma (2003) in church music, regular playing in church services.
- ▷ Singing: member of the *Academic Choir* of the FA University of Erlangen-Nürnberg (2002 – 2005), member of the choir *pro musica* (since 2005).
- ▷ Photography: using a professional SLR camera
- ▷ Travel: various journeys to many different countries, mainly in Asia, Latin America, and Europe.
- ▷ Languages: Latin (7 years), English (7 years), French (3 years) in high school. Basic courses in Chinese and Russian at university, and studies of the Arabic language (2004 – 2005), including a one-month language course in Lebanon.