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Citizenship: Canadian

Education

June 2003 • Ph.D. in Computer Science — University of Waterloo, Canada
Thesis title: Algorithms for the Construction of the Minimal Telescopers
Thesis co-supervisors: Dr. K.O. Geddes, Dr. S.A. Abramov

May 1999 • M.Math. in Computer Science — University of Waterloo, Canada
Thesis title: Client-Server Communication Standards for Mathematical Computation
Thesis supervisor: Dr. G. Labahn

May 1995 • Co-op Honours B.Math. in Computer Science — University of Waterloo, Canada

Research Interests

- Symbolic computation
- Computer graphics

Employment

Research

Oct. 2004 – Present • Postdoctoral Fellowship — Department of Mathematics, Simon Fraser University, Canada

Supervisor: Dr. M. Monagan

Research in symbolic summation, and differential equations.

Software development in numerical analysis, and polynomial computation.

Employment (continued)

Sept. 2003 – Sept. 2004 • Postdoctoral Fellowship The French National Institute for Research in Computer Science and Control, France
Supervisor: Dr. B. Salvy

Research in symbolic summation and integration.

Software development in series computation, and algorithms in skew-polynomial rings.

Dec. 1996 – Apr. 2003 • Research Assistant Department of Computer Science, University of Waterloo, Canada
Supervisors: Dr. K.O. Geddes, Dr. G. Labahn

Designed and implemented algorithms in symbolic summation.

Developed client-server communication standards for mathematical computation.

Helped supervise co-op students.

Teaching

Jan. 2005 – Apr. 2005 • Instructor Department of Mathematics, Simon Fraser University
Taught a third-year course in computational numerical analysis `http://www.cecm.sfu.ca/~hle/teaching/MACM316/`.

Dec. 1996 – Apr. 2003 • Teaching Assistant Department of Computer Science, University of Waterloo
Acted as teaching assistant for courses in numerical analysis, software specification, and symbolic computation.

Industry

June 2003 – July 2003 • Consultant Waterloo Maple Inc., Waterloo, Canada

Designed and developed mathematical software.

Sept. 1997 – Dec. 1997 • Consultant Web Pearls Inc., Waterloo, Canada
Supervisor: Dr. C.R. Howlett

Developed client-server communication between computer algebra systems and the two international standards representing mathematical objects: OpenMath and MathML.

Employment (continued)

May 1994 – Nov. 1996 • Software developer Waterloo Maple Inc., Waterloo, Canada
Supervisor: Dr. C.R. Howlett

Designed and developed mathematical software which includes two packages in geometry, and the software which supports visualization of mathematical objects using Virtual Reality Modeling Language.

Integrated software developed at various international research labs into the computer algebra system Maple. This included enforcing standards on coding, testing, and software documentation.

Supervised co-op students.

Jan. 1991 – Apr. 1994 • Co-op student and research assistant Symbolic Computation Group, University of Waterloo, Canada
Supervisors: Dr. K.O. Geddes, Dr. G. Labahn

Involved in various development stages of Maple, including code development, testing, bug fixing. Designed and developed software in number theory, and visualization of mathematical objects.

Sept. 1993 – Dec. 1993 • Co-op student Bell Northern Research, Ottawa, Canada

Developed and maintained a simulation software package.

List of Publications

Refereed Journal Publications

[1] • S.A. Abramov, H.Q. Le. On the order of the recurrence produced by the method of creative telescoping. *Discrete Mathematics*, 298, 2–17, Aug. 2005.

[2] • S.A. Abramov, J.J. Carette, K.O. Geddes, H.Q. Le. Telescoping in the context of symbolic summation in Maple. *Journal of Symbolic Computation*, 38(4), 1303–1326, Oct. 2004.

[3] • H.Q. Le. A direct algorithm to construct the minimal Z-pairs for rational functions. *Advances in Applied Mathematics* 30, 137–159, Feb. 2003.

[4] • S.A. Abramov, H.Q. Le. A criterion for the applicability of Zeilberger's algorithm to rational functions. *Discrete Mathematics*, 259, 1–17, Dec. 2002.

[5] • H.Q. Le. On the q-analogue of Zeilberger's algorithm to rational functions. *Programming and Comput. Software (Programmirovanie)*, 27, 35–42, Jan-Feb 2001.

List of Publications (continued)

[6] • H.Q. Le. Mathematical graphical object representation. *Programming and Comput. Software (Programmirovanie)*, 26(6), 346–351 Nov-Dec 2000.

[7] • H.Q. Le. Communication-oriented representation of mathematical objects. *Programming and Comput. Software (Programmirovanie)*, 26(1), 7–16, Jan-Feb 2000.

Refereed Conference Publications

[8] • K.O. Geddes, H.Q. Le, Z. Li. Differential rational normal forms and a reduction algorithm for hyperexponential functions. In J. Gutierrez, editor, *Proceedings of the 2004 International Symposium on Symbolic and Algebraic Computation*, 183–190, 2004.

[9] • S.A. Abramov, H.Q. Le. Utilizing relationships among linear systems generated by Zeilberger's algorithm. In *Proceedings of the 2004 Formal Power Series and Algebraic Combinatorics*, 29–38, 2004.

[10] • S.A. Abramov, H.Q. Le, M. Petkovšek. Rational canonical forms and efficient representations of hypergeometric terms. In J.R. Sendra, editor, *Proceedings of the 2003 International Symposium on Symbolic and Algebraic Computation*, 7–14, 2003.

[11] • S.A. Abramov, H.Q. Le. The sequence of linear algebraic systems generated by Zeilberger's algorithm. *Proceedings of the 2003 Formal Power Series and Algebraic Combinatorics*, on CD 2003.

[12] • H.Q. Le. Simplification of definite sums of rational functions by creative symmetrizing method. In T. Mora, editor, *Proceedings of the 2002 International Symposium on Symbolic and Algebraic Computation*, 161–167, 2002.

[13] • S.A. Abramov, H.Q. Le. A lower bound for the order of telescopers for a hypergeometric term. In O. Foda, editor, *Proceedings of the 2002 Formal Power Series and Algebraic Combinatorics*, on CD, 2002.

[14] • S.A. Abramov, K.O. Geddes, H.Q. Le. Computer algebra library for the construction of the minimal telescopers. In N. Takayama, A.M. Cohen and X. Gao, editors, *Proceedings of the 2002 International Congress of Mathematical Software*, 319–329, 2002.

[15] • K.O. Geddes, H.Q. Le. An algorithm to compute the minimal telescopers for rational functions (differential – integral case). In N. Takayama, A.M. Cohen and X. Gao, editors, *Proceedings of the 2002 International Congress of Mathematical Software*, 453–463, 2002.

[16] • H.Q. Le. A direct algorithm to construct Zeilberger's recurrences for rational functions. In H. Barcelo and V. Welker, editors, *Proceedings of the 2001 Formal Power Series and Algebraic Combinatorics*, 303–312, 2001.

List of Publications (continued)

[17] • S.A. Abramov, H.Q. Le. Applicability of Zeilberger's algorithm to rational functions. In A.A. Mikhalev, D. Krob and A.V. Mikhalev, editors, *Proceedings of the 2000 Formal Power Series and Algebraic Combinatorics*, 91–102, 2000.

[18] • H.Q. Le. On the differential-integral analogue of Zeilberger's algorithm to rational functions. In D. Wang and X. Gao, editors, *Proceedings of the 2000 Asian Symposium on Computer Mathematics*, 204–213, 2000.

[19] • H.Q. Le, C.R. Howlett. Client-server communication standards for mathematical computation. In S. Dooley, editor, *Proceedings of the 1999 International Symposium on Symbolic and Algebraic Computation*, 299–306, 1999.

Technial Reports, Theses, Preprints

[20] • H.Q. Le, Z. Li. On a class of hyperexponential elements and the fast versions of Zeilberger's algorithm. KLMM research preprint, 23, Institute of Systems Sciences, AMSS, Academia Sinica, Dec. 2004.

[21] • H.Q. Le. Algorithms for the construction of the minimal telescopers. PhD thesis, School of Computer Science, University of Waterloo, 2003.

[22] • S.A. Abramov, H.Q. Le, Z. Li. OreTools: a computer algebra library for univariate Ore polynomial rings. Technical Report CS-2003-12, School of Computer Science, University of Waterloo, 2003.

[23] • S.A. Abramov, K.O. Geddes, H.Q. Le. HypergeometricSum: a Maple package for finding closed forms of indefinite and definite sums of hypergeometric type. Technical Report CS-2001-24, School of Computer Science, University of Waterloo, 2001.

[24] • S.A. Abramov, K.O. Geddes, H.Q. Le. A direct algorithm to construct the minimal telescopers for rational functions (q-difference case). Technical Report CS-2001-25, School of Computer Science, University of Waterloo, 2001.

[25] • H.Q. Le. Computing the minimal telescoper for sums of hypergeometric terms. SIGSAM Bulletin*: Communications on Computer Algebra*, 35(3):2–10, Sept. 2001.

[26] • H.Q. Le. Client-server communication standards for mathematical computation. Master's thesis, School of Computer Science, University of Waterloo, 1999.

Presentations

Invited Speaker

- A report on Zeilberger's algorithm. Seminar in Symbolic Computation, Research Institute for Symbolic Computation (RISC), Linz, Austria, August 2004.

- Efficient representations of hypergeometric terms and the assignment problem. Seminar in Symbolic Computation, University of Limoges, France, November 2003.

- Algorithms and computer algebra library for the construction of the minimal telescopers. *Scientific Committee's Invitational Special Session of the 8th International Conference on Applications of Computer Algebra*, Volos, Greece, June 2002.

- LCLM techniques for constructing Zeilberger's recurrences. Seminar in Symbolic Computation, University of Limoges, France, October 2001.

- New features of Maple V Release 6. The Joint Institute of Nuclear Research, Dubna, Russia, July 1999.

- Some fun with MapleV Release 5. The Joint Institute of Nuclear Research, Dubna, Russia, September 1998.

- Communication-oriented representation of mathematical objects. *Monthly seminar on Computer Algebra*, Moscow States University, Moscow, Russia, October 1998.

Conference Papers

- Differential rational normal forms and a reduction algorithm for hyperexponential functions. *The 2004 International Symposium on Symbolic and Algebraic Computation*, Santander, Spain, July 2004.

- Differential rational normal forms and representations of hyperexponential functions. The Ninth Rhine Workshop on Computer Algebra, University of Nijmegen, Nijmegen, The Netherlands, March 2004.

- Rational canonical forms and efficient representations of hypergeometric terms. *The 2003 International Symposium on Symbolic and Algebraic Computation*, Philadelphia, USA, August 2003.

- Computer algebra library for the construction of the minimal telescopers. *The 2002 International Congress of Mathematical Software*, Beijing, China, August 2002.

- An algorithm to compute the minimal telescopers for rational functions (differential – integral case). *The 2002 International Congress of Mathematical Software*, Beijing, China, August 2002.

Presentations (continued)

- Simplification of definite sums of rational functions by creative symmetrizing method. *The 2002 International Symposium on Symbolic and Algebraic Computation*, Lille, France, July 2002.

- A direct algorithm to construct Zeilberger's recurrences for rational functions. *The 2001 Formal Power Series and Algebraic Combinatorics*, Arizona, USA, May 2001.

- On the differential-integral analogue of Zeilberger's algorithm to rational functions. *The 4th Asian Symposium on Computer Mathematics*, Chiang Mai, Thailand, December 2000.

- Applicability of Zeilberger's algorithm to rational functions. *The 2000 Formal Power Series and Algebraic Combinatorics*, Moscow, Russia, June 2000.

- Client-server communication standards for mathematical computation. *The 1999 International Symposium on Symbolic and Algebraic Computation*, Vancouver, Canada, July 1999.

Awards and Scholarships

Fall 2001	• Ontario Graduate Scholarship for Science and Technology.
Spring 1992, Winter 1993	• Natural Sciences and Engineering Research Council (NSERC) Undergraduate Student Research Award.

Professional Services

- Member of the Poster Committee of the 2005 International Symposium on Symbolic and Algebraic Computation, Beijing, China.

- Member of the Poster Committee of the 2004 International Symposium on Symbolic and Algebraic Computation, Cantabria, Santander, Spain.

- June 15, 2003 – July 8, 2003: visiting researcher at the Department of Computer Science & Cybernetics, Moscow State University, Moscow, Russia.

- Served as a referee for the Journal of Symbolic Computation, Advances in Applied Mathematics, 2004 and 2005 International Symposium on Symbolic and Algebraic Computation.

- Web Master, the 1999 International Symposium on Symbolic and Algebraic Computation.

References

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