CURRICULUM VITAE

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Date of birth:	January 16, 1972
Place of birth:	Lazdijai distr., Lithuania
Nationality:	Dutch
Spoken languages:	English, Dutch, Lithuanian, Russian, Japanese

WORKING EXPERIENCE

2007–2012	Assistant professor at Kobe University (Japan)
Grants:	JSPS research grant "Identities between Special Functions"
Supervision:	Two master students
Teaching:	Postgraduate courses on Orthogonal Polynomials and Zeilberger's Algorithm
2003–2006	Post-doctoral project on Special Functions, Kyushu University (Fukuoka, Japan)
Grants:	21st Century COE Programme, Japanese government
2002–2003	Post-doc projects on non-commutative geometry at the University of Antwerp and the Free University of Brussels
Grants:	ESF NOG, EC TMR and Belgian Science Foundation
1999–2001	Post-doc project "Algorithmic Methods for Special Functions by Computer Algebra" at the KdV Institute (University of Amsterdam) and at the CWI (Amsterdam)
Teaching:	A course on special functions
1995–1999	PhD student, teaching assistant, University of Groningen
PhD thesis:	"Aspects of Algorithmic Algebra: Differential Equations and Splines"
Teaching:	I taught classes for (in total) 10 courses
1993–1994	Participation in projects "Signature Recognition" and "Stereo-image Recognition"
Function:	Computer programmer

EDUCATION

1995–1999	PhD research at the University of Groningen, Netherlands
Research:	Symbolic solution of differential equations, computation of two-dimensional splines
Supervisors:	Prof. Dr. Marius van der Put and Dr. Gert Vegter
1994–1995	MRI (Mathematical Research Institute) Master Class
Place:	University of Utrecht, The Netherlands
Subject:	Algebraic and Arithmetic Geometry
1990–1994	Mathematics Department, Vilnius University, Lithuania
Study:	Computer Science and Mathematics
1979–1990	3rd Druskininkai Secondary School, Lithuania
Activities:	Successful participation in Lithuanian and Soviet Union schoolchildren Olympiads in Mathematics, Computer Science and Physics.

REFERENCE PERSONS

- Prof. Dr. Nobuki Takayama, Kobe University, e-mail: takayama@math.kobe-u.ac.jp.
- Prof. Dr. Masaaki Yoshida, Kyushu University (Fukuoka), e-mail: myoshida@math.kyushu-u.ac.jp.
- Prof. Dr. Mark van Hoiej, Florida State University, e-mail: hoeij@math.fsu.edu.
- Prof. Dr. Marta Mazzocco, Loughborough University, e-mail: M.Mazzocco@lboro.ac.uk.
- Prof. Dr. Tom H. Koornwinder, KdV Institute (Amsterdam), e-mail: T.H.Koornwinder@uva.nl.
- Prof. Dr. Wadim Zudilin, University of Newcastle (NSW, Australia), e-mail: Wadim.Zudilin@newcastle.edu.au.
- Prof. Dr. Joris van der Jeugt, University of Ghent, e-mail: Joris.VanderJeugt@UGent.be.
- Prof. Dr. Alexander V. Kitaev, Steklov Math. Inst. (St. Petersburg), e-mail: kitaev@pmdi.ras.ru.
- Dr. Nico M. Temme, CWI (Amsterdam), e-mail: Nico.Temme@cwi.nl.

PUBLICATIONS

1. M. Mazzocco, R. Vidūnas, *Cubic and quartic transformations of the sixth Painleve equation in terms of Riemann–Hilbert correspondence.* Studies in Applied Mathematics, Vol. 130 (2013), pg. 17–48.
2. R. Vidūnas, G. Filipuk, *A classification of coverings yielding Heun-to-hypergeometric reductions.* Accepted by Osaka Journal of Mathematics. Available at http://arxiv.org/abs/1204.2730.
3. R. Vidūnas, G. Filipuk, *Parametric transformations between the Heun and Gauss hypergeometric functions.* Accepted by Funkcialaj Ekvacioj. Available at http://arxiv.org/abs/0910.3087.
4. R. Vidūnas, *Darboux evaluations of algebraic Gauss hypergeometric functions.* Accepted by Kyushu Journal of Mathematics. Available at http://arxiv.org/abs/math/0504264
5. R. Vidūnas, *Transformations and invariants for dihedral Gauss hypergeometric functions.* Kyushu Journal of Mathematics, Vol. 66 (2012), pg. 143–170.
6. R. Vidūnas, *Dihedral Gauss hypergeometric functions*, Kyushu Journal of Mathematics, Vol. 65 (2011), pg. 141–167.
7. R. Vidūnas, *A generalization of Clausen's identity*, Ramanujan Journal, Vol. 26 (2011), pg. 133–146.
8. R. Vidūnas, *On singular univariate specializations of bivariate hypergeometric functions*, Journal of Mathematical Analysis and Applications, Vol. 365 (2010 May), pg. 135–141.
9. R. Vidūnas, *Specialization of Appell's functions to univariate hypergeometric functions*, Journal of Mathematical Analysis and Applications, Vol. 355 (2009 July), pg. 145–163.
10. R. Vidūnas, *Algebraic transformations of Gauss hypergeometric functions*, Funkcialaj Ekvacioj, Vol. 52 (2009 August), pg 139–180.
11. R. Vidūnas, A. V. Kitaev, *Computation of highly ramified coverings*, Mathematics of Computation, Vol. 78 (2009), pg. 2371–2395.
12. R. Vidūnas, A. V. Kitaev, *Quadratic transformations of the sixth Painlevé equation*, Mathematische Nachrichten, Vol. 280, No 16 (2007), pg. 1834–1855.
13. R. Vidūnas, *Askey-Wilson relations and Leonard pairs*, Discrete Mathematics, Vol. 308, No 4 (2008), pg. 479–495.
14. R. Vidūnas, *Normalized Leonard pairs and Askey-Wilson relations*, Linear Algebra and its Applications, Vol. 422 (2007), pg. 39–57.

15. P. Terwilliger, R. Vidūnas, *Leonard pairs and the Askey-Wilson relations*, Journal of Algebra and its Applications, Vol. 3, No. 4 (2004), pg. 411–426.
16. R. Vidūnas, *Degenerate Gauss hypergeometric functions*, Kyushu Journal of Mathematics, Vol. 61 (2007), pg. 109–135.
17. R. Vidūnas, *Expressions for values of the gamma function*, Kyushu Journal of Mathematics, Vol. 59 (2005), pg. 267–283.
18. R. Vidūnas, *Transformations of some Gauss hypergeometric functions*, Journal of Computational and Applied Mathematics, Vol. 178 (2005), pg. 473–487.
19. R. Vidūnas, *Contiguous relations of hypergeometric functions*, Journal of Computational and Applied Mathematics, Vol. 153 (2003), pg. 507–519.
20. R. Vidūnas, *A generalization of Kummer's identity*, "Rocky Mountain Journal of Mathematics", Vol. 32, No. 2 (2002), pg. 919–936.
21. R. Vidūnas, *Geometrically continuous octahedron*, in "Topics in Algebraic Geometry and Geometric Modeling", R. Goldman, R. Krasauskas (Eds.), AMS series "Contemporary Mathematics", No 334 (2003), pg. 37–52.
22. R. Vidūnas, N.M. Temme, *Parabolic cylinder functions: examples of error bounds for asymptotic expansions*, Analysis and applications, Vol. 1, No 3 (2003), pg. 265-288.
23. R. Vidūnas, N.M. Temme, *Symbolic evaluation of coefficients in Airy-type asymptotic expansions*, "Journal of Mathematical Analysis and Applications", Vol. 269 (2002), pg. 317–331.
24. F. Beukers, R. van Luijk, R. Vidūnas, *A linear algebra exercise*, "Nieuw Archief voor Wiskunde" (a journal of the Dutch Mathematical Society), Series V, Vol. 3, No. 2 (2002), pg. 42–43.
25. R. Vidūnas, *Differential equations of order two with one singular point*, "Journal of Symbolic Computation", Vol. 28, No. 4–5 (1999), pg. 495–520.
26. A. Belenkiy, R. Vidūnas, *A greatest common divisor algorithm*, "International Journal of Algebra and Computation" Vol. 8, No. 5 (1998), pg. 617–623.

BOOK REVIEWS

- *An Introduction to Differential Equations: Order and Chaos*, by Florin Diacu, for "Nieuw Archief voor Wiskunde", Series V, Vol. 5, No 4 (2004), pg. 328.
- *Geometric Modeling with Splines: An Introduction*, by E. Cohen, R.F. Riesenfeld, G. Elber, for "Nieuw Archief voor Wiskunde", Series V, Vol. 8, No 1 (2007), pg. 63–64.

OTHER RESEARCH PAPERS

- *Belyi functions for hyperbolic hypergeometric-to-Heun transformations*, with M. van Hoiej, available at http://arxiv.org/abs/1212.3803.
- *Arithmetic identities characterising Heun functions reducible to hypergeometric functions*, with M. van Hoiej, available at http://www.math.kobe-u.ac.jp/ vidunas/RIMSlist.pdf.
- *Transformations of algebraic Gauss hypergeometric functions*, available at http://arxiv.org/abs/0807.4808.
- *Transformations of hypergeometric elliptic integrals*, available at http://arxiv.org/abs/0811.4641.
- *Schlesinger transformations for algebraic Painleve VI solutions*, with A. Kitaev, available at http://arxiv.org/abs/0810.2766.
- *Computation of RS-pullback transformations for algebraic Painleve VI solutions*, with A. Kitaev, available at http://arxiv.org/abs/0910.3087.
- *Uniform convergence of hypergeometric series*, available at http://arxiv.org/abs/math/0603646.

RESEARCH INTERESTS

My main field of interest is *Special Functions.* The last several years I worked on various identities and transformations of hypergeometric (including multivariate) functions, Heun and Painlevé functions. In particular, I classified all hypergeometric-to-hypergeometric transformations and (together with M. van Hoeij, R. Maier, G. Filipuk) most interesting Heun-to-hypergeometric transformations. Working with M. Mazzocco and A. Kitaev, I explored new transformations and algebraic solutions of the Painlevé VI equation. In addition, I started a systematic investigation of univariate specializations of Appell's and other multivariate hypergeometric functions to univariate hypergeometric or Heun functions. This lead to explicit expressions for the ${}_2F_1$ functions with a dihedral monodromy group in terms of

terminating Appell's F_2 functions. I look for more identities of this terminating type for other special cases of the mentioned functions.

The wide spectrum of considered special functions is unified by a few basic methods of their research, primarily transformation of related *differential equations*. In particular, algebraic hypergeometric (or Heun) functions can be instructively expressed via Klein's pullback transformations from of the few standard hypergeometric equations, or via pullback transformations to a cyclic monodromy group. Other rich cases of special functions consist of elliptic integrals as hypergeometric or Heun functions, and Picard's and Hitchin's solutions of the Painlevé VI equation with an action of isogenies on generic elliptic curves.

Many of the considered transformations are realized by *Belyi functions*; they are finite coverings of the projective line branching only above 3 points. They have deep relations to arithmetic of algebraic curves, and the action of the absolute Galois group on their *dessins d'enfant* if of particular interest to Grothendieck's famous 1984 research program. I developed an effective algorithm for computing Belyi fiunctions, able to tackle Belyi coverings of degree 60 and higher. My immediate research plan is computation of Belyi functions that yield algebraic Heun functions by Klein's pull-back transformations, and computations of some peculiar Belyi functions of degree 90–100. In particular, I will compute a degree 100 Belyi covering whose permutation monodromy group is the sporadic Janko J_2 group. These computations will produce numerous examples of small Galois orbits of high degree Belyi functions. This will allow an analysis of the Galois action of, say, conjugations of real quadratic fields on dessins d'enfant. Belyi functions also relate modular subgroups of $PSL(2, \mathbf{Z})$, automorphic forms, and produce interesting arithmetic identities in several ways.

Belyi-alike functions also produce pull-back transformations of isomonodromic Fuchsian systems parametrized by algebraic Painlevé VI, as I investigated together with A. Kitaev. I submitted a JSPS grant proposal to support writing a book on transformations of hypergeometric, Heun, Painlevé, Appell functions, "degenerate" explicit cases of these functions. The book would be complemented with a computer algebra bundle, to enhance usage of transformation formulas and invite further reasearch.

Other aspects of special functions that I am interested in are: Zeilberger type summation algorithms; contiguous and recurrence relations; orthogonal polynomials; asymptotics; Picard-Fuchs equations; modular forms; q-versions of various special functions; Macdonald symmetric functions; application to the representation theory of quantum groups, or to number theory, combinatorics, random matrix theory. In particular, I worked on *Leonard pairs* that appear in the framework of the Askey-Wilson scheme of orthogonal

polynomials, or association schemes, distance regular graphs, statistical mechanics, representation theory of certain non-commutative algebras. Besides, I have lasting interest in number theory, non-commutative geometry, geometric modeling, discretization of integrable systems, cellular automata, analysis of time series for detection persistent regimes and their changes.

TEACHING STATEMENT

I began teaching in 1996 at the University of Groningen. Here is a sample of classes that I taught: algorithms and data structures; computer algebra; functional analysis; special functions; linear algebra and calculus for undergraduate physics students. My first assignment was computer practicum with the package Mathematica. This was not difficult. I remember discussing with smart students correctness of their "smart" programs. I frequently gave successful classes when students made good exercises themselves, and at the same time they were visibly satisfied that they learned something new from me. Even after difficult classes I have heard later appreciative remarks from the same students. The most pleasant situation is when students appreciate your teaching immediately. I am eager to improve my teaching skills and communication with students.

During my current tenure at Kobe University I taught two graduate courses (on orthogonal polynomials, and Zeilberger's algorithm), and supervised two graduate students. I am highly motivated to supervise graduate and PhD students, to share my knowledge, research experience and open problems of appropriate difficulty.

In my view, the major task of a university lecturer is to teach students to use mathematics professionally. This means that the students should acquire a certain standard of understanding and skills in the taught subject, recognize the scope of their new knowledge. I intend to be an active teacher and supervisor, guided by my best teaching experiences.

I have written a review of the textbook "An Introduction to Differential Equations: Order and Chaos" by Florin Diacu for the journal of the Dutch Mathematical Society. The author aims to reconcile the classical and "reform" approaches to teaching of calculus. I favour successful intuitive arguments. They give good qualitative mathematical methods and informative visualizations. On the other hand, I do not think that intuitive arguments always make the material easier and clearer. I wrote the review that a vague definition or an ambiguous explanation may endanger clarity more than an open discussion of the particular mathematical situation.