

ADAM DOLIWA

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PERSONAL

Date and place of birth: 28 February 1965, Elk (Poland)

Marital status: married, daughter Joanna (born 2001), son Jan (born 2004)

EDUCATION

2012 Professor title in Mathematics, Institute of Mathematics, Polish Academy of Sciences

2002 Habilitation (D.Sc.) in Mathematical Physics, Warsaw University
Integrable discrete geometry

1995 Ph.D. in Theoretical Physics, Warsaw University, Thesis Advisor: A. Sym
Methods of soliton geometry in the theory of harmonic mappings

1988 M.Sc. in Physics, Warsaw University, Thesis Advisor: A. Sym
Soliton geometry in the periodic sector

ACADEMIC & RESEARCH POSITIONS

Feb. 2018 – present Ordinary Professor, University of Warmia & Mazury

Oct. 2002 – Feb. 2018 Associate Professor, University of Warmia & Mazury

Oct. 2010 – Aug. 2011 Associate Professor, Institute of Mathematics, Polish Academy of Sciences

May. 2005 – Dec. 2005 Scientific Collab., DFG Research Center MATHEON, Techn. Univ. Berlin

Oct. 1998 – Oct. 2002 Assistant Professor, Institute of Theoretical Physics, Warsaw University

Oct. 1996 – Sept. 1998 Postdoctoral Fellow, Italian Nat. Inst. for Nucl. Physics, Rome Section

Oct. 1988 – Oct. 1998 Assistant, Institute of Theoretical Physics, Warsaw University

PROFESSIONAL SERVICE

May 2015 – present President of Olsztyn Branch of the Polish Mathematical Society

Jan. 2012 – present Head of the Chair of Discrete Mathematics and Theoretical Computer Science

Sept. 2005 – 2012 Deputy Dean for Research and International Cooperation

Jan. 2012 – present leader of the seminar **Discrete Mathematics and Theoret. Comp. Science**

Oct. 2009 – present co-leader of the seminar **Geometry and Dynamical Systems**

Oct. 1998 – 2003 co-leader of the seminar **Geometry and Nonlinearity**

HONOURS

2003 – The **Wacław Sierpiński Prize** in Mathematics of the Polish Academy of Sciences.

RESEARCH

- | | |
|--|---|
| Differential Geometry
& Soliton Systems | <ul style="list-style-type: none">• Integrable dynamics of curves and submanifolds• Harmonic maps and Toda systems• Conjugate nets and multicomponent Kadomtsev–Petviashvili hierarchy |
| Integrable Discrete
Geometry | <ul style="list-style-type: none">• Geometric discretizations of integrable PDE's• Analytic and algebraic methods in theory of integrable lattices• Geometric interpretation of the integrability scheme• Algebro-geometric techniques in integrable cellular automata |
| Non-Commutative
Integrable Systems | <ul style="list-style-type: none">• Quantum lattice systems• Non-commutative systems in geometries over division rings• Integrable structures in the theory of formal languages |

RESEARCH GRANTS

- 1 P03B 017 28 *Integrable discrete systems and geometry* (28.05.2005 - 28.05.2008)
- NN202 174739 *Classical and quantum integrable systems: geometry and physics* (30.08.2010 – 29.08.2013)
- 2015/19/B/ST2/03575, *Integrable discrete systems – theory and applications* 14.06.2016 – 13.12.2019)

TEACHING EXPERIENCE

- graduate level monographic courses: *Methods of Algebraic Geometry in Soliton Theory, Geometry and Integrable Systems, Elements of Soliton Theory, Elements of the Theory of Elliptic Functions, Q-Calculus, Harmonic Oscillator, Quantum Algorithms, Introduction to Coding and Information Theory*
- undergraduate level courses: *Linear Algebra with Geometry, Mathematical Analysis, Complex Analysis, Differential Geometry, Elements of Theoretical Physics, Discrete Mathematics*
- recitations for courses of analytical mechanics, mathematical methods of physics, mathematical analysis, linear algebra, mathematical methods of geophysics, differential geometry, complex analysis, discrete mathematics

ORGANIZED CONFERENCES

- 7 Forum of Polish Mathematicians (Olsztyn, Poland, September 12-17, 2016)
- Second Workshop on Nonlinearity and Geometry. Darboux Days (Będlewo, Poland, April 13-19, 2008)
- Integrable Systems (Research Group, Warsaw, Poland, December 13-15, 2010)
- Bihamiltonian Geometry and Integrable Systems (Summer School, Będlewo, Poland, August 28 - September 2, 2011)
- Integrable Systems (Olsztyn, Poland, June 21-22, 2012)

EDITORIAL WORK

- Guest Editor of the Special Issue "Symmetries and Integrability of Difference Equations" of *Journal of Physics A: Mathematical and Theoretical* **40** (2007)

HOBBIES

- hearing and playing classical music
- sports: running, tennis, sailing

PUBLICATIONS

1. A. Doliwa & S. M. Sergeev, *The pentagon relation and incidence geometry*, J. Math. Phys. **55** (2014) 063504 (21pp).
2. A. Doliwa & Runliang Lin, *Discrete KP equation with self-consistent sources*, Phys. Lett. A textbf378 (2014) 1925–1931
3. A. Doliwa, *Non-commutative q -Painlevé VI equation*, J. Phys. A: Math. Theor. **47** (2014) 035203 (8pp).
4. A. Doliwa, *Non-commutative rational Yang-Baxter maps*, Lett. Math. Phys. **104** (2014) 299–309
5. A. Doliwa, *Non-commutative lattice modified Gel'fand-Dikii systems*, J. Phys. A: Math. Theor. **46** (2013) 205202 (14pp).
6. A. Doliwa, *The affine Weyl group symmetry of Desargues maps and of the non-commutative Hirota-Miwa system*, Phys. Lett. A **375** (2011) 1219–1224.
7. A. Doliwa, *The C -(symmetric) quadrilateral lattice, its transformations and the algebro-geometric construction*, J. Geom. Phys. **60** (2010) 690–707.

8. A. Doliwa, *Desargues maps and the Hirota–Miwa equation*, Proc. R. Soc. A **466** (2010) 1177–1200.
9. A. Doliwa & M. Nieszporski, *Darboux transformations for linear operators on two dimensional regular lattices*, J. Phys. A: Math. Theor. **42** (2009) 454001 (27 pp.).
10. A. Doliwa, *On τ -function of the quadrilateral lattice*, J. Phys. A: Math. Theor. **42** (2009) 404008 (9 pp.).
11. P. M. Santini, A. Doliwa & M. Nieszporski, *Integrable dynamics of Toda-type on the square and triangular lattices*, Phys. Rev. E **77** (5): art. no. 056601 Part 2 MAY 2008.
12. A. Doliwa, M. Nieszporski & P. M. Santini, *Integrable lattices and their sub-lattices II. From the B-quadrilateral lattice to the self-adjoint schemes the triangular and the honeycomb lattices*, J. Math. Phys. **48** (11): art. no. 113056 NOV 2007.
13. A. Doliwa, *Generalized isothermic lattices*, J. Phys. A: Math. Theor. **40** (2007) 12539-12561.
14. A. Doliwa, P. Grinevich, M. Nieszporski & P. M. Santini, *Integrable lattices and their sub-lattices: from the discrete Moutard (discrete Cauchy-Riemann) 4-point equation to the self-adjoint 5-point scheme*, J. Math. Phys. **48** (1): art. n. 013513 JAN 2007.
15. A. Doliwa, *The B-quadrilateral lattice, its transformations and the algebro-geometric construction*, J. Geom. Phys. **57** (2007) 1171–1192.
16. A. Doliwa, *On τ -function of conjugate nets*, J. Nonlin. Math. Phys. **12** Supplement (2005) 244–252.
17. P. M. Santini, M. Nieszporski & A. Doliwa, *Integrable generalization of the Toda law to the square lattice*, Phys. Rev. E. **70** (5): art. no. 056615 Part 2 NOV 2004.
18. A. Doliwa, *The normal dual congruences and the dual Bianchi lattice*, Glasgow Math. J. **47A** (2005) 51–63.
19. M. Białeckı & A. Doliwa, *Algebro-geometric solution of the discrete KP equation over a finite field out of a hyperelliptic curve*, Comm. Math. Phys. **253** (2005) 157–170.
20. A. Doliwa, P. M. Santini & M. Nieszporski, *Geometric discretization of the Bianchi system*, J. Geom. Phys. **52** (2004) 217–240.
21. M. Nieszporski, P. M. Santini & A. Doliwa, *Darboux transformations for 5-point and 7-point self-adjoint schemes and an integrable discretization of the 2D Schrödinger operator*, Phys. Lett. A. **323** (2004) 241–250.
22. M. Białeckı & A. Doliwa, *The discrete KP and KdV equations over finite fields*, Theor. Math. Phys. **137** (2003) 1412–1418.
23. A. Doliwa, M. Białeckı & P. Klimczewski, *The Hirota equation over finite fields. Algebro-geometric approach and multisoliton solutions*, J. Phys. A **36** (2003) 4827–4839.
24. A. Doliwa, *Geometric discretization of the Koenigs nets*, J. Math. Phys **44** (2003) 2234–2249.
25. A. Doliwa, M. Nieszporski & P. M. Santini, *Asymptotic lattices and their integrable reductions I: the Bianchi and the Fubini-Ragazzi lattices*, J. Phys. A **34** (2001) 10423–10439.
26. A. Doliwa, *The Darboux-type transformations of integrable lattices*, Rep. Math. Phys. **48** (2001) 59–66.

27. A. Doliwa, *Discrete asymptotic nets and W-congruences in Plücker line geometry*, J. Geom. Phys. **39** (2001) 9–29.
28. A. Doliwa, *Asymptotic Lattices and W-Congruences in Integrable Discrete Geometry*, Journal of Nonlinear Mathematical Physics **8** Supplement (2001) 88–92.
29. A. Doliwa & P. M. Santini, *The symmetric, D-invariant and Egorov reductions of the quadrilateral lattice*, J. Geom. Phys. **36** (2000) 60–102.
30. A. Doliwa, P. M. Santini & M. Mañas, *Transformations of Quadrilateral Lattices*, J. Math. Phys. **41** (2000) 944–990.
31. A. Doliwa, M. Mañas, L. Martínez Alonso, *Generating quadrilateral and circular lattices in KP theory*, Phys. Lett. A **262** (1999) 330–343.
32. A. Doliwa, *Quadratic Reductions of Quadrilateral Lattices*, J. Geom. Phys. **30** (1999) 169–186.
33. A. Doliwa, M. Mañas, L. Martínez Alonso, E. Medina & P. M. Santini, *Charged Free Fermions, Vertex Operators and Transformation Theory of Conjugate Nets*, J. Phys. A. **32** (1999) 1197–1216.
34. A. Doliwa, S. V. Manakov & P. M. Santini, *$\bar{\partial}$ -Reductions of the Multidimensional Quadrilateral Lattice: the Multidimensional Circular Lattice*, Comm. Math. Phys. **196** (1998) 1–18.
35. J. Cieśliński, A. Doliwa & P. M. Santini, *The Integrable Discrete Analogues of Orthogonal Coordinate Systems are Multidimensional Circular Lattices*, Phys. Lett. A **235** (1997) 480–488.
36. A. Doliwa, *Geometric discretisation of the Toda system*, Phys. Lett. A **234** (1997) 187–192.
37. A. Doliwa & P. M. Santini, *Multidimensional Quadrilateral Lattices are Integrable*, Phys. Lett. A **233** (1997) 365–372.
38. M. Mañas, A. Doliwa & P. M. Santini, *Darboux Transformations for Multidimensional Quadrilateral Lattices. I*, Phys. Lett. A **232** (1997) 99–105.
39. A. Doliwa, *Holomorphic curves and Toda systems*, Lett. Math. Phys. **39** (1997) 21–32.
40. A. Doliwa, *Harmonic maps and Toda systems*, J. Math. Phys. **38** (1997) 1685–1691.
41. A. Doliwa & P. M. Santini, *Integrable dynamics of a discrete curve and the Ablowitz-Ladik hierarchy*, J. Math. Phys. **36** (1995) 1259–1273.
42. A. Doliwa & P. M. Santini, *An elementary geometric characterization of the integrable motions of a curve*, Phys. Lett. A **185** (1994) 373–384.
43. A. Doliwa & A. Sym, *Non-linear σ -Models on Spheres and Toda Systems*, Phys. Lett. A **185** (1994) 453–460.

BOOKS AND CONFERENCE PROCEEDINGS CHAPTERS

1. A. Doliwa, *Desargues maps and their reductions*, [in:] Nonlinear and Modern Mathematical Physics, W.X. Ma, D. Kaup (eds.), AIP Conference Proceedings, Vol. 1562, AIP Publishing 2013, pp. 30–42.
2. A. Doliwa, *Hirota equation and the quantum plane*, [in:] Algebraic and Geometric Aspects of Integrable Systems and Random Matrices, A. Dzhamay, K. Maruno, V. Pierce (eds.), Contemporary Mathematics, vol. 593, Amer. Math. Soc., Providence, RI, 2013, pp. 205–230.

3. A. Doliwa & P. M. Santini, *Integrable Systems and Discrete Geometry*, [in:] *Encyclopedia of Mathematical Physics*, J. P. Francoise, G. Naber and T. S. Tsun (eds.) Vol. III, pp. 78-87, Elsevier, 2006.
4. A. Doliwa, *Integrable Multidimensional Discrete Geometry: Quadrilateral Lattices, their Transformations and Reductions*, [in:] *Integrable Hierarchies and Modern Physical Theories* H. Aratyn & A. S. Sorin (eds.), Kluwer, Dordrecht, 2001 pp. 355–389.
5. A. Doliwa, *The Ribaucour congruences of spheres within Lie sphere geometry*, [in:] *Bäcklund and Darboux Transformations: The Geometry of Soliton Theory, Halifax, 1999*, C. Rogers & P. Winternitz (eds.) *CMR Proceedings and Lecture Notes* **29**, pp. 159–166, AMS, Providence, 2001.
6. A. Doliwa & P. M. Santini, *Integrable Discrete Geometry: the Quadrilateral Lattice, its Transformations and Reductions*, [in:] *SIDE III – Symmetries and Integrability of Difference Equations*, D. Levi, & O. Ragnisco (eds.), *CMR Proceedings and Lecture Notes*, Vol. 25, AMS, Providence, 2000 pp. 101–119.
7. A. Doliwa, *Lattice geometry of the Hirota equation*, [in:] *SIDE III – Symmetries and Integrability of Difference Equations*, D. Levi, & O. Ragnisco (eds.), *CMR Proceedings and Lecture Notes*, Vol. 25, AMS, Providence, 2000 pp. 93-100.
8. A. Doliwa, *Minimal Surfaces, holomorphic curves and Toda systems*, [in:] *Proceedings of the 1st NOSONGE, Warsaw '95*, J. Cieśliński & D. Wójcik (eds.), pp. 227–236, Polish Scientific Publishers, Warsaw 1998.
9. A. Doliwa & P. M. Santini, *Geometry of Discrete Curves and Lattices and Integrable Difference Equations*, [in:] *Discrete Integrable Geometry and Physics*, A. Bobenko & R. Seiler (eds.), Oxford University Press, 1999.
10. A. Doliwa, *Integrable Discrete Geometry with Ruler and Compass*, [in:] *Symmetries and Integrability of Difference Equations*, P. Clarkson & F. Nijhoff (eds.), pp. 122–136, University Press, Cambridge, 1999.
11. A. Doliwa, *Teoria solitonów i geometria, (Soliton theory and geometry)*, [in:] *Fizyka Teoretyczna Lat 90-tych, Sympozjum Instytutu Fizyki Teoretycznej UW 14–16 grudnia 1995*, P. Klimczewski & S. G. Rohozinski (eds.) pp. 41–53, Zakład Graficzny UW, Warszawa 1996 (in Polish).
12. A. Doliwa & P. M. Santini, *The Integrable Dynamics of a Discrete Curve*, [in:] *Symmetries and Integrability of Difference Equations*, D. Levi, L. Vinet & P. Winternitz (eds.), *CMR Proceedings and Lecture Notes*, Vol. 9, AMS, Providence, 1996, pp. 91–102.
13. A. Doliwa & A. Sym, *Constant Mean Curvature Helicoids in E^3 as an Example of Soliton Surfaces*, [in:] *Nonlinear Evolution Equations and Dynamical Systems*, M. Boiti, L. Martina & F. Pompinelli (eds.), pp. 111-117, World Scientific, Singapore 1992.
14. A. Doliwa & A. Sym, *On Kida Class of Vortex Filament Motion*, [in:] *Symmetries in Science III*, B. Gruber & S. Iachello (eds.), Plenum Press, New York 1989.

UNPUBLISHED PREPRINTS AND OTHER PUBLICATIONS

1. A. Doliwa, *Non-commutative double-sided continued fractions*, [arXiv:1905.10429](https://arxiv.org/abs/1905.10429)
2. A. Doliwa, J. Kosiorek, *Quadrangular sets in projective line and in Moebius space, and geometric interpretation of the non-commutative discrete Schwarzian Kadomtsev-Petviashvili equation*, [arXiv:1903.11952](https://arxiv.org/abs/1903.11952)

3. A. Doliwa, A. M. Grundland, *Minimal surfaces in the soliton surface approach*, arXiv:1511.02173
4. A. Doliwa, *Hopf algebra structure of generalized quasi-symmetric functions in partially commutative variables*, arXiv:1603.03259
5. A. Doliwa, *Hirota equation and the quantum plane*, Mathematisches Forschungsinstitut Oberwolfach, Discrete Differential Geometry, Report No. 34/2012, doi: 10.4171/OWR/2012/34
6. A. Doliwa, *Geometric algebra and quadrilateral lattices*, arXiv:0801.0512 [nlin.SI].
7. M. Nieszporski, A. Doliwa & P. M. Santini, *The integrable discretization of the Bianchi-Ernst system*, arXiv:nlin.SI/0104065.
8. A. Doliwa, *What distinguishes soliton equations from other partial differential equations?*, [in:] Bulletin of the Student Nonlinear Physics Research Group No. 1, P. Goldstein, M. Pycia & D. Wojcik (eds.) pp. 28–35, Zakład Graficzny UW, Warszawa 1995.
9. A. Doliwa & A. Sym, *Minimal Surfaces in S^{2m} and Toda Systems*, Warsaw University Preprint IFT 11/92.