Research report 2017

Articles

Guest, Martin A.; Ho, Nan-Kuo
A Lie-theoretic description of the solution space of the tt*-Toda equations.
Math. Phys. Anal. Geom. 20 (2017) 27pp.
10.1007/s11040-017-9255-z

Monographs

Guest, Martin A.; Hertling, Claus
Painleve III: a case study in the geometry of meromorphic connections.
Lecture Notes in Mathematics 2198, Springer 2017, 202pp.
10.1007/978-3-319-66526-9

Talks

2017/4 "On the monodromy data of the tt*-Toda equations", talk at workshop on Hodge Theory, Stokes Phenomenon and Applications, CIRM Luminy (France)

2017/9 "Patterns in Stokes data of the radial Toda equations", Mathematical Physics seminar,
Indiana University Purdue University Indianapolis (USA)

2017/11 "Painleve III: the geometry of the solutions", Differential Geometry seminar, University of Hannover (Germany)

2018/2 "The enhanced Coxeter Plane - an application of integrable systems to Lie groups", Differential Geometry seminar, Tohoku University

2018/3 "Some applications of irregular meromorphic o.d.e. to geometry", talk at Taiwan Geometry Symposium, National Changhua University of Education (Taiwan)

Conferences co-organized

Koriyama Geometry and Physics Days 23-24 February 2018, Nihon University (Koriyama, Fukushima)。Study meeting on the theme: "Noncommutative geometry and related topics"

Differential Geometry and Differential Equations: the influence of Mirror Symmetry and Physics, 11-15 December 2017, Waseda University

Germany-Japan One-Day Workshop on Geometry and Topology, 22 May 2017, Waseda University

Research summary

I am studying Lie-theoretic and symplectic properties of moduli spaces of solutions of the tt*-Toda equations. This a nonlinear p.d.e. which is important in geometry (harmonic maps) and supersymmetric quantum field

theory (quantum cohomology). In joint work with Alexander Its (IUPUI, USA) and Chang-Shou Lin (National Taiwan University, Taiwan) we have solved these equations on the punctured complex plane and given parametrizations of the solutions using asymptotic data, monodromy data, and holomorphic data (Weierstrass/DPW data).