

Transformations of Hamiltonian systems connected with the fifth Painlevé equation

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The talk will be about the Painlevé equations, especially about the fifth one P_V . I am going to present three different Hamiltonians and Hamiltonian systems connected with P_V (KNY Hamiltonian, Okamoto's Hamiltonian and Rational Hamiltonian) and present a method how to match them by using algebraic geometry tools. I will show how that can be done by matching surface roots on the level of the Picard lattice. Moreover I will check whether our matching is canonical.

This is a joint work with Galina Filipuk, Anton Dzhamay and Alexander Stokes.

References

- [1] <https://dlmf.nist.gov/32>
- [2] K. Kajiwara, M. Noumi, and Y. Yamada, “Geometric aspects of Painlevé equations”, *J. Phys. A* 50 (2017), no. 7, 073001, 164.
- [3] K. Iwasaki, H. Kimura, S. Shimomura and M. Yoshida, “From Gauss to Painlevé. A modern theory of special functions”, *Aspects of Mathematics*, E16, Friedr. Vieweg & Sohn, Braunschweig, 1991.
- [4] M. Noumi, “Painlevé Equations through Symmetry”, *Translations of Mathematical Monographs*, Vol. 233, American Mathematical Society, Providence, RI, 2004.
- [5] K. Okamoto, “Sur les feuilletages associés aux équations du second ordre à points critiques fixes de P. Painlevé.(French)[On foliations associated with second - order Painlevé equations with fixed critical points]”, *Japan. J. Math.(N.S.)* 5 (1979), no. 1, 1-79.
- [6] K. Okamoto, “Studies on the Painlevé equations. III. Second and fourth Painlevé Equations P_{II} and P_{IV} .”, *Math. Ann.* 275 (2), pp. 221–255.
- [7] H. Sakai, “Rational surfaces associated with affine root systems and geometry of the Painlevé equations (1999)”, *Comm. Math. Phys.* 220 (2001), no. 1, 165–229.

- [8] I. R. Shafarevich, “Basic Algebraic Geometry 1. Varieties in projective space”, Third ed., Springer, Heidelberg, 2013.