# Different Hamiltonians for Painlevé Equations and their identification using geometry of the space of initial conditions

Anton Dzhamay

Department of Mathematics, University of Northern Colorado

## Abstract

It is well-known that differential Painlevé equations can be written in a Hamiltonian form. However, a coordinate form of such representation is far from unique – there are many very different Hamiltonians that result in the same differential Painlevé equation. In this talk we describe a systematic procedure for finding changes of coordinates transforming different Hamiltonian systems into some canonical form. Our approach is based on Sakai's geometric theory of Painlevé equations. We explain our approach using the fourth differential PIV equation as an example, but it can be easily adapted to other Painlevé equations a well. This is a joint work with Galina Filipuk and Adam Ligeza (University of Warsaw) and Alexander Stokes (the University of Tokyo).