Student Geometry Seminar

國立清華大學數學系 學生幾何研討會

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講題 From a Vanishing Loop to Arithmetic Picard--Lefschetz Formula

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Abstract

Consider a family of smooth elliptic curves degenerating to a singular curve. As two branch points collide, a loop shrinks to a point. Yet moving around the singular parameter produces a nontrivial transformation of the remaining cycles, described by the classical Picard--Lefschetz formula.

In this talk, we will explore this phenomenon through concrete pictures of curves, monodromy, and differential forms. We will then consider the same degeneration over the p-adic integers, where the role of monodromy is played by the inertia group acting on torsion points.

This example leads naturally to arithmetic Picard–Lefschetz theory. I will explain how my thesis generalizes the classical arithmetic formula from ordinary double points to diagonal-type isolated singularities, and describe some consequences for inertia, Frobenius, and the arithmetic of Airy moments.

Find more information at https://sites.google.com/view/sgsnthu/home