IMU 2024 meeting, Algebraic and Arithmetic Geometry
Titles&abstracts

Alexei Entin:

Title: Sectional monodromy of projective curves, towards a classification

Abstract: The sectional monodromy of projective curves is already implicit in Abel's proof of the insolvability in radicals of equations of degree n>=5 and appears in full generality in Castelnuovo's proof of his famous inequality on the genus of a projective curve. However the most interesting aspects of sectional monodromy arise only in positive characteristic p>0.

In this talk I will give an introduction to the subject, discuss the problem of sectional monodromy classification and report on some recent progress based on a joint work in progress with Daniele Garzoni.

Borys Kadets:

Title: Algebraic points on curves

Abstract: I will survey various works which aim to describe the infinite collections of degree d algebraic points on curves over number fields.

The case d=1 is well understood due to Faltings' theorem, and similar types of answers were given (by many people, including the speaker) for d up to 5. While the problem is arithmetic in nature, the difficulty lies in curious puzzles from classical geometry of Riemann surfaces.

David Corwin:

Title: Advances in Chabauty-Kim: Beyond Quadratic Chabauty

Abstract: Faltings' Theorem says that a hyperbolic curve has finitely many rational points; concretely, a nonsingular two-variable polynomial equation of degree at least 5 has finitely many rational solutions. The Quadratic Chabauty method has in recent years allowed us to provably find sets of rational points on previously inaccessible hyperbolic curves, but it still has limitations. Quadratic Chabauty is based on the more general non-abelian Chabauty method of Minhyong Kim, but this method has rarely been applied outside the "quadratic" case.. We discuss a variety of work in progress, some joint with Ishai Dan-Cohen and/or Martin Luedtke, which provide the tools for applying the method more generally. Our methods rely heavily on Tannakian categories of Galois representations or motives.

Gal Binyamini:

Title: Log-Noetherian functions

Abstract: In the early eighties Khovanskii defined the class of Pfaffian functions and proved that they satisfy an analog of the Bezout theorem: an explicit upper bound for the number of solutions for systems of equations in terms of the degrees. He conjectured that similar bounds hold for the larger class of "Noetherian functions". I will discuss a proof of this conjecture for Noetherian functions and a still larger class of "log-Noetherian" functions. Unlike Khovanskii's topological approach, this proof involves several ideas inspired by algebraic geometry and resolution of singularities.

I'll also explain how the solution of Khovanskii's conjecture leads to "effective o-minimality" of a large structure containing many functions of interest in algebraic and arithmetic geometry, in particular period maps for variations of Hodge structures.