11TH CONFERENCE ON ARITHMETIC AND ALGEBRAIC GEOMETRY
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ABSTRACTS

Achinger, Piotr (IMPAN)
Wild ramification and K(pi, 1) spaces

Abstract. I will sketch the proof that every connected affine scheme in positive characteristic is a K(pi,1) space for the etale topology. The key technical ingredient is a "Bertini-type" statement regarding the wild ramification of l-adic local systems on affine spaces. Its proof uses in an essential way recent advances in higher ramification theory due to Takeshi Saito. Time permitting, I will discuss some "anabelian" and "irregular" ramifications of the result.

Brion, Michel (Univ. Grenoble)
Actions of connected algebraic groups on normal varieties

Abstract. Let G be a connected algebraic group acting on a normal algebraic variety X. We show that X is covered by open G-stable quasi-projective subvarieties; moreover, every such subvariety admits an equivariant embedding into the projectivization of a G-linearized vector bundle on an abelian variety, quotient of G. This generalizes a result of Sumihiro on actions of affine algebraic groups, and yields a refinement of a result of Weil on birational actions.

Groechenig, Michael (Berlin Free Univ.)
p-adic integration for the Hitchin system

Abstract. I will report on joint work with D. Wyss and P. Ziegler. We prove a conjecture by Hausel-Thaddeus which predicts an agreement of appropriately defined Hodge numbers for certain moduli spaces of Higgs bundles over the complex numbers. Despite the complex-analytic nature of the statement our proof is entirely arithmetic.

Hashimoto, Kenji (Univ.Tokyo)
Symplectic automorphisms of K3 surfaces and applications

Abstract. An automorphism of a K3 surface is called symplectic if it acts on the $(2,0)$-cohomology. In this talk, we discuss results on invariant and coinvariant lattices of symplectic actions of finite groups. Applying these results, we classify so-called Calabi-Yau threefolds of type K.

Hsia, Liang-Chung (NTNU)
Unlikely intersection for family of Hénon maps

Abstract. The topic to be discussed in this talk is in the context of unlikely intersection problem in arithmetic dynamics, and more generally in arithmetic geometry. Specifically, we consider a 1-parameter family $H_t : \mathbb{A}^2 \to \mathbb{A}^2$ of Hénon maps, where $H_t(x, y) = (y + f_t(x), x)$ and $f_t(x) \in \mathbb{C}[x, t]$ with the degree (in x) of $f_t(x)$ being at least 2. Let $\Sigma(Z)$ denotes the set of parameters $t = \lambda \in \mathbb{C}$ where the point $Z \in \mathbb{C}^2$ is periodic for the specialized Hénon map H_λ. Let $P, Q \in \mathbb{C}^2$ be given. The "unlikely intersection questions" we're interested in are the conditions under which the intersection $\Sigma(P) \cap \Sigma(Q)$ is an infinite set. That is, conditions under which the given points P and Q are simultaneously periodic for the same specialized Hénon map infinitely often. In general, one can not expect this can happen unless P and Q are in some special subvariety of $\mathbb{A}^2$ and they are "dynamically related". We'll discuss these phenomena in the talk.

This is a joint work with Shu Kawaguchi.

Ito, Atsushi (Nagoya Univ.)
On Grothendieck ring of varieties and derived equivalence

Abstract. Two varieties are said to be L-equivalent if their classes coincide in the localization of the Grothendieck ring of varieties by the class of the affine line. I will talk about L-equivalence in connection with derived equivalence. This is a joint work with Makoto Miura, Shinnosuke Okawa, and Kazushi Ueda.

Jarossay, David (Univ.Geneve)
p-adic multiple zeta values and p-adic pro-unipotent harmonic ac- tions

Abstract. Multiple zeta values are periods of the pro-unipotent fundamental groupoid of $\mathbf{P}^1 - \{0, 1, \infty\}$. They are also generalizations of the values of the Riemann zeta function at positive integers, and they can be expressed as sums of series. We study their p-adic analogues, defined abstractly as p-adic periods of the pro-unipotent fundamental groupoid of $\mathbf{P}^1 - \{0, 1, \infty\}$. We will show that they can be expressed explicitly as sums of series, in a way which keeps track of the motivic Galois action. This will be expressed by means of certain group actions which we will call p-adic pro-unipotent harmonic actions. We will deduce a variant of the motivic Galois theory of p-adic multiple zeta values which refers to their explicit expression as sums of series. An application is to shed light on a notion of finite multiple zeta values recently introduced by Kaneko and Zagier.

Katsura, Toshiyuki (Hosei Univ.)
Classification of Enriques surfaces with finite automorphism group in characteristic 2

Abstract. In characteristic 0, S. Kondo classified Enriques surfaces with finite automorphism group into seven types. In this talk, we consider Enriques surfaces with finite automorphism group in characteristic 2, and give the complete classification of them. We have 3 types for singular Enriques surfaces, 5 types for supersingular Enriques surfaces and 8 types for classical Enriques surfaces. We also determine the structure of automorphism groups. This is a joint work with S. Kondo and G. Martin.

Matsuzawa, Yohsuke (Univ.Tokyo)
The height growth along the orbits of rational self-maps and the dynamical degrees

Abstract. I will talk about some relationships between arithmetic and geometry that arise in the field of algebraic dynamics. The arithmetic degrees, which were introduced by Silverman, measure the growth rate of a Weil height function along the orbits of rational self-maps of algebraic varieties. Silverman and Kawaguchi conjecture that the arithmetic degrees of Zariski dense orbits are equal to the dynamical degree of the map. I proved that the arithmetic degrees are always bounded above by the dynamical degree. I also proved that, under some nice conditions, we can define the dynamical canonical height function of the dynamical system. Kaoru Sano and I determined the set of arithmetic degrees of self-morphisms of semi-abelian varieties and proved the conjecture for them.

Miyatani, Kazuaki (Hiroshima Univ.)
p-adic hypergeometric D-modules and multiplicative convolution

Abstract. In this talk, we prove that the arithmetic D-modules defined by p-adic hypergeometric differential equations can be described as an iterated multiplicative convolution of arithmetic D-modules of rank one; this is a p-adic counterpart of a result by Katz about algebraic hypergeometric D-modules with complex parameters. Moreover, in the case where the parameters are rational, we use this result to prove that the p-adic hypergeometric differential equations define overconvergent F-isocrystals and that they are crystalline companions of l-adic hypergeometric sheaves constructed by Katz.

Nagano, Atsuhira (Univ.Tokyo)
Analogues of Kronecker's Jugendtraum from the viewpoint of toric K3 hypersurfaces

Abstract. The work on Calabi-Yau 3-folds by Candelas et al. (1991) is a pioneering work for mirror symmetry. Their work is closely related to toric Calabi-Yau hypersurfaces and hypergeometric equations. On the other hand, Kronecker's Jugendtraum is a construction of class fields by elliptic modular functions. Based on the relation between modular forms and hypergeometic equations, we can give an application of hypergeometric equations to number theory. In this talk, the speaker will present a construction of class fields based on hypergeometric equations attached to toric K3 hypersurfaces.

Okuyama, Yusuke (Kyoto Ins. Tec.)
Arithmetic and algebraic geometry of the moduli of complex dynamics

Abstract. Abstract: The dynamical moduli $\mathcal{M}_d$ of rational functions of degree $d > 1$ on the projective line over $\mathbb{C}$ can be defined over $\mathbb{Z}$ by Silverman. We would present arithmetic and algebraic geometric properties of $\mathcal{M}_d$ in a quantitative way. This talk is based on a joint work with Professors Thomas Gauthier and Gabriel Vigny (Amiens).

Tanaka, Hiromu (Univ.Tokyo)
Kodaira vanishing theorem for Witt canonical sheaves

Abstract. We establish an analogue of the Kodaira vanishing theorem in terms of de Rham-Witt complex. More specifically, given a smooth projective variety over a perfect field of positive characteristic, we prove that the higher cohomologies vanish for the tensor product of the Witt canonical sheaf and the Teichmuller lift of an ample invertible sheaf.

Wittenberg, Olivier (CNRS, ENS)
Zero-cycles on homogeneous spaces of linear groups

Abstract. (Joint work with Yonatan Harpaz.) The Brauer-Manin obstruction is expected to control the existence and weak approximation properties of rational points on homogeneous spaces of linear algebraic groups over number fields. We establish the zero-cycle variant of this conjecture. The same method also leads to a new proof of Shafarevich's theorem that finite nilpotent groups are Galois groups over any number field.

Yatagawa, Yuri (Saitama Univ.)
Characteristic cycle and ramification of a constructible sheaf

Abstract.

   The characteristic cycle of a constructible sheaf on a smooth variety over a perfect field is defined to be an algebraic cycle on the cotangent bundle of the variety using vanishing cycles. An important property of the characteristic cycle is computing the Euler characteristic as an intersection number.

   In this talk, we discuss a computation of the characteristic cycle of a rank one sheaf on a smooth surface in terms of ramification theory. As key ingredients of the proof of the main result, we introduce a sufficient condition for two constructible sheaves on a smooth variety having the same characteristic cycle, which is a joint work with T. Saito, and the homotopy invariance of characteristic cycles of rank one sheaves on a smooth surface.