

Workshop “ p -adic method and its applications in arithmetic geometry”



As an international workshop of JSPS Core-to-Core Program No. 18005: “New Developments of Arithmetic Geometry, Motive, Galois Theory, and Their Practical Applications”, we have a workshop on p -adic geometry at Hiroshima University.

Date : 24, 25 November, 2006

Place : B707 room in Faculty of Science, Hiroshima University

Homepage : <http://www.math.sci.hiroshima-u.ac.jp/~m-mat/JSPS-CoreToCore/P-ADIC061124/p-adic061124.html>

This workshop is also partially supported by JSPS Grant-in-Aid for Scientific Research No. 16204002, and No. 17340008.

Program

24 November (Friday)

10:00 – 11:00 Jean-Marc Fontaine (Paris Sud)

φ -crystals and locally constant φ -modules

Abstract : Let S be a scheme of characteristic p assumed to be syntomic over some perfect scheme. We intend to define the category of locally constant φ -modules and the category of φ -crystals over S and to explain that these two categories are equivalent. We expect this equivalence to be useful because

- on one hand there are interesting p -torsion sheaves naturally associated to locally constant φ -modules,
- on the other hand φ -crystals over S are elementary and very explicit purely algebraic objects.

11:15 – 12:15 Fabrizio Andreatta (Padova)

Relative (ϕ, Γ) -modules and applications

Abstract: I will define relative (ϕ, Γ) -modules for Tate affinoid algebras generalizing Fontaine’s construction for local fields. I will then discuss joint works with O. Brinon and with A. Iovita providing applications to the computation of étale cohomology (both local and global).

2:00 – 3:00 Kazuma Morita (Kyoto)

p -adic Hodge Theory in the imperfect residue field case

Abstract : In this talk, we state some results on Galois representations of local field with imperfect residue field obtained by using the theory of p -adic differential equations. Then, we extend the work of L.Berger (potentially semi-stable theorem) to the imperfect residue field case.

3:00 – 3:30 Tea

3:30 – 4:30 Kentarou Nakamura (Tokyo)

Geometric construction of p -adic polylogarithm

Abstract : The aim of this talk is to construct p -adic polylog on $\mathbb{P}^1 - \{0, 1, \infty\}$ geometrically after Huber-Wildeshaus. For this purpose, we define higher direct images of rigid log syntomic coefficients in a special case.

6:00 - Welcome party

25 November (Saturday)

10:00 – 11:00 Pierre Berthelot (Rennes)

Rigid cohomology and de Rham-Witt complexes

Abstract : We will explain how the de Rham-Witt complex of a smooth embedding can be used to compute rigid cohomology with compact supports for arbitrary algebraic varieties over a field of characteristic p . In particular, the slope < 1 part of rigid cohomology can be described using classical Witt vector cohomology. This result gives congruence properties mod q on the number of rational points for certain varieties over a finite field with q elements.

11:15 – 12:15 Makoto Matsumoto (Hiroshima)

Malcev type completion of arithmetic mapping class groups (Joint work with R. Hain)

Abstract: Let G be the arithmetic fundamental group of the moduli stack of (g, n) -curves over Q . We define a Malcev type completion of G , and show that it is an extension of the arithmetic part (appeared as the tannakian fundamental group of the mixed Tate motives over Z) by the geometric part (known as the relative Malcev completion of the mapping class group).

2:00 – 3:00 Atsushi Shiho (Tokyo)

Relative log convergent cohomology and relative rigid cohomology II

Abstract: We introduce a variant of relative log convergent cohomology and prove basic properties of it. Using this cohomology, we give a partial answer to a conjecture of Berthelot on the coherence and overconvergence of relative rigid cohomology.

3:15 – 4:15 Yukiyoishi Nakkajima (Tokyo-Denki)

Weight-filtered convergent complex (a joint work with A. Shiho)

Abstract : For a smooth scheme with a relative simple normal crossing divisor in characteristic p , we construct a fundamental filtered complex of abelian sheaves in a convergent topos. Using this filtered complex, we prove a p -adic purity and construct the p -adic weight spectral sequence. We give a comparison theorem between the projection of this complex in a Zariski topos and the projection of a weight-filtered crystalline complex in the Zariski topos. As corollaries, we obtain a filtered base change theorem, filtered Künneth formula, filtered Poincaré duality, the E_2 -degeneration of the p -adic weight spectral sequence and the strict compatibility of the weight filtration.

Organizers : Makoto Matsumoto, Nobuo Tsuzuki (Hiroshima)