研究集会 “レギュレーター in ニセコ 2015”

場所：ヒルトンニセコビレッジ 会議室 東山 (3 階)

Program

９月７日 (月)

9:20–10:20 都築暢夫 (東北大学)
“数論的 3 次元超幾何カラビ・ヤウ多様体の族の特異ファイバーを巡って”

10:40–11:40 山田一紀 (慶応大学)
“強半安定スキームのリジッドサントミックコホモロジーについて”

14:00–15:00 小林真一 (東北大学)
“一般 Heegner cycle の p 進補間について”

15:20–16:20 甲斐亘 (東京大学)
“代数的サイクルのモジュラス付き移動補題と引き戻し写像”

16:40–17:40 千田雅隆 (東北大学)
“Beilinson conjecture for Rankin-Selberg products of modular forms”

９月８日 (火)

9:20–10:20 寺杣友秀 (東京大学)
“A construction of algebraic surface with big higher Chow group”

10:40–11:40 小野田実頼 (東工大)
“1-cycles of additive higher chow groups”

午後 Free Time

９月９日 (水)

9:20–10:20 Thomas Geisser (立教大学)

"Duality schemes over global fields"

10:40–11:40 津嶋貴弘 (千葉大学)

"Stable reduction of Lubin-Tate curve with finite level structures and Lustig theory over finite rings"

14:00–15:00 安田正大 (大阪大学)

"Two topics remotely related to regulators: a convolution with Eisenstein determinants and an explicit 2-cocycle for SL_n"

15:20–16:20 宮崎弘安 (東京大学)

"On moving algebraic cycles with modulus of bounded degree"

16:40–17:40 斎藤秀司 (東工大)

"Motives with modulus"

Abstracts

都築暢夫 (東北大学)

一般超幾何関数 ${}_4F_3(1/2, 1/2, 1/2, 1/2; 1, 1, 1; \lambda)$ を周期積分に持つ射影直線上の 3 次元カラビ・ヤウ多様体の数論的族において、$\lambda = 1$ における半安定族の特異ファイバーの既約成分には、有理数体上の剛性カラビ・ヤウ多様体が現れる。この 3 次元剛性カラビ・ヤウ多様体の具体的な保型性とその上に存在するある代数的サイクルについて論じる。

山田一紀 (慶応大学)

リジッドサントミックコホモロジーは p 進整数環上の非特異スキームに対して定義されているコホモロジーで, Beilinson-Deligne コホモロジーの p 進類似にあたる. 本講演ではその定義を p 進整数環上の強半安定スキームに拡張し, スペクトル系列や Chern 類写像の存在等の諸性質についても紹介する.

小林真一 (東北大学)

この講演では Bertolini-Darmon-Prasanna によって定義された一般 Heegner cycle の Abel-Jacobi 像の family を, Perrin-Riou の指数写像の像として p 進補間できることを説明する. 時間にゆとりがあれば応用についても述べる.

甲斐亘 (東京大学)

The theory of algebraic cycles with modulus, such as the additive higher Chow group introduced by Bloch and Esnault and the Chow group with modulus by Binda, Kerz and Saito, is an emerging branch of algebraic cycle theory. The concept ”modulus” concerns how cycles behave at the boundary, expressed by a Cartier divisor. In this talk we exhibit how the contravariance (in affine smooth varieties) of these theories can be deduced from a new moving lemma with modulus. We explain what kind of difficulties are caused by the modulus condition when establishing it.

千田雅隆 (東北大学)

In this talk, we will give an explicit construction of elements in the motivic cohomology of the product of two Kuga-Sato varieties and we will explain a relation between these elements and non-critical values of Rankin-Selberg L-functions for modular forms. This is a joint work with Francois Brunault.

寺杣友秀 (東京大学)

Higher Chow group is considered as the obstruction for the exactness for localization sequence for Chow group. It is interesting problem to construct an algebraic variety with big higher Chow group. In this talk we construct surfaces and elements on them and prove the independentness of them. For this reason, we consider chern class map for higher Chow group and prove the independentness of the images of these elements.

小野田実頼 (東工大)

In this talk, I will explain the additive higher Chow groups of 1-cycles over the field of characteristic 0 by using the residue theory.

Thomas Geisser (立教大学)

We explain how to obtain an analog of the Tate-Poitou sequence for constructible sheaves on varieties over global fields.

津嶋貴弘 (千葉大学)

T. Yoshida constructs a semi-stable model of the Lubin-Tate space with Drinfeld level p -structure, and proves that the reduction has a Zariski open subset, which is isomorphic to the Deligne-Lustig variety for general linear group over finite fields. By using the Lustig theory over finite rings, which is a generalization of the Deligne-Lustig theory, we constructs a curve which is expected to appear in the stable reduction of the Lubin-Tate curve with finite level structures (This is a joint work with T. Ito). J. Weinstein constructs a family of affinoids in the Lubin-Tate perfectoid space, whose middle cohomology realizes supercuspidal representations of unramified type. In this talk, we construct a family of affinoids in the Lubin-Tate curve with finite levels and compare their reductions with the curve in the above conjecture.

安田正大 (大阪大学)

I will talk abuout my two small works remotely related to regulators. One is on a convolution with Eisenstein determinants of certain cusp forms on GL_d over the rational function field, and this work is motivated by an expectation by Satoshi Kondo. The other is on an explicit 2 -cocycle for SL_n over a field.

宮崎弘安 (東京大学)

Friedlander and Lawson developed the theory of moving algebraic cycles of bounded degree. In other words, for a family of cycles {Z} , {W} of bounded degree on a projective variety, we can move all Z uniformly so that they intersect properly with all W. The moving lemma of this type plays an important role in Voevodsky's $\mathbb{A}^1$-homotopy theory of motives. For example, the moving lemma enables us to prove the duality theorem of motives. Recently, a non-homotopical generalization of Voevodsky's $\mathbb{A}^1$-homotopy theory of motives is studied by Kahn-Saito-Yamazaki. The aim of this talk is to present a modification of the moving lemma of Friedlander-Lawson which might be used in the (future) non-homotopical theory of motives.

斎藤秀司 (東工大)

Recently several attempts have been made to introduce theory of motivic cohomology with modulus, which motivate a quest for motives with modulus. In this talk I report a work in progress with B. Kahn and T. Yamazaki on an attempt to extend Voevodsky's theory of motives to motives with modulus.

Let k be a perfect field and Sm be the category of smooth schemes over k. Let $\mathbf{DM}^{\mathrm{eff}}$ be the tensor triangulated category of effective motives defined by Voevodsky. It is equiped with a functor

$$\mathrm{Sm} \to \mathbf{DM}^{\mathrm{eff}} : X \to M(X).$$

A fundamental result of Voevodsky is a formula:

$$\mathrm{Hom}_{\mathbf{DM}^{\mathrm{eff}}}(M(Y), M(X)[i]) = H^i_{\mathrm{Nis}}(Y, C_*(X)),$$

where $C_*(X)$ is the Suslin complex of X and RHS is the Nisnevich cohomology. The formula plays a crucial role for proving the comparison theorems of motivic (co)homology with various cycle groups such as Suslin homology and Bloch's higher Chow groups.

To extend Voevodsky's theory we introduce *modulus pairs* which are pairs $\mathscr{X} = (\overline{X}, X_\infty)$ of an integral separated k-scheme $\overline{X}$ and an effective Cartier divisor X_∞ (not reduced in general) on $\overline{X}$ such that $\mathscr{X}^o = \overline{X} - |X_\infty|$ is smooth, where $|X_\infty|$ is the support of X_∞. Modulus pairs form a category $\mathbf{MSm}$ with a functor

$$\omega : \mathbf{MSm} \to \mathrm{Sm} : \mathscr{X} \to \mathscr{X}^o.$$

I will then introduce a commutative diagram

$$\begin{array}{ccc} \mathbf{MSm} & \xrightarrow{M} & \mathbf{DR}^{\mathrm{eff}} \\ \downarrow{\scriptstyle \omega} & & \downarrow{\scriptstyle \omega^{\mathrm{eff}}} \\ \mathrm{Sm} & \xrightarrow{M} & \mathbf{DM}^{\mathrm{eff}} \end{array}$$

where $\mathbf{DR}^{\mathrm{eff}}$ is a tensor triangulated category equipped with a functor

$$\mathbf{MSm} \to \mathbf{DR}^{\mathrm{eff}} : \mathscr{X} \to M(\mathscr{X})$$

and ω^{eff} is a tensor triangulated functor. A main result is a formula

$$\mathrm{Hom}_{\mathbf{DR}^{\mathrm{eff}}}(M(\mathscr{Y}), M(\mathscr{X})[i]) = H^i_{\mathrm{Nis}}(\overline{Y}, RC_*(\mathscr{X})_{\mathscr{Y}}) \ \ (\mathscr{X},\ \mathscr{Y} \in \mathbf{MSm}).$$

Here $\mathscr{Y} = (\overline{Y}, Y_\infty)$ and $RC_*(\mathscr{X})$ is the *derived Suslin complex of* $\mathscr{X}$ which induces a complex of sheaves $RC_*(\mathscr{X})_{\mathscr{Y}}$ on the Nisnevich site $\overline{Y}_{\mathrm{Nis}}$ depending on $\mathscr{Y}$, not only on $\overline{Y}$.