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Sommersemester 2023

Arithmetische und Algebraische Geometrie

Mittwoch 16-18, LMU Theresienstr. 39, Raum A027 oder TUM, Boltzmannstr. 3, Raum ???

19.04.2023 .

Title:
 Abstract:

26.04.2023 .

Title:
 Abstract:

03.05.2023 Werner Bley (LMU).

Title: Stably free cancellation over integral group rings

Abstract: For a finite group G we write $\mathbb{Z}[G]$ for the integral group ring. We say that $\mathbb{Z}[G]$ has stably free cancellation, if $P \oplus \mathbb{Z}[G]^n \simeq \mathbb{Z}[G]^{n+m}$ implies $P \simeq \mathbb{Z}[G]^m$ for all $\mathbb{Z}[G]$ -modules P . We will present an algorithm which for a given finite group G decides whether $\mathbb{Z}[G]$ has stably free cancellation or not.

This is a report on joint work in progress with Tommy Hofmann and Henri Johnston.

10.05.2023 .

Title:
 Abstract:

17.05.2023 Sören Kleine (UniBw)

Title: On the $\mathfrak{M}_H(G)$ -property

Abstract: Let p be a rational prime, and let E be an elliptic curve defined over \mathbb{Q} with good ordinary reduction at p . We let K be a number field, which we assume to be totally imaginary if $p = 2$.

Let K_∞ be a \mathbb{Z}_p^2 -extension of K which contains the cyclotomic \mathbb{Z}_p -extension K_{cyc} of K . We denote by $X(E/K_\infty)$ the Pontryagin dual of the Selmer group of E over K_∞ , and we write

$$H_{cyc} = \text{Gal}(K_\infty/K_{cyc}) \subseteq \text{Gal}(K_\infty/K) =: G.$$

We consider the quotient $X(E/K_\infty)_f := X(E/K_\infty)/X(E/K_\infty)[p^\infty]$ of $X(E/K_\infty)$ by its p -torsion submodule. This module is known to be finitely generated over $\mathbb{Z}_p[[G]]$. The $\mathfrak{M}_H(G)$ -conjecture predicts that actually it should be finitely generated as a module over the smaller group ring $\mathbb{Z}_p[[H_{cyc}]]$.

In this talk, we discuss an analogous property for non-cyclotomic \mathbb{Z}_p -extensions. To be more precise, we let \mathcal{E} be the set of \mathbb{Z}_p -extensions $L \subseteq K_\infty$ of K . For each $L \in \mathcal{E}$, one can ask whether the quotient $X(E/K_\infty)_f$ is finitely generated as a $\mathbb{Z}_p[[H]]$ -module, where now

$$H = \text{Gal}(K_\infty/L).$$

The main result we would like to present is a collection of several equivalent criteria for the validity of this $\mathfrak{M}_H(G)$ -property, some of which generalise previously known conditions for the special case $H = H_{\text{cyc}}$, whereas several other conditions are completely new. The new conditions involve, for example, the boundedness of λ -invariants of the Pontryagin duals $X(E/L)$ as one runs over the elements $L \in \mathcal{E}$. If time permits, then we can also describe some applications.

This is joint work with Ahmed Matar and Sujatha.

24.05.2023 Konferenz in Madrid

Title:

Abstract:

31.05.2023 .

Title:

Abstract:

07.06.2023 Rustam Steingart (Heidelberg).

Title: Analytic Cohomology of Lubin-Tate (φ, Γ) -Modules

Abstract: If L is a non-trivial finite extension of \mathbb{Q}_p there exist L -linear representations of the absolute Galois group G_L which are not overconvergent. A sufficient condition to ensure overconvergence is L -analyticity. This makes it interesting to study analytic extensions of such modules or, more generally, analytic cohomology. Using p -adic Fourier theory we can, after passing to a large field extension of L , describe these cohomology groups in terms of an explicit "Herr-complex" which allows us to deduce finiteness and base change properties analogous to the results of Kedlaya-Pottharst-Xiao on continuous cohomology. We also obtain a variant of Shapiro's Lemma for Iwasawa-cohomology in certain cases. The above results form the technical foundations for studying an "analytic" variant of the local epsilon-isomorphism conjecture.

14.06.2023 .

Title:

Abstract:

21.06.2023 Alain Togbé (Purdue University Northwest, Indiana USA)

Title: On a family of biquadratic fields that do not admit a unit power integral basis

Abstract: In this talk, we will answer the following question:

*For which number fields does there exist
a power integral basis consisting of units?*

In fact, we consider the following family of biquadratic fields

$$\mathbb{K} = \mathbb{Q}(\sqrt{18n^2 + 17n + 4}, \sqrt{2n^2 + n})$$

and prove that if $18n^2 + 17n + 4$ and $2n^2 + n$ are both square-free, then \mathbb{K} does not admit a power integral basis consisting of units.

27.06.2023 Mufit Sezer (ACHTUNG: Dienstag !!!)

An der TUM, Boltzmannstr. 3, Raum 03.06.011)

Title: Vector invariants of permutation groups in characteristic zero

Abstract: We consider a finite permutation group acting naturally on a vector space V over a field k . A well-known theorem of Göbel asserts that the corresponding ring of invariants $k[V]^G$ is generated by invariants of degree at most $\binom{\dim V}{2}$. In this note we show that if the characteristic of k is zero then the top degree of vector coinvariants $k[V^m]_G$ is also bounded above by $\binom{\dim V}{2}$, which implies the degree bound $\binom{\dim V}{2} + 1$ for the ring of vector invariants $k[V^m]^G$. So Göbel's bound almost holds for vector invariants in characteristic zero as well. This is a joint work with F. Reimers.

28.06.2023 Ivan Rosas-Soto (Université de Bourgogne)

Title: Integral Hodge classes and étale motivic cohomology

Abstract: Although the integral Hodge conjecture is false, Rosenschon and Srinivas proved that the étale version of it, i.e. changing Chow by Lichtenbaum cohomology groups, is equivalent to the Hodge conjecture with rational coefficients, which is still an open question. In this talk, I will revisit some of the counter-examples to the integral Hodge conjecture, such as the ones of Atiyah-Hirzebruch and Benoist-Ottem, but from an étale motivic point of view, followed by some consequences of the equivalence between the conjectures.

05.07.2023 Tuan Ngo Dac (Caen)

Title: On multiple zeta values in positive characteristic

Abstract: Multiple zeta values (MZVs for short) in positive characteristic were introduced by Thakur as analogues of classical multiple zeta values of Euler. In this talk we first review Euler's MZVs and some algebra structures related to these values, and state important conjectures such as those of Ihara-Kaneko-Zagier, Hoffman and Zagier. Then we explain our recent works on Hoffman-Zagier's conjectures and algebraic structures of MZVs in positive characteristic.

12.07.2023 Andreas Rosenschon (LMU)

Title: Remarks on the Hodge Conjecture

Abstract:

19.07.2023 Stephan Elsenhans. **ACHTUNG:** Der Vortrag entfällt und wird ins WS verschoben.

Title: Cubic surfaces – moduli spaces and arithmetic

Abstract: The study of cubic surfaces and in particular the structure of the 27 lines on the surface is classical. From an arithmetic perspective, the Galois action on the lines plays an important role. In this talk we will inspect several descriptions of the moduli space of cubic surfaces. Based on this I will explain how to construct cubic surfaces with a prescribed Galois action on the 27 lines.