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Wintersemester 23/24

Arithmetische und Algebraische Geometrie

Mittwoch 16-18, LMU Theresienstr. 39, Raum B251 oder TUM, Garching, Boltzmannstr. 3,
Raum 02.08.020

18.10.2023 Florian Griesser (LMU München)

Title: On the 2-part of the BSD-conjecture for elliptic curves with CM

Abstract: In the first half of the 1960s Birch and Swinnerton-Dyer developed their famous conjecture, which claims a close connection between the arithmetic and analytic properties of $L(E, s)$ (at $s = 1$) for an elliptic curve E defined over \mathbb{Q} . Down to the present day this conjecture is still unproved. For elliptic curves with complex multiplication by the maximal order of an imaginary quadratic field, John Coates analyzed the 2-adic valuation of the algebraic part of the L -series at $s = 1$. For quotients with special quadratic twists, he proved an inequality for the 2-adic valuation of the Tamagawa numbers for the twisted curve. This is in close connection to the 2-part of the BSD-conjecture, which predicts the difference in the inequality to be determined by the Shafarevich-Tate group.

This is the defense of my master's thesis, which is based on a paper of John Coates. In this thesis I analyzed the results of Coates and recomputed the numerical examples using the computer algebra system MAGMA.

25.10.2023 Katharina Müller (UniBw München)

Title: On towers of isogeny graphs with full level structure

Abstract: Let k be a finite field of characteristic q . Let p, l be primes coprime to q and let N be a positive integer coprime to pql . In this talk we will define graphs $X_l^q(Np^n)$ whose vertices are tuples (E, P, Q) , where E/k is an elliptic curve and P, Q is a basis for $E[Np^n]$. The edges are given by degree l isogenies. We will discuss when $X_l^q(Np^n)/X_l^q(Np^{n-1})$ is Galois and will describe the structure of these graphs as volcanos.

This is joint work with Antonio Lei.

08.11.2023 Daniel Schaeppi (Regensburg)

Title: Symplectic K -theory and stably free modules

Abstract: The low-dimensional symplectic K -groups can be defined by replacing the general linear group with the symplectic group in the definition of the ordinary K -groups. Similar tools are available for their study, for example so called analytic patching diagrams. These patching diagrams can be used to relate some classical questions about stably free modules to symplectic K -theory.

Combining this with recent developments in hermitian K -theory for rings where 2 is not assumed to be a unit, we are able to settle the following open question. We call a ring Hermite if all stably free modules over it are free. The Hermite ring conjecture is the conjecture that the polynomial ring over a Hermite ring is again Hermite. With the above mentioned tools, we can construct a counterexample to the Hermite ring conjecture in characteristic 2.

15.11.2023 Georg Tamme (Mainz)

Title: On the vanishing of negative K -groups

Abstract: The negative algebraic K -groups of a scheme encode some information about its geometry. For example, they vanish when the scheme is regular. In this talk, I will discuss the following vanishing result for negative K -groups: For any quasi-compact, quasi-separated scheme X , the K -groups $K_i(X)$ vanish for i less than the negative valuative dimension of the scheme. The valuative dimension is a variant of the Krull dimension introduced by Jaffard in 1960 which still behaves well for non-Noetherian schemes. The main new ingredient in the proof is a descent result for algebraic K -theory under abstract blowups in the non-Noetherian setting. This is joint work with Shane Kelly and Shuji Saito and also based on earlier joint work with Markus Land, and with Moritz Kerz and Florian Strunk.

22.11.2023 Ute Ludwig (LMU München)

Title: Der Satz von Ferrero-Washington

Abstract: Der Satz von Ferrero-Washington besagt, dass Iwasawas μ -Invariante für die zyklotomische \mathbb{Z}_p -Erweiterung jedes absolut abelschen Zahlkörpers verschwindet. Neben dem Beweis von Ferrero und Washington (1979) gibt es dafür einen weiteren Beweis von Sinnott (1984), die beide im Vortrag skizziert werden. Dieser Vortrag findet im Rahmen meiner Masterarbeit statt.

29.11.2023 Stephan Elsenhans (Universität Würzburg)

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.

06.12.2023 .

Title:

Abstract:

13.12.2023 Wolfgang Lück (Bonn)

Title: On the K -theoretic Farrell-Jones Conjecture for Hecke algebras of reductive p -adic groups

Abstract: We formulate and sketch the proof of the K -theoretic Farrell-Jones Conjecture for the Hecke algebra of reductive p -adic groups. This is the first time that a version of the Farrell-Jones Conjecture for topological groups is formulated. It implies that the reductive projective class group of the Hecke algebra of a reductive p -adic group is the colimit of these for all compact open subgroups. This has been proved rationally by Bernstein and Dat using representation theory. The main applications of our result will concern the theory of smooth representations. In particular we will prove a conjecture of Dat.

20.12.2023 .

Title:

Abstract:

10.01.2024 .

Title:

Abstract:

17.01.2024 Martin Kreuzer (Universität Passau)

Title:

Abstract:

24.01.2024 Robert Pollack (Boston University).

Title:

Abstract:

31.01.2024 Luca Marannino (Duisburg-Essen).

Title:

Abstract:

07.02.2023 Stefan Schreieder (Hannover)

Title:

Abstract: