

ISSN 1881-6193

RIMS Kôkyûroku Bessatsu B77

Algebraic Number Theory and Related Topics 2016

edited by Yasuo Ohno, Hiroshi Tsunogai and Toshiro Hiranouchi

April, 2020

Research Institute for Mathematical Sciences
Kyoto University

RIMS Kôkyûroku Bessatsu B77

Algebraic Number Theory
and
Related Topics 2016

November 28 ~ December 2, 2016

edited by Yasuo Ohno, Hiroshi Tsunogai and Toshiro Hiranouchi

April, 2020

Research Institute for Mathematical Sciences

Kyoto University, Kyoto, Japan

The papers presented in this volume of RIMS Kôkyûroku Bessatsu are in final form and refereed.
©2020 by the Research Institute for Mathematical Sciences, Kyoto University. All rights reserved.
Printed in Japan.

Preface

This volume is the proceedings of the conference “Algebraic Number Theory and Related Topics 2016” held at RIMS, Kyoto University from November 28 (Mon) through December 2 (Fri), 2016. The conference was held as one of the workshops supported by the joint research program of RIMS, and was intended to cover a wide range of topics in number theory such as algebraic number theory, Iwasawa theory, arithmetic geometry, automorphic representations, prime number theory, prehomogeneous vector spaces and multiple zeta values.

Articles in this volume were all written by speakers of the conference and their collaborators, and reviewed by anonymous referees. The articles are classified in the following three categories: Survey Articles (surveys explaining recent results, backgrounds, ideas and outlines of proofs etc. on specific topics), Research Articles (usual original research articles), and Research Announcements (announcements on results whose details are/will be published elsewhere).

We would like to thank all who kindly helped us to organize the conference and to edit these proceedings. In particular, we are grateful to anonymous referees for their kind cooperation, without which the proceedings would have never been completed, the graduate students who helped us during the conference, and all the staff of the joint research office at RIMS for their constant support. Finally we would like to express our sincere gratitude to all who recommended speakers, and to all the speakers of the conference for giving interesting talks and writing articles for this volume. We hope that the articles in this volume will lead to further developments in number theory and related subjects.

December 2019

Yasuo Ohno
Hiroshi Tsunogai
Toshiro Hiranouchi

Program

Algebraic Number Theory and Related Topics 2016

Date November 28 (Mon) - December 2 (Fri), 2016

Place Room 420, Research Institute for Mathematical Sciences, Kyoto University

November 28 (Mon)

- 9:45 – 10:00 Introduction
- 10:00 – 10:50 Akihiko Yukie (Kyoto University)
Rational orbits of prehomogeneous vector spaces
- 11:05 – 12:05 Takashi Taniguchi (Kobe University)
Orbital exponential sums for prehomogeneous vector spaces
- 13:30 – 14:20 Yohsuke Matsuzawa (University of Tokyo)
Arithmetic and dynamical degrees of rational self-maps of an algebraic variety
- 14:35 – 15:25 Koichiro Sawada (Kyoto University)
Pro- p and cohomological aspects of anabelian geometry of hyperbolic polycurves
- 15:40 – 16:30 Naotake Takao (Kyoto University)
Recent progress in higher-dimensional anabelian geometry

November 29 (Tue)

- 10:00 – 10:50 Hohto Bekki (University of Tokyo)
On periodicity of geodesic continued fractions
- 11:05 – 12:05 Keiju Sono (Ehime University)
Recent progress on twin prime conjecture
- 13:30 – 14:20 Akinari Hoshi (Niigata University)
Rationality problem for fields of invariants
- 14:35 – 15:25 Shin-ichiro Seki (Osaka University)
Finite multiple polylogarithms and their functional equations
- 15:40 – 16:30 Takao Komatsu (Wuhan University)
Complementary Euler numbers with their generalizations and applications

November 30 (Wed)

- 9:30 – 10:20 Rei Otsuki (Keio University)
The p -adic L -functions for higher weight modular forms in the super-singular case
- 10:35 – 11:25 Takahiro Kitajima (Keio University)
On the plus and the minus Selmer groups for elliptic curves at super-singular primes
- 11:40 – 12:40 Shinichi Kobayashi (Kyushu University)
Anti-cyclotomic Iwasawa theory and generalized Heegner cycles

December 1 (Thu)

- 9:30 – 10:20 Toshiki Matsusaka (Kyushu University)
Formulas for the Fourier coefficients of genus zero modular functions
- 10:35 – 11:25 Sho Yoshikawa (University of Tokyo)
On modularity of elliptic curves over certain totally real fields
- 11:40 – 12:40 Yoichi Mieda (University of Tokyo)
Arthur's classification and its applications I
- 14:00 – 14:50 Kenji Makiyama (Kyoto Sangyo University)
A p -adic analytic family of the D -th Shintani lifting for a Coleman family and congruences between the central L -values
- 15:05 – 15:55 Tomomi Ozawa (Tohoku University)
Classical weight one Hilbert cusp forms in a Hida family
- 16:10 – 17:00 Shin Hattori (Kyushu University)
On a properness of the Hilbert eigenvariety at integral weights

December 2 (Fri)

- 9:30 – 10:20 Satoshi Mochizuki (Chuo University)
Motivic homotopy theory without assuming \mathbb{A}^1 -homotopy invariance
- 10:35 – 11:25 Fuetaro Yobuko (Tohoku University)
Frobenius splitting height and lifting of Calabi-Yau varieties
- 11:40 – 12:40 Yoichi Mieda (University of Tokyo)
Arthur's classification and its applications II
- 14:00 – 14:50 Uwe Jannsen (University of Tokyo, Universität Regensburg)
Filtered de Rham Witt complexes and wildly ramified higher class field theory over finite fields
- 15:05 – 15:55 Hironori Shiga (Chiba University)
The Shimura canonical model for the quaternion algebra of discriminant 6 via the hypergeometric modular function
- 15:55 – 16:05 Closing

Contents

Preface	i
Program	ii
Contents	v
Survey Articles	1
宗野 恵樹 (Keiju SONO).....	3
Recent progress on twin prime conjecture	
星 明考 (Akinari HOSHI).....	29
Noether's problem and rationality problem for multiplicative invariant fields: a survey	
小林 真一 (Shinichi KOBAYASHI).....	55
反円分拡大の岩澤理論と一般 Heegner サイクル (Anticyclotomic Iwasawa theory and generalized Heegner cycles)	
三枝 洋一 (Yoichi MIEDA).....	75
Arthur 分類とその応用 (Arthur's classification and its applications)	
志賀 弘典 (Hironori SHIGA).....	127
An explicit Shimura canonical model for the quaternion algebra of discriminant 6	
Research Articles	141
小松 尚夫 (Takao KOMATSU).....	143
On poly-Euler numbers of the second kind	
呼子 笛太郎 (Fuetaro YOBUKO).....	159
On the Frobenius-splitting height of varieties in positive characteristic	
Research Announcements	177
雪江 明彦 (Akihiko YUKIE).....	179
Rational orbits of prehomogeneous vector spaces	
松澤 陽介 (Yohsuke MATSUZAWA).....	183
Arithmetic and dynamical degrees of rational self-maps on algebraic varieties	

澤田 晃一郎 (Koichiro SAWADA)	191
Pro- p and cohomological aspects of anabelian geometry of hyperbolic polycurves	
高尾 尚武 (Naotake TAKAO)	203
Recent progress in higher-dimensional anabelian geometry	
戸次 鵬人 (Hohto BEKKI)	215
On periodicity of geodesic continued fractions: a precis	
関 真一郎 (Shin-ichiro SEKI)	225
有限多重ポリログとその関数等式 (Finite multiple polylogarithms and their functional equations)	
大槻 玲 (Rei OTSUKI)	239
超特異な場合における重さの高い保型形式の p 進 L 関数について (The p -adic L -functions for higher weight modular forms in the supersingular case) (announcement)	
北島 孝浩 (Takahiro KITAJIMA)	251
超特異還元楕円曲線の偶奇 Selmer 群について (On the plus and the minus Selmer groups for elliptic curves at supersingular primes – a research announcement)	
松坂 俊輝 (Toshiki MATSUSAKA)	259
The Fourier coefficients of the McKay-Thompson series and the traces of CM values, an announcement	
吉川 祥 (Sho YOSHIKAWA)	265
総実代数体上の楕円曲線の保型性について (On modularity of elliptic curves over certain totally real fields; a résumé)	
小澤 友美 (Tomomi OZAWA)	271
Classical weight one forms in Hida families: Hilbert modular case (research announcement)	