THE SEVENTH CHINA-JAPAN SEMINAR
ON NUMBER THEORY

Plowing and starring through the high wave forms

Kyushu University
October 28-November 1, 2013

Organized by
Masanobu Kaneko, Kyushu University
Shigeru Kanemitsu, Kinki University
Jianya Liu, Shandong University

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Monday, October 28, 2013

Registration, opening and photo session
Address: Ito Guest House, Kyushu University   Moto-oka, Fukuoka, Japan

Monday, October 28, 2013

13:00-13:30 Opening ceremony (Masanobu Kaneko, Shigeru Kanemitsu, and Jianya Liu).

- Monday Afternoon Session (Chair: Masanobu Kaneko)

  October 28, 13:50-14:30   Lin Weng (Kyushu Univ.)

Motivic Euler product and its applications

October 28,14:50-15:30   Shigeki Akiyama (Tsukuba Univ.)

On the mean divisibility of multinomial sequences

October 28, 15:45-16:00   Tomokazu Onozuka (Nagoya Univ.)

Mean values of Mordell-Tornheim double zeta-functions (a joint work with Takuya Okamoto)

- Tuesday Morning Session (Chair: Katsuya Miyake)
  October 29, 10:00-10:40   Yoshiyuki Kitaoka (Meijo Univ.),

  The distribution of roots of a polynomial modulo prime powers

  October 29, 11:00-11:40   Guangshi Lv (Shandong Univ.),

  On Fourier coefficients of automorphic forms

- Tuesday Afternoon Session (Chair: Yoshiyuki Kitaoka)
  October 29, 13:30-14:10   Ryotaro Okazaki (Doshisha Univ.)

  Geometry for totally imaginary quartic Thue equation

  October 29, 14:30-15:10   Wenguang Zhai (China Univ. of Mining and Tech.),

  On the Dirichlet divisor problem in short intervals

  October 29, 15:30-15:45   Tomoya Kiyuna (Kyushu Univ.)

  A certain differential equation for Jacobi forms

  October 29, 15:45-16:00   Takahiro Wakasa (Nogoya Univ.)

The explicit upper bound of the multiple integral of $S(t)$ on the Riemann Hypothesis

- Wednesday Morning Session (Chair: Jianya Liu)

  October 30, 10:00-10:40   Andrzej Schinzel (PAN)

  On integer-valued polynomials
  October 30, 11:00-11:40   Katsuya Miyake
  (emeritus professor of Tokyo Metropolitan Univ.)

  Complex multiplication in the sense of Abel

- Thursday Morning Session (Chair: Koichi Kawada)

  October 31, 10:00-10:40   Kohji Matsumoto (Nagoya Univ.) A joint composite hybrid strong universality theorem

  October 31, 11:00-11:30   Hiroki Aoki (Tokyo Univ. of Sci.) On Jacobi forms of fractional weight

- Thursday Afternoon Session (Chair: Isao Walabayashi) October 31,

  13:30-14:10   Shigeki Egami (Shibaura Inst. of Tech.) On analytic continuation of some Dirichlet series

  October 31, 14:30-15:10   Xiumin Ren (Shandong Univ.) Asymptotic expansions of Voronoi's summation formulas for $GL(m)$ and applications

  October 31, 15:30-16:10   Tianxin Cai (Zhejiang Univ.) Congruent numbers on the right trapezoid

October 31, 16:20-16:35   Ade Irma Suriajaya (Nagoya Univ.) On the zeros of the second derivative of the Riemann zeta function under the Riemann hypothesis

- Friday Morning Session (Chair: Shigeki Egami)

  November 1, 10:30-11:10   Zhi-Wei Sun (Nanjing Univ.), Some new problems involving primes and permutations

  November 1, 11:30-11:40   Closing

ABSTRACTS

1. Shigeki Akiyama
University: Tsukuba University
E-mail: akiyama@math.tsukuba.ac.jp
Talk Title: On the mean divisibility of multinomial sequences.

Abstract: A sequence $a_1, a_2, \ldots$ of non-zero integers is divisible if a_n divides a_{kn} for a positive integer k. We generalize this notion and define almost k-mean divisibility: $\prod_{i=1}^{n} a_n$ divides $C \prod_{i=1}^{n} a_{kn}$ with a positive constant C. Then we show that under some condition, sequences defined by multinomial coefficients enjoy this property although they are not divisible. The proof depends on an integral inequality which seems to be interesting of its own.

2. Hiroki Aoki
University: Tokyo University of Science
E-mail: aoki_hiroki@ma.noda.tus.ac.jp
Talk title: **On Jacobi forms of fractional weight**
Abstract: On elliptic modular forms, modular forms of fractional (not half integral) weights had been studied by Ibukiyama, Bannnai et al. In this talk, we introduce Jacobi forms of fractional weights and fractional indices, from the view point of structure theorem. If time is allowed, we will also explain Siegel modular forms of fractional weights.

3. Shigeki Egami

University: Shibaura Institute of Technology
E-mail: egami-sg@shibaura-it.ac.jp
Talk title: **On analytic continuation of some Dirichlet series**
Abstract: In this talk we discuss the analytic continuation of the following two types of Dirichlet series: (1) Dirichlet series associated to linear recurrence series. (2) Variants of Hardy-Littlewood-Hecke series.

4. Yoshiyuki Kitaoka
University: Meijo University
E-mail: kitaoka@ccmfs.meijo-u.ac.jp
Talk title: **The distribution of roots of a polynomial modulo prime powers**
Abstract: Let f be a monic polynomial with integer coefficients. The aim is to state several observations on the distribution of roots of f modulo prime powers. They give new difficult problems.

5. Guangshi Lü
University: Shandong University
E-mail: gslv@sdu.edu.cn
Talk title: **On Fourier coefficients of automorphic forms**
Abstract: Fourier coefficients of classical automorphic forms are interesting and important objects in number theory. In this talk, I shall introduce some recent results on Fourier coefficients of automorphic forms.

6. Katsuya Miyake
University: Emeritus professor of Tokyo Metropolitan University
E-mail: miyakek@bz-csp.tepm.jp
Talk title: **Complex multiplication in the sense of Abel**
Abstract: Starting from the definition of the most classical complex multiplication, we launch on expounding modernized one for elliptic curves and Abelian varieties. Also included is some comments from the coming book "A survey of elliptic functions".

7. Ryotaro Okazaki
University: Doshisha University
E-mail: rokazaki@mail.doshisha.ac.jp
Talk title: **Geometry for totally imaginary quartic Thue equation**
Abstract: Let F be a binary quartic form of integer coefficients. Assume F has no real linear factors. We consider the Thue equation by equating F with unity. This is one of the so-called trivial case of Thue equations.

However, the precise universal upper bound on the number of its solution is still open. In this talk, we try to identify those F with 3 solutions module $(x, y) \leftrightarrow (-x, -y)$. This will eventually leads to completion of a project initiated by Nagell.

8. Kohji Matsumoto
University: Nagoya University
E-mail: kohjimat@math.nagoya-u.ac.jp
Talk title: **A joint composite hybrid strong universality theorem**
Abstract: After the discovery of the universality property of the Riemann zeta-function by Voronin (1975), the universality theory of zeta and L-functions has been studied quite extensively. Various refinements and/or generalizations, such as joint universality, composite universality, hybrid universality, and strong universality were introduced and discussed. In this talk we first survey the history of universality theory, especially explain the above four notions. Then we report a new result, obtained jointly with A. Laurincikas and J. Steuding, which combines all of these four notions.

9. Xiumin Ren
University: Shandong University
E-mail: yangbo-ye@uiowa.edu
Talk title: **Asymptotic expansions of Voronoi's summation formulas for $\mathrm{GL}(m)$ and applications**
Abstract: Let $m \geq 3$ and f a Maass cusp form for $\mathrm{GL}(m)$ with Fourier coefficients $A_f(n_1, \cdots, n_{m-1})$. I will talk about Voronoi's summation formula for $A_f(n_1, \cdots, n_{m-1})$, give asymptotic expansions of the formula and outline some applications.

10. Andrzej Schinzel
University: Polish Academy of Sciences
E-mail: schinzel@impan.pl
Talk title: **On integer-valued polynomials**
Abstract: This is a survey lecture but it contains new results of mine on fixed divisors of forms

11. Zhi-Wei Sun
University: Nanjing University
E-mail: zwsun@nju.edu.cn
Talk title: **Some new problems involving primes and permutations**

Abstract: In this talk we introduce various new problems on primes and permutations. For example, we conjecture that for any positive integer n there is a circular permutation $a(0), a(1), ..., a(n)$ of $0, 1, \cdots, n$ such that all the $n+1$ adjacent sums $a(0)+a(1), a(1)+a(2), \cdots, a(n-1)+a(n), a(n)+a(0)$ are among those integers k with $6k-1$ and $6k+1$ twin primes.

12. Lin Weng
University: Kyushu University
E-mail: weng@math.kyushu-u.ac.jp
Talk title: **Motivic Euler product and its applications**
Abstract: We begin with a construction of motivic abelian and non-abelian zeta functions for curves over any base field, using moduli stacks of semistable bundles. Based on them, we define motivic Euler products. As applications, we offer a pair of intrinsic relations between total motivic mass of principal bundles and its semi stable parts, following Harder-Narashimhan, Zagier and Lamoun-Rapoport, with the help of Arthur and Lafforgue truncations. If time is allowed, we will also explain how these works are naturally related with Atiyah-Bott's question on Tamagawa measures associated to bundles over Riemann surfaces and our work with Zagier on the Riemann Hypothesis for non-abelian zeta functions for elliptic curves over finite fields.

Short communications

13. Tomoya Kiyuna
University: Kyushu University
E-mail: t-kiyuna@math.kyushu-u.ac.jp
Talk title: **A certain differential equation for Jacobi forms**
Abstract: Kaneko and Zagier introduced a certain differential equation for elliptic modular forms. The differential equation was studied by Kaneko and Koike. In this talk, we carry out a similar study for Jacobi forms.

14. Tomokazu Onozuka
University: Nagoya University
E-mail: m11022v@math.nagoya-u.ac.jp
Talk title: **Mean values of Mordell-Tornheim double zeta-functions (a joint work with Takuya Okamoto (Ritsumeikan Univ.))**
Abstract: Matsumoto and Tsumura proved the mean value theorems for the Euler-Zagier double zeta-function. In this talk, we consider mean value theorems for the Mordell-Tornheim double zeta-function.

15. Ade Irma Suriajaya

University: Nagoya University
E-mail: adeirmasuriajaya@yahoo.com
Talk title: **On the zeros of the second derivative of the Riemann zeta function under the Riemann hypothesis**

Abstract: The number of zeros and the distribution of the real part of non-real zeros of the derivatives of the Riemann zeta function have been investigated by Berndt, Levinson, Montgomery, and Akatsuka. Berndt, Levinson, and Montgomery investigated the general case, meanwhile Akatsuka gave sharper estimates for the first derivative of the Riemann zeta function under the truth of the Riemann hypothesis. In this talk, we shall introduce the extension of the results of Akatsuka to the second derivative of the Riemann zeta function.

16. Takahiro Wakasa

University: Nagoya University
E-mail: d11003j@math.nagoya-u.ac.jp
Talk title: **The explicit upper bound of the multiple integral of $S(t)$ on the Riemann Hypothesis**

Abstract: We prove explicit upper bounds of the function $S_m(t)$, defined by the repeated integration of the argument of the Riemann zeta-function. The explicit upper bound of $S(t)$ and $S_1(t)$ have already been obtained by A. Fujii. Our result is a generalization of Fujii's results.