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**Membership of academic societies:**

The Mathematical Society of Japan

**Research Interest:**

- Zeta-functions,  $L$ -functions
- Multiple zeta-functions

**Research Summary:**

There are a lot of functions called zeta or  $L$ -functions, and they are important objects of research in various fields of mathematics, especially in number theory. I am interested in the behaviour of, and the mutual relations among those zeta and  $L$ -functions. Using mainly the tools of function theory, Fourier analysis and probability theory, I am studying mean values and the value-distribution of the most classical Riemann zeta and Dirichlet  $L$ -functions, Hurwitz zeta-functions, zeta-functions attached to algebraic or function fields, and  $L$ -functions attached to automorphic forms.

Generalizing the summation in the definition of zeta-functions to the multiple summation, we arrive at the notion of multiple zeta-functions. Recently the theory of multiple zeta-functions has been actively studied, and I am also interested in this direction of research. I have studied the analytic continuation, the asymptotic expansion, functional relations and functional equations for multiple zeta-functions. I defined the notion of zeta-functions of root systems, which are multi-variable generalizations of Witten zeta-functions, introduced by Witten in the study of quantum gauge theory. Recently I am studying, using the method of Lie theory, the properties of the zeta-function of each root system, and also the structure of the family of those functions.

**Major Publications:**

- [1] A. Laurinćikas and K. Matsumoto, The universality of zeta-functions attached to certain cusp forms, *Acta Arith.* **98** (2001), 345-359.
- [2] K. Matsumoto, Liftings and mean value theorems for automorphic  $L$ -functions, *Proc. London Math. Soc.*(3)**90** (2005), 297-320.
- [3] K. Matsumoto and H. Tsumura, On Witten multiple zeta-functions associated with semisimple Lie algebras I, *Ann. Inst. Fourier* **56** (2006), 1457-1504.
- [4] Y. Komori, K. Matsumoto and H. Tsumura, Shuffle products for multiple zeta values and partial fraction decompositions of zeta-functions of root systems, *Math. Z.* **268** (2011), 993-1011.
- [5] Y. Ihara and K. Matsumoto, On certain mean values and the value-distribution of logarithms of Dirichlet  $L$ -functions, *Quart. J. Math. (Oxford)* **62** (2011), 637-677.
- [6] K. Matsumoto, *The Riemann Zeta-Function* (in Japanese), Asakura Shoten, 2005.

**Awards and Prizes:**

- 2005, Algebra Prize (The Mathematical Society of Japan), “Studies on the analytic behaviour of zeta-functions”

### **Education and Appointments:**

- 1981 Graduated from Faculty of Science, University of Tokyo
- 1986 Graduated from Graduate School of Science, Rikkyo University
- 1987 Lecturer, Faculty of Education, Iwate University
- 1990 Associate Professor, Faculty of Education, Iwate University
- 1995 Associate Professor, Graduate School of Mathematics, Nagoya University
- 2001 Professor, Graduate School of Mathematics, Nagoya University

### **Message to Prospective Students:**

My seminar for the students of Master Course usually begins with the study of some standard textbook of zeta and  $L$ -functions. After getting basic knowledge and technique in this area, the students can choose his/her favorite topic and write the master thesis.

As for the students of Doctor Course, usually I just support his/her research which is chosen by his/her own interest. Therefore the students can choose any topic, though I can give substantial suggestions only in the field of zeta and  $L$ -functions.