Arithmetic Geometry, Arithmetic Differential Equations
Associate Professor Kazuaki Miyatani

Faculty of
Science and
Technology
Tokushima University

〈図表〉

Theory of complex differential equations
e.g. hypergeometric functions

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p-adic differential equations

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Arithmetic theory
e.g. hypergeometric functions over finite fields

Content:

My research field is arithmetic geometry. This is a field that investigates arithmetic properties based on ideas from various areas of mathematics, primarily complex geometry and complex analysis.

I am particularly interested in p-adic differential equations. The key ingredient is the world of ``p-adic numbers'', which serves as a bridge between the world of "characteristic 0" (i.e. adding 1 repeatedly never results in 0) and the world of "characteristic p" (i.e. adding p copies of 1 results in 0, where p is a prime number). Functions and differential equations in p-adic numbers sometimes show an interesting feature: while they look like objects in the complex number world, they also possess number-theoretic information.

I have studied general (single-variable, with an arbitrary number of parameters) hypergeometric differential equation in p-adic numbers. Then, I proved that this equation has an information of an algebraic-number-theoretic function which is called ``hypergeometric functions over finite fields''.

Currently, I am studying various objects on p-adic numbers, somehow related to hypergeometric functions, to investigate other interesting connections between complex number world and p-adic number world.

Keywords：Arithmetic geometry

E-mail: miyatani@tokushima-u.ac.jp

Tel. +81-88-656-7546

Fax:

HP : https://math.miyatani.org/