

Number Theory Day

Date: June 9, Friday, 2023

Venue: Room 638, 6 Floor, Institute of Mathematics, Academia Sinica (NTU Campus)

- 09:40-10:40 **Professor Yuk-Kam Lau** (The University of Hong Kong)
- Problems on the sign of Hecke eigenvalues of some automorphic forms
- 10:40-11:00 **Tea break**
- 11:00-12:00 **Professor Jiu-Kang Yu** (The Chinese University of Hong Kong)
- Zeta functions of locally symmetric complexes of type A
- 12:00-14:00 **Lunch break**
- 14:00-15:00 **Professor Ling Long** (Louisiana State University)
- Hypergeometric functions in number theory
- 15:00-15:20 **Tea break**
- 15:20-16:20 **Professor Yifan Yang** (National Taiwan University)
- Class number relations arising from intersections of Shimura curves and Humbert surfaces

Abstract



Talk 1

In this talk we consider the $GL(2)$ automorphic forms which are primitive holomorphic or Maass forms for congruence subgroups. These forms are eigenfunctions of Hecke operators and have real eigenvalues. We shall give an exposition on the study of the sign of these (Hecke) eigenvalues.



Talk 2

The Ihara zeta function of a finite regular graph plays a fundamental role in spectral graph theory. We will discuss higher dimensional version of this theory, generalizing the pioneering work of WC Li and MH Kang. This is a joint work with MH Kang.



Talk 3

Hypergeometric functions form an important class of special functions in mathematics and physics. Their finite field analogues can be equally explicit to compute and are useful for counting points on certain algebraic varieties. Intricately linked by group actions in the background, these two kinds of hypergeometric functions enjoy similar properties. In this talk we will discuss a few applications of hypergeometric functions in number theory.



Talk 4

In an earlier work, we obtain class number relations by considering intersections of Shimura curves and Humbert surfaces. In this talk, we will present a proof of these relations using modular forms.

Organizers: Wen-Ching Winnie Li (Pennsylvania state University)
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