

# Workshop on automorphic forms at Kumamoto (Titles and Abstracts)

## First day (January 7th)

### First talk of the morning session 10:00~11:00:

Speaker: Tadashi Ochiai (Osaka University)

Title:

Some basic problems on critical values and periods of automorphic L-functions in p-adic contexts

Abstract:

In general, according to Shimura, Deligne and some other people, critical values of automorphic L-functions are conjectured to be algebraic and are described with “periods”. In this survey talk, we give quick and rough sketch of some basic results and problems on critical values of automorphic L-function of  $GL(2)$  over number fields (or elliptic modular case) which naturally arise in the study of these special values in mod  $p$  or p-adic contexts. Some of them are quite standard problems whose formulations are already generalized (and partially solved) for more general automorphic L-functions. For some other problems it might not be clear if they can be formulated or make sense for more general automorphic L-functions other than  $GL(2)$ .

### Second talk of the morning session 11:30~12:30:

Speaker: Hidenori Katsurada (Muroran Institute of Technology)

Title:

Periods and congruences of various lifts of modular forms

Abstract:

For a cuspidal Hecke eigenform  $g$  of integral/half-integral weight for an elliptic modular group, consider a certain lift  $G$  to the space of cusp forms for some another modular group (e.g. symplectic group, unitary group etc.). Here we mean by a lift of  $g$  a Hecke eigenform whose certain L-function is expressed in terms of certain L-functions of related with  $g$ . Then we propose the following problems:

Problem A: Express the ratio  $\langle G, G \rangle / \langle g, g \rangle$  of the period (or Petersson product) of  $G$  to some power of the period of  $g$  in terms of the special values of certain L-functions related with  $g$ .

Problem B. Characterize primes giving congruence between  $G$  and another Hecke eigenform not coming from the lift in terms of the invariants in Problem A.

In the first part of this talk, we give affirmative answers to the above problems in the following case:

- (1) Problem A for the Duke-Imamoglu-Ikeda lift (joint work with H. Kawamura)
- (2) Problem B for the Duke-Imamoglu-Ikeda lift
- (3) Problem A for the Hermitian Ikeda lift.

In the second part of this talk, we give some conjectures and numerical examples in the following cases:

- (4) Problem B for the Ikeda-Miyawaki lift (joint work with T. Ibukiyama, C. Poor and D. Yuen)
- (5) Problem B for the Ibukiyama-Kim-Ramakrishnan-Shahidi lift (joint work with S. Take-mori.)

**Lunch break 12:30~14:30**

**First talk of the afternoon session 14:30~15:30:**

Speaker: Siegfried Böcherer (Universität Mannheim)

Title:

On p-adic Siegel modular forms

Abstract:

I will survey results on Siegel modular forms mod  $p$  and p-adic Siegel modular forms, mainly obtained in collaboration with S.Nagaoka. Topics include level change, congruences for weights, p-adic properties of differential operators (Theta operators) and also quasimodular forms as p-adic modular forms. We will include vector-valued modular forms whenever possible. Our point of view is classical and explicit.

**Second talk of the afternoon session 16:00~17:00:**

Speaker: Atsushi Murase (Kyoto Sangyo University)

Title:

Symmetries characterizing Borcherds lifts

Abstract:

In this talk I will give a survey on characterization of holomorphic Borcherds lifts by certain symmetries (joint work with B. Heim). I will also discuss a possible generalization of our work.

## Second day (January 8th)

### First talk of the morning session 10:00~11:00:

Speaker: Masao Tsuzuki (Sophia Univeristy)

Title:

Equidistribution of automorphic spectrum

Abstract:

In this talk, I would like to discuss equidistribution phenomenon for spectral parameters of representations arising from automorphic forms with varying weights or levels. We recall known results on equidistribution for several interesting cases, and explain its consequences on abundant existence of automorphic forms with non vanishing  $L$ -values and with other global or local constraints. If time permits, I try to convey some idea how the trace formulae or its relative analogue are used to establish such results.

### Second talk of the morning session 11:30~12:30:

Speaker: Tomoyoshi Ibukiyama (Osaka University)

Title:

Correspondence between symplectic automorphic forms

Abstract:

The following three topics on conjectures on correspondence between symplectic automorphic forms of degree two will be treated.

- (1) Compact twist and the split form.
- (2) Integral weight and half-integral weight.
- (3) Related lifting theory and open problems.