

# RESEARCH PLAN

## Background and Overview

I want to expand the theory of Shintani functions to the pair  $(G_n^J, G_n)$ . Here we denote by  $G_n^J$  the Jacobi group of index one and degree  $n$ , which is a non-reductive group, and by  $G_n = Sp_{2n}$  the symplectic group of degree  $n$ .

## Current Research Projects

### (1) Deriving explicit formulas of Shintani functions for $(G_n^J, G_n)$ .

In general, local Shintani functions are defined by using an intertwining operator from the tensor product of irreducible representations of two *reductive* groups  $H_0 \subset H$  to the trivial representation of  $H_0$ . First I'll expand the definition of local Shintani functions to non-reductive groups. Next I'll construct Shintani functions for  $(G_n^J, G_n)$  by using Poisson integrals, and will derive an explicit formula of the Shintani functions. I'll study Shintani functions associated with unramified principal series representations and discrete series representations at finite place and real place, respectively.

### (2) Formulating a zeta integral of Murase–Sugano type for $(G_n^J, G_n)$ .

I'll formulate a global zeta integral of Murase–Sugano type and will attempt to prove basic identity. It is able to expect that the global integral relates to local integral having Shintani functions as integrands by the basic identity. I'll compute the local integral by using the explicit formulas of Shintani functions and will consider a relation between the local integral and an automorphic local  $L$ -factor.

### (3) Liftings for $G_n^J$ .

This will be joint work with Atsushi Murase. We will study theta lifts for  $O_{2,1} \times G_n^J$  and  $O_{3,2} \times G_n^J$ . In 2021, we reformulated Shintani liftings, which are mappings from elliptic modular forms of integral weight to Jacobi forms of index one and integral weight, as theta lifts of  $O_{2,1} \times G_1^J$  and proved norm formulas for Shintani lifts. In the future, we will attempt to generalize our results for theta lifts for  $O_{2,1} \times G_1^J$ .