

Research results

I research into the topology and geometry of symplectic quotients for a direct product of coadjoint orbits of a compact simple Lie group. These quotient spaces are called *multiplicity varieties*, which are related to representation theory. In particular, quotient spaces by the maximal torus of a Lie group are called *multiple weight varieties*.

The following are my research results.

1. Explicit formulas for the symplectic volume of multiplicity varieties.

This research is a joint work with Professor Tatsuru Takakura (Chuo University).

The symplectic volume of a multiplicity variety coincides with the asymptotic dimension of the invariant subspace in a tensor product of irreducible representations.

Using the representation theory of Lie groups and Lie algebras, we gave two explicit formulas (finite sum formula and infinite sum formula) for the symplectic volume of multiplicity varieties associated with the special unitary group of degree three, and any compact simple Lie groups under the assumption that all highest weights are regular ([1], [2]).

2. An explicit formula for the symplectic volume of double weight varieties associated with the special unitary group of degree three.

The symplectic volume of a multiple weight variety coincides with the asymptotic behavior of the weight multiplicity in the weight decomposition of a tensor product of irreducible representations.

I gave an explicit formula for the symplectic volume of double weight varieties, which are symplectic torus quotients of two coadjoint orbits, associated with the special unitary group of degree three. Furthermore, in some typical cases, I classified double weight varieties and concretely expressed the symplectic volume of them ([3], [4]).