

A GEOMETRIC REALIZATION OF DEGENERATE PRINCIPAL SERIES REPRESENTATIONS OF SYMPLECTIC GROUPS

DO NGOC DIEP AND TRUONG CHI TRUNG

ABSTRACT. The multidimensional quantization procedure, proposed by the first author and its modifications (reduction to radicals and lifting on $U(1)$ -coverings) give us a almost universal theoretical tools to find irreducible representations of Lie groups. By using this method and the root theory, we realize in this paper the representations of the degenerate principal series of symplectic groups.

1. INTRODUCTION

Let us consider a Lie group G and its Lie algebra $\mathfrak{g}$. The group G acts on its Lie algebra $\mathfrak{g}$ by adjoint representation Ad and in the dual vector space $\mathfrak{g}^*$ by coadjoint action $K := coAd$. The vector space $\mathfrak{g}^*$ is therefore divided into the disjoint union of coadjoint orbits (or K -orbits). Each coadjoint orbit $\Omega \in \mathfrak{g}^*/G$ admits a natural G -homogeneous symplectic structure, corresponding to the Kirillov form B_Ω associated with the bilinear form

$$B_F(X, Y) := \langle F, [X, Y] \rangle,$$

where $F \in \mathfrak{g}^*$, the kernel $\ker B_F$ of which is just isomorphic to the Lie algebra $\mathfrak{g}_F := \text{Lie } G_F$ of the stabilizer G_F of a fixed point $F \in \Omega$. Therefore, the triple (Ω, B_Ω, G) is a homogeneous symplectic manifold (Hamiltonian system) with a flat action, i.e.,

$$\{f_X, f_Y\} = f_{[X, Y]}, \forall X, Y \in \mathfrak{g},$$

where f_X is such a function that $df_X = -\iota(\xi_X)B_\Omega$ and

$$\xi_X(m) := \frac{d}{dt}\bigg|_{t=0} \exp(tX)m,$$

see [1] of G . Following the well known classification theorem of A. Kirillov-B. Kostant-Souriaux, every homogeneous symplectic manifold with a flat action of G is locally diffeomorphic to a coadjoint orbit of G or its central extension $\tilde{G}$ by $\mathbb{R}$.

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The Degenerate Principal Series For Sp_{2n}

**Masanobu Kaneko, Siegfried
Bocherer, Tomoyoshi
Ibukiyama, Fumihiko Sato**

The Degenerate Principal Series For Sp_{2n} :

The Degenerate Principal Series for Sp_{2N} , 1981 Degenerate Principal Series for Symplectic and Odd-Orthogonal Groups Chris Jantzen, 1996-01-01 This memoir studies reducibility in a certain class of induced representations for and where p is adic. In particular it is concerned with representations obtained by inducing a one dimensional representation from a maximal parabolic subgroup. i.e. degenerate principal series representations. Using the Jacquet module techniques of Tadi the reducibility points for such representations are determined. When reducible the composition series is described giving Langlands data and Jacquet modules for the irreducible composition factors. **Degenerate Principal Series for**

Symplectic Groups Chris Jantzen, 1993 This paper is concerned with induced representations for p -adic groups. In particular Jantzen examines the question of reducibility in the case where the inducing subgroup is a maximal parabolic subgroup of Sp_{2n} . F and the inducing representation is one dimensional. Two different approaches to this problem are used. The first based on the work of Casselman and of Gustafson reduces the problem to the corresponding question about an associated finite dimensional representation of a certain Hecke algebra. The second approach is based on a technique of Tadi and involves an analysis of Jacquet modules. This is used to obtain a more general result on induced representations which may be used to deal with the problem when the inducing representation satisfies a regularity condition. The same basic argument is also applied in a case by case fashion to nonregular cases. *Eisenstein Series and Applications* Wee Teck Gan, Stephen S.

Kudla, Yuri Tschinkel, 2007-12-22 Eisenstein series are an essential ingredient in the spectral theory of automorphic forms and an important tool in the theory of L functions. They have also been exploited extensively by number theorists for many arithmetic purposes. Bringing together contributions from areas which do not usually interact with each other this volume introduces diverse users of Eisenstein series to a variety of important applications. With this juxtaposition of perspectives the reader obtains deeper insights into the arithmetic of Eisenstein series. The central theme of the exposition focuses on the common structural properties of Eisenstein series occurring in many related applications. **Automorphic Forms and**

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Automorphic Forms on Quaternion Algebras and Central L-values Taliesin Sutton, 2006

Modular Forms and Special Cycles on Shimura Curves. (AM-161) Stephen S. Kudla, Michael Rapoport, Tonghai Yang, 2006-04-24 Modular Forms and Special Cycles on Shimura Curves is a thorough study of the generating functions constructed from special cycles both divisors and zero cycles on the arithmetic surface M attached to a Shimura curve M over the field of rational numbers These generating functions are shown to be the q expansions of modular forms and Siegel modular forms of genus two respectively valued in the Gillet Soul arithmetic Chow groups of M The two types of generating functions are related via an arithmetic inner product formula In addition an analogue of the classical Siegel Weil formula identifies the generating function for zero cycles as the central derivative of a Siegel Eisenstein series As an application an arithmetic analogue of the Shimura Waldspurger correspondence is constructed carrying holomorphic cusp forms of weight 3 to classes in the Mordell Weil group of M In certain cases the nonvanishing of this correspondence is related to the central derivative of the standard L function for a modular form of weight 2 These results depend on a novel mixture of modular forms and arithmetic geometry and should provide a paradigm for further investigations The proofs involve a wide range of techniques including arithmetic intersection theory the arithmetic adjunction formula representation densities of quadratic forms deformation theory of p divisible groups p adic uniformization the Weil representation the local and global theta correspondence and the doubling integral representation of L functions

Automorphic Forms And Zeta Functions - Proceedings Of The Conference In Memory Of Tsuneo Arakawa Masanobu Kaneko, Siegfried Bocherer, Tomoyoshi Ibukiyama, Fumihito Sato, 2006-01-03 This volume contains a valuable collection of articles presented at a conference on Automorphic Forms and Zeta Functions in memory of Tsuneo Arakawa an eminent researcher in modular forms in several variables and zeta functions The book begins with a review of his works followed by 16 articles by experts in the fields

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Casimir Force, Casimir Operators, and the Riemann Hypothesis Gerrit van Dijk, Masato Wakayama, 2010 The series is aimed specifically at publishing peer reviewed reviews and contributions presented at workshops and conferences Each volume is associated with a particular conference symposium or workshop These events cover various topics within pure and applied mathematics and provide up to date coverage of new developments methods and applications

Pacific Journal of Mathematics, 2001

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