

第 1 回 GCOE レクチャーズ
グローバル COE プログラム「数学新展開の研究教育拠点」

- DATE AND PLACE 1. October 14 (Tue), 2008, 15:00–16:00, Room 118
2. October 15 (Wed), 2008, 15:00–16:00, Room 122
3. October 16 (Thu), 2008, 15:00–16:00, Room 123
4. October 17 (Fri), 2008, 15:00–16:00, Room 118
5. October 27 (Mon), 2008, 16:30–17:30, Room 128
Graduate School of Mathematical Sciences, the University of Tokyo
- SPEAKER **Professor Dr. Joachim Hilgert** (Paderborn University)
- TITLE Holomorphic extensions of unitary representations
- ABSTRACT 大学院生・若手研究者を対象とした連続講義です。
- 1 講目 Overview and Examples
In this lecture we present the Gelfand–Gindikin program of decomposing L^2 -spaces into families of irreducible representations using complex geometry. We then briefly outline results due to Olshanski, Hilgert–Ólafsson–Ørsted, Hilgert–Neeb–Ørsted, Krötz–Stanton and others in this direction. In particular, we will explain holomorphic extensions of holomorphic discrete series representations and their relation to Hardy and weighted Bergman spaces.
- 2 講目 Geometric Background
In this lecture we will explain the complex geometry needed to understand the phenomena described in the first lecture. The key words here are Olshanski semigroups, invariant cones in Lie algebras, Akhiezer–Gindikin domain, and coadjoint orbits of convex type.
- 3 講目 Highest weight representations
In this lecture we explain the extension results in a little more detail and explain how they lead to geometric realizations of singular highest weight representations on nilpotent coadjoint orbits.
- 4 講目 Applications and open problems
In this lecture we present further applications of the given extension results and describe some open problems. In particular, we will mention estimates for automorphic forms (Krötz–Stanton), random matrices (Huckleberry–Püttmann–Zirnbauer), unitarizability of highest weight representation with non-scalar lowest K-type, and infinite dimensional groups.
- 5 講目 Holomorphic extensions of highest weight representations to Olshanskii semigroups
In this lecture I will present a proof of Olshanskii’s Theorem, which says that for a simple group of Hermitean type unitarizable highest weight representations can be holomorphically extended to contractive representations of a complex semigroup containing the group in its boundary.

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<http://www.ms.u-tokyo.ac.jp/~toshi/seminar/ut-seminar.html>