

Lie Group and Representation Theory Seminar

Date: April 16 (Fri), 2004, 10:30–11:30

Place: RIMS 402

Speaker: Adam Koranyi (CUNY, USA)

Title: A SIMPLE DESCRIPTION OF THE SYMMETRIC SPACES OF RANK ONE

Abstract:

These are the hyperbolic spaces over R, C, H, O , the corresponding four projective spaces, and the sphere. It is usually difficult to make computations in them because O is hard to handle; the alternative way, using the structure theory of semisimple Lie groups, is also relatively complicated. Here a direct description of these spaces will be given, in which everything is fairly easily computable.

A Euclidean space Z determines a Clifford algebra $\text{Clif}(Z)$. We write $C = R1 + Z$ and define a C -module as a Euclidean space X with an orthogonal action of $\text{Clif}(Z)$, such that for every non-zero x in X , Cx is an invariant subspace. Then the unit ball in $X + C$ can be made in a natural way into a hyperbolic space; a certain compactification of $X + C$ gives the projective spaces and the sphere (which appears as a degenerate projective space). One can work with these without using any classification. One can also study “ C -lines” and the collineation groups of the projective spaces.

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