Lie Group and Representation Theory Seminar

Title: On the support of the Plancherel measure

Date: February 14 (Wed) 10:00–11:30

Place: 005 RIMS, Kyoto University （いつもと部屋が違います）

Speaker: Joseph Bernstein (Tel Aviv)

Abstract.

In 1970-s Harish Chandra finished his work on harmonic analysis on real reductive groups G. In particular, he proved the Plancherel formula for G which describes the decomposition of the regular representation of G as an integral of irreducible unitary representations of the group $G \times G$ (Plancherel decomposition).

The remarkable feature of this formula was the fact that only some of the unitary representations of the group G contributed to this formula (so called **tempered** representations).

In fact this phenomenon was already known in PDE. Namely in this case it was known that one can describe the spectral decomposition of an elliptic self-adjoint differential operator D in terms of eigenfunctions which have moderate growth (i.e. they almost lie in L^2). The general result of this sort was proven by Gelfand and Kostyuchenko in 1955.

In my paper "On the support of Plancherel measure" (1988) I have applied the ideas of Gelfand and Kostyuchenko and gave an a priori proof of the fact that only tempered representations contribute to the Plancherel decomposition.

Moreover, I have shown that a similar statement holds for decompositions of $L^2(X)$ for a large class of homogeneous G-spaces X.

Examples are:

(i) $X = G/K$, where K is the maximal compact subgroup

(ii) more generally, $X = G/H$, where H is a symmetric subgroup (subgroup of fixed points of some involution of G);

(iii) $X = G/\Gamma$, where Γ is a discrete lattice in G.

(iv) G a reductive p-adic group, $X = G/H$, where H is either an open compact subgroup or a symmetric subgroup.

I have discovered that the corresponding statement depends on some geometric structure on the space X (I called it "the structure of large scale space") and that this structure has the same properties in all the cases listed above.

In my lecture I will discuss all these questions.

いつもと部屋・場所が違うのでご注意ください

Organizer: Toshiyuki Kobayashi
http://www.kurims.kyoto-u.ac.jp/~toshi/