Lie Group and Representation Theory Seminar

Date: November 28 (Fri) , 2003, 15:00–16:00
Place: RIMS 402
Speaker: Jorge Vargas (FAMAF, Argentine)
Title: Restriction of Discrete Series representations, continuity of the Berezin transform

Abstract:
Let G be a connected semisimple matrix Lie group. We fix a connected reductive subgroup H of G and a maximal compact subgroup K of G such that $H \cap K$ is a maximal compact subgroup of H. We assume that the group G has a nonempty Discrete Series. Let (π, V) be a square integrable irreducible representation of G, and let (τ, W) be its lowest $K-$type. Let $E := G \times_K W \longrightarrow G/K$ be the $G-$homogeneous, Hermitian, smooth vector bundle attached to the representation τ. After the work of Hotta and other authors, we may and will realize V as an eigenspace of the Casimir operator acting on $L^2(E)$. Since the Casimir operator is an elliptic operator, the elements of V are smooth sections. Let $F := H \times_{H \cap K} W \longrightarrow H/H \cap K$. Because of our setting, F is a subbundle of E and we may restrict the elements of V to smooth sections of F. We denote the resulting linear transformation from V into the space of smooth sections of F by r. In this talk we will show that the image of r consist of L^2-sections of F, the (2,2)-continuity of r, as well as the (2,2)-continuity of Berezin transform, $rr^\star$. We also analyze $(p, p)-$continuity of the Berezin transform. Later on, we will suppose (G, H) is a generalized symmetric pair. We write, $\mathfrak{g} = \mathfrak{k} \oplus \mathfrak{s} = \mathfrak{h} \oplus \mathfrak{q}$. For each nonnegative integer m, let $S^m(\mathfrak{q} \cap \mathfrak{s})$ denote the $m^{th}-$symmetric power of $\mathfrak{q} \cap \mathfrak{s}$. Thus, $S^m(\mathfrak{q} \cap \mathfrak{s}) \otimes W$ is an $H \cap K-$module. A basic idea in branching theory is to consider normal derivatives corresponding to the immersion $H/H \cap K \to G/K$. Using this we may show that if (ρ, Z) is an $H-$irreducible discrete factor of (π, V). Then, there exists $m \geq 0$ and an injective, continuous, linear $H-$map from V into $L^2(H \times_{H \cap K} (S^m(\mathfrak{s} \cap \mathfrak{q}) \otimes W))$. That is, the discrete spectrum of the restriction of π to H, up to multiplicities, is contained in the discrete spectrum of $L^2(H \times_{H \cap K} (S(\mathfrak{s} \cap \mathfrak{q}) \otimes W))$. The above facts together with some consequences are joint work with Bent Ørsted.

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