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Resonances for the Laplacian on Riemannian symmetric spaces

Abstract:

Let Δ be the Laplacian on a Riemannian symmetric space $X = G/K$ of the noncompact type and let $\sigma(\Delta) \subseteq \mathbb{C}$ denote its spectrum. The resolvent $(\Delta - z)^{-1}$ is a holomorphic function on $\mathbb{C} \setminus \sigma(\Delta)$, with values in the space of bounded operators on $L^2(X)$. Surprisingly, if we view it as a function with values in $\text{Hom}(C_c^\infty(X), C_c^\infty(X)^*)$, then it often admits a meromorphic continuation beyond $\mathbb{C} \setminus \sigma(\Delta)$. We study this meromorphic continuation as a map defined on a Riemann surface above $\mathbb{C} \setminus \sigma(\Delta)$. The poles of the meromorphically extended resolvent are called resonances. The image of the residue operator at a resonance is a G -module. The main problems are the existence and the localization of the resonances as well as the study of the (spherical) representations of G so obtained.

This talk is based on joint works with Joachim Hilgert and Tomasz Przebinda.