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On the Decomposition of $L^2(\Gamma \setminus G)$ in the Cocompact Case

Let G be a semisimple Lie group with a finite center and finitely many connected components. For example, G could be a group of $\mathbb{R}$–points of a semisimple Zariski connected algebraic group defined over $\mathbb{Q}$. Let Γ be a discrete cocompact subgroup of G. Using the spectral decomposition of compactly supported Poincaré series we discuss the existence of various types of irreducible unitary subrepresentations of $L^2(\Gamma \setminus G)$.

Keywords: Poincare series, cocompact quotients.

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