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Goal: we will describe a sum formula of Kuznetsov type, in the context of G an \mathbb{R} -rank one Lie group and Γ a (non cocompact) lattice in G , together with applications to the estimation of generalized Kloosterman sums. In particular, we shall give generalizations of Linnik estimates in this context.

Introduction

Let $G = SL(2, \mathbb{R})$, $\Gamma = SL(2, \mathbb{Z})$, $H =$ upper half plane. Have

$$L^2(\Gamma \backslash H) = L^2_{\text{disc}}(\Gamma \backslash H) \oplus L^2_{\text{cont}}(\Gamma \backslash H)$$

$$L^2_{\text{disc}}(\Gamma \backslash H) = \bigoplus_{j \geq 1} \mathbb{C} \Psi_j$$

$$\Delta \Psi_j = \left(\frac{1}{4} - \nu_j^2\right) \Psi_j \quad \text{with } \nu_j \in i\mathbb{R} \cup (0, \frac{1}{2}]$$

Kuznetsov (+ Bruuggeman) (~1978) derived a sum formula of the following form: