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An Explicit Plancherel Formula for Line Bundles over the One-Sheeted Hyperboloid

We consider $G = \text{SL}(2, \mathbb{R})$ and $H$ the subgroup of diagonal matrices. Then $X = G/H$ is a unimodular homogeneous space which can be identified with the one-sheeted hyperboloid. For each unitary character $\chi$ of $H$ we decompose the induced representations $\text{Ind}_{H}^{G}(\chi)$ into irreducible unitary representations, known as a Plancherel formula. This is done by studying explicit intertwining operators between $\text{Ind}_{H}^{G}(\chi)$ and principal series representations of $G$. These operators depends holomorphically on the induction parameters.

**Keywords:** Plancherel formula, SL(2,R), intertwining operator, Fourier-Jacobi transform, direct integral.

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