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

We consider $G = \mathrm{SL}(2, \mathbb{R})$ 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 χ of H we decompose the induced representations $\mathrm{Ind}_H^G(\chi)$ into irreducible unitary representations, known as a Plancherel formula. This is done by studying explicit intertwining operators between $\mathrm{Ind}_H^G(\chi)$ and principal series representations of G . These operators depends holomorphically on the induction parameters.

Keywords: Plancherel formula, $\mathrm{SL}(2, \mathbb{R})$, intertwining operator, Fourier-Jacobi transform, direct integral.

MSC: 22E45