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**Local Coefficient Matrices of Metaplectic Groups**

The principal series representations of the  $n$ -fold metaplectic covers of the general linear group  $\mathrm{GL}_r(\mathbb{F})$  were described in the foundational paper “Metaplectic Forms,” by Kazhdan and Patterson (1984). In this paper, we study the local coefficient matrices for a certain class of principal series representations over  $\mathrm{GL}_2(\mathbb{F})$ , where  $\mathbb{F}$  is a nonarchimedean local field. The local coefficient matrices can be described in terms of the intertwining operators and Whittaker functionals associated to such representations in a standard way. We characterize the nonsingularity of local coefficient matrices in terms of the nonvanishing of certain local  $\zeta$ -functions by computing the determinant of the local coefficient matrices explicitly. Using these results, it can be shown that for any divisor  $d$  of  $n$ , the irreducibility of the given principal series representation on the  $n$ -fold metaplectic cover of  $\mathrm{GL}_2(\mathbb{F})$  is intimately related to the irreducibility of its  $d$ -fold counterpart.

**Keywords:** Principal series, automorphic forms, Shimura’s correspondence.

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