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EICHLER CLASSES ATTACHED TO AUTOMORPHIC FORMS OF DIMENSION —1

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1. Introduction

In his work [1], Eichler discussed a relation between the automorphic forms of dimension $-2k$ (k is an integer and >1) for a fuchsian group Γ and the cohomology groups of Γ with certain modules of polynomials as coefficients, where the cocycles appeared as the periods of 'the generalized abelian integrals' attached to the automorphic forms. Gunning [2] gave a more general form of this relation.

The purpose of the present paper is to give an analogous relation in the case of automorphic forms of dimension -1 for a fuchsian group and give an application to Selberg's eigenspace [3].

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2. The eigenspaec $\mathfrak{M}\left(1, -\frac{3}{2}\right)$

Let

$$S = \{z = x+iy;\ x, y \text{ real and } \ y>0\}$$

denote the complex upper half-plane and let $G=SL(2, \boldsymbol{R})$ be the real special linear group of the second degree. Consider direct products

$$\tilde{S} = S\times \boldsymbol{R}/(2\pi)\,,$$
$$\tilde{G} = G\times \boldsymbol{R}/(2\pi)\,,$$

where $\boldsymbol{R}/(2\pi)$ denotes the real torus, and let an element (σ, θ) of $\tilde{G}$ operate on $\tilde{S}$ as follows:

$$\tilde{S}\ni(z, \phi) \to (z, \phi)(\sigma, \theta) = \left(\frac{az+b}{cz+d}, \phi+\arg(cz+d)+\theta\right)\in\tilde{S}\,,$$

where $\sigma=\begin{pmatrix} a & b \\ c & d\end{pmatrix}\in G$. The operation of $\tilde{G}$ on $\tilde{S}$ is transitive. $\tilde{S}$ is a