Cohomology of Complex Torus Bundles Associated to Cocycles

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Abstract. Equivariant holomorphic maps of Hermitian symmetric domains into Siegel upper half spaces can be used to construct families of abelian varieties parametrized by locally symmetric spaces, which can be regarded as complex torus bundles over the parameter spaces. We extend the construction of such torus bundles using 2-cocycles of discrete subgroups of the semisimple Lie groups associated to the given symmetric domains and investigate some of their properties. In particular, we determine their cohomology along the fibers.