The function epsilon for complex Tori and Riemann surfaces

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Abstract

In the framework of the quantization of Kähler manifolds carried out in [3], [4], [5] and [6], one can define a smooth function, called the function *epsilon*, which is the central object of the theory. The first explicit calculation of this function can be found in [10].

In this paper we calculate the function *epsilon* in the case of the complex tori and the Riemann surfaces.

1 Introduction

A quantization of a Kähler manifold (M, ω) is a pair (L, h), where L is a holomorphic line bundle over M and h is a hermitian structure on L such that $\mathrm{curv}(L, h) = -2\pi i\omega$. The curvature $\mathrm{curv}(L, h)$ is calculated with respect to the *Chern connection*, i.e. the unique connection compatible with both the holomorphic and the hermitian structure. Not all manifolds admit such a pair. In terms of cohomology classes, a Kähler manifold admits a quantization if and only if the form ω is integral [7], i.e. its cohomology class $[\omega]_{dR}$ in the de Rham group, is in the image of the natural map $H^2(M, \mathbb{Z}) \hookrightarrow H^2(M, \mathbb{C})$. In particular, when M is compact, the integrality of ω implies, by a well-known theorem of Kodaira, that M is a projective algebraic manifold.

In the framework of the quantization of a Kähler manifold (M, ω) one can define a smooth function $\epsilon_{(L,h)}$ on M, depending on the pair (L, h), which is the central object of the theory and which is one of the main ingredients needed to apply a procedure

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