TAU-FUNCTIONS ON SPACES OF ABELIAN DIFFERENTIALS AND HIGHER GENUS GENERALIZATIONS OF RAY-SINGER FORMULA

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Abstract

Let w be an Abelian differential on a compact Riemann surface of genus $g \geq 1$. Then $|w|^2$ defines a flat metric with conical singularities and trivial holonomy on the Riemann surface. We obtain an explicit holomorphic factorization formula for the ζ-regularized determinant of the Laplacian in the metric $|w|^2$, generalizing the classical Ray-Singer result in $g = 1$.

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