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Higher analytic torsion forms for direct images and anomaly formulas. (English)

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J. Algebr. Geom. 1, No. 4, 647-684 (1992).

The authors construct analytic torsion forms associated to Kähler fibrations and establish corresponding anomaly formulas. In §1, one recalls results concerning the Levi-Civita superconnections and Kähler fibrations. In §2, one proves variation formulas for the Levi-Civita superconnection and the corresponding heat kernel supertraces in terms of the (1,1)-form ω of the Kähler fibration. In §3, one constructs analytic torsion forms $T(\omega, h^\xi)$ associated to Kähler fibrations for nonacyclic complexes, whose cohomology groups form a vector bundle on the base. The main result, Theorem 3.10, describes the dependence of $T(\omega, h^\xi)$ on ω and h^ξ . As a corollary, one proves in Theorem 3.11 that the class of $T(\omega, h^\xi)$ (modulo ∂ and $\bar{\partial}$ coboundaries) only depends on the natural holomorphic and metric data of the problem. These anomaly formulas make these analytic torsion forms “natural” in Arakelov arithmetic geometry.

Reviewer: [Vasile Brînzănescu \(București\)](#)

MSC:

[32L05](#) Holomorphic bundles and generalizations
[14G40](#) Arithmetic varieties and schemes; Arakelov theory; heights
[53C05](#) Connections (general theory)

Cited in **8** Reviews
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[analytic torsion forms](#); [Kähler fibrations](#); [anomaly](#); [superconnections](#)