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The Analysis of Elliptic Families

II. Dirac Operators, Êta Invariants, and the Holonomy Theorem

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Abstract. In this paper we specialize the results obtained in [BF 1] to the case of a family of Dirac operators. We first calculate the curvature of the unitary connection on the determinant bundle which we introduced in [BF 1].

We also calculate the odd Chern forms of Quillen for a family of self-adjoint Dirac operators and give a simple proof of certain results of Atiyah-Patodi-Singer on êta invariants.

We finally give a heat equation proof of the holonomy theorem, in the form suggested by Witten [W 1, 2].

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