

COMPLEX TOPOLOGICAL INVARIANTS OF THREE-HYPERBOLIC MANIFOLDS

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ABSTRACT. We derive invariants associated with compact real three-dimensional hyperbolic manifolds which can be combined to form a component of Thurston complex invariant. Explicit formulas for the Chern-Simons invariant of irreducible $U(n)$ -flat connections on hyperbolic fibered manifolds are obtained. We discuss supersymmetry surviving for supergravity solutions involving real hyperbolic factors, and briefly review the determinant line bundle with its connection to the eta invariant, the global anomaly formula, and the vanishing theorems for type $(0, q)$ cohomology of locally symmetric spaces.

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1. INTRODUCTION

In this paper we give an expository overview of various topological invariants associated to the Dirac operator, notably the eta invariant, and their relation to the Chern-Simons functional. In an introductory part we comment on the possible role these invariants might play in three-dimensional quantum gravity, though this part of the paper is mainly concerned with a

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