COMPLEX TOPOLOGICAL INVARIANTS OF
THREE–HYPERBOLIC MANIFOLDS

M.C.B. ABDALLA
INSTITUTO DE FÍSICA TEÓRICA, UNIVERSIDADE ESTADUAL PAULISTA,
RUA PAMPLONA 145, 01405-900 - SÃO PAULO, SP, BRAZIL
MABDALLA@IFT.UNESP.BR

A.A. BYTSENKO
DEPARTAMENTO DE FÍSICA, UNIVERSIDADE ESTADUAL DE LONDRINA,
CAIXA POSTAL 6001, LONDRINA-PARANÁ, BRAZIL
ABYTS@UEL.BR

M.E.X. GUIMARÃES
DEPARTAMENTO DE MATEMÁTICA, UNIVERSIDADE DE BRASÍLIA,
70910-900, BRASÍLIA, DF, BRAZIL
MARG@UNB.BR

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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 hy-
perbolic 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 invari-
ants associated to the Dirac operator, notably the eta invariant, and their
relation to the Chern-Simons functional. In a introductionary part we com-
ment on the possible role these invariants might play in three-dimensional
quantum gravity, though this part of the paper is mainly concerned with a