

INTEGRAL INVARIANTS OF 3-MANIFOLDS. II

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Abstract

This note is a sequel to our earlier paper of the same title [4] and describes invariants of rational homology 3-spheres associated to acyclic orthogonal local systems. Our work is in the spirit of the Axelrod–Singer papers [1], generalizes some of their results, and furnishes a new setting for the purely topological implications of their work.

1. Introduction

This note is an addendum to our earlier paper of the same title [4]. Our aim here will be to construct invariants for framed 3-dimensional homology spheres (M, f) , associated to an acyclic orthogonal local system E on M .

Like in our earlier note, we follow the guidelines of the Axelrod–Singer paper [1] on the asymptotics of the Chern–Simons theory, and we have again put aside the physics inspired aspects of the subject, concentrating our efforts on the construction of potential configuration-space integral invariants of (M, f) . More precisely we are seeking invariants that depend on the diffeomorphism type of M and the *homotopy class* of the framing f .

For simplicity we assume throughout that M is a connected, oriented 3-dimensional homology sphere so that—up to conjugacy—local systems over M are classified by representations of $\pi_1(M; p)$ where p is some fixed point in M .

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