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TOPOLOGY PROCEEDINGS

Volume 46, 2015

Pages 309–322

http://topology.nipissingu.ca/tp/

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Electronically published on October 13, 2014

Topology Proceedings

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E-mail:	topolog@auburn.edu
ISSN:	0146-4124

http://topology.auburn.edu/tp/
http://topology.nipissingu.ca/tp/

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Volume 46 (2015)
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POLYNOMIAL SPLITTINGS OF OZSVÁTH AND SZABÓ'S d-INVARIANT

YUANYUAN BAO

Abstract. For any rational homology 3-sphere and one of its spin^c-structures, Peter Ozsváth and Zoltán Szabó defined a topological invariant, called d-invariant. Given a knot in the 3-sphere, the d-invariants associated with the prime-power-fold branched covers of the knot obstruct the smooth sliceness of the knot. These invariants bear some structural resemblances to Casson-Gordon invariants, which obstruct the topological sliceness of a knot. Se-Goo Kim found a polynomial splitting property for Casson-Gordon invariants. In this paper, we show a similar result for Ozsváth and Szabó's d-invariants. We give an application of the result.

1. Introduction

We work in the smooth category, and all manifolds are supposed to be smooth unless stated otherwise. An oriented knot K in the 3-sphere S^3 is said to be *slice* if there is a smoothly embedded 2-disk Δ in the 4-ball B^4 satisfying $\partial(B^4, \Delta) = (S^3, K)$. Here Δ is called a *slice disk* of K. A pair of knots K_1 and K_2 are said to be *smoothly concordant* (denoted by $K_1 \sim K_2$) if $K_1 \sharp (-K_2)$ is slice where $-K_2$ is the mirror image of K_2 with reversed orientation. Smooth concordance is an equivalence relation among knots and the set of equivalence classes becomes an abelian group under the operation of connected sum. The group is called the knot

2010 *Mathematics Subject Classification.* Primary 57M27, 57M25.

Key words and phrases. Alexander polynomial, knot concordance, Ozsváth and Szabó's d-invariant.

The author was supported by Grant-in-Aid for JSPS Fellows and by Platform for Dynamic Approaches to Living System from the Ministry of Education, Culture, Sports, Science and Technology, Japan.