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学位論文題名	On the twisted Alexander polynomials for some hyperbolic knots いくつかの双曲結び目のねじれアレキサンダー多項式について（英文）
論文審査委員	主査　教授　　横田　佳之 委員　教授　　相馬　輝彦 委員　准教授　赤穂　まなぶ

【論文の内容の要旨】

The twisted Alexander polynomial is a generalization of the classical “Alexander polynomial”, and is defined for a fundamental group of the knot complement and its representation. This invariant defined for knots by Lin [1] and defined for finitely presentable groups by Wada [2]. In particular, Wada showed that the twisted Alexander polynomials distinguish Kinoshita-Terasaka knot and Conway’s 11 crossing knots, whose Alexander polynomials are trivial.

If a knot is hyperbolic, i.e. the knot complement admits a complete hyperbolic metric of finite volume, there is a canonical representation, called “holonomy representation”. In such a case, Dunfield, Friedl, and Jackson conjectured that their genus and fiberedness are determined by the twisted Alexander polynomial associated to their holonomy representation [3].

In this thesis, we compute the twisted Alexander polynomials of all Montesinos knots with tunnel number one which contains (-2, 3, 2n+1)-pretzel knots and two-bridge knots. As a corollary of our computation, we obtain some new supporting evidence of the conjecture above.

Another application of the twisted Alexander polynomial is the relations to the hyperbolic volume. It is known that hyperbolic volume of the knot complement is related to a higher dimensional Reidemeister torsion of a knot [4], and that the twisted Alexander polynomial can be regarded as a Reidemeister torsion [5]. Recently,　Goda

gave a formula of the hyperbolic volume using the twisted Alexander polynomial [6]. Furthermore, Park gave a generalization of the formula of the volume with higher dimensional Reidemeister torsion and conjectured that complex volume are obtained by complexification of his results [7].

In this paper, we consider the complexification of Goda's formula. That is, for hyperbolic knots up to 6 crossings, we observe the asymptotic behavior of the twisted Alexander polynomials associated to n-dimensional representations obtained from the holonomy representation for large n.

Reference

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