My results

Yasuyoshi Tsutsumi

In 1985, A. Casson defined an invariant λ for oriented integral homology 3-spheres. The Casson invariant is an integer valued invariant. The cyclic covering space of 3-sphere branched over a knot is difficult to calculate the Casson invariant. In [1], I compute the Casson invariant of the cyclic covering space of 3-sphere branched over some satellite knot. I consider the following the satellite knot. Let V be the standard solid torus in 3-sphere. Let K(p,2) be the (p,2)-torus knot in V such that K(p,2) meets a meridian disk D of V in two points with the winding number zero and the 2-string tangle obtained by cutting along D is a Conway's tangle. Let C be a 2-bridge knot and let K(p, C) be the satellite knot whose companion is C and pattern is (V, K(p,2)), and let M(r; p, C) be the r-fold cyclic covering of 3-sphere branched over K(p, C). I show how to obtain a surgery description of M(r; p, C) and I show main theorem of [1] by using Hoste's formula. From these results I can also show that λ (M(r; p, C)) is not equal to 0.

K. Walker extended the Casson invariant to rational homology 3-spheres. C. Lescop extended the Casson-Walker invariant to any closed 3-manifold. The cyclic covering space of 3-sphere branched over a knot is difficult to calculate the Casson-Walker-Lescop invariant. In [2], I compute the Casson-Walker-Lescop invariant of the cyclic covering space of 3-sphere branched over a 2-bridge knot. I show main theorem of [2] by using Lescop's formula.