Research program

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The following researches are projected.

• A list of the $(n, 1)$-cable versions of the Γ-polynomials of prime knots with up to 10 crossings for $n \geq 3$

Since a study of the cable version of the Γ-polynomial is unexplored, it is important to summarize basic information. Therefore, I will make a list of the $(n, 1)$-cable versions of the Γ-polynomials of prime knots with up to 10 crossings for $n \geq 3$. (For $n = 1, 2$, I have already made such a list.)

• Can the (p, q)-cable version of the Γ-polynomial distinguish a mutant knot pair for $p \geq 4$?

As I mentioned in Research results, for $p = 1, 2, 3$, the (p, q)-cable version of the Γ-polynomial is invariant under mutation. Therefore, I will study the (p, q)-cable versions of the Γ-polynomials of mutant knots for $p \geq 4$.

• Can the Γ-polynomials of knots be characterized by using knots with clasp number at most two?

Kawauchi showed that the Γ-polynomials of knots are characterized by using knots with unknotting number one. Moreover, Fujii showed that the Γ-polynomials of knots are characterized by using 2-bridge knots with unknotting number one. One of my interests is whether the Γ-polynomials of knots can be characterized by using knots with clasp number at most two.

• The arc indices of cable knots and Kanenobu knots
(This is a joint work with Hwa Jeong Lee.)

It is known that the arc index of an alternating knot is equal to the crossing number plus two. Since cable knots and Kanenobu knots contain infinitely many non-alternating knots, it is important to determine the arc indices of them. In the case of cable knots, we gave sharper upper bounds of the arc indices of cable knots and determined the arc indices of the $(2, q)$-cable knots of prime knots with up to 8 crossings. In the case of the Kanenobu knots, we calculated the Kauffman polynomials of the Kanenobu knots and determined the arc indices of infinitely many Kanenobu knots. These works are now in progress.