Research program

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The following researches are projected.

• Cabling for the Γ and Jones polynomials
I will study the problem "Which is strong, cabling of the Γ-polynomial or cabling of the Jones polynomial?"

• The (p, q)-cabling of the Γ-polynomial for sufficiently large p
Considering the (p, q)-cabling of the Γ-polynomial for sufficiently large p, I will study whether we can obtain geometric information of knots like the volume conjecture.

• Kawauchi's conjecture
Let K, K' be knots. If $\Gamma_{p/q}(K) = \Gamma_{p/q}(K')$ for any coprime integers $p(> 0)$ and q, then $P(K) = P(K')$ and $F(K) = F(K')$, where $\Gamma_{p/q}$ is the (p, q)-cabling of the Γ-polynomial, P is the HOMFLYPT polynomial and F is the Kauffman polynomial.

• Cabling of the first coefficient HOMFLYPT polynomial for mutant knots
It was shown that cabling of the zeroth coefficient HOMFLYPT polynomial, that is, the Γ-polynomial is invariant under mutation by Tetsuya Ito. Our interest is the case of cabling of the first coefficient HOMFLYPT polynomial.

• Relation between the Γ-polynomial, its $(2, 1)$-cabling, HOMFLYPT and Kauffman polynomials
We have already shown that there exist infinitely many knots with the trivial $(2, 1)$-cabling of the Γ-polynomial and the knots have the trivial Γ-polynomial and the trivial first coefficient HOMFLYPT and Kauffman polynomials. I consider whether any knot with the trivial $(2, 1)$-cabling of the Γ-polynomial has the trivial Γ-polynomial and the trivial first coefficient HOMFLYPT and Kauffman polynomials.

• Characterization of the Γ-polynomials of knots by using knots with clasp number at most two
It is known that the Γ-polynomials of knots are characterized by using 2-bridge knots with unknotting number one. I consider whether the Γ-polynomials of knots can be characterized by using knots with clasp number at most two.

• Clasp-pass moves of type X and the Γ-polynomial for knots
It is known that the Γ-polynomial is invariant under clasp-pass moves of type X. I consider whether $\Gamma(K) = \Gamma(K') \Rightarrow K \sim_{CPX} K'$.

• Minimal grid diagrams and minimal closed braid diagrams
(Joint work with Hwa Jeong Lee)
Every knot has minimal grid diagrams. We consider whether there always exists a minimal grid diagram which presents a minimal closed braid diagram.

• 4-move for cable knots
(Joint work with Hwa Jeong Lee)
Our purpose is to deform the $(2, 1)$-cable knots of knots up to ten crossings into the unknot by 4-moves.