Plan of Research

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Properties of constituent split links of a handlebody-knot

We have shown the uniqueness of the Alexander polynomial of constituent split links of a handlebody-knot. A natural question is whether the group of constituent split links of a handlebody-knot is uniquely determined, or whether the constituent split link of a handlebody-knot is uniquely determined.

If the constituent split link $L = K_1 \cup K_2$ of a handlebody-knot is uniquely determined, then is the handcuff graph $\Gamma = L \cup c = K_1 \cup K_2 \cup c$ of a handlebody-knot uniquely determined ? If the handcuff graph Γ is uniquely determined, then we consider Γ as the standard form of a handlebody-knot with a constituent split link, and the problem of classification of handlebody-knots is reduced to classification of Γ.

If the constituent split link of a handlebody-knot is not uniquely determined, then the set of all constituent split links is an invariant of the handlebody-knot. Among the constituent links of a handlebody-knot, the constituent split link is easy to calculate, so we would like to investigate how strong an invariant it is.

A lower bound for the crossing number of a handlebody-knot

We have a lower bound for the crossing number of constituent links of a handlebody-knot. To prove this, we use a property of a C-complex of a constituent link of a handlebody-knot. We introduced a C-complex of a handlebody-knot. I would like to consider a lower bound for crossing number of a handlebody-knot as an analogy.

Alexander ideal of a handlebody-knot

We introduced the graph G_H as an invariant of handlebody-knot H derived from the Alexander polynomial. There is infinite many handlebody-knots whose Alexander polynomial is trivial and whose Alexander ideal is non-trivial. I would like to expand the invariant G_H by using the Alexander ideal of a handlebody-knot.