Research Plan

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1 Enumeration and classification of ribbon 2-knots

We continue to enumerate and classify ribbon 2-knots.

(i) We enumerate and classify the ribbon 2-knots of 1-fusion with length up to 7.

(ii) We enumerate and classify the ribbon 2-knots with ribbon crossing number 5. In this family there exist ribbon 2-knots of 2-fusion. So, we might need some new technique to classify them.

2 Classification of ribbon knots with symmetric union presentations

The symmetric union introduced by Kinoshita and Terasaka and its generalization is a well-known method to construct a ribbon knot. Lamm gives many examples of symmetric unions and asks whether every ribbon knot is a symmetric union representation. Besides this, Eisermann and Lamm introduced a notion of symmetric equivalence among symmetric union diagrams. We would like to consider a classification of knots presented as symmetric union. We can find several examples sharing the same polynomial invariants such as the Alexander, Conway, Jones, HOMFLYPT, Q, or Kauffman polynomials. For a particular family of knots we have difficulty in classifying them.