## Plans of my research

**1.** We would like to prove the additivity of the 3-dimensional clasp numbers. This question may lead us to the additivity of the unknotting numbers. Let $K$ be a knot, $c(K)$ the clasp number, and $g(K)$ the genus. If we restrict the case $c(K) = g(K)$, then the additivity of the clasp numbers holds by the additivity of the genera. To extend the case, we may have to use the theory of the minimal genus Seifert surface by D. Gabai.

**2.** We conjectured the clasp number of the two bridge knots. We obtained a partial answer. To prove the conjecture, the theory of the minimal genus Seifert surface may be able to apply.

**3.** The theory of pv-link may have applications to the 2-dimensional hyperbolic geometry. For example, constructing a method how to determine whether a loop on a compact surface is essential or not.

**4.** We investigated the virtual crossimg number of 2-component pv-link with the supporting genus 1. We determined the virtual crossing number for some class which is an infinite set. We would like to extend the class.

**5.** What does it mean that the difference between the ordinary Arf invariant and the new Arf invariant in "Proper link, algebraically split link and Arf invariant"? The question may lead us to determination whether an algebraically split link is a boundary link or not.

**6.** In "Component-isotopy of Seifert complexes", we showed the fundamental moves for C-complexes. We would like to consider how is the case of R-complexes. This may lead us to the slice-ribbon conjecture.

**7.** A. Kawauchi proposed how to arrange orientable closed 3-manifolds on the Euclidean lattice. The applicant pointed out that it is significant to consider the 3-manifolds which are 0-surgeries along the torus links.