My results

1. "Seifert complex for links and 2-variable Alexander matrices" :

Seifert complex is a union of Seifert surfaces of each component of a link. When intersections among Seifert surfaces are clasp singularities, we define it *C-complex.* We gave the characterization of the Alexander matrices for 2-component links by using 2-component C-complexces. By using the result, we reproved the Torres formula, and the Bailey-Nakanishi theorem which is the characterization of the Alexander polynomials for 2-component links with the linking number zero.

2. "Proper link, algebraically split link and Arf invariant" (joint work with A. Yasuhara) :

We defined the new Arf invariant for algebraically split links by using an R-complex. I contributed to show the invariant is well-defined. Our new Arf invariant is defined for a pair of an algebraically split link and its R-complex F, and satisfies the additivity for components.

3. "Component-isotopy of Seifert complexes" :

D. Cooper showed the fundamental moves of 2-component C-complexes. We generalized his result to the case of n-component C-complexes by adding one fundamental move. We also proved this new move cannot be removed by showing an example which are two C-complexes for the Borromean rings. The fundamental moves of singular Seifert surfaces can be obtained by the similar way.

4. "Detecting non-triviality of virtual links":

We consider the non-triviality of virtual links by using the *supporting genus* which is the minimal genus of a surface-realization of a virtual link diagram. A virtual link has the underlying *projected virtual link* (pv-link) which is obtained by identifying positive crossings and negative crossings. We gave an algorithm to obtain the supporting genus of a pv-link. By using the algorithm, we proved the virtual knot, which had been outstanding whether it is trivial or not, has the supporting genus 2. (*i.e.* non-trivial) We pointed out that there is a relation between the Virtual Knot Theory and the 2-dimensional hyperbolic geometry. In the other paper, we consider the connected sum of pv-links.

5. "On the additivity of 3-dimensional clasp numbers":

Let K be a knot in the 3-sphere. The *clasp number* $c(K)$ of K is the minimal number of clasps on clasp disks spanning K. We consider a question "Let K_1 and K_2 be knots. Then $c(K_1 \sharp K_2) = c(K_1) + c(K_2)$?" It had been proved that the question is affirmative if $c(K_1 \sharp K_2) \leq 3$. We proved that the case of $c(K_1 \sharp K_2) \leq 5$ is affirmative. In the other paper, we showed a table of the clasp number for prime knots with crossing number at most 10.

6. "Reidemeister torsion of homology lens spaces":

V. Turaev gave a method how to compute the Reidemeister torsion of compact 3-manifolds. By using the result, we gave a necessary condition for a homology lens space, which is the result of a rational surgery along a knot in a homology 3-sphere, to be a lens space, and investigated particularly the case of torus knot, genus g knot, and $(-2, m, n)$-pretzel knot.