

Reserch results

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In the master course, I mainly reserched on orientable closed surface and its mapping class group. Mapping class group is a quotient group consisiting of equivalence classes of self-diffeomorphisms of the closed surface mudulo isotopy. I studied that it is finitely generated by the isotopy classed called Dehn twists and moreover, it is finitely presented. These reserch was fulfilled by Lickorish, Birman, Wajjnryb and so on. On the other hand, by the fact that the element of the mapping class group determines the homeomorphic classes in constructing 3-manifold by Dehn surgery, the mapping class group plays an essential role in low dimensional topology as well as the related areas in mathematics, for example, in complex analysis. I submitted a part of these results as my master thesis in Osaka-city university in 2003.(cf. paper list[1])

In the doctor course, I have reserched on the spin structure of the orientable closed surface and diffeomorphisms of mapping classes leaving the given spin structure invariant. Generally speaking, some manifolds with some conditions of fiber bundles over the manifold admit some spin structures. Especially, when the manifold is a closed orientable surfaces, they can always given spin structures. Moreover, the set of all spin structures on a surface and the set of all quadratic forms, which is a map defined on the mod 2-first homology group of an orientable surface corresponds $1 : 1$. And it is known that the mapping classes preserving the given spin structure form a subgroup of the mapping class group, and it is called spin mapping class group by Harer. I'm interested in the "homology version" of the spin mapping class group, and I call this group "the spin-preserving symplectic group" in the paper[2] listed in the "paper list". To sum up, my major reserch object is the automorphisms over the first mod 2-homology group induced by the self-diffeomorphisms preserving the given spin structure. It is already known that the group of automorphisms induced by the self-diffeomorphisms is isomorphic to the mod 2-symplectic group. In [2], I deterimined the spin-preserving symplectic group in the case of the genus of the surface less than two and described some appliations to the surface-konts(to be submitted soon). The reserch is still continued.