Reserch results

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I have mainly reserched on orientable closed surface and its mapping class group, and the spin structure.
Mapping class group is a quotient group consisiting of equivalence classes of self-diffeomorphisms of the closed surface mudulo isotopy, which is finitely generated by the isotopy classed called Dehn twists and moreover, it is finitely presented. By the fact that the elements of the mapping class group determines the homeomorphic classes in constructing 3-manifold by Dehn surgery, and the Heegaard splittings, 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.

We can define spin structures on closed orientable manifolds iff the second Stifel-Whitney class of its tangent bundle vanishes. Especially, it is always passible to define spin structures on maifolds whose dimensions are less than three. In addition, the set of spin structures of the closed orientable surfaces and the set of quadratic forms are equivalent as affine spaces on mapping class group. Such isotopy classes that fixes given quadratic form=spin structure form a subgroup of the mapping class group, and called spin mapping class group by J. Harer.

In the paper [2], [3], I reserched the homology version of the spin mapping class group, i.e., the automorphisms of the mod two first homology group of the surface indued by the elements of the spin mapping class group. I named this group "the spin-preserving symplectic group" in the paper, and gave a presentation of them in the case of the genus of the surface less than two. In additon, I define a surface-knot invariant coming from this group, and showed some examples of computations when the surface-knots are quitely specific.