Reserch plan

Kawami Masahiro

What I keep on reserching is that the "homology version" of the spin mapping class group which I mentioned in the "reserch results". I call this group "the spin-preserving symplectic group" in the paper [2] listed in the "paper list", and its some applications to the surface knot theory. I consider my current reserch plan as follows.

[Reserch Task1]

The concrete determination of the spin-preserving symplectic group. As I desribed in the paper[2] listed in the "paper list", in the case of the genus of the surface less than two, I fulfilled the determination of spin-preserving symplectic group. I aim to deterimine this group in the case of the general genus.

[Reserch Task2]

As I desribed in the paper[2] listed in the "paper list", spin-preserving symplectic group have some applications to the surface-knots(which is the smoothly embedded surfaces in the 4-sphere). That is, when we give the canonical quadratic form called the Rochlin quadratic form on the surface, and give the spin structure corresponding to it. In this situation, we embedd this spin surface in the 4-sphere nontrivially(in other words, we embed the surface so that it does not bound the handlebody in the 4-sphere). Then we consider the auomorphsims of the mod 2-first homology group induced by the self-diffeomorphisms preserving the spin structure. We find that these automorphisms is isomorphic to the subgroup of the spin-preserving symplectic group, and consulting my previous results, it is easy to detect such a group. Converseley, we can ask which subgroup can "realize" the concrete surface-knot. For example, the spin-preserving symplectic group of the 4-dimensional spun trefoil, which is a surface-kont obtained by rotating the trefoil knot along the fixed axis in the 3-sphere, is the trivial group. I try to find other realizable examples and the categorifiacation of the surface-knots constructed by these examples are my reserch tasks in the near future.