Reserch plan

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[Reserch Task1]　The determination of the spin-preserving symplectic groups and its applications

The determination of the spin-preserving symplectic groups, as I desribed in the paper[2], [3] in the paper list, has been successful only in the case of the genus less than two. I want to give the presentations for the general genus. And I aim to solve the realization problem, that is, which surface-knots have the spin-preserving symplectic groups. I want to compute the group for the twist-spun knots and the ribbon knots, etc. The categorifiacation of the surface-knots family classified by the groups will be my second task.

[Reserch Task2]　　The generalization of the idea of spin structures on low-dimentional manifolds (especially closed surfaces)

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. However, there are some manifolds, like the complex projective plane, which admit no spin structures. I think it may be possible to define the counterpart of the spin structure on non-orientable manifolds. Montesions showed : For the two dimensional torus, its spin mapping class group, and the group consisting of the isotopy classes extendable to the self-diffeomorphisms of the four-sphere, are equal as subgroups of the mapping class group. Hirose extended this result for higher genus. These facts originally stem from the fact that the set of spin structures of the closed orientable surfaces and the set of quadratic forms have 1 : 1 correspondence. From these, can we define some "good mappings" on the mod two first homology group of the non-orientable surfaces? In addition, I conjecture : The subgroup of the mapping class group of the non-orientable surfaces, which consisits of the isotopy classes extenedable to the self-diffeomorphisms of the complex projective plane is equal to the subgroup of the mapping class group of a non-orientable surface consisting of isotopy classes fixing the "good mapping".