Research Plan

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I would like to keep to study the transformation group theory form the topological view point. I have some research plans. However, in this paper, I only mention what I research now.

I defined some $2n$ valent GKM graph with legs Γ and now I study "Wright down a structure of a graph cohomology ring $H_T^*(\Gamma)$ from combinatorial view point". This Γ is a GKM graph correspondes to a $4n$ dimensional manifold which has some $n+1$ dimensional torus T action.

A motivation of this research is Harada-Holm showed the equivariant cohomology rings of hyper toric manifolds $H_T^*(M)$ are denoted by combinatorial information. They showed $H_T^*(M)$ is isomorphic to the ring which is defined by the information of the interesection of half spaces induced from a hyper toric. Our defined class contains their cases. Moreover our class contains $\mathbf{H}P^n$. From this fact we may get a very interesting class. In 1995 R.Scott tried to consturct a quaternionic version of toric manifolds by making use of the research of Davis-Januszkiewics (the small cover which is a real version of toric manifolds that is the n dimensional manifold which has $\mathbf{Z}_2^n$-action is studied). However, his constructed manifold (contains $\mathbf{H}P^n$) does not have $Sp(1)^n$-action in general. It is difficult to say his manifold is a quaternionic version of a toric manifold from the transformation group theory. Therefore if we answer the question "When does the restricted T^n-action extend to an $Sp(1)^n$-action?", we will be able to define the class of the quaternonic version of toric manifold. Moreover I except that the condition of extendable is denoted by the words of graphs. I think these research has values to study from these aspects. First I would like to solve these questions.