

## Research plan

I will study representations on cohomology rings of toric manifolds. At first I will study the cohomology representation of the toric manifold associated to type B root system. The Weyl group of type B root system is a signed symmetric group. In the case of type A Procesi initiated the study and described the cohomology representation. He used two facts; one is a one-to-one correspondence between the set of irreducible representations of a symmetric group which is the Weyl group of type A root system and the set of Young diagrams and the other is the fact that the toric manifold (permutohedral variety) associated to type A root system is obtained by blowing-up a complex projective space several times. The cohomology representations in the cases of other types are not known. To describe the cohomology representation associated to type B root system I need to study irreducible representations of the Weyl group (signed symmetric group). It is known that there is a one-to-one correspondence between the set of irreducible representations of a signed symmetric group and the set of star diagrams which are ordered sets of several Young diagrams. Moreover it is also known that the toric manifold associated to type B root system is obtained by blowing-up product of copies of complex projective space of complex dimension 1. The goal is to describe the cohomology representation associated to type B root system in terms of star diagrams by using the argument of Procesi.

I will study the cohomology representations of the real toric manifolds associated to type B root system. In the case of type A Henderson described representations, however, representations in the cases of other types are not studied. The representation associated to type A real toric manifold can be described in a neater way than the that associated to type A toric manifold. I think the representation associated to type B real toric manifold can be also described in a neater way than that associated to type B toric manifold.

I will study the cohomology representation of (real) toric manifolds associated to other root systems.

I study the  $\text{Aut}(G)$ -representation on the cohomology ring of the toric manifold associated to a simple graph  $G$ . I will study the cohomology representation associated to a cycle graph again. I described the cohomology representations associated to cycle graphs with 3, 4, and 5 nodes, but I could not describe the cohomology representations associated to cycle graphs with more than 5 nodes. I will consider the cohomology representation by using the representation on the equivariant cohomology ring.