

Chiral equivariant cohomology

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Abstract

In this talk, I will describe a new equivariant cohomology theory for any smooth manifold equipped with a compact Lie group action, which takes values in a vertex algebra and contains the classical equivariant cohomology as a subalgebra. The main idea is to synthesize the algebraic approach to the classical equivariant cohomology theory due to H. Cartan and Guillemin-Sternberg, with the chiral de Rham complex of Malikov-Schechtman-Vaintrob, by using a vertex algebra notion of invariant theory. We also construct the vertex algebra analogues of the Mathai-Quillen isomorphism, the Weil and the Cartan models for equivariant cohomology, and the Chern-Weil map. It turns out that there are interesting cohomology classes in the new theory that have no classical analogues. This is a joint work with Bong H. Lian.