
W -algebras and Whittaker coinvariants

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The (finite) W -algebra $U(\mathfrak{g}, e)$ associated to a reductive Lie (super)algebra \mathfrak{g} and nilpotent element e in \mathfrak{g} is obtained from $U(\mathfrak{g})$ by a certain quantum Hamiltonian reduction. The Whittaker invariants functor and the Whittaker coinvariants functor are two important functors relating the representation theory of $U(\mathfrak{g})$ and the representation theory of $U(\mathfrak{g}, e)$. Whilst the Whittaker invariants induces an equivalence of categories from a category of generalized Whittaker modules, the Whittaker coinvariants functor is not fully understood in general. In this talk I will explain some recent results on the representation theory of W -algebras and the Whittaker coinvariants functor. This will cover joint work with Brown and Brundan, and with Arakawa.