Universal vertex algebras beyond the W_{\infty}-algebras

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1. Abstract

The principal W-algebras W^k(sl_n), as well as the cosets Com(V^k(gl_n), V^k(sl_{n+1})) for n \geq 2, are all quotients of a universal 2-parameter vertex operator algebra (VOA) which is freely generated of type W(2,3,4,...). This VOA admits many other interesting 1-parameter quotients which can be identified (up to an extra Heisenberg field) with the Gaiotto-Rapcak Y-algebras. We consider a similar construction in type C, namely, the cosets Com(V^k(sp_{2n}), V^k(sp_{2n+2})), for n \geq 2. This gives rise to a 2-parameter VOA which is freely generated of type W(1^3, 2, 3^3, 4, \dots), which we expect to be the universal VOA of this type. The universal algebra admits 8 infinite families of 1-parameter quotients, which are analogues of the Gaiotto-Rapcak Y-algebras. Assuming that the universal algebra has exactly two parameters, which is ongoing work to prove, we present some applications including new rationality results for W-(super)algebras. This is a joint work with Thomas Creutzig and Vlad Kovalchuk.