

REPRESENTATIONS OF SUPERCONFORMAL ALGEBRAS. GRADED MODULES VERSUS CONFORMAL MODULES

Consuelo Martínez

Department of Mathematics. University of Oviedo, Spain
cmartinez@uniovi.es

Abstract. If F is an algebraically closed field of zero characteristic, a graded simple Lie superalgebra $L = \sum_{i \in \mathbb{Z}} L_i$ is called superconformal if dimensions of the homogeneous components are uniformly bounded from above and L_0 contains Virasoro. V. Kac and van de Leur conjectured that $W(1, n)$ (the superalgebra of superderivations of polynomials in one even Laurent variable and n odd Grassman variables) plus its Cartan subsuperalgebras plus an exceptional superalgebra called Cheng-Kac superalgebra (see [2]), give all possible superconformal algebras. The conjecture has been proved only in case that the Lie superalgebra comes, via the Tits-Kantor-Koecher construction, from a Jordan superalgebra (see [3]).

Recently, conformal modules have been classified in a series of papers see ([2,4]). In particular we have classified finite type conformal modules over the Cheng Kac superalgebra, $CK(6)$ (see [6]). Here we will speak of some connections about graded modules over superconformal algebras and conformal modules over the linked conformal superalgebras (see [7] and [8]) that show that they are "essentially" the same.

References

- [1] S. Cheng and V.G. Kac, Conformal modules, *Asian J. Math* **1**, 181-193, (1997). Erratum: 2 ,153-156, (1998).
- [2] S. Cheng and V.G. Kac, A new $N = 6$ superconformal algebra, *Comm. Math. Phys.* **186** no. 1, 219-231, (1997).
- [3] V.G. Kac, C. Martínez and E. Zelmanov, Graded simple Jordan superalgebras of growth one, *Memoirs of the AMS* **150**, 140pp.,(2001).
- [4] C. Martínez and E. Zelmanov, Irreducible representations of the exceptional Cheng-Kac Superalgebra, *Transactions of the AMS.* **366** n. 11, 5853-5876 , (2014).
- [5] C. Martínez and E. Zelmanov, Graded modules over superconformal algebras. *Non-associative and non-commutative algebra and operator theory*, 4153, *Springer Proc. Math. Stat.* , **160**, Springer, Cham, (2016).
- [6] C. Martínez and E. Zelmanov, Bracket, Superalgebras and Spectral Gap *Preprint*.