Neveu–Schwarz–Ramond singular vectors from Uglov polynomials

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In this work, we study $\mathcal{N} = 1$ super analogue of the Virasoro algebra. This algebra has two sectors: Neveu–Schwarz and Ramond, we will abbreviate it to NSR algebra. It was conjectured in [1] that after certain special bosonization the singular vectors in NS sector are identified with Uglov symmetric functions with rectangular Young diagram. Uglov symmetric functions [2] are defined as limit of Macdonald polynomials when q, t goes to root of unity, in the conjecture [1] the limit $q, t \to -1$ appears. We extend this conjecture to R sector and prove it in both sectors. The idea of the proof is to use result [3] on singular vectors for deformed Virasoro algebra and then take the limit. We show that in the $q, t \to -1$ limit of the generating current $T(z)$ of q-Virasoro algebra one gets the NSR algebra with an additional fermion.

[1] Belavin A A, Bershtein M A and Tarnopolsky G M 2013 *J. High Energy Phys.* **2013** 35

[2] Uglov D 1998 *Commun. Math. Phys.* **191** 663–696

[3] Shiraishi J, Kubo H, Awata H and Odake S 1996 *Lett. Math. Phys.* **38** 33–51