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Principal Subspaces for Double Yangian $DY(\mathfrak{sl}_2)$

We consider the realization of level 1 infinite-dimensional modules for the double Yangian $DY(\mathfrak{sl}_2)$ found by K. Iohara. We use the corresponding vertex operators to generate a family of nonlocal h -vertex algebras W_N , $N \in \mathbb{Z}_{\geq 0}$. Finally, we construct combinatorial bases of W_N and establish a connection with the sum side of the Rogers-Ramanujan identity.

Keywords: Combinatorial basis, double Yangian, principal subspace, quantum vertex algebra.

MSC: 17B37, 17B69