

Supersymmetric Yangian, DIM algebra, and AGT relation

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ABSTRACT: The affine Yangian of \mathfrak{gl}_1 is known to be isomorphic to $\mathcal{W}_{1+\infty}$, the W -algebra that characterizes the bosonic higher spin – CFT duality. In this paper we propose defining relations of the Yangian that is relevant for the $\mathcal{N} = 2$ superconformal version of $\mathcal{W}_{1+\infty}$. Our construction is based on the observation that the $\mathcal{N} = 2$ superconformal $\mathcal{W}_{1+\infty}$ algebra contains two commuting bosonic $\mathcal{W}_{1+\infty}$ algebras, and that the additional generators transform in bi-minimal representations with respect to these two algebras. The corresponding affine Yangian can therefore be built up from two affine Yangians of \mathfrak{gl}_1 by adding in generators that transform appropriately. Besides, we will discuss other quantum algebras like Ding-Iohara-Miki algebra involved in AGT relation.