

# Yangian Double of Strange Lie Superalgebra $Q_n$ and its Central Extension: Basic results and formulas for Universal R-matrix

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The Yangian  $Y(Q_n)$  of strange Lie superalgebra of  $Q_n$  type, its quantum double  $DY(Q_n)$  and the central extension of quantum double are described as a results of quantization of twisted current Lie superbialgebras of polynomial currents, of Laurant currents and its central extension, correspondingly. Two systems of generators and defining relations for Yangian are introduced. Equivalence of this systems of generators and defining relations is proved. PBW theorem is formulated and proved. The double of Yangian and its central extension are described in terms of generators and defining relations. Formulas for universal R-matrix for double of Yangian and its central extension are computed.

It is well-known that Lie superalgebras of classical type divided on two classes: basic and strange Lie superalgebras (see [6]). The Lie superalgebras from first class have characteristics like as simple Lie algebras. They have a nondegenerate invariant bilinear form (and nontrivial Casimir operator). This characteristic make possible to define Yangian of basic Lie superalgebra as Yangian of simple Lie algebra as a quantization of current Lie biosuperalgebra. I recall, that the notion of Yangian of a simple Lie algebra  $g$  was introduced in ([1]) as a deformation of the universal enveloping algebra  $U(g[t])$  of a current algebra  $g[t]$  and it can be extended on the case of a basic Lie superalgebras type (see, for example, [2], [3]). But strange Lie superalgebras  $P_n, Q_n$  havn't natural bisuperalgebra structure. But, sometimes, such structure can be defined onto the twisted current superalgebra. This fact was received in [4]), where  $Y(Q_n)$  was defined using RTF (Reshetikhin-Faddeev-Takhtadjan) formalism (see also [5]). We define here  $Y(Q_n)$  using Drinfel'd approach. We also define the quantum double of  $Y(Q_n)$  and its central extension. The main goal of this article is to compute

a multiplicative formula of universal  $R$ -matrix for Yangian double and its central extension. Such formula for Yangian Double of simple Lie algebra  $\mathfrak{sl}(2)$  was computed in [7] and in the case of  $DY(A(m,n))$  in the [3].

## References

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