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Review: Quantization of Hamiltonian-type Lie Algebras

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Let $\Gamma$ be a nondegenerate additive subgroup of $\mathbb{F}^{2n}$ and pick an $\mathbb{F}$-basis $\varepsilon_1, \ldots, \varepsilon_{2n}$ for $\mathbb{F}^{2n}$ from $\Gamma$. Set $\sigma_i = \varepsilon_i + \varepsilon_i$ for $1 \leq i \leq n$. The Hamiltonian Lie algebra $H$ is defined to be the quotient $\overline{H}/\mathbb{F} \cdot 1$, where $\overline{H}$ is the Lie algebra spanned by the set $\{t^\alpha | \alpha \in \Gamma\}$ with the product

$$[t^\alpha, t^\beta] = \sum_{i=1}^{n} (\alpha_i \beta_{n+i} - \beta_i \alpha_{n+i}) t^{\alpha+\beta-\sigma_i},$$

for $\alpha, \beta \in \Gamma$.

Hamiltonian Lie algebras were defined in [X. P. Xu, J. Algebra 224 (2000), no. 1, 23–58; MR1736692 (2001b:17021)] as generalizations of simple Lie algebras of Cartan type. The Lie bialgebra structures on such Lie algebras were classified in [B. Xin, G. A. Song and Y. C. Su, Sci. China Ser. A 50 (2007), no. 9, 1267–1279; MR2370614 (2008j:17042)]. In the paper under review the authors quantize these structures. In particular they explicitly write down the coproduct and the antipode of the quantized enveloping algebras associated with a given Drinfel’d twist element. The proof consists of six pages of involved computations organized into five lemmas.

Reviewed by Gizem Karaali

References


*Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.*

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