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Quantum Duality Principle for Quantum Continuous Kac-Moody Algebras

For the quantized universal enveloping algebra $U_\hbar(\mathfrak{g}_X)$ associated with a continuous Kac-Moody algebra $\mathfrak{g}_X$ as in [A. Appel, F. Sala, *Quantization of continuum Kac-Moody algebras*, Pure Appl. Math. Q. **16** (2020), 439–493], we prove that a suitable formulation of the *Quantum Duality Principle* holds true, both in a "formal" version – i.e., applying to the original definition of $U_\hbar(\mathfrak{g}_X)$ as a *formal* QUEA over $\Bbbk[[\hbar]]$ – and in a "polynomial" one – i.e., for a suitable polynomial form of $U_\hbar(\mathfrak{g}_X)$ over $\Bbbk\big[q, q^{-1}\big]$. In both cases, the QDP states that a suitable Hopf subalgebra of the given quantization of the Lie bialgebra $\mathfrak{g}_X$ is in fact a suitable quantization (in formal or in polynomial sense) of a connected Poisson group G_X^* dual to $\mathfrak{g}_X$.

Keywords: Continuous Kac-Moody algebras, continuous quantum groups, quantization of Lie bialgebras, quantization of Poisson groups.

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