
Hopf25

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The Poisson-Fourier transform

While the quantization of Lie bialgebras is well understood, the problem of quantizing a given Poisson–Lie group into a locally compact quantum group remains very difficult. An interesting contrast emerges in the duality theories associated with these objects: Lie bialgebras admit a well-behaved duality that persists after quantization, whereas the Poisson-dual of a Poisson–Lie group is only characterized by its Lie algebra and is thus not unique. This raises the question of how Poisson-duality interacts with quantization.

In several examples, we identified a Fourier transform between dual Poisson–Lie groups which implements this duality after quantization. We call it the Poisson–Fourier transform. It provides a more robust interpretation of Poisson-duality and demonstrates that the connected and simply connected dual is not always the most natural choice. Remarkably it also allows us to explicitly reconstruct all the operators related to the quantum groups, including the Haar weights. This suggests we could use these ideas in future works to construct new locally compact quantum groups.

In this talk we will look at some examples of this phenomenon and outline a potential framework for formalizing the Poisson–Fourier transform. Joint work with P. Bieliavsky.