

Unitary bicocycles.

Robin Hudson

Nottingham, Great Britain, R.Hudson@lboro.ac.uk

The double product $\Pi(1 + dr)$ with

$$dr = dA^\dagger \otimes dA - dA \otimes dA^\dagger$$

has been constructed as the second quantisation of a double product of infinitesimal rotations which can be evaluated explicitly, by interpreting dr as an angular momentum [1,2].

In this talk we describe a similar construction for the case when

$$dr = dA^\dagger \otimes dA^\dagger - dA \otimes dA - \frac{1}{2}dt \otimes dt$$

as unitary implementors of Bogolubov transformations which are explicit double products of infinitesimal pseudo-rotations but which are not themselves unitary.

Quantum stochastic double product integrals were developed originally as algebraic objects consisting of formal power series, to provide a method of constructing quantum groups [3]. It is hoped that the present analytic theory will find applications in quantum generalisations of the Black-Scholes model in mathematical finance, in random matrix theory, and in theories of quantum evolutions in a random environment.

References

- [1] R L Hudson, A double dilation constructed from a double product of rotations, *Markov Processes and Related Fields* 13 (2006), 169-190.
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- [3] R L Hudson and S Pulmannova, Double product integrals and Enriquez quantisation of Lie bialgebras II: the quantum Yang Baxter equation, *Letters in Mathematical Physics* 72 (2005), 211-224.