

Probabilistic Operator Algebra Seminar

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Title: *Stochastic integration with respect to the q -Brownian motion*

The q -Brownian motion ($q \in [0, 1)$) is a family of non-commutative processes (that is, paths with values in a non-commutative probability space) providing us with a natural interpolation between the free Brownian motion ($q = 0$) and the classical Brownian motion ($q \rightarrow 1$).

We will discuss about a possible approach, inspired by Lyons' theory of rough paths, to *stochastic integration with respect to the q -Brownian motion*. The method offers a new perspective on the pioneering Itô-type constructions of Biane, Speicher and Donati-Martin, as well as additional robust continuity properties.

The resulting constructions allow us in particular to reinforce the link between free and classical stochastic calculus.

References

- [1] P. Biane and R. Speicher: Stochastic calculus with respect to free Brownian motion and analysis on Wigner space. *Probab. Theory Related Fields* 112 (1998), no. 3, 373-409.
- [2] A. Deya and R. Schott: On the rough paths approach to non-commutative stochastic calculus. *J. Funct. Anal.* 265 (2013), no. 4, 594-628.
- [3] A. Deya and R. Schott: On stochastic calculus with respect to q -Brownian motion. *J. Funct. Anal.* 274 (2018), no. 4, 1047-1075.
- [4] A. Deya and R. Schott: Integration with respect to the non-commutative fractional Brownian motion. *Bernoulli* 25 (2019), no. 3, 2137-2162.