2ÈME JOURNÉE

PROBABILITÉS QUANTIQUES

BESANÇON-GREIFSWALD

5 FÉVRIER 2016 À BESANCCON

Programme

- **9:30 - 10:20** Malte Gerhold : Coalgebra Subproduct Systems
- **10:20 - 10:40** Café
- **10:40 - 11:30** Jean-Christophe Bourin : Some matrix inequalities
- **11:30 - 13:30** Déjeuner
- **13:30 - 14:20** Yulia Kuznetsova : Quantum semigroups generated by locally compact semigroups
- **14:20 - 14:40** Café
- **14:50 - 15:40** Martin Lindsay : Elementary evolutions and Itô algebra for quantum stochastic analysis

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Les exposés auront lieu dans la salle 316Bbis du Bâtiment Métrologie, Campus Bouloie.

Abstracts

Jean-Christophe Bourin (University of Franche-Comté): Some matrix inequalities.

Malte Gerhold (Greifswald University): Coalgebra Subproduct Systems. One way to construct subproduct systems is to start with a convolution semigroup of positive sesquilinear forms on a fixed coalgebra, define Hilbert spaces by separation and completion (GNS-construction) with respect to the positive sesquilinear forms and take the maps induced by comultiplication as coassociative coisometries. We call a subproduct system which arises in this way a coalgebra subproduct system, and show that the product system generated by a coalgebra subproduct system is always Fock (type I). Joint work with Michael Skeide.

Yulia Kuznetsova (University of Franche-Comté): Quantum semigroups generated by locally compact semigroups. Group C^*-algebras of locally compact groups are one of main tools of their study and provide in particular classical examples of quantum groups. It is natural to suppose that semigroups algebras would give rise to quantum semigroups.

The situation is however nontrivial: a natural semigroup algebra might be noncommutative even for a commutative semigroup. Moreover, the quantum semigroups that we construct are co-commutative but are not duals of functions algebras on the semigroup.

To specify these statements, let S be a subsemigroup of a locally compact group G, such that $S^{-1}S = G$. We consider the C^*-algebra $C^*_\delta(S)$ generated by the operators of translation by all elements of S in $L^2(S)$. We show that this algebra admits a comultiplication which turns it into a compact quantum semigroup, cocommutative but not commutative even for $S = \mathbb{R}_+$. For S with nonempty interior, this comultiplication can be extended to the von Neumann algebra $VN(S)$ generated by $C^*_\delta(S)$.

Martin Lindsay (Lancaster University): Elementary evolutions and Itô algebra for quantum stochastic analysis. Whereas norm-continuous one-parameter semigroups in a unital Banach algebra are all generated by simple exponentiation, no such structure exists for norm-continuous evolutions. However there is a natural analoge of exponentiation, nicely described via Guichardet's symmetric measure space of the half-line, which yields an interesting subclass of norm-continuous evolutions. After a discussion of such *elementary* evolutions, I shall seek to elucidate the algebraic structure of the basic composition law, on the set of bounded operators on a direct sum of Hilbert spaces, which is relevant to the generation of quantum stochastic evolution. Elementary evolutions and quantum Itô algebra will then be brought to bear on the problem of extending the Lie–Trotter pproduct formula to a quantum stochastic setting.

The first part of the talk will require no background in quantum stochastic analysis; the second part may contain a challenge, in the form of an open conjecture.