UNIVERSITÄT DES SAARLANDES
FACHRICHTUNG MATHEMATIK
Prof. Dr. Roland Speicher

Non-Commutative (Algebraic) Geometry

Lecture Winter Semester 2017/2018

Classical spaces (e.g., topological, measurable, geometric) can be encoded via functions on those spaces; and very often classical mathematical theories can be re-formulated in terms of the algebras of these functions. Clearly those function algebras are commutative. Non-commutative versions of these theories consist then in giving up the requirement of commutativity of the algebras, but keeping as much as possible of the remaining structures and ideas. Non-commutative geometry is such a non-commutative version of classical algebraic geometry.

Whereas classical algebraic geometry deals with solutions of systems of equations in commuting variables by looking on corresponding commutative algebras, non-commutative algebraic geometry is trying to deal with equations in non-commuting variables by looking on non-commutative algebras in a similar way.

At the moment there are many bits and pieces of such a theory, but the final picture has still to be found. We will address various pieces, like:

- non-commutative linear algebra

- non-commutative Nullstellensaetze and Positivstellensaetze

- Hochschild cohomology

- cyclic (co)homology

- spectral triples a la Connes

- non-commutative geometry a la Kontsevich/Rosenberg

Some of those are quite abstract modern topics, but we will take a more naive approach, trying to focus more on concrete examples and calculations. So some knowledge in algebraic geometry or functional analysis might be helpful, but is not necessarily required.

Time and Place:	**Monday, 10 − 12, and Thursday, 12 − 14,**
	Lecture Hall IV, Building E2 4

For further information, see: