General Mathematics Seminar
of the
University of Luxembourg

In cooperation with the
Luxembourg Mathematical Society

October 2010

Tuesday, Oct 5, 2010 at 17:00 Campus Kirchberg, room A02

Jean-Louis Loday
(CNRS, Strasbourg)

Hidden structures in homological algebra

If a chain complex is equipped with some compatible algebraic structure, then its homology gets equipped with this algebraic structure. The surprise is that, in most cases, there is a hidden algebraic structure on this homology. We will give several elementary examples and show how the notions of spectral sequence, Connes boundary map B, A-infinity algebra and MacLane invariant of a crossed module come naturally out of this principle. I'll end up with a problem in biology.

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Tuesday, October 19, 2010, at 17:00 **Campus Kirchberg, room A02**

Prof. E. M. Semenov
(Voronezh University, Russia)

Invariant Banach limits

Abstract:

A linear functional $B \in l_\infty^*$ is said to be a Banach limit if $B(1,1,\ldots) = 1$, $B \geq 0$ and $B(Tx) = Bx$ for any $x \in l_\infty$ where T is the translation operator, that is $T(x_1,x_2,\ldots) = (x_2,x_3,\ldots)$. We present a set of easily verifiable sufficient conditions on an operator $H \in L(l_\infty)$, guaranteeing the existence of a Banach limit B s.t. $B = BH$. We apply our results to the classical Cesaro operator. We present another application to geometry of non-separable Banach spaces.

Joint work with F. A. Sukochev (Sydney University, Australia).

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Tuesday, Oct 26, 2010 at 17:00 Campus Kirchberg, room A02

Kalyan B. Sinha
(Jawaharlal Nehru Centre for Advanced Scientific Research
and Indian Institute of Science, Bangalore, India)

Introduction to Quantum Stochastic Calculus and Applications

Many avenues exist for extending probability theory to a non-Kolmogoroffian one – one of these is the one following from the Quantum theory. A system of filtrations can be constructed in the Fock space by an increasing family of noncommutative *-algebras, often containing commuting subfiltrations, most noteworthy amongst them are the classical ones coming from the Brownian motion and Poisson process. Non-commutative diffusions can be constructed in Fock space starting with a stochastic differential equation, driven by three fundamental non-commuting martingales.