Conférence
« ARTA III : Avancées en théorie des représentations des algèbres »
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Meeting
"ARTA III. Advances in Representation Theory of Algebras"
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Periodic algebras of polynomial growth

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Let A be a finite dimensional K-algebra over an algebraically closed field K. Denote by Ω_A the syzygy operator on the category $\operatorname{mod} A$ of finite dimensional right A-modules, which assigns to a module M in $\operatorname{mod} A$ the kernel $\Omega_A(M)$ of a minimal projective cover $P_A(M) \to M$ of M in $\operatorname{mod} A$. A module M in $\operatorname{mod} A$ is said to be periodic if $\Omega_A^n(M) \cong M$ for some $n \geq 1$. Then A is said to be a periodic algebra if A is periodic in the module category $\operatorname{mod} A^e$ of the enveloping algebra $A^e = A^{\mathrm{op}} \otimes_K A$, that is, periodic as an A-A-bimodule. The periodic algebras A are selfinjective and their module categories $\operatorname{mod} A$ are periodic (all modules in $\operatorname{mod} A$ without projective direct summands are periodic). The periodicity of an algebra A is related with the periodicity of its Hochschild cohomology algebra $HH^*(A)$ and is invariant under equivalences of the derived category $D^b(\operatorname{mod} A)$ of bounded complexes over $\operatorname{mod} A$. One of the exciting open problems in the representation theory of selfinjective algebras is to determine the Morita equivalence classes of periodic algebras.

It has been proved by Dugas that every selfinjective algebra of finite representation type, without semisimple summands, is a periodic algebra. During the talk we will present a description of all basic, indecomposable, representation-infinite periodic algebras of polynomial growth.

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