Graduiertenkolleg

Experimentelle und konstruktive Algebra

Experimental and constructive algebra

Kolloquiumsvortrag

Dienstag, 25. Juli 2017, 14:00 Uhr, SeMath

Christian Lomp (University of Porto, Portugal):
Ring theoretical properties of affine cellular algebras

As a generalisation of Graham and Lehrer's cellular algebras, affine cellular algebras have been introduced by Koenig and Xi in order to treat affine versions of diagram algebras like affine Hecke algebras of type A and affine Temperley-Lieb algebras in an unifying fashion. Since then several classes of algebras, like the Khovanov-Lauda-Rouquier algebras or Kleshchev's graded quasihereditary algebras have been shown to be affine cellular. An affine cell ideal of an algebra A with involution $*$ is a $*$-ideal J that is isomorphic as an A-bimodule to a generalized matrix ring $M_n(B)$ over some commutative affine k-algebra B, whose multiplication is deformed by some "sandwich" matrix ψ, i.e. the product of two matrices x and y is defined to be $x\psi y$. An affine cellular algebra is then a $*$-algebra A that admit a chain of $*$-ideals $J_0 < J_1 < J_2 < \cdots < J_n = A$ such that each quotient J_i/J_{i-1} is an affine cell ideal of A/J_{i-1}. In this talk I will exhibit some ring theoretical properties of affine cellular algebras. In particular we will show that any affine cellular algebra A satisfies a polynomial identity, from which it follows that simple modules are finite dimensional (in case A is an algebra over an algebraically closed field). Furthermore, we show that A can be embedded into its asymptotic algebra if the occurring commutative affine k-algebras B_j are reduced and the determinants of the "sandwich" matrices are non-zero divisors. As a consequence we show that the Gelfand- Kirillov dimension of A (which measures the growth of the algebra) is less or equal to the largest Krull dimension of the algebras B_j and that equality hold in case all affine cell ideals are finitely generated (e.g. idempotent) or if the Krull dimension of the algebras B_j is less or equal to 1. Special emphasis is given to the question when an affine cell ideal is idempotent, generated by an idempotent or finitely generated.

This is joined work with Paula Carvalho, Steffen Koenig and Armin Shalile

Wir laden alle Interessierten herzlich ein.