SFB-Seminar Torische Varietäten und K-Theorie (Teilprojekte C1 und C3)

ZEIT:
2.7.2013, 15:00 Uhr - 19:00 Uhr

ORT:
Zuse-Institut Berlin
Großer Hörsaal
Takustr. 7
14195 Berlin

PROGRAMM:

15:00 - 15:45 SFB-Vollversammlung

15:45 - 16:15 Kaffee-Pause

16:15 - 17:15 **Prof. Dr. Guillermo Cortiñas**

K-theory of toric varieties
This talk concerns the effect of dilations in the K-theory of monoidal algebras and schemes. We use multiplicative notation for monoids; if A is a monoid, and $a,b\in A$, then ab is their product. Any integer $n\ge 0$ defines a monoid homomorphism
A\to A, a\mapsto a^n
called the \emph{dilation} of ratio n. If $c=(n_1,n_2,\dots)$ is a sequence of integers ≥ 2, we write $A^{1/c}$ for the result of formally adding an $n_1\cdots n_i$ root $a^{1/n_1\cdots n_i}$ for every $i\ge 1$ and every element $a\in A$. Joseph Gubeladze has conjectured that if R is a noetherian regular commutative ring, and A is torsion-free, cancellative and seminormal (all these conditions hold, for example, when A is toric), then the K-theory of the monoid algebra $R[A^{1/c}]$ is just the K-theory of R. That is, the inclusion $R\subset R[A^{1/c}]$ induces an isomorphism
K_*(R)=K_*(R[A^{1/c}])
Gubeladze proved his conjecture in the case when R contains a field

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of characteristic zero. In recent joint work with Haesemeyer, Walker and Weibel, we have proved that it also holds if R contains a field of positive characteristic. Thus the conjecture holds whenever R contains a field. In fact this is the affine case of a more general result on the effect of dilations on the K-theory of monoidal schemes. In the talk we intend to discuss all these results.

17:15 - 17:45 Kaffee-Pause

17:45 - 18:45 **Prof. Dr. Sean Keel**

Canonical Coordinates

Prof. Dr. Sean Keel will discuss his conjecture, joint with Gross and Hacking, that affine Calabi-Yau manifolds (with maximal boundary) have canonical "theta functions" -- a canonical vector space basis of the algebra of global functions, with structure constants for the multiplication rule, non-negative integers determined by counts of rational curves
(on the mirror), and our partial results, which include a proof in dimension two, and a proof, joint with Kontsevich, of much of the conjecture for cluster varieties. We obtain in particular in a unified way
1) the classical theory of theta functions for elliptic curves
2) the natural trace functions on the SL2 character variety of a punctured riemann surface
3) a canonical basis for each irreducible representation of SLr
4) a canonical basis for loads of cluster algebras
by a general, and conceptually quite simple, scheme that applies to any CY, and which in particular does not involve any elliptic curves, riemann surfaces, representation theory, or cluster algebras. He will aim the talk at a quite broad mathematical audience -- if you know what is meant by the order of pole of a rational function along a divisor in an algebraic variety then you know more than enough to absorb the main ideas.

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