

MATHEMATICS DEPARTMENT
North Carolina State University

ALGEBRA SEMINAR

Friday, November 30, 2007

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Institute of Mathematics and Informatics
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**Automorphisms and derivations of polynomial and
free associative algebras**

ABSTRACT: We present an introduction to the theory of automorphisms of the polynomial algebra $\mathbb{C}[x_1, \dots, x_n]$. We discuss some of the main problems and survey recent results. We consider the generation of the automorphism group, tame and wild automorphisms, including the remarkable recent results of Shestakov and Umirbaev on the wildness of the Nagata automorphism of $\mathbb{C}[x, y, z]$. Derivations of $\mathbb{C}[x_1, \dots, x_n]$ are related to many important problems on automorphisms and invariant theory, including the Jacobian conjecture, the 14th Hilbert problem, etc.

Although the theory of automorphisms and derivations of the free associative algebra $\mathbb{C}\langle x_1, \dots, x_n \rangle$ repeats the main steps of the case of $\mathbb{C}[x_1, \dots, x_n]$, there are a lot of specific differences, due to the noncommutativity. We discuss the result of Umirbaev about the wildness of the Anick automorphism of $\mathbb{C}\langle x, y, z \rangle$, constructions in noncommutative algebra which lead to new automorphisms and derivations also in the commutative case, and the description of the constants of locally nilpotent derivations of $\mathbb{C}\langle x, y \rangle$.

3:00 - 3:50 pm HA 335

Faculty and Students are invited to attend.