

Algebraic Geometry - Mariusz Koras in memoriam
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NESTED AUTOMORPHISM GROUPS

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ABSTRACT. This talk is based on joint works with Sergey Kovalenko, Andriy Regeta, and Mikhail Zaidenberg. We will discuss complexity of automorphism groups of affine algebraic varieties and propose the following distinctive feature: whether unipotent elements generate an abelian subgroup. More precisely, we conjecture that the following conditions on the neutral component of the automorphism group are equivalent:

- (1) it is equal to the union of all algebraic subgroups;
- (2) it is exhausted by an inductive limit of algebraic subgroups (then we call it *nested*);
- (3) it is a semidirect product of an algebraic torus and an abelian unipotent group;
- (4) its tangent algebra consists of locally finite elements;
- (5) its unipotent elements comprise an abelian subgroup.

We have fully confirmed this conjecture in dimension 2 and partially in arbitrary dimension: the equivalences hold for a subgroup of the automorphism group generated by algebraic groups (a subalgebra of the tangent algebra generated by locally finite elements, respectively)