

The Group of Outer Automorphisms of the Category of Finitely Generated Free Non-associative Nilpotent of Degree n Algebras

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Abstract

In this work, which is a joint work with A. Tsurkov (UFRN), we compute the quotient group $\mathfrak{A}_n/\mathfrak{I}_n$ of all automorphisms \mathfrak{A}_n of the category Θ_n^0 of all finitely generated free nilpotent non-associative algebras of degree n over a field \mathbb{k} of characteristic 0, by the normal subgroup \mathfrak{I}_n of all inner automorphisms. We call $\mathfrak{A}_n/\mathfrak{I}_n$ the group of outer automorphisms of Θ_n^0 . In the universal algebraic geometry setting, this group is very important, because it measures the possible difference between geometric and automorphic equivalences in the variety Θ_n of all nilpotent non-associative algebras of degree n . We prove the conjecture of A. Tsurkov that for every $n \geq 3$ holds $\mathfrak{A}_n/\mathfrak{I}_n = \mathbb{k}^* \rtimes \text{Aut}\mathbb{k}$, where \mathbb{k}^* is the group of all non-zero elements of \mathbb{k} and $\text{Aut}\mathbb{k}$ is the group of all automorphisms of \mathbb{k} .