

Squares and associative representations of two dimensional evolution algebras

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Abstract

We associate an square to any two dimensional evolution algebra. This geometric object is uniquely determined, does not depend on the basis and describes the structure and the behaviour of the algebra. In this talk we will explain that we have determined the identities of degrees at most four, as well as derivations and automorphisms. We look at the group of automorphisms as an algebraic group, getting in this form a new algebraic invariant. The study of associative representations of evolution algebras is also started in our work, and we get faithful representations for most two-dimensional evolution algebras. In some cases we prove that faithful commutative and associative representations do not exist, giving raise to the class of what could be termed as "exceptional" evolution algebras, in the sense of not admitting a monomorphism to an associative algebra with deformed product.