A New Perspective on the Cayley–Dickson Construction: Flipped Polynomial Rings

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a joint work with

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Abstract

In this talk, I will shed new light on the mysterious Cayley–Dickson construction. We introduce a new class of polynomial rings equipped with a "flipped" multiplication, from which all Cayley–Dickson algebras arise naturally as quotients. This framework extends the classical realization of the complex numbers as a quotient of a polynomial ring, and the quaternions as a quotient of a skew polynomial ring, to the octonions and beyond. This is joint work with Masood Aryapoor.

Keywords

Cayley–Dickson algebra, Cayley double, Flipped non-associative Ore extensions, Flipped non-associative skew polynomial rings.

References

 M. Aryapoor and P. Bäck, Flipped Non-Associative Polynomial Rings and the Cayley-Dickson Construction, J. Algebra 662 (2025).

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