

From the Griess algebra to decomposition algebras

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In 1982 R. L. Griess constructed the Monster group as the automorphism group of a commutative, non-associative algebra, called the Griess algebra. This construction was simplified by J. H. Conway who noticed the following important property. The Griess algebra is generated by a class of idempotents. Multiplication by such an idempotent splits the Griess algebra into its eigenspaces which multiply according to a given fusion law. This property led A. A. Ivanov to the definition of a Majorana algebra which was further generalized by J. I. Hall, F. Rehren and S. Shpectorov to the definition of an axial algebra.

The study of these kinds of algebras has recently gotten a lot of attention which led to different sorts of new algebras. However, not all of these examples are axial algebras but their properties are very similar. Therefore, we believe that it is useful to generalize this concept even further to what we call decomposition algebras. These algebras are a lot more algebraic of nature in the sense that they allow for morphisms and categorical constructions.

This is joint work with T. De Medts, S. Peacock and S. Shpectorov.