Isomorphisms of Leibniz Algebras Using Association With (Pseudo)Digraphs

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Abstract

Finding new links between different fields is one of the most stimulating research in Science and, particularly, in Mathematics. In this way and by using computational methods, we study in this paper the link between Graph Theory and Leibniz algebras. This work continues the research started in [1, 2], where a mapping between Leibniz algebras and combinatorial structures was introduced in order to translate properties of these algebras into the language of Graph Theory and vice versa.

This paper studies the link between isomorphic digraphs and isomorphic Leibniz algebras, determining in detail this fact when using (psuedo)digraphs of 2 and 3 vertices associated with Leibniz algebras according to their isomorphism classes. Moreover, we introduce and implement an algorithmic procedure devoted to decide if a given combinatorial structure is associated or not with a Leibniz algebra. As application of this algorithm, we give the complete list with all the non-isomorphic combinatorial structures of 3 vertices associated with Leibniz algebras, studying the Leibniz-algebra structure associated with each configuration.

References

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