

Abstract

joint work with Bérénice Delcroix-Oger (IRIF) and Jovana Obradović (Institute of Mathematics of the Czech Academy of Sciences)

Loday and Ronco unveiled a splitting of the shuffle product of planar trees (that encode the faces of associahedra) in three natural summands, leading to the notion of tridendriform algebra, defined by three generators, and relations. Burgunder and Ronco, and then Burgunder, Curien and Ronco studied a tridendriform structure on surjections (that encode the faces of permutohedra). Both associahedra and permutohedra belong to a class of polytopes known as hypergraph polytopes, or nestohedra. Therefore, the question arises of defining tridendriform structures on other families of hypergraph polytopes (including simplices, hypercubes, cyclohedra...), in some uniform way. We show that under a simple condition such a structure can be defined and proved to be indeed tridendriform (and hence associative, the product being defined as a suitable linear combination of the three operations). Preliminary investigations also suggest that we can complete the structure with a coproduct giving rise to a Hopf

algebra. This is still a preliminary work!