

Abstract

In this paper, we provide a general operadic definition for the anti-splitting the operations of algebraic structures. We achieve this by introducing the anti-bisuccessors and anti-trisuccessors of a binary algebraic operad defined by generating operations and relations. These constructions are proved to be equivalent to some Manin products of operads and also closely connected with anti-Rota-Baxter operators. Thus it leads to a new way to calculate Manin black products. Moreover, it also provides a general way to relate known operads and to produce new operads from the known ones. As an application, we introduce the notion of anti-post-Lie algebras, which can be viewed as the anti-splitting of Lie algebras.

Similarly, we also provide a general operadic notion for the anti-replicators, namely anti-duplicators and anti-triplicators of a binary quadratic operad. Finally, we show that taking the anti-successor of a binary operad is in Koszul dual with taking the anti-replicator of the dual operad. This work is joint with Professor Bai, Professor Guo and Professor Sheng.