

Abstract

The algebra of multiple zeta values (MZVs) is encoded as a stuffle (quasi-shuffle) algebra and a shuffle algebra. The MZV stuffle algebra has a natural Hopf algebra structure which has important applications to MZVs. Recently the MZV shuffle algebra is equipped with a Hopf algebra structure. The needed coproduct is defined by a recursion through a family of weight-increasing linear operators, and can be recovered from a differential locality Hopf algebra on Chen fractions.

Furthermore, this coproduct has two other interpretations: One as the quotient of the deconcatenation coproduct on words, and one as the quotient of a 1-cocycle coproduct on a free commutative Rota-Baxter algebra.

On the other hand, the MZV shuffle algebra naturally extends to a larger shuffle algebra that corresponds to MZVs with arbitrary arguments, and another Hopf algebra structure is given to the subalgebra for negative arguments. Moreover, the two Hopf algebras are naturally related by a duality. This talk will give a survey of these results, obtained in various papers jointly with Wenchuan Hu, Hongyu Xiang, Bin Zhang and Yi Zhang.