Rota-Baxter operators on algebras and Beyond

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Abstract

Rota-Baxter operators appeared first in the realm of probability by G. Baxter and then developed from the algebraic viewpoint in combinatorics by G.-C. Rota. A connection to mathematical physics was given by A. Connes and D. Kreimer in their Hopf algebra approach to renormalization in Quantum field theory. Since then they were intensively studied by providing connections with Yang-Baxter equation and various nonassociative algebras, like dendriform algebras. Recently, some generalizations were studied. Bai, Guo and Ni introduced the extended O-operator generalizing the concept of O-operators and studied the relations with the associative Yang-Baxter equations. While T. Brzezinski introduced the notion of Rota-Baxter system, their curved version and investigated the relations with weak pseudotwistors, differential graded algebras and pre-Lie algebras.
The aim of this talk is to give an overview of the theory within its various connections as well as the recent developments.