# ROTA-BAXTER OPERATORS, O-OPERATORS, BISYSTEMS AND BIALGEBRAS

**Abdenacer Makhlouf**

*University of Haute Alsace, Mulhouse, France*
*abdenacer.makhlouf@uha.fr*

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 review the recent developments and introduce Rota-Baxter cosystems, Rota-Baxter bisystems and Rota-Baxter bialgebras. Moreover, we introduce the notion of curved O-operator systems and their connection to some algebraic structures.

**REFERENCES:**

1. T. Ma, A. Makhlouf and S. Silvestrov *Rota-Baxter bisystems and covariant bialgebras.* arXiv:1710.05161 [math.RA] (2017)

2. T. Ma, A. Makhlouf and S. Silvestrov *Curved O-operator systems.* arXiv:1710.05232 [math.RA] (2017)

3. A. Makhlouf, *Hom-dendriform algebras and Rota-Baxter Hom-algebras.* Operads and universal algebra, 147–171, Nankai Ser. Pure Appl. Math. Theoret. Phys.,**9**, World Sci. Publ., Hackensack, NJ, 2012.

4. A. Makhlouf and D. Yau, *Rota-Baxter Hom-Lie-admissible algebras.*, Comm. Algebra **42** (2014), no. 3, 1231–1257.