

Post-Lie Algebras: from geometric integration to matrix factorization algorithms

Kurusch Ebrahimi-Fard
Instituto de Ciencias Matemáticas
Consejo Superior de Investigaciones Científicas

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In this talk we would like to outline a new approach to abstract matrix factorization. It is motivated by the quest for understanding several apparently unrelated factorizations which arise in the context of quantum field theory, combinatorial Hopf algebras, integrable systems, and numerical methods for differential equations. Key is a particular recursion formula which is based on the classical Baker-Campbell-Hausdorff identity. We will describe the algebraic structures underlying this approach, i.e., pre- and post-Lie algebras. This research is part of the general project which aims at exploring results and methods from algebraic combinatorics in the context of pure and applied mathematics as well as theoretical and mathematical physics.