

On an interplay of computer algebra and ring theory

Viktor Levandovskyy

[viktor.levandovskyy@mathematik.uni-kassel.de]

Institute of Mathematics, Kassel University, Germany

Many concepts from the ring theory are complicated or even infeasible for an algorithmic treatment. However, when algorithmizable, they often offer serious advances for applications of computer algebra. Being interested in non-commutative algebras, I will address Gelfand-Kirillov dimension and Ore localization of algebras and modules as well as generalized torsion, and discuss several important applications to problems arising in systems of linear functional equations. Many of the topics above have been supported by implementation in SINGULAR:PLURAL [1], a subsystem of SINGULAR for treating PBW algebras (a.k.a G -algebras) and providing vast functionality for modules over such algebras.

Keywords

Non-commutative computer algebra, Non-commutative Gröbner basis, Gelfand-Kirillov dimension, Ore localization

References

[1] G.-M. GREUEL, V. LEVANDOVSKYY, A. MOTSAK AND H. SCHÖNEMANN, SINGULAR:LETTERPLACE — A SINGULAR 4-3-1 Subsystem for Non-commutative Polynomial Algebras, <https://www.singular.uni-kl.de>, 2023.