

ON NEW APPLICATIONS OF NONCOMMUTATIVE RINGS

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We will mention some open questions and results in noncommutative ring theory related to other research areas; for example, related to resolutions of noncommutative singularities, superpotential algebras, Jacobi algebras, noncommutative projective algebraic geometry and group theory. Some new ring theoretic approaches for studying differential polynomial rings and tensor products $A \otimes A$ and $A \otimes A^{opp}$ will be mentioned within the context of coalgebras, Hopf algebras and Lie algebras. These methods are related to the Golod-Shafarevich theorem.

We will also look at a ring theoretic approach to the Yang-Baxter equation, which explores the connection between braces and nilpotent rings. Braces are a generalisation of Jacobson radical rings, and have been introduced by Rump as a tool for investigating non degenerate involutive set-theoretic solutions of the Yang-Baxter equation. We will present both old and new results from this area, together with a gentle introduction to the subject. No previous knowledge of braces, braided groups nor of the Yang-Baxter equation is assumed.