

Representability of algebras satisfying ACC

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a joint work with

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Abstract

An algebra A over a commutative ring C is **weakly representable** if, for a suitable commutative associative C -algebra K , A is embeddible as a C -subalgebra of a K -algebra W that is a finite free K -module. A is called **representable** if K can be taken to be a field.

Representability of algebras is a venerable subject which was explored in depth by PI (polynomial identity) theorists in the 1970s since every representable algebra obviously is PI, satisfying the identities of $M_n(K)$. But a homomorphic image of a representable algebra need not be representable. In this talk, based on joint work with Greenfeld, we give the current picture concerning PI-rings satisfying ACC on ideals. We present a non-representable example, and some positive results concerning Noetherian PI-rings. These require results of independent interest concerning the structure of rings with ACC and the construction of Lewin-Bergman-Dicks-Anan'in. The general question of the representability of Noetherian PI-rings (even Artinian PI-rings) remains open.

Keywords

PI-algebra, Noetherian algebra, representable algebra, universal derivations.

References

- [1] A.Z. Anan'in, *Representable varieties of algebras*, Translated from Algebra i Logika, **28** (2) (1989), 144–159.
- [2] A.Z. Anan'in, *The representability of finitely generated algebras with chain condition*, Arch. Math. **59** (1992), 275–277.
- [3] G. M. Bergman, W. Dicks, *On universal derivations*, Journal of Algebra **36** (2), 193–211 (1975).

- [4] J. Lewin, *On some infinitely presented associative algebras*, Collection of articles dedicated to the memory of Hanna Neumann, III. J. Austral. Math. Soc. **16** (1973), 290-293.
- [5] Markov, V.T., *On the representability of finitely generated PI-algebras by matrices. (Russian)* Vestnik Moskov. Univ. Ser. I Mat. Mekh. 1989, no. 2, 17-20, 104; translation in Moscow Univ. Math. Bull. 44 (1989), no. 2, 23-27.
- [6] L.H. Rowen, L.W. Small, *Representability of algebras finite over their centers*, J. Algebra **442** (2015), 506–524.