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Prime ideals of quantized Weyl algebras. (English) Zbl 0881.16012

Glasg. Math. J. 38, No. 3, 283-297 (1996).

The algebras of the title, denoted $A_n^{\overline{q},\Lambda}$ (where $\overline{q}$ is an n-vector and Λ a multiplicatively antisymmetric $n \times n$ matrix of nonzero scalars), were introduced by *E. E. Demidov* [Usp. Mat. Nauk 48, No. 6, 39-74 (1993); English transl.: Russ. Math. Surv. 48, No. 6, 41-79 (1993; Zbl 0839.17011)], *G. Maltsiniotis* [Calcul différentiel quantique, Groupe de travail, Université Paris VII (1992)], and others. Here, the authors compute the prime spectrum of $A_n^{\overline{q},\Lambda}$, under the assumption that certain subgroups of the multiplicative group generated by the entries of $\overline{q}$ and Λ have maximal rank. In particular, the prime ideals of $A_n^{\overline{q},\Lambda}$ are all polynormal, there are infinitely many maximal ideals (all of height $2n$), while there are only finitely many nonmaximal prime ideals. (Similar results were obtained, using different methods, by *L. Rigal* [Beitr. Algebra Geom. 37, No. 1, 119-148 (1996; Zbl 0876.17012)].) The authors also investigate a related algebra $\mathcal{A}_n^{\overline{q},\Lambda}$, which shares with $A_n^{\overline{q},\Lambda}$ the simple localization $B_n^{\overline{q},\Lambda}$ studied by the second author [J. Algebra 174, No. 1, 267-281 (1995; Zbl 0833.16025)]. In this algebra, the prime ideals are again polynormal, but there are only finitely many of them if $n > 1$.

A different description of spec $A_n^{\overline{q},\Lambda}$ is implicit in work of *T. H. Lenagan* and the reviewer [J. Pure Appl. Math. 111, 1-3, 123-142 (1996; Zbl 0864.16018)], and is given explicitly in work of *E. S. Letzter* and the reviewer [The Dixmier-Moeglin equivalence in quantum matrices and quantized Weyl algebras (to appear)]. In these papers, the only restriction on the parameters is that no entry of $\overline{q}$ is a root of unity.

Reviewer: K.R.Goodearl (Santa Barbara)

MSC:

16P40	Noetherian rings and modules (associative rings and algebras)
16D25	Ideals in associative algebras
17B37	Quantum groups (quantized enveloping algebras) and related deformations
16S36	Ordinary and skew polynomial rings and semigroup rings

Keywords:
quantized Weyl algebras; polynormal prime ideals; prime spectra; normal elements; maximal ideals

Full Text: DOI

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