

Jordan, David A.

A simple localization of the quantized Weyl algebra. (English) Zbl 0833.16025
J. Algebra 174, No. 1, 267-281 (1995).

Generalizing earlier work of the author, this paper describes a general construction of a skew polynomial ring R in two variables over an affine k -algebra A (k is any field). The construction critically depends on the choice of a normal element in A , and it generates a normal element in R which can then be used for iteration. Various classes of algebras of interest are obtained in this fashion, most notably the quantized Weyl algebras $A_n^{\bar{q},\Lambda}$ in $2n$ variables which form the main topic of the article. Building on earlier work of *J. Alev* and *F. Dumas* [*J. Algebra* 170, No. 1, 229-265 (1994; [Zbl 0820.17015](#))] and related work by *J. C. McConnell* and *J. J. Pettit* [*J. Lond. Math. Soc.*, II. Ser. 38, 47-55 (1988; [Zbl 0652.16007](#))], the author constructs a set Z of n commuting normal elements in $A_n^{\bar{q},\Lambda}$ such that, provided no member of $\bar{q} \in (k^\bullet)^n$ is a root of unity, the localization $B_n^{\bar{q},\Lambda} = (A_n^{\bar{q},\Lambda})_Z$ is simple. Under the same hypothesis on \bar{q} , it is also shown that $B_n^{\bar{q},\Lambda}$ has Krull and global dimension n , all of which perfectly mirrors the situation for the classical n -th Weyl algebra in characteristic 0.

Reviewer: [M.Lorenz \(Philadelphia\)](#)

MSC:

- [16S36](#) Ordinary and skew polynomial rings and semigroup rings
- [16S90](#) Torsion theories; radicals on module categories (associative algebraic aspects)
- [16P60](#) Chain conditions on annihilators and summands: Goldie-type conditions
- [17B37](#) Quantum groups (quantized enveloping algebras) and related deformations
- [16S20](#) Centralizing and normalizing extensions
- [16D60](#) Simple and semisimple modules, primitive rings and ideals in associative algebras

Cited in **6** Reviews
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Keywords:

quantum groups; Krull dimension; skew polynomial rings; affine algebras; normal elements; quantized Weyl algebras; commuting normal elements; localizations; global dimension

Full Text: [DOI](#)