

International Electronic Journal of Algebra Volume * (2022) **_***

 $DOI:\,00.000000/ieja.000000$

THE HOM-ASSOCIATIVE WEYL ALGEBRAS IN PRIME CHARACTERISTIC

Per Bäck and Johan Richter

Received: 15 March 2021; Accepted: 14 October 2021 Communicated by A. Çiğdem Özcan

ABSTRACT. We introduce the first hom-associative Weyl algebras over a field of prime characteristic as a generalization of the first associative Weyl algebra in prime characteristic. First, we study properties of hom-associative algebras constructed from associative algebras by a general "twisting" procedure. Then, with the help of these results, we determine the commuter, center, nuclei, and set of derivations of the first hom-associative Weyl algebras. We also classify them up to isomorphism, and show, among other things, that all nonzero endomorphisms on them are injective, but not surjective. Last, we show that they can be described as a multi-parameter formal hom-associative deformation of the first associative Weyl algebra, and that this deformation induces a multi-parameter formal hom-Lie deformation of the corresponding Lie algebra, when using the commutator as bracket.

Mathematics Subject Classification (2020): 17B61, 17D30

Keywords: hom-associative Ore extensions, hom-associative Weyl algebras, formal multi-parameter hom-associative deformations, formal multi-parameter hom-Lie deformations

Per Bäck (Corresponding Author)
Division of Mathematics and Physics
The School of Education, Culture and Communication
Mälardalen University
SE-721 23 Västerås, Sweden
e-mail: per.back@mdh.se

Johan Richter

Department of Mathematics and Natural Sciences Blekinge Institute of Technology SE-371 79 Karlskrona, Sweden e-mail: johan.richter@bth.se