International Electronic Journal of Algebra
Volume ** (20**) **-**
DOI: 10.24330/ieja.******

SOME ALGEBRAS IN TERMS OF DIFFERENTIAL OPERATORS

Ghorban Soleymanpour and Ali S. Janfada

Received: 16 February 2020; Revised: 1 May 2020; Accepted 27 May 2020
Communicated by Abdullah Harmancı

Abstract. Let C be a commutative ring and $C[x_1, x_2, \ldots]$ the polynomial ring in a countable number of variables x_i of degree 1. Suppose that the differential operator $d^1 = \sum_i x_i \partial_i$ acts on $C[x_1, x_2, \ldots]$. Let $\mathbb{Z}_p$ be the p–adic integers, K the extension field of the p–adic numbers $\mathbb{Q}_p$, and $\mathbb{F}_2$ the 2-element filed. In this article, first, the C-algebra $\mathcal{A}_1(C)$ of differential operators is constructed by the divided differential operators $(d^1)^{\vee k}/k!$ as its generators, where $\vee$ stands for the wedge product. Then, the free Baxter algebra of weight 1 over $\varnothing$, the λ–divided power Hopf algebra $\mathcal{A}_\lambda$, the algebra $C(\mathbb{Z}_p, K)$ of continuous functions from $\mathbb{Z}_p$ to K, and the algebra of all $\mathbb{F}_2$–valued continuous functions on the ternary Cantor set are represented in terms of the differential operators algebra $\mathcal{A}_1(C)$.

Mathematics Subject Classification (2020): 13N10, 55S10
Keywords: Differential operator, integral Steenrod operator, λ-divided power Hopf algebra, Baxter algebra

Gh. Soleymanpour and **A. S. Janfada** (Corresponding Author)
Department of Mathematics
Faculty of Science
Urmia University
Urmia 57561-51818, Iran
e-mails: gh.soleymanpour@urmia.ac.ir (Gh. Soleymanpour)
asjanfada@gmail.com; a.sjanfada@urmia.ac.ir (A. S. Janfada)