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MR1949205 (2003k:17043) 17D92 17A36
Guzzo, H., Jr. (BR-SPL-IMS); **Vicente, P.**
Derivatives in nth-order Bernstein algebras. II. **(English summary)**
Algebras Groups Geom. **19** (2002), *no. 4,* 423–444.

The present paper is a second part of another paper [Part I, Int. J. Math. Game Theory Algebra **12** (2002), no. 2, 171–185; MR1912789 (2003d:17042)] in which the authors start the study of derivations in a Bernstein algebra of order n.

An nth-order Bernstein algebra is an algebra A over a field F (in this paper $\mathrm{ch}F = 0$ is assumed), having a nonzero homomorphism of algebras $\omega: A \to F$, such that $x^{[n+2]} = (\omega(x))^{2^n} x^{[n+1]}$ for every $x \in A$. Here $x^{[n]}$ denotes the nth-plenary power of the element x.

The existence of a nonzero idempotent element e and the associated Peirce decomposition is known for every nth-order Bernstein algebra. So $A = Fe + U_e + Z_e$, where $U_e = \{u \in \operatorname{Ker}\omega |\ eu = \frac{1}{2}u\}$ and $Z_e = \{z \in \operatorname{Ker}\omega |\ L_e^n(z) = 0\}$. The dimensions of the U- and the Z-component in a Peirce decomposition do not depend on the particular idempotent element.

A derivation $D: A \to A$ is given by a triple $(\tilde{u}, f, g)$, where $\tilde{u} = D(e) \in U_e$ and $f: U_e \to U_e$ and $g: Z_e \to Z_e$ are linear maps that satisfy some conditions.

In this paper authors study derivations in the power-associative case and for nth-order Bernstein algebras satisfying $(U_e \oplus Z_e)^2 \subseteq Z_e$, finding some properties and some upper bounds for the dimension of the derivation algebra. Also, inner derivations in the two mentioned cases are studied, and conditions over an element x that guarantee that the multiplication by x is a derivation of A are found. In particular, $\mathrm{Inn}(A)$ is explicitly given for Bernstein algebras of order n that are also Jordan, in which case $\mathrm{Der}(A)$ is proved to be nonzero.

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