

ON BP -ALGEBRAS

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Abstract

In this paper, we introduce the notion of a BP -algebra, and discuss some relations with several algebras. Moreover, we discuss a quadratic BP -algebra and show that the quadratic BP -algebra is equivalent to several quadratic algebras.

Keywords: B -algebra, 0-commutative, BF -algebra, BP -algebra, BH -algebra, (normal) subalgebra.

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1. Introduction

Y. Imai and K. Iséki introduced two classes of abstract algebras: BCK -algebras and BCI -algebras ([3, 4]). It is known that the class of BCK -algebras is a proper subclass of the class of BCI -algebras. In [1, 2] Q. P. Hu and X. Li introduced a wide class of abstract algebras: BCH -algebras. They have shown that the class of BCI -algebras is a proper subclass of the class of BCH -algebras. J. Neggers and H. S. Kim ([11]) introduced the notion of d -algebras which is another generalization of BCK -algebras, and then they investigated several relations between d -algebras and BCK -algebras as well as some other interesting relations between d -algebras and oriented digraphs. Also they introduced the notion of B -algebras ([9, 12, 13]), i.e., (I) $x*x = e$; (II) $x*e = x$; (III) $(x*y)*z = x*(z*(e*y))$, for any $x, y, z \in X$. A. Walendziak ([14]) obtained another axiomatization of B -algebras. Y. B. Jun, E. H. Roh and H. S. Kim ([5]) introduced a new notion, called a BH -algebras which is a generalization of $BCH/BCI/BCK$ -algebras. A. Walendziak ([15]) introduced a new notion, called an BF -algebra, i.e., (I); (II) and (IV) $e*(x*y) = y*x$ for any $x, y \in X$. In ([15]) it was shown that a BF -algebra is a generalizations of a B -algebra. H. S. Kim and N. R. Kye ([7]) introduced the notion of a quadratic BF -algebra, and obtained that quadratic BF -algebras, quadratic Q -algebras, BG -algebras and B -algebras are equivalent nations on a field X with $|X| \geq 3$, and hence every quadratic BF -algebra is a BCI -algebra. In this paper, we introduce the notion of

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