46th Annual Iranian Mathematics Conference
25-28 August 2015
Yazd University

Some types of ideals in bounded BCK-algebras.

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Abstract

The aim of this work is to investigate the relationship between ideals in bounded BCK-algebras so we introduce the concepts of involutory and EI-ideals in bounded BCK-algebras and characterise their properties. Also we introduce the concepts of EQI-algebras and EQI-ideals in bounded BCK-algebras and show that EQI-algebras include some important BCK structures such as involutory BCK-algebras, commutative and PC-lattices. The relationships between these ideals and quotient algebras that are constructed via these ideals are described. We clarify that EI, involutory and commutative ideals coincide in PC-lattices, whereas they are not the same in bounded BCK-algebras in general. It is proved that EQI-ideals contain some current ideals such as involutory, commutative, positive implicative and implicative ideals

Keywords: involutory ideal, EI-ideal, EQI-ideal, EQI-algebras
Mathematics Subject Classification [2010]: 06F35, 03B47

1 Introduction

This paper by extended view on ideal theory of bounded BCK-algebras introduces concepts of involutory, EI and EQI-ideals in bounded BCK-algebras. By introduce the concept of EQI-algebras, we have a new structure of bounded BCK-algebras that contains some important BCK structures such as PC-lattices, bounded commutative BCK-algebras and involutory BCK-algebras. We describe the relationships between these ideals that mentioned in the abstract.

Definition 1.1. Let X be a set with a binary operation $*$ and a constant 0. Then $(X; *, 0)$ is called a BCK-algebra if it satisfies the following axioms:
(BCK-1) $((x * y) * (x * z)) * (z * y) = 0$,
(BCK-2) $(x * (x * y)) * y = 0$,
(BCK-3) $x * x = 0$,
(BCK-4) $x * y = 0$ and $y * x = 0$ imply $x = y$.
(BCK-5) $0 * x = 0$

A partial ordering $\leq$ on X can be defined by $x \leq y$ if only if $x * y = 0$.

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