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ON WEAKLY COMPLETELY QUASI PRIMARY AND
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TERNARY SEMIRINGS

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ON WEAKLY COMPLETELY QUASI PRIMARY AND COMPLETELY QUASI PRIMARY IDEALS IN TERNARY SEMIRINGS

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ABSTRACT. In this investigation we studied completely quasi primary and weakly completely quasi primary ideals in ternary semirings. Some characterizations of completely quasi primary and weakly completely quasi primary ideals were obtained. Moreover, we investigated relationships between completely quasi primary and weakly completely quasi primary ideals in ternary semirings. Finally, we obtained necessary and sufficient conditions for a weakly completely quasi primary ideal to be a completely quasi primary ideal.

1. Introduction

There is a large literature dealing with ternary operations. The notion of a ternary semigroup is a natural generalization of a ternary group. Algebraic structures play a prominent role in mathematics with wide applications in many disciplines, such as computer sciences, information sciences, engineering, physics, etc. S. Banach (cf. J. Los [17]) found some applications in a ternary semigroup. He gave an example to show that a ternary semigroup does not necessarily reduce to an ordinary semigroup. J. Los [17] studied some properties of a ternary semigroup and proved that every ternary semigroup can be embedded in a semigroup.

In 1932, D. H. Lehmer introduced the concept of a ternary semigroup [16]. The algebraic structures of ternary semigroups were also studied by some authors, for example, Sioson studied ideals in ternary semigroups [20]. A nonempty set S is called a ternary semigroup if there exists a ternary operation

$$\cdot : S \times S \times S \rightarrow S,$$

written as $(x_1, x_2, x_3) \mapsto x_1x_2x_3$, satisfying the following identity for any $x_1, x_2, x_3, x_4, x_5 \in S$,

$$(x_1x_2x_3)x_4x_5 = x_1(x_2x_3x_4)x_5 = x_1x_2(x_3x_4x_5).$$

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