SOFT BI-IDEALS RELATED TO GENERALIZED FUZZY BI-IDEALS IN SEMIGROUPS

O. Kazancı*, Ş. Yılmaz*

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Abstract

In this paper, the concepts of $\varepsilon$-soft set and $q$-soft set are introduced and some interesting properties are investigated. Using the notion of generalized fuzzy bi-ideals in a semigroup, characterizations for an $\varepsilon$-soft set and a $q$-soft set to be bi-idealistic soft semigroups are established.

Keywords: Semigroup, Bi-ideal, Soft semigroup, Bi-idealistic soft semigroup, Belong to, Quasi-coincident with, $(\varepsilon, \varepsilon \lor q)$-fuzzy bi-ideals, $(\varepsilon, \varepsilon \lor \#)$-fuzzy bi-ideals.


1. Introduction

The theory of fuzzy sets, which was introduced by Zadeh [28], has been applied to many mathematical branches. Rosenfeld [25] inspired the fuzzification of algebraic structures and introduced the notion of fuzzy subgroup. Das [6] characterized fuzzy subgroups by their level subgroups. The concept of a fuzzy ideal in semigroups was developed by Kuroki [14]–[18]. He studied fuzzy ideals, fuzzy bi-ideals and fuzzy semiprime ideals in semigroups. Fuzzy ideals and Green’s relations in semigroups were investigated by McLean and Kummer [21]. Dib and Galhum [7] introduced definitions of a fuzzy groupoid and a fuzzy semigroup, studied fuzzy ideals and fuzzy bi-ideals of a fuzzy semigroup. Murali [24] proposed a definition of a fuzzy point belonging to a fuzzy subset under a natural equivalence on a fuzzy set. The idea of quasi-coincidence of a fuzzy point with a fuzzy set, which is mentioned in [22], played a vital role in generating some different types of fuzzy subgroup. A new type of fuzzy subgroup (viz, a $(\varepsilon, \varepsilon \lor q)$-fuzzy subgroup) was introduced in an earlier paper Bhakat and Das [3, 4] by using the combined notions of “belongingness” and “quasi-coincidence” of fuzzy points and fuzzy sets. In fact, a