

CUBIC GENERALIZED BI-IDEALS IN SEMIGROUPS

ASMAT HADI AND ASGHAR KHAN

*Department of Mathematics
Abdul Wali Khan University
Mardan, KPK, Pakistan*

e-mail: khanmujtaba2011@hotmail.com
azhar4set@yahoo.com

Abstract

In this paper, the concept of a cubic generalized bi-ideal in a semigroup is introduced, which is a generalization of the concept of a fuzzy generalized bi-ideal and interval-valued fuzzy generalized bi-ideal. Using this concept some characterization theorems are provided. In particular, we characterize regular semigroups by using cubic generalized bi-ideals. We show how the images or inverse images of a cubic generalized bi-ideal of a semigroup become a cubic generalized bi-ideal.

Keywords: semigroups, left (right) ideals, generalized bi-ideal, bi-ideal, cubic left (right) ideal, cubic bi-ideal, cubic generalized bi-ideal.

2010 Mathematics Subject Classification: 32A99, 08A72.

REFERENCES

- [1] J. Howie, Fundamentals of Semigroup Theory, London Mathematical Society Monographs. New Series, 12. Oxford Science Publications (The Clarendon Press, Oxford University Press, New York, 1995).
- [2] L.A. Zadeh, *Fuzzy sets*, Inform. Control **8** (1965) 338–353.
doi:10.1016/S0019-9958(65)90241-X
- [3] N. Kuroki, *On fuzzy ideals and fuzzy bi-ideals in semigroups*, Fuzzy Sets and Systems **5** (1981) 203–215. doi:10.1016/0165-0114(81)90018-X
- [4] N. Kuroki, *On fuzzy semigroups*, Inform. Sci. **53** (1991) 203–236.
doi:10.1016/0020-0255(91)90037-U
- [5] N. Kuroki, *Fuzzy semiprime quasi-ideals in semigroups*, Inform. Sci. **75** (1993) 201–211. doi:10.1016/0020-0255(93)90054-P

- [6] N. Kuroki, *Fuzzy generalized bi-ideals in semigroups*, Inform. Sci. **66** (1992) 235–243. doi:10.1016/0020-0255(92)90095-P
- [7] L.A. Zadeh, *The concept of a linguistic variable and its applications to approximate reasoning-I*, Inform. Sci. **8** (1975) 199–249. doi:10.1016/0020-0255(75)90036-5
- [8] Y.B. Jun, C.S. Kim and K.O. Yang, *Cubic sets*, Ann Fuzzy Math. Inform. **4** (2012) 83–98.
- [9] Y.B. Jun, A. Khan, *Cubic ideals in semigroups*, Honam Math. J. **35** (2013) 607–623. doi:10.5831/HMJ.2013.35.4.607
- [10] S.K. Majumder and M. Mandal, *Fuzzy generalized bi-ideals in Γ semigroups*, Fuzzy Inf. Eng. **4** (2012) 389–399. doi:10.1007/s12543-012-0122-0
- [11] Y.B. Jun, K.J. Lee and M.S. Kang, *Cubic structures applied to ideals of BCI-algebras*, Comput. Math. Appl. **62** (2011) 3334–3342. doi:10.1016/j.camwa.2011.08.042
- [12] S. Umar, A. Hadi and A. Khan, *On prime cubic bi-ideals of semigroups*, Ann Fuzzy Math. Inform. **9** (2015) 957–974.

Received 4 December 2013

Revised 1 November 2016