"Vasile Alecsandri" University of Bacău
Faculty of Sciences
Scientific Studies and Research
Series Mathematics and Informatics
Vol. 28(2018), No. 1, 5-28

GENERALIZED VERSION OF FUZZY δ-SEMICLOSED SET

ANJANA BHATTACHARYYA

Abstract. The notions of fuzzy δ-semiopen and fuzzy δ-semiclosed set have been introduced in [5]. Taking this idea as a basic tool, we introduce the notion of fuzzy generalized δ-semiclosed set ($fg\delta$-semiclosed set, for short). Then the mutual relationships between this set with fg-closed set [2, 3], fgs-closed set [3], fsg-closed set [3], $fg\beta$-closed set [3], $f\beta g$-closed set [3] are established. Afterwards, we introduce and characterize $fg\delta$-semiclosed function. In Section 4, a new type of idempotent operator, viz., generalized δ-semiclosure operator is introduced and studied some of its properties. Next we introduce and characterize fuzzy generalized δ-semicontinuous function and show that the composition of two fuzzy generalized δ-semicontinuous functions may not be so. In Section 5, we introduce and characterize fuzzy generalized δ-semiregular and fuzzy generalized δ-seminormal spaces and also we prove the invariance of the propery of a fuzzy topological space of being generalized δ-seminormal, under fuzzy generalized δ-semiirresolute function. In the last section, we first introduce fuzzy generalized δ-semi T_2-space and then three different types of fuzzy continuous-like functions are introduced and establish that the inverse image of fuzzy generalized δ-semi T_2-space under these functions are fuzzy T_2-spaces [13].

Keywords and phrases: $fg\delta$-semiclosed set, $fg\delta$-semiclosed function, $fg\delta$-semicontinuous function, $fg\delta$-semiregular (normal) space, $fg\delta$-semi T_2-space.
(2010) Mathematics Subject Classification: 54A40, 54C99

References

[1] Azad, K.K.; On fuzzy semi-continuity, fuzzy almost continuity and fuzzy weakly continuity, *J.Math. Anal. Appl.*, 82 (1981), 14-32.
[2] Balasubramanian, G. and Sundaram, P.; On some generalizations of fuzzy continuous functions, *Fuzzy Sets and Syatems*, Vol. 86 (1997), 93-100.
[3] Bhattacharyya, Anjana; $fg^*\alpha$-continuous functions in fuzzy topological spaces, *International Journal of Scientific and Engineering Research*, Vol. 4, Issue 8 (2013), 973-979.
[4] Bhattacharyya, Anjana; Fuzzy generalized continuity, *Annals of Fuzzy Mathematics and Informatics*, Vol. 11, No. 4 (April 2016), 645-659.
[5] Bhattacharyya, Anjana; Several concepts of continuity in fuzzy setting, *e-Proceedings, The 10th International Conference MSAST*, 5(2016), 282-293.
[6] Bhattacharyya, Anjana; Fuzzy generalized closed sets in a fuzzy topological space, *The Journal of Fuzzy Mathematics*, Vol. 25, No. 2 (2017), 285-301.
[7] Chang, C.L.; Fuzzy topological spaces, *J. Math. Anal. Appl.*, 24 (1968), 182-190.
[8] Fath Alla, M.A.; On fuzzy topological spaces, Ph.D. Thesis, Assiut Univ., Sohag, Egypt (1984).
[9] Ganguly, S. and Saha, S.; A note on δ-continuity and δ-connected sets in a fuzzy set theory, *Simon Stevin*, 62 (1988), 127-141.
[10] Hutton, B.; Normality in fuzzy topological spaces, *J. Math Anal. Appl.*, 50 (1975), 74-79.
[11] Pu, Pao Ming and Liu, Ying Ming; Fuzzy topology I. Neighbourhood structure of a fuzzy point and Moore-Smith Convergence, *J. Math Anal. Appl.*, 76 (1980), 571-599.
[12] Pu, Pao Ming and Liu, Ying Ming; Fuzzy topology II. Product and Quotient spaces, *J. Math. Anal. Appl.*, 77 (1980), 20-37.
[13] Sinha, S.P.; Study of some fuzzy topological problems, *Ph.D. Thesis*, University of Calcutta (1990).
[14] Thakur, S.S. and Saraf, R.K.; Fuzzy pre-semiclosed mappings, *Ind. Sci. Cong* (CHENNAI) 1999.
[15] Wong, C.K.; Fuzzy points and local properties of fuzzy topology, *J. Math. Anal. Appl.*, 46 (1974), 316-328.
[16] Zadeh, L.A.; Fuzzy Sets, *Inform. Control*, 8 (1965), 338-353.

Victoria Institution (College),
Department of Mathematics,
78B, A.P.C. Road,
Kolkata-700009, India
e-mail: anjanabhattacharyya@hotmail.com