On Equality of Infimum Soft Sequences

[1]Abdulsattar Abdullah hamad, [2]Dr.Raad A.Hameed, [3] Muayyad Mahmood Khalil,
[4]Dr.Azher Abbas mohammad Ayad hammad
,Dept of mathematics,College of sciences ,Acharya Nagarjuna University ,AP,Guntur

Abstract: *in present research paper we give one new theorem for Equality of infimum soft sequences and in this work we are proved*

$$inf\ \{inf\ \{X_a, X_b, X_C\} = inf\ \{X_a, X_b, X_c\}$$

Key Words : *Equality, soft sequences, soft real sets*

.

Introduction: In a recent paper, Dubois and Prade [3] pointed out that "Zadeh [11] used the word *fuzzy*' as referring especially to the introduction of *shades* or *grades* in *all or noting concepts*". According to Zadeh [11], a fuzzy set is a generalization, in the naïve sense, of a subset with boundaries "*gradual* rather than *abrupt* or *sharp*". It is defined by a membership function from a basic set to the unit interval and its cuts are sets. Different variations of fuzzy sets are defined by various authors such as Atanassov [2], Pawlak[10] etc. However there is confusion in the literature between the word *fuzzy*' and the words *imprecise inexact vague*' etc. which rather refer to lack of sufficient information, whereas the term 'fuzzy' explicitly refers to the idea of gradual transition from 'yes' to 'no'. For example, by a fuzzy number [4], we generally mean a function which is upper semi continuous, normal and convex so that its closed interval , for each α So it may be termed as '*fuzzyinterval* commented by Dubios and Prade [3]) as its α -level set is an interval, not a number. In fact the interval represents the 'imprecision' in choosing a number that lies within it and after removal of which we get a number, whereas the values may be represented as a tool representing the gradual transition process. Thus in the present definition of fuzzy real number "fuzziness" as well as "imprecision" are both combined. This could be better understood if one performs (as is done in the engineering problem) the defuzzification of a fuzzy real number by swapping these two steps: given a fuzzy number-revoving first the imprecision (i.e., by selecting a real number r from the interval for each and after that what remains is the pure 'graduality' or the 'fuzziness' of numbers and removing this fuzziness in the second step the defuzzification process completes, thus getting a crisp number. Initiated by this observation Dubios and Prade [3,4] define gradual number (the terminology is used to avoid confusion with the existing terminology fuzzy number) to be such a fucnion that to each there corresponds a number (real) which explains "fuzz iness"without"imprecision".This problem leads ultimately to the introduction of the notion of *fuzzy element* [3] of fuzzy set. On the other hand, in 1999, D. Molodtsov [9] proposed an idea of soft set as a parameterized family of sets where the parameter takes vales over an arbitrary set instead of the unit interval I□ [0,1] or some suitable lattice L as in the caseof a fuzzy set. In fact if X is a universe and E is a non-empty set then a mapping from E to 2X is called a soft set whereas a fuzzy set on X can be represented (with respect to the level set decomposition) as a mapping from I (or L) to 2X . Subsequently R. Biswas, A. Roy, P. K. Maji, A. Mukherjee [6,7], H. Aktas, & N. Cagman [1], Z. Pawlak [10], P. Majumdar and S. K. Samanta [8] have progressed significantly in the theoretical study on soft sets and their applications.

1- Equality and inequality of soft real sets

In this section we define different types of equality and inequality of soft real sets

Definition 1.1. Let $(F, A), (G, A) \in R(A)$ then

(I)-(F,A)said to be equal to (G,A) and denoted by (F,A)= $(G, A), if \quad F(\lambda) = G(\lambda), \forall \lambda \in A$

(II)-(F,A) is said to be upper (lower) soft equal to (,A) an denoted by $(F, A) \cong (G, A)(F, A) \cong (G, A), if$ $\sup F(\lambda) = \sup G(\lambda), (\inf F(\lambda) = \inf G(\lambda)), \forall \lambda \in A.$

(III)- (F,A) Said to be soft equal to (G,A) and denoted by $(F, A) \approx (G, A)$, if $(F, A) \cong (G, A) and\ (F, A) \cong (G, A).$

Now we define inequalities of soft real sets as follows:

Definition 1.2 let $(F, A), (G, A) \in R(A)$ then

(I)-Upper (lower) soft inequality, denoted by $(F,A) <^{s} (G,A)$ (or $(F,A) <_{s} (G,A)$,

Is said to be hold iff $\sup F(\lambda) \leq \sup G(\lambda), (or \quad \inf F(\lambda) \leq \inf G(\lambda) \forall \lambda \in A$

The notation $(F,A)\ ^{s}> (G,A) (or\ (F,A)_{s} > (G,A))$ is equivalent to

$(G,A) <^{s} (F,A) (or\ (G,A) <_{s} (F,A)$.

(I I)- soft inequality denoted by $(F,A)s < (G,A)$ .is said to be hold iff $\inf F(\lambda) \leq \inf G(\lambda)$ and $\sup F(\lambda) \leq \sup G(\lambda), \forall \lambda \in A$ then notation $(F,A) > s(G,A)$ is equivalent to $(G,A)s < (F,A)$).

(III)- Strong soft inequality denoted by $(F,A)_{s>}(G,A)$ is said to hold iff $\sup F(\lambda) < \inf G(\lambda), \forall \lambda \in A$.

The notation $(F,A)_{s>}(G,A)$ is equivalent to $(F,A)_{<s}(G,A)$.

Definition 1.3. Let (F,A) be a soft real set and $\overline{0}$ be the soft real set such that

$\overline{0}(\lambda) = \{0\}, \forall \lambda \in A$ .then (F,A) is said to be

(i) positive soft real set if $\overline{0}_{<_s}(F,A)$

(ii) negative soft real set if $(F,A)_{<s}\overline{0}$,

(iii) non-negative soft real set if $F(\lambda)$ is a subset of the set of non-negative real number for each $\lambda \in A$,

(iv) non-positive soft real set if $F(\lambda)$ is a subset of the set of non-positive real number for each $\lambda \in A$,

Note 1.4. Every negative soft real set is also a non-positive soft real set.
Let us denote the set of all non-negative soft real sets by $R(A)^{*}$.

Note 1.5. '$\approx$'','$\cong$','$\equiv$' are all equivalence relations on the set of all soft real sets.

Note 1.6. In case of soft real numbers and hence of gradual numbers defined by Dubios and Prade, all the above three types of equalities are identical with the equality of soft real sets, provided a singleton soft real set is identified with a soft real number.

Note 1.7. '$<^{s}, <_{s}, <$' are all partial order relations on the set of all soft real sets with respect to upper soft equality, lower soft equality and soft equality of soft real sets respectively.

Note 1.8. In particular, in case of soft real numbers and hence for gradual numbers, all the above three inequalities become identical with the identification of singleton soft real sets with the corresponding soft real numbers.

Main Result

Theorem: for any (a,b,c) be a soft real element of infimum, then

$inf\ \{inf\ \{X_a, X_b, X_C\} = inf\ \{X_a, X_b, X_c\}$

$U \subseteq \inf\{X_a, X_b\}$and $U \leq X_C$ Proof: let $U=\inf\{\inf\{X_a,X_b,X_C\}$, and $V=inf\ \{X_a, X_b, X_c\}$

$v \leq X_a, V \leq X_b$ and $V \leq X_c$

$U \leq X_a, U \leq X_b, U \leq X_c, and$

$V \leq X_a, V \leq X_b$

$U \leq \inf\{X_a, X_b\}, X_c\}, and\ , V \leq \inf\{X_a, X_b\}, V \leq X_c$

$U \leq V\ , V \leq \inf\{X_a, X_b\}, V \leq X_c$

$\because inf\ \{inf\ \{X_a, X_b, X_C\} = inf\ \{X_a, X_b, X_c\}$

$\Rightarrow U \leq V\ , And\ , V \leq inf\ \{inf\ \{X_a, X_b\}, X_C\}$

$\Rightarrow U \leq V\ , And\ , V \leq U$

$\Rightarrow V \leq U$

$\therefore inf\ \{inf\ \{X_a, X_b, X_C\} = inf\ \{X_a, X_b, X_c\}$

where a,b,c any soft element

.

References

[1] Hac Aktas and Naim Cagman, Soft sets and soft groups, Informations Sciences,177 (2007), 2726-2735.
[2] K. Atanassov, Intuitionistic fuzzy sets, Fuzzy Sets and Systems, 20 (1986), 87-96.
[3] D. Dubois and H. Prade, Gradual elements in a fuzzy set, Soft Comput, 12 (2008), 165-175.
[4] J. Fortin, D. Dubois and H. Prade, Gradual numbers and their applications to fuzzy interval analysis, IEEE Transaction of Fuzzy Systems, 16 (2) (2008), 388-402.
[5] G. J. Klir and B. Yuan, Fuzzy sets and fuzzy logic, Theory and applications, Prentic-Hall of India Pvt.Ltd., (1997).
[6] P. K. Maji, R. Biswas and A. R. Roy, On soft set theory, Computers Math. Applic., 45 (2003), 555-562.
[7] P. K. Maji, R. Biswas and A. R. Roy, Fuzzy soft sets, The Journal of fuzzy Math., 9 (3) (2001), 589-602.
[8] P. Majumdar and S. K.Samanta, Similarity measure of soft sets, World Scientific Publishing Compa Vol. 4, No.1 (2008), 1-12.
[9] D. Molodtsov, Soft set theory-first results, Computers Math. Applic, 37 (4/5) (1999), 19-31.
[10] Z. Pawlak, Rough sets, International Journal of Information and Computer Sciences, 11 (1982), 341-356.
[11] L.A. Zadeh, Fuzzy sets, Infor. And Control, 8 (1965), 338-353.
[12] S.Das, S.k. samanta, soft real sets, soft real numbers and their properties, Journal of fuzzy mathematics vol.20,NO.3,2012.