On Some typical kind of Continuity in Soft Topological Space

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ABSTRACT

In this paper we have made an attempt to make results on some typical kind of continuous functions of Soft J Open and Soft J Closed sets in Soft Topological spaces. This study also describes the characterization of continuity with reference to our Soft J Open sets in Soft Topological Spaces.

Keywords—Soft J Open set, Soft J Continuous Functions, Soft Strongly J Continuous Functions and Soft Perfectly J Continuous Functions.

# INTRODUCTION

*Soft* set hypothesis was proposed by Molodtsov [4] in 1999 to manage vulnerability in a parametric way. A *Soft* set is a defined group of sets, instinctively *Soft* on the grounds that the limit of the set relies upon the boundaries. One idea of a set is the idea of dubiousness. Molodtsov [6] proposed *Soft* set as a totally nonexclusive numerical instrument for displaying vulnerabilities. There is no restricted condition to the depiction of articles. One of the critical benefits of soft topological spaces lies in their capacity to deal with complex frameworks with deficient or problematic information. They can display questionable conditions, rough thinking, and manage fractional data in a more regular and natural way contrasted with customary topological spaces.

# PRELIMINARIES

**Definition 2.1:[6]** A set on the universe is deﬁned by the set of ordered pairs , where such that for all . Hence is called an set . The value of may be , some of them may be , some may have non empty intersection.

**Definition 2.2: [2]**

1. A set over is called as a Set denoted by or if for all , .
2. A set over is called as an Set denoted by or if for all *,*

**Definition 2.3:[6]** Suppose be a collection of sets over with a fixed set of parameters. Then, is called a on if

1. belongs to .
2. The artbitrary union of sets in is again in .
3. The finite intersection sets in is again in .

The term is called . The members of are called sets in and complements of them are called sets in .

**Definition 2.4:[3]** A set of a is known as a  **set** if when and is . stands for the set of all .

**Definition 2.5.[3]** A of a space is known as a  **set** if its complement is a set. stands for the set of all sets.

**Definition 2.6.** **[1,5]** A map is called a

1. if the of every set in is in .
2. if the of every set in is in .
3. if the of every set in is in .
4. if the of every set in is in .
5. if the of every set in is in .
6. if the of every set in is in .
7. if the of every set in is in .
8. if the of every set in is in .
9. if the of every set in is in .
10. if the of every set in is in .
11. if the of every set in is in .
12. if the of every set in is in .
13. if the of every set in is in .

if the of every set in is in .

**Result 2.7.[6]**

* + - 1. Each one of the set remains .
      2. Each one of the remains .
      3. Each one of the set remains .
      4. Each one of the remains .
      5. Each one of the set remains .
      6. Each one of the set remains .
      7. Each one of the set remains .

# FUNCTIONS

**Deﬁnition 3.1:** A map is known as if the of each one of the set in is both and (i.e ) in .

**Theorem 3.2:** Each one of the map is .

**Proof:** Let be and be a set in . Thereon is in . Since is , is in . By Result 2.7, is .

**Remark 3.3:** It is observed from the subsequent illustration that the reverse implication of the above theorem is incorrect.

**Example 3.4:** Let Define and as and . Consider the Soft topologies where and are described this way: and where and are described this way: and . Precisely the mapping is Soft totally J continuous. The set defined as is a set in . But is not in . Hence is not .

**Theorem 3.5:** Each one of the map is .

**Proof:** Let is and be set in . Since is , is in . Then is in . Thereupon is .

**Remark 3.6:** It is observed from the subsequent illustration that the reverse implication of the above theorem is incorrect.

**Example 3.7:** Let Define and as and . Consider the Soft topologies where and are described this way: and where is described this way: . Let be a mapping. Precisely is but not , because is not in .

**Theorem 3.8:** Each one of the map is .

**Proof:** is . Let be a set in . Then is in . Also, is in . Thus is .

# FUNCTIONS

**Deﬁnition 4.1:** A map is known as if the of each one of the set in is in .

**Example 4.2:** Let Define and as and . Consider the topologies where and are deﬁned as and where is described this way: . Let be a mapping. Precisely is .

**Proposition 4.3:** If is then it is .

**Proof:** It is verified by Result 2.7, that each one of the set is in .

**Proposition 4.4:** If is then it is .

**Proof:** It is verified by Result 2.7, that each one of the set is in .

**Proposition 4.5:** If is then it is .

**Proof:** It is proved by Result 2.7, that each one of the set is in .

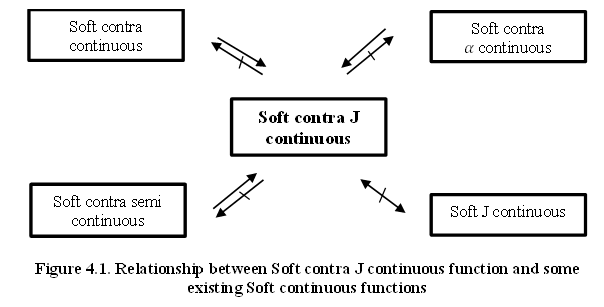
**Result 4.6:** It is observed from the subsequent illustration that the reverse implication of the above propositions 4.3, 4.4, 4.5 are incorrect.

**Example 4.7:** Consider the set in Example 4.2. Here, is not ( closed, ) in . Hence is but not (, ).

**Remark 4.8:** and are independent. It is observed from the subsequent illustration.

**Example 4.9:**

1. Let Define and as and . Consider the topologies where and are described this way: and where and are described this way: . Precisely the mapping is . The inverse-image of the set , is not a set in . Hence is not .
2. Let Define and as and . Consider the where and are deﬁned as and where is described this way: . Let be a mapping. Precisely is . The set defined as is in but its is not in . Hence is not .

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**Lemma 4.10:** The following properties hold for the subsets of a space .

1. and if is in .

2. then .

**Proof:** The proof is obvious.

**Theorem 4.11:** For a mapping the subsequent properties are equivalent. Assume that is closed under any union and is closed under any intersection.

1. is .

2. The of a set of is .

3. for each one of the subset of of .

4. for each one of the subset of .

**Proof:**

It is evident.

Let be any subset of . Suppose . Then by lemma 4.10, there exists such that . Thus and . Therefore, and . Thereon for every subset of of .

Let be any subset of . Then by (3) and Lemma 4.10, and then .

Let be any subset of . Therefore, by hypothesis and by Lemma 4.10, . So, . This reveals that is in . Hence is .

**Result 4.12:** The composition of two functions need not be and it is observed from the subsequent illustration.

**Example 4.13:** Let and Define and as and . Consider the topologies where and are described this way: , where is described this way: and where and are described this way: . Let and be two mappings. Precisely and are but their composition is not because is not in .

**Proposition 4.14:** If is and is then their composition is .

**Proof:** Let be a set in . Since is is in . Because is , is in . So is .

**Proposition 4.15:** If is and is then their composition is .

**Proof:** Let be a set in . Since is is in . Since is is in . Thus is .

**Proposition 4.16:** If is and is then their composition is .

**Proof:** Let be a set in . Since is is in . Since is is in . By Result 2.7, is in . Thus is .

**Proposition 4.17:** If is and is then their composition is .

**Proof:** Let be a set in . Since is is in . Since is , is in . By Result 2.7, is in . Thus is .

**Theorem 4.18:** Let be any family of . If is then is for each , where is the of onto .

**Proof:** It has been verified by the combination of facts that is continuous.

**Theorem 4.19:** If is a and is a map such that their composition is , then is .

**Proof:** Let be a set in . Since is a , is in . Because is and , is in . Thereon is .

**Theorem 4.20:** If is and is then is .

**Proof:** Let be an arbitrary of and be a set of containing . Since is , there exists a set in containing such that . Now, is a set in containing and is . Therefore, by Theorem 4.11 there exists such that . Then . Hence is .

**Proposition 4.21:** If is and is is .

**Proof:** Let be a any set in . Since is , is in . Since is is set in . Because each one of the set is , is set in . Thus is .

**Theorem 4.22:** If and be any two maps then

1. is if both and are .
2. is if is and is .

**Proof:**

1. Let be a set in . Since is , is in . Because is is in . So, is .
2. Let be a set in . Since is is in . Since is is in . So, is .

**Theorem 4.23:** If and be any two then

1. is if is and are .
2. is if both and are .
3. is if is and is .
4. is if is and is .
5. is if is and is .

**Proof:**

1. Let be a set in . Since is is in . Since is is in . So, is .
2. Let be a set in . Since is is in . By Result 2.7, is set in . Because is also , is in . Thus is .
3. Let be a set in . Since is is in . Since is is in . Thus is .
4. Let be a set in . Since is is in . By Result 2.7, is set in . As is , is in . So, is .
5. Let be a set in . Because is is in . Since is is in . Thus is .

**Theorem 4.24:** If and be any two maps then

1. is if is and are .
2. is if both and are .
3. is if is and is .

**Proof:**

1. Let be a set in . Since is is in . Since is is in . Thus is .
2. Let be a set in . Since is is in . By Result 2.7, is set in . Now, is also , then is in . Thus is .
3. Let be a set in . Since is , is set in . Since is is in . So, is .

**Theorem 4.25:** If and be any two maps then

1. is if is and are .
2. is if is and is .

**Proof:**

1. Let be a set in . Since is is set in . By Result 2.7, is set in . Since is is in . Thus is .
2. Let be a set in . Since is is in . Since is is in .Thus is .

**Theorem 4.26:** Let and be any two maps then their composition is if is and is .

**Proof:** Let be a set in . Since is is in . Since is is in . Thus is .

**Theorem 4.27:** If is and is then their composition is .

**Proof:** Let be a set in . Since is is in . Since is is in . Thus is .

**Theorem 4.28:** If is and is then their composition is .

**Proof:** Let be a set in . Since is is in . Since is is in . Then by Result 2.7, is in . Thus is .­

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