International Journal of Engineering and Information Systems (IJEAIS)
ISSN: 2000-000X
Vol. 2 Issue 8, August – 2018, Pages: 55-58

Another Results on Feebly Open Set With Respect to Ideal Topological Spaces

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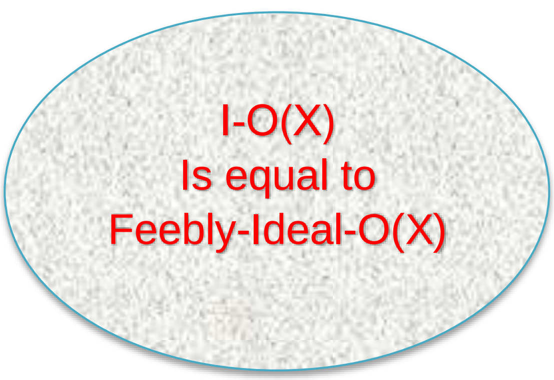
Abstract: *This paper introduce a new result about the definition of feebly open set in ideal topological spaces which is complementary to the results obtained in a previous research [1].*

Keywords: feebly open set, I-open set. Feebly ideal -open set, feebly ideal T_i, ideal topological spaces

1. Introduction

In [1] we are defined the feebly open set with respect to ideal topological space as follow : subset A of an ideal topological space X is say to be feebly I – open set if $A \subseteq scl(int(A^*))$ and since A^* is closed set we get that the set of all I-open set and feebly I-open set are equal , there for we use the set of feebly open set to expand the space of I-open sets to feebly –I-open sets .



Where $A \subseteq Scl(int(A^*))$

Where $A \subseteq Scl\left(int_f(A^*)\right)$

Similar results were obtained by adding some conditions and also some other results introduced

In this paper $int_f(A)$ *mean the feebly interior of the set A where* $int(A) \subseteq int_f(A)$ *and also* $int_f(A \cap B) \subseteq int_f(A) \cap int_f(B)$.

***Definition* (1-1)**

Let (X, T) be a topological space and I be an ideal defined on X, a subset A of X is said to be feebly-ideal-open set in the ideal topological space (X, T, I) if $A \subseteq Scl\left(int_f(A^*)\right)$ and the family of all feebly-ideal-open sets denoted by F-I-O(X) .

***Example* (1-2)**

Let X={a,b,c,d,e} ,T={X, ∅,{a},{d},{a,d},{c,d},{a,c,d},{a,b,d,e}} and I={∅,{a}} then

S.O(X)={X, ∅,{a},{d},{a,b},{a,c},{c,d},{a,b,c},{a,c,d},{b,c,d},{c,d,e},{a,b,c,d},{a,b,d,e},{b,c,d,e},{a,d},{a,b,d},{a,c,d},{a,d,e},{a,c,d,e}}.

F.O={X, ∅,{a},{d},{a,d},{c,d},{a,b,d},{a,b,c},{a,c,d},{b,c,d},{c,d,e},{a,b,c,d},{a,c,d,e},{a,b,d,e},{b,c,d,e}}

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F-I-O(X)={∅,{d},{b,d},{c,d},{d,e},{b,c,d},{b,d,e},{c,d,e},{b,c,d,e}}

Definition (1-3)

Let (X, T) be a topological space and I be an ideal defined on X, a subset A of X is said to be feebly-ideal-neighborhood of a point x∈X if there exist feebly-ideal-open set G in X such that x∈G⊆A.

Theorem (1-4)

A subset A of ideal topological (X, T, I) is Feebly-ideal-open set if and only if it is feebly-ideal-nbd. of each of its point.

Proof

Let A is Feebly-ideal-open then ∀ x∈ A x∈A⊆A then A is Feebly-ideal-nbd for every x in A , Conversely let A is Feebly-ideal-nbd if A=∅ then A is open if A ≠ ∅ then ∀ x∈ A there exist U_x∈ Feebly-ideal-open set such that x∈U_x⊆A , A=∪{U_x:x∈ A} then A is Feebly-ideal-open.

Definition (1-5)

Feebly-ideal- interior of a subset A of An ideal topological space (X, T, I) is the union of all Feebly-ideal-open set containing in A and it is denoted by F-I-int(X).

***Definition* (1-6)**

Feebly-ideal-closure of a subset A of a topological space(X, T, I) is the intersection of all Feebly-ideal-closed subset of X continuing A, and it is denoted by F-I-CL(X).

Proposition (1-7)

Let (X, T, I) be an ideal topological space if {Aλ;λ ∈ Λ} is a family of feebly-ideal-open set, then ∪ {Aλ;λ ∈ Λ} is feebly-ideal-open set.

Proof

Let Aλ is F-I-open set ,∀ λ then Aλ ⊆Scl(int_f(A^*λ)) then ∪Aλ ⊆∪Scl(int_f(A^*λ)) and then ∪Aλ ⊆ Scl(int_f(∪Aλ)*) therefor ∪Aλ is F-I-open set .

***Theorem* (1-8)**

Let (X, T, I) be an ideal topological space, if A is T-open set and B is feebly-ideal-open set, then A ∪ B and A ∩ B is not feebly-ideal-open set.

Example (1-9):

Let X={a,b,c,d,e}
,T={X, ∅,{a},{d},{a,d},{c,d},{a,c,d},{a,b,d,e}} and I={∅ } then

F-I-O(X)={∅,X,{a},{,d},{c,a},{d,e},{a,d},{b,d},{c,d}, {a,b,c}{a,b,d}{b,c,d}{a,c,d}
{b,d,e}{c,d,e}{a,b,c,d}{b,c,d,e}{a,c,d,e}{a,b,d,e}}

now {a,c,d,e} is feebly ideal open set and {a,b,d,e} is open set then

{a,c,d,e} ∩{a,b,d,e} ={a,d,e} which is not feebly ideal open set and {a}is open set ,{d,e}is feebly ideal open set then

{a}∪{d,e}=={a,d,e}which is not feebly ideal open set

***Theorem* (1-10)**

Let (X, T, I) be an ideal topological space then if A is feebly-ideal-open set then A is ∗-dence in itself.

***Proof*:** Exist by definition
The converse of the above theorem is not true as we show in the following example

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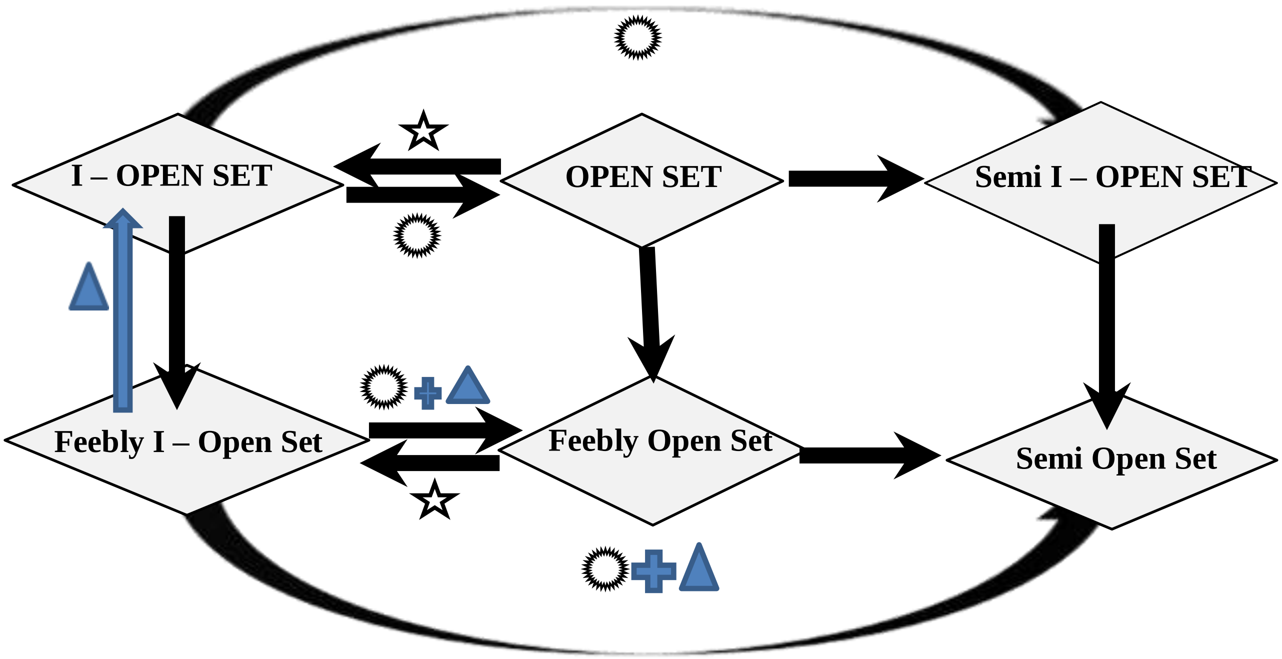
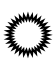
***Example* (1-11)**

By example (1.2) we get that $\{b\}^*=\{b,e\}$ then $\{b\} \subseteq \{b\}^*$ but {b} is not F-I-open.

The following diagram displays previous results with new conditions



 : mean that the set is T^*- closed

: Means that the set is * -dense in itself .

: mean that every F-I-open set is open set.

***Definition* (1-12)[2]**

Let (X, T, I) be an ideal topological space then :

1) feebly-ideal-T_0 space :- if for each pair of distinct point x and y in X there exist feebly-ideal-open set U in X such that $x \in U$ and $y \notin U$ or $y \in U$ and $x \notin U$.

2) feebly-ideal-T_1 space :- if for each pair of distinct point x and y in X there exist feebly-ideal-open set U_1 , U_2 in X, such that $x \in U_1$, $y \in U_2$.

3) feebly-ideal-T_2 space:- if for each two pair of distinct point x and y in X there exist disjoint feebly-ideal-open set U_1 , U_2 in X, such that $x \in U_1$, $y \in U_2$.

4) **feebly- ideal-regular space**: if for each H closed set subset of X such that $x \notin H$, there exist disjoint feebly-ideal-open set U_1 , U_2 such that $x \in U_1$, $H \subseteq U_2$ and if X is feebly-ideal-regular space and feebly-ideal-T_1 space, then X is called feebly - ideal-T_3

5) **feebly-ideal- normal space :** if for each U_1 , U_2 of disjoint closed subsets of X, there is a pair V_1 , V_2 of disjoint feebly-ideal-open sets of X such that $U_1 \subseteq V_2$ and $U_2 \subseteq V_2$, and if X is feebly-ideal-T_1 space and feebly-ideal-normal space then X is feebly-ideal -T_4 space .

Definition (1-13)

Let (X,T,I) be an ideal topological space and let Y⊆X then (y,T_y ,I_y)is a subspace of the ideal topological space X were T_y={G∩Y:G ∈T} I_Y={H∩Y:H ∈I}.

Remark (1-14)

Let (X, T, I) be an ideal topological space than F-I-T_i – space is not hereditary property for each i where i=0, 1,2,3,4 .

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