International Journal of Pure and Applied Mathematics
Volume 118 No. 6 2018, 159-166
ISSN: 1311-8080 (printed version); ISSN: 1314-3395 (on-line version)
url: http://www.ijpam.eu
Special Issue
ijpam.eu

$I_{\ddot{g}}$-Totally continuity and $I_{\ddot{g}}$-connectedness in Ideal Topological Spaces

T. Indira[1] and S. Vijayalakshmi[2]

[1]*PG and Research Department of Mathematics,*
Seethalakshmi Ramaswami College, Trichy-2.
drtindira.chandru@gmail.com
[2]*PG and Research Department of Mathematics,*
Seethalakshmi Ramaswami College, Trichy-2.
viji93selva@gmail.com

Abstract

The intention of this paper is to introduce $I_{\ddot{g}}$-Totally continuity and $I_{\ddot{g}}$-connectedness in Ideal topological spaces. It also aims to study the properties of $I_{\ddot{g}}$-continuous function and $I_{\ddot{g}}$-connectedness space.

AMS Subject Classification: 54A05,54D10.

Key Words and Phrases:$I_{\ddot{g}}$-Totally continuous function, Totally $I_{\ddot{g}}$-continuous function, $I_{\ddot{g}}$-separated sets and $I_{\ddot{g}}$-connectedness space.

1 Introduction

Ideal in topological spaces have been considered since 1930. This topic has won its importance by the paper of Vaidhaynathaswamy[10]. Applications to various fields were further investigated by Jankovic[4] and Hamlett[5]; Dontchev et al[1]; Mukherjee et al[7], etc. In 1960, Levin[6] introduced strongly continuous maps. In 1984, Noiri introduced and studied perfectly continuous maps.

In topology and related branches of mathematics a connected space is a topological space that cannot be requested as the union of two disjoint non-empty open sets. Connectedness is one of the principle topological spaces. In 2008, Ekici[2] introduced connectedness in ideal topological spaces.

The purpose of this paper is to introduce the notion of $I_{\ddot{g}}$-totally continuity, totally $I_{\ddot{g}}$-continuity, $I_{\ddot{g}}$-separated sets and $I_{\ddot{g}}$-connectedness in ideal topological spaces and also to investigate their properties.

2 Preliminaries

The present paper throughout by (X,τ) or (Y,σ) denote a topological space with no separation properties assumed. For a subset A of a topological space (X,τ), $cl(A)$, and $Int(A)$ will denote the closure and interior of A in (X,τ) respectively.

Definition 1. An ideal I on a topological space (X,τ) is a non-empty collection of subsets of X which satisfies,
(1) $A \in I$ and $B \subset A \implies B \in I$.
(2) $A \in I$ and $B \in I \implies A \cup B \in I$.
An ideal topological space is a topological space (X,τ) with an ideal I on X and is denoted by (X,τ,I).

Definition 2. For a subset $A \subset X$,

$$A^*(I) = \{x \in X : U \cap A \notin I \text{ for every neighbourhood U of x}\}$$

is called the local function of A with respect to I and τ. We simple write A^* instead of $A^*(I)$ to be brief.

Definition 3. For every ideal topological space (X,τ,I) there exists a topology $\tau^*(I)$, finer that τ, generated by $\beta(I,\tau) = \{U - i : U \in \tau andi \in I\}$, but in general $\beta(I,\tau)$ is not always a topology. Additionally, $cl^*(A) = A \cup A^*$ defines a kuratowski closure operator for $\tau^*(I)$.

Definition 4. [3] A subset A of an ideal topological space (X,τ,I) is said to be
(1)I$_{\ddot{g}}$-closed if $A^* \subseteq U$ whenever $A \subseteq U$ and U is sg-open.
(2)I$_{\ddot{g}}$-open if its complement is I$_{\ddot{g}}$-closed.

Definition 5. A function $f : (X,\tau) \to (Y,\sigma,J)$ is said to be
(1) I$_{\ddot{g}}$-continuous($I_g - continuous$) if the inverse image of every closed set in Y is I$_{\ddot{g}}$-closed
($I_g - closed$) in X.
(2)Strongly I$_{\ddot{g}}$-continuous if the inverse image of every I$_{\ddot{g}}$-closed set in Y is closed in X.
(3) Perfectly I$_{\ddot{g}}$-continuous if the inverse image of every I$_{\ddot{g}}$-open set in (Y,σ,J) is both open and closed in (X,τ).

lemma 6. Every closed set in (X,τ,I) is I$_{\ddot{g}}$-closed set[3].

Definition 7. Let (X,τ,I) be a ideal topological space $A \subset X$. The intersection of all I$_{\ddot{g}}$-closed supersets of A is called the closure of A and is denoted by $Cl_{I_{\ddot{g}}}(A)$.

3 I$_{\ddot{g}}$-Totally Continuous Function

Definition 8. A function $f : (X,\tau,I) \to (Y,\sigma,I)$ is called I$_{\ddot{g}}$-totally continuous function if the inverse image of every I$_{\ddot{g}}$-open subset of Y clopen in X.

Theorem 9. *A function $f : (X,\tau,I) \to (Y,\sigma,I)$ is I$_{\ddot{g}}$-totally continuous function if only if the inverse image of every I$_{\ddot{g}}$-closed subset of Y is clopen in X.*

Proof. Let F be any I$_{\ddot{g}}$-closed set in Y. Then F^c is I$_{\ddot{g}}$-open in Y. By definition 8, $f^{-1}(F^c)$ is clopen in X. But $f^{-1}(F^c)$=$(f^{-1}(F))^c$, which is clopen in X implies $f^{-1}(F)$ is

clopen in X.
Conversely, suppose V is I$_{\ddot{g}}$-open in Y, then V^c is I$_{\ddot{g}}$-closed set in Y. By hypothesis, $f^{-1}(V^c)$=$(f^{-1}(V))^c$, which is clopen in X implies $f^{-1}(V)$ is clopen in X. Hence the inverse image of every I$_{\ddot{g}}$-open set in Y is clopen in X..Thus f is I$_{\ddot{g}}$-totally continuous. □

Theorem 10. *Every I$_{\ddot{g}}$-totally continuous functions is perfectly continuous.*

The converse of the above theorem need not be true as seen from the following example.

example 11. Let $X = Y = \{a, b, c\}$; $\tau = \{\emptyset, X, \{b\}, \{c\}, \{b, c\}\}$; $I = \{\emptyset, \{a\}\}$; $\sigma = \{\emptyset, Y, \{a\}\}$; $J = \{\emptyset, \{a\}\}$. I$_{\ddot{g}}$-open sets are $X, \emptyset, \{b\}, \{c\}, \{b, c\}$. I$_{\ddot{g}}$-open sets are $Y, \emptyset, \{a\}, \{b\}, \{a, b\}$.
Define a function $f : (X, \tau, I) \to (Y, \sigma, J)$ by $f(a) = b; f(b) = a; f(c) = c$. Then the inverse image of every open set in Y is clopen in X. Since $\{a\} \in Y \implies f^{-1}(\{a\}) = \{b\}$. Therefore $\{b\}$ is clopen in X. Thus f is perfectly continuous but f is not I$_{\ddot{g}}$-totally continuous. Since the I$_{\ddot{g}}$-open set of Y, $f^{-1}(\{b\}) = \{a\}$ is not clopen in X.

Theorem 12. *Let $f : (X, \tau, I) \to (Y, \sigma, I)$ be a function. Then the following are equivalent.*

(i) f is I$_{\ddot{g}}$-totally continuous.

(ii) For each $x \in X$ and each I$_{\ddot{g}}$-open set V in Y with $f(x) \in V$, there is a clopen set U in X such that $x \in X$ and $f(U) \subseteq V$.

Proof. .
(i) $\Longrightarrow$ (ii)
Suppose f is I$_{\ddot{g}}$-totally continuous and V be any I$_{\ddot{g}}$-open set in Y containing $f(x)$ so that $x \in f^{-1}(V)$. Since f is I$_{\ddot{g}}$-totally continuous, $f^{-1}(V)$ is clopen in X. Let U=$f^{-1}(V)$, then U is clopen in X and $x \in U$. Hence $f(U)$=$f(f^{-1}(V)) \subseteq V \implies f(U) \subseteq V$.
(ii) $\Longrightarrow$ (i)
Let V be I$_{\ddot{g}}$-open set in Y. Let $x \in f^{-1}(V)$ be any arbitrary point. Then $f(x) \in V$, there is a clopen set $f(G) \subseteq X$ containing x such that $f(G) \subseteq V \implies G \subseteq f^{-1}(V)$ and $x \in G \subseteq f^{-1}(V)$. $f^{-1}(V)$ is neighbourhood of each of its points. Hence $f^{-1}(V)$ is clopen set in X. Thus f is I$_{\ddot{g}}$-totally continuous. □

Theorem 13. *If a function $f : (X, \tau, I) \to (Y, \sigma, I)$ is I$_{\ddot{g}}$-totally continuous then it is continuous but not conversely.*

example 14. Let $X = Y = \{a, b, c\}$; $\tau = \{\emptyset, X, \{b\}, \{c\}, \{b, c\}\}$; $I, J = \{\emptyset, \{a\}\}$; $\sigma = \{\emptyset, Y, \{a\}\}$. Define a function $f : (X, \tau, I) \to (Y, \sigma, J)$ by $f(a) = b; f(b) = a; f(c) = c$. Then the inverse image of every closed set in Y is closed in X. $[f^{-1}(\{b, c\}) = \{a, c\}]$. Thus f is continuous but f is not I$_{\ddot{g}}$-totally continuous. since for the subset $\{a\}$ is I$_{\ddot{g}}$-open set in Y, $f^{-1}(\{a\}) = \{b\}$ is open in X but not closed in X.

Theorem 15. *The composition of two I$_{\ddot{g}}$-totally continuous function is I$_{\ddot{g}}$-totally continuous.*

Proof. Let $f : (X, \tau, I) \to (Y, \sigma, J)$ and $g : (Y, \sigma, J) \to (Z, \eta, K)$ be any two I$_{\ddot{g}}$-totally continuous function. Let V be I$_{\ddot{g}}$-open in Z. Since g is I$_{\ddot{g}}$-totally continuous, $g^{-1}(V)$ is clopen and hence open in Y. Since every open set is I$_{\ddot{g}}$-open, $g^{-1}(V)$ is I$_{\ddot{g}}$-open in Y. Also f is I$_{\ddot{g}}$-totally continuous, $f^{-1}(g^{-1}(V))$ is clopen in X. But $f^{-1}(g^{-1}(V)) = (g \circ f)^{-1}(V)$. Which is clopen in X. Hence $g \circ f$ is I$_{\ddot{g}}$-totally continuous. □

Theorem 16. *If a function $f : (X, \tau, I) \to (Y, \sigma, J)$ is $I_{\ddot{g}}$-totally continuous then f is strongly $I_{\ddot{g}}$-continuous but not conversely.*

example 17. Let $X = Y = \{a, b, c\}$; $\tau = \{\emptyset, X, \{a\}, \{a, b\}\}$; $I = \{\emptyset, \{b\}\}$; $\sigma = \{\emptyset, Y, \{b\}, \{a, b\}\}$; $J = \{\emptyset, \{a\}\}$. Define a function $f : (X, \tau, I) \to (Y, \sigma, J)$ by $f(a) = b; f(b) = f(c) = a$.
$I_{\ddot{g}}$-closed sets are $X, \emptyset, \{c\}, \{b, c\}$,; $I_{\ddot{g}}$-open sets are $X, \emptyset, \{a\}, \{a, b\}, \{b, c\}$.
$I_{\ddot{g}}$-closed sets are $Y, \emptyset, \{a\}, \{c\}, \{a, c\}$; $I_{\ddot{g}}$-open sets are $Y, \emptyset, \{b\}, \{b, c\}, \{a, b\}$.
Then the inverse image of every $I_{\ddot{g}}$-open set in Y is open in X. Thus f is strongly $I_{\ddot{g}}$-continuous, but f is not $I_{\ddot{g}}$-totally continuous. Since the subset $\{b\}$ is $I_{\ddot{g}}$-open in Y. $f^{-1}(\{b\}) = \{a\}$ is open but closed in X.

Theorem 18. *Let X be a discrete topological space and Y be ideal space and $f : (X, \tau, I) \to (Y, \sigma, J)$ be a function where $I = \emptyset$. If f is strongly $I_{\ddot{g}}$-continuous then f is $I_{\ddot{g}}$-totally continuous.*

Proof. Let V be $I_{\ddot{g}}$-open in Y. since f is strongly $I_{\ddot{g}}$-continuous, $f^{-1}(V)$ is open in Y. Since X is discrete space, $f^{-1}(V)$ is both open and closed in X. Hence f is $I_{\ddot{g}}$-totally continuous. □

Definition 19. A function $f : (X, \tau, I) \to (Y, \sigma, J)$ is called totally $I_{\ddot{g}}$-continuity if $f^{-1}(V)$ is $I_{\ddot{g}}$-clopen in X for each open set V in (Y, σ, J).

Theorem 20. *Every totally $I_{\ddot{g}}$-totally continuous function is $I_{\ddot{g}}$-continuous. The converse of the above theorem need not be true as seen from the following example.*

example 21. In example 17 $f : (X, \tau, I) \to (Y, \sigma, J)$ by $f(a) = b; f(b) = a, f(c) = a$. then inverse image of every closed set in Y is $I_{\ddot{g}}$-closed in X. Thus f is $I_{\ddot{g}}$-continuous, but it is not totally $I_{\ddot{g}}$-continuous since the set $\{b\}$ is open in Y, $f^{-1}(\{b\}) = \{a\}$ is $I_{\ddot{g}}$-open and not $I_{\ddot{g}}$-closed in X.

Theorem 22. *Every $I_{\ddot{g}}$-totally continuous function is totally $I_{\ddot{g}}$-continuous.*

Proof. Suppose $f : (X, \tau, I) \to (Y, \sigma, J)$ is $I_{\ddot{g}}$-totally continuous. Let U be any open subset of Y. Then U is $I_{\ddot{g}}$-open in Y, $f^{-1}(U)$ is open in Y. Since f is $I_{\ddot{g}}$-totally continuous, $f^{-1}(U)$ is clopen in X □

4 $I_{\ddot{g}}$ - Connectedness

Definition 23. An ideal topological space (X, τ, I) is said to be $I_{\ddot{g}}$-connected if X cannot be written as the disjoint union of two non-empty $I_{\ddot{g}}$-open sets in X. If X is not $I_{\ddot{g}}$-connected if it is said to be $I_{\ddot{g}}$-disconnected. A subset of X if $I_{\ddot{g}}$-connected if it is $I_{\ddot{g}}$-connected as a subspace of X.

Theorem 24. *For an ideal topological space (X, τ, I). Then the following are equivalent.*
(i) X is $I_{\ddot{g}}$-connected.
(ii) X and $\emptyset$ are the only subsets of X which are both $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed.

Proof. (i) $\Longrightarrow$ (ii)
Suppose X is $I_{\ddot{g}}$-connected holds. To prove X and $\emptyset$ are the only subsets of X which are both $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed. Let V be a $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed subset of X. Then V^c is

both $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed subset of X..Therefore $X = V \cup V^c$, a disjoint union of two non-empty $I_{\ddot{g}}$-open sets. Which is contradiction to (i). Thus $V = \emptyset$ or X. Hence (i) $\Longrightarrow$ (ii).
(ii) $\Longrightarrow$ (i)
Suppose (ii) holds that is X and $\emptyset$ are the only subsets of X which are both $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed. To prove: X is $I_{\ddot{g}}$-connected. Suppose not, then $X = A \cup B$, where A and B are disjoint non-empty $I_{\ddot{g}}$-open subsets of X. Then A is both $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed. Also $A \neq \emptyset$ and $A \neq X$. Therefore A is proper non-empty subset of X which is both $I_{\ddot{g}}$-open and $I_{\ddot{g}}$-closed. Which is contradiction to our assumption. Hence (ii) $\Longrightarrow$ (i). □

Theorem 25. *Every $I_{\ddot{g}}$-connected space is connected. The converse of the above theorem need not be true as seen from the following example.*

example 26. Let $X = \{a, b, c, d\}$; $\tau = \{X, \emptyset, \{a\}, \{b, d\}, \{a, b, d\}\}$; $I = \{\emptyset, \{a\}\}$
$I_{\ddot{g}}$-closed sets are $X, \emptyset, \{c\}, \{a\}, \{a, c\}, \{b, c\}, \{a, b, c\}, \{b, c, d\}$;
$I_{\ddot{g}}$-open sets are $X, \emptyset, \{a\}, \{d\}, \{b, d\}, \{a, d\}, \{b, c, d\}, \{a, b, d\}$.
In ideal space X is connected but not $I_{\ddot{g}}$-connected because the set $X = \{a\} \cup \{b, c, d\}$ which are non-empty disjoint $I_{\ddot{g}}$-open sets.

Theorem 27. *Let (X, τ, I) be an ideal topological space. If X is $I_{\ddot{g}}$-connected, then X cannot be written as union of two disjoint non-empty $I_{\ddot{g}}$-closed sets.*

Proof. Suppose $X = A \cup B$, where A and B are $I_{\ddot{g}}$-closed sets $A \neq \emptyset$, $B \neq \emptyset$ and $A \cap B = \emptyset$. Then $A = B^c$ and $B = A^c$. Since A and B are $I_{\ddot{g}}$-closed,then A and B are $I_{\ddot{g}}$-open. There exists non-empty proper subsets A and B of X which are both $I_{\ddot{g}}$-clopen. Which is contradiction to our assumption therefore X cannot be written as the union of the disjoint non-empty $I_{\ddot{g}}$-closed sets. □

Theorem 28. *Let $f : (X, \tau, I) \to (Y, \sigma, J)$ be a function. If X is $I_{\ddot{g}}$-connected and f is $I_{\ddot{g}}$-irresolute surjective, then Y is $I_{\ddot{g}}$-connected.*

Proof. suppose Y is not $I_{\ddot{g}}$-connected. Then $Y = A \cup B$, where A and B are disjoint non-empty $I_{\ddot{g}}$-open sets in Y. Since f is $I_{\ddot{g}}$-irresolute and surjective. Then $X = f^{-1}(A) \cup f^{-1}(B)$ and $f^{-1}(A) \cap f^{-1}(B) = f^{-1}(\emptyset) = \emptyset$, where $f^{-1}(A)$ and $f^{-1}(B)$ are disjoint non-empty $I_{\ddot{g}}$-open in X. This contradicts to fact that X is $I_{\ddot{g}}$-connected. Hence Y is $I_{\ddot{g}}$-connected. □

Theorem 29. *Let $f : (X, \tau, I) \to (Y, \sigma, J)$ be a function. If X is $I_{\ddot{g}}$-connected and f is $I_{\ddot{g}}$-continuous surjective, then Y is connected.*

Proof. Let X be $I_{\ddot{g}}$-connected and f be $I_{\ddot{g}}$-continuous, surjective. Suppose Y is not connected. Then $Y = A \cup B$, where A and B are disjoint non-empty $I_{\ddot{g}}$-open sets in Y. Since f is $I_{\ddot{g}}$-continuous and surjective. Then $X = f^{-1}(A) \cup f^{-1}(B)$ and $f^{-1}(A) \cap f^{-1}(B) = f^{-1}(\emptyset) = \emptyset$, where $f^{-1}(A)$ and $f^{-1}(B)$ are disjoint non-empty $I_{\ddot{g}}$-open in X. This contradicts to fact that X is $I_{\ddot{g}}$-connected. Hence Y is connected. □

Theorem 30. *If a surjective map $f : (X, \tau, I) \to (Y, \sigma, J)$ is strongly $I_{\ddot{g}}$-continuous and X is connected space then Y is $I_{\ddot{g}}$-connected.*

Proof. Suppose Y is not $I_{\ddot{g}}$-connected. Then $Y = A \cup B$, where A and B are disjoint non-empty $I_{\ddot{g}}$-open sets in Y. Since f is strongly $I_{\ddot{g}}$-continuous and surjective map. Then $X = f^{-1}(A) \cup f^{-1}(B)$ and $f^{-1}(A) \cap f^{-1}(B) = f^{-1}(\emptyset) = \emptyset$, where $f^{-1}(A)$ and $f^{-1}(B)$ are disjoint non-empty open in X. This contradicts to fact that X is connected. Hence Y is $I_{\ddot{g}}$-connected. □

Theorem 31. *If $f : (X, \tau, I) \to (Y, \sigma, J)$ is $I_{\ddot{g}}$-totally continuous, surjective and X is connected space then Y is $I_{\ddot{g}}$-connected.*

Proof. Suppose Y is not $I_{\ddot{g}}$-connected. Then $Y = A \cup B$, where A and B are disjoint non-empty $I_{\ddot{g}}$-open sets in Y. Therefore $X = f^{-1}(Y) = f^{-1}(A) \cup f^{-1}(B)$ and $f^{-1}(A) \cap f^{-1}(B) = f^{-1}(\emptyset) = \emptyset$, where $f^{-1}(A)$ and $f^{-1}(B)$ are disjoint non-empty clopen in X(since f is $I_{\ddot{g}}$-totally continuous) implies X is not connected. This contradicts to fact that X is connected. Hence Y is $I_{\ddot{g}}$-connected. □

Definition 32. An ideal topological space (X, τ, I) is said to be $I_{\ddot{g}}$-separated if there exists two non-empty subsets A and B such that $cl_{I_{\ddot{g}}}(A) \cap B = \emptyset = A \cap cl_{I_{\ddot{g}}}(B)$.

Theorem 33. *Let (X, τ, I) be an ideal topological space and A be an open subset of X. If A is $I_{\ddot{g}}$-connected subset of X and H, G are $I_{\ddot{g}}$-separated subset of X with $A \subseteq H \cup G$ then either $A \subseteq H$ or $A \subseteq G$.*

Proof. Suppose $A \subseteq H \cup G$, where H and G are $I_{\ddot{g}}$-separated sets. Then $H \cap cl_{I_{\ddot{g}}}(G)=\emptyset = cl_{I_{\ddot{g}}}(H) \cap G$. Now $A \subseteq H \cup G$ implies $A = A \cap (H \cup G) = (A \cap H) \cup (A \cap G)$.
$cl_{I_{\ddot{g}}}(A \cap H) \cap (A \cap G) \subseteq \big(cl_{I_{\ddot{g}}}(A) \cap cl_{I_{\ddot{g}}}(H)\big) \cap (A \cap G) = \big(cl_{I_{\ddot{g}}}(A) \cap A\big) \cap \big(cl_{I_{\ddot{g}}}(H) \cap G\big) = \emptyset$.
Similarly $(A \cap H) \cap cl_{I_{\ddot{g}}}(A \cup G) = \emptyset$. Hence $A \cap H$ and $A \cap G$ are $I_{\ddot{g}}$-separated sets but A is connected one of them and their must be empty that is either $A \cap H = \emptyset$ or $A \cap G = \emptyset$.
$A \cap G = \emptyset \implies A \subset H$ or $A \cap H = \emptyset \implies A \subset G$. □

Theorem 34. *Let A and B are subsets of a connected space (X, τ, I) such that $A \subseteq B \subseteq cl_{I_{\ddot{g}}}(A)$. If A is $I_{\ddot{g}}$-connected then B is $I_{\ddot{g}}$-connected.*

Proof. Given that $A \subseteq B \subseteq cl_{I_{\ddot{g}}}(A)$ and A is $I_{\ddot{g}}$-connected. To prove: B is $I_{\ddot{g}}$-connected. Suppose not, there exists non-empty $I_{\ddot{g}}$-separated sets G and H such that $B = G \cap H$. Now $A \subset B = G \cap H \implies A \subset G \cap H$. Since A is $I_{\ddot{g}}$-connected by theorem either $A \subset G$ or $A \subset H$. Let $A \subset G \implies cl_{I_{\ddot{g}}}(A) \subseteq cl_{I_{\ddot{g}}}(G) \implies cl_{I_{\ddot{g}}}(A) \cap H \subseteq cl_{I_{\ddot{g}}}(G) \cap H = \emptyset$.
$\implies cl_{I_{\ddot{g}}}(A) \cap H = \emptyset$. $G \cup H = B \subset cl_{I_{\ddot{g}}}(A) \implies H \subset B \subset cl_{I_{\ddot{g}}}(A)$.
$cl_{I_{\ddot{g}}}(A) \cap H = H = \emptyset$. Which is a contradiction. Therefore B is $I_{\ddot{g}}$-connected. □

5 Conclusion

In this paper we introduced $I_{\ddot{g}}$-totally continuity, totally $I_{\ddot{g}}$-continuity, $I_{\ddot{g}}$-separated sets and $I_{\ddot{g}}$-connectedness and their properties were investigated. Further we proposed to introduced $I_{\ddot{g}}$-compactness, $I_{\ddot{g}}$-separated axioms, Higher separation axioms in ideal topological spaces.

References

[1] Dontchev.J, Ganster.M, Rose. D, Ideal resolvability, *Topology and its applications* **93**(1)(1999), 1-16.

[2] Ekici.E and Noiri.T,connectedness in ideal topological spaces, *Novi Sad J.Math*,**38** (2)(2008), 65-70.

[3] Indira.T and Vijayalakshmi.S, On $\ddot{g}$-closed sets in ideal topological spaces, *International journal of Innovative Research in Science*, *Engineering and Technology*, **6**,(8)(2017), 15987-15992.

[4] Jankovic.D and Hamlet.T.R, Compactible extensions of ideals, *Boll., Un. Mat. Ital*,**7**,6-B(1992), 453-465.

[5] Jankovic.D and Hamlet.T.R, New topologies from old via ideals, *Amer., Math. Monthly.*,**97**, (1990), 295-310.

[6] Levine.N, Strongly continuity in topological spaces, *Amer., Math. Monthly.*,**67**, (1990), 295-310.

[7] Mukherjee.M.N, Bishwambhar.R and sen.R, On extension of topological spaces in terms of ideals, *Topology and its applications*,**154**,(2007), 3167-3172.

[8] Sakthisathi.B and Murugesan, *rpsl*-connectedness and compactness in ideal topological spaces, *J.Comp and Math.Sci*,**Vol 4**, (2013), 431-436.

[9] Sakthisathi.B and Murugesan, *rpsl*-continuous function in ideal topological spaces, *International Journal of Mathematics Archieve*, **4**, (3)(2013), 305-308.

[10] Vaidyanathaswamy.R, The localization theory in set topology, *Proc.Indian Acad.Sci*, **20**, (1945), 51-61.