International Journal of Innovative Research in Science and Engineering
Vol. No.3, Issue 03, March 2017
www.ijirse.com
ISSN (O) 2454-9665
ISSN (P) 2454-0663

# $\alpha_T$ OPEN SETS IN TRI TOPOLOGICAL SPACE

**U.D.Tapi[1], Ranu Sharma[2]**

[1,2] *Department of Applied Mathematics and Computational Science, SGSITS, Indore (M.P.), India,*

**ABSTRACT**

*The main aim of this paper is to introduce new type of open sets namely $\alpha_T$ open sets in tri topological spaces along with their several properties and characterization .As application to $\alpha_T$ open sets we introduce* $\alpha_T$ continuous functions and obtain some of their basic properties.

***Keywords:*** $\alpha_T$ ***open sets***, $\alpha_T$ continuous ***function.***

**AMS** ***Mathematics Subject Classification (2010):*** 54A40

## I. INTRODUCTION

In 1961 J .C. Kelly [ II] introduced the concept of bitopolgical space. N. Levine [VI] introduced the idea of semi open sets and semi continuity and Mashhour et. al [ VII ] introduced the concept of pre open sets and pre continuity in a topological space. F.H. Khedr , S.M. Al-Areefi and T. Noiri [IV] generalize the notion of semi pre open sets to bitoplogical spaces and semi pre continuity in bitopological spaces. The concept of Pre-semi open sets ( $\alpha$ open sets ) was introduced by O. Njastad [VIII] in 1965. Tri topological space is a generalization of bitopological space . The study of tri-topological space was first initiated by Martin M. Kovar [V] .
S. Palaniammal [IX ] study tri topological space. N.F. Hameed and Moh. Yahya Abid [I] gives the definition of 123 open set in tri topological spaces .U.D. Tapi , R. Sharma and B. Deole [X] introduce semi open set and pre open set in tri topological space. The purpose of the present paper is to introduce $\alpha_T$ open sets and $\alpha_T$ continuity and their fundamental properties in tri topological space. In this paper, tri open set is use in place of 123 open sets.

### 1. Preliminaries

**Definition 1.1[VIII]:** A subset A of a topological space $(X,\tau)$ is called pre-semi open set( $\alpha$ open sets) if $A \subseteq \text{int}(cl(\text{int} A))$ .The complement of pre semi open set is called pre-semi closed set. The class of all pre-semi open sets of $X$ is denoted by $PSO(X,\tau)$.

**Definition 1.2[VIII ]: Let** $(X,T_1)$ **and** $(Y,T_2)$ are topological spaces. A function $f: X \to Y$ is called pre-semi continuous ( $\alpha$ continuous) if the inverse image of each open set in $Y$ is a pre-semi open set ( $\alpha$ -open set) in $X$ .

**Definition 1.3[IX ]:** Let $X$ be a nonempty set and $T_1, T_2$ and $T_3$ are three topologies on $X$ .The set $X$ together with three topologies is called a tri topological space and is denoted by $(X,T_1,T_2,T_3)$

ISSN (O) 2454-9665
ISSN (P) 2454-0663

**Definition 1.4 [I]:** A subset $A$ of a topological space $X$ is called 123 open set if $A \in T_1 \cup T_2 \cup T_3$ and complement of 123 open set is 123 closed set.

## 2. $\alpha_T$ open sets in Tri topological space

**Definition 2.1:** Let $(X, T_1, T_2, T_3)$ be a tri topological space. A subset $A$ of $X$ is called $\alpha_T$ open in $X$, if $A \subseteq ps\,\text{int}\, pscl ps\,\text{int}\, A$. The complement of $\alpha_T$ open set is called $\alpha_T$ closed set. The collection of all $\alpha_T$ open sets of $X$ is denoted by $PSO(X, T_1, T_2, T_3)$.

**Example 2.2** Let $X = \{a, b, c\}$, $T_1 = \{X, \phi, \{a, b\}\}$, $T_2 = \{X, \phi, \{a\}\}$, $T_3 = \{X, \phi, \{b\}\}$

Tri open sets in tri topological spaces are union of all three topologies.

$\alpha_T$ open set of $X$ is denoted by $PS\,O(X) = \{X, \phi, \{a\}, \{a, b\}, \{b\}\}$.

Let $A = \{a, b\}$;

$$
\begin{aligned}
T\,\text{int}\, TclT\,\text{int}\{a, b\} &= T\,\text{int}\, Tcl\{a, b\} \\
&= T\,\text{int}\, X \\
&= X
\end{aligned}
$$

$A = \{a, b\}$ is $\alpha_T$ open.

**Definition 2.3:** Let $(X, T_1, T_2, T_3)$ be a tri topological space. Let $A \subset X$. An element $x \in A$ is called $\alpha_T$ interior point of $A$, if there exist a $\alpha_T$ open set $U$ such that $x \in U \subset A$. The set of all $\alpha_T$ interior points of $A$ is called the $\alpha_T$ interior of $A$ and is denoted by $ps\,\text{int}(A)$.

**Theorem 2.4:** Let $A \subset X$ be a tri topological space. $ps\,\text{int}(A)$ is equal to the union of all $\alpha_T$ open sets contained in $A$.

**Note 2.5:** 1. $ps\,\text{int}(A) \subset A$.

2. $ps\,\text{int}(A)$ is $\alpha_T$ open sets.

**Theorem 2.6:** $ps\,\text{int}(A)$ is the largest $\alpha_T$ open sets contained in $A$.

**Theorem 2.7:** $A$ is $\alpha_T$ open if and only if $A = ps\,\text{int}(A)$

**Theorem 2.8:** $ps\,\text{int}(A \cup B) \supset ps\,\text{int}\, A \cup ps\,\text{int}\, B$.

**Definition 2.9:** Let $(X, T_1, T_2, T_3)$ be a tri topological space. Let $A \subset X$. The intersection of all $\alpha_T$ semi closed sets containing $A$ is called a $\alpha_T$ closure of $A$ and is denoted as $pscl(A)$.

**Note 2.10 :** Since intersection of $\alpha_T$ closed sets is $\alpha_T$ closed set, $pscl(A)$ is a $\alpha_T$ closed set.

**Note 2.11:** $pscl(A)$ is the smallest $\alpha_T$ closed set containing $A$.

**Theorem 2.12:** $A$ is $\alpha_T$ closed set if and only if $A = pscl(A)$.

**Theorem 2.13:** Let $A$ and $B$ be subsets of $(X, T_1, T_2, T_3)$ and $x \in X$

a) $A$ is $\alpha_T$ closed if and only if $A = pscl(A)$

b) If $A \subset B$, then $pscl(A) \subset pscl(B)$.

c) $x \in pscl(A)$ if and only if $A \cap U \neq \phi$ for every $\alpha_T$ open set $U$ containing $x$.

**Theorem 2.14:** Let $A$ be a subsets of $(X, T_1, T_2, T_3)$, if there exist an $\alpha_T$ open set $U$ such that $A \subset U \subset pscl(A)$, then $A$ is $\alpha_T$ open.

**Theorem 2.15:** In a tri topological space $(X, T_1, T_2, T_3)$ , the union of any two $\alpha_T$ open sets is always an $\alpha_T$ open set.

**Proof:** Let $A$ and $B$ be any two $\alpha_T$ open sets in $X$ .

Now $A \cup B \subseteq pscl\left(ps\,\text{int}\left(A\right)\right) \cup pscl\left(ps\,\text{int}\left(B\right)\right)$

$\Rightarrow A \cup B \subseteq pscl\left(\text{int}\left(A \cup B\right)\right)$. Hence $A \cup B$ is $\alpha_T$ open sets.

**Remark 2.16:** The intersection of any two $\alpha_T$ open sets may not be a $\alpha_T$ open sets as show in the following example.

**Example 2.17:**Let $X = \{a,b,c,d\}$, $T_1 = \{X, \phi, \{a,d\}\}$ , $T_2 = \{X, \phi, \{a,b,c\}\}$, $T_3 = \{X, \phi, \{b,c,d\}\}$ tri pre semi open set of $X$ is denoted by $PSO(X) = \{X, \phi, \{a,b,d\}, \{a,b,c\}, \{b,c,d\}\}$.

**Here** $\{a,d\} \cap \{b,c,d\} = \{d\} \notin PSO(X)$.

**Theorem 2.18:** Let $A$ and $B$ be subsets of $X$ such that $B \subseteq A \subseteq pscl(B)$ .if $B$ is $\alpha_T$ open set then $A$ is also $\alpha_T$ open set.

\

## 3. $\alpha_T$ Continuity in Tri topological space

**Definition 3.1:** A function f from a tri topological space $(X, T_1, T_2, T_3)$ into another tri topological space $\left(Y, W_1, W_2, W_3\right)$ is called $\alpha_T$ continuous if $f^{-1}\left(V\right)$ is $\alpha_T$ open set in $X$ for each tri open set $V$ in $Y$.

**Example 3.2:** Let, $X = \{a,b,c\}$, $T_1 = \{X, \phi, \{a\}\}$ , $T_2 = \{X, \phi, \{a,b\}\}$, $T_3 = \{X, \phi, \{b,c\}\}$

Open sets in tri topological spaces are union of all three topologies.

Then tri open sets of $X = \{X, \phi, \{a\}, \{a,b\}, \{b,c\}\}$.

$PS\,O(X)$ sets of $X = \{X, \phi, \{a\}, \{a,b\}, \{b,c\}\}$.

Let $Y = \{1,2,3\}$, $W_1 = \{Y, \phi, \{1,3\}\}$ , $W_2 = \{Y, \phi, \{2\}\}$, $W_3 = \{X, \phi, \{2\}, \{1,2\}\}$

ISSN (O) 2454-9665
ISSN (P) 2454-0663

tri open sets of $Y = \{Y, \phi, \{2\}, \{1,2\}, \{1,3\}\}$.

$PSO(Y)$ sets of $Y = \{Y, \phi, \{2\}, \{1,2\}, \{1,3\}\}$.

Consider the function $f : X \to Y$ is defined as

$f^{-1}\{2\} = \{a\}$, $f^{-1}\{1,2\} = \{a,b\}$, $f^{-1}\{1,3\} = \{b,c\}$ , $f^{-1}(\phi) = \phi$, $f^{-1}(Y) = X$ .

Since the inverse image of each tri open set in $Y$ under $f$ is tri pre semi open set in $X$ . Hence $f$ is tri pre semi continuous function.

**Theorem 3.3:** Let $f : (X, T_1, T_2, T_3) \to (Y, W_1, W_2, W_3)$ be a $\alpha_T$ continuous open function .If $A$ is an $\alpha_T$ open set of $X$ , then $f(A)$ is $\alpha_T$ open in $Y$ .

**Proof :** First ,let $A$ be $\alpha_T$ open set in $X$ .There exist an tri open set $U$ in $X$ such that $A \subset U \subset pscl(A)$ .since f is $\alpha_T$ open function then $f(U)$ is tri open in $Y$ . Since f is tri continuous function, we have $f(A) \subset f(U) \subset f(cl(A)) \subset cl(f(A))$ .This show that $f(A)$ is tri pre open in $Y$ . Let $A$ be tri pre open in $X$ .There exist an tri pre open set $U$ such that $U \subset A \subset (cl(U))$ . Since $f$ is tri continuous function, we have $f(U) \subset f(A) \subset f(cl(U)) \subset cl(f(U))$ .by the proof of first part, $f(U)$ is tri pre open in $X$ .Therefore , $f(A)$ is tri pre open in $Y$ .

**Theorem 3.4:** Let $(X, T_1, T_2, T_3)$ and $(Y, W_1, W_2, W_3)$ be two tri topological space .Then $f : X \to Y$ is pre semi continuous function if and only if $f^{-1}(V)$ is pre semi closed in $X$ whenever $V$ is tri closed in $Y$ .

**Theorem 3.5:** Let $(X, T_1, T_2, T_3)$ and $(Y, W_1, W_2, W_3)$ be two tri topological spaces. A function $f : X \to Y$ is pre-semi continuous ( $\alpha_T$ continuous) if and only if the inverse image of every $\alpha_T$ open set in $Y$ is tri open in $X$.

**Proof: (Necessary):** Let $f : (X, T_1, T_2, T_3) \to (Y, W_1, W_2, W_3)$ be pre semi continuous function and U be any $\alpha_T$ open set in $Y$ .Then Y-U is $\alpha_T$ closed in $Y$ . Since $f$ is $\alpha_T$ continuous function, $f^{-1}(Y - U) = X - f^{-1}(U)$ is $\alpha_T$ closed in $X$ and hence $f^{-1}(U)$ is $\alpha_T$ open in $X$ .

**(Sufficiency):** Assume that $f^{-1}(V)$ is pre semi open in $X$ for each tri open set $V$ in $Y$ . Let V be a closed set in $Y$ .Then $Y - V$ is $\alpha_T$ open in $Y$ .By assumption $f^{-1}(Y - V) = X - f^{-1}(V)$ is pre semi open in $X$ which implies that $f^{-1}(V)$ is pre semi closed in $(X, T_1, T_2, T_3)$ . Hence f is pre semi continuous function.

**Theorem 3.6:** Let $f : (X, T_1, T_2, T_3) \to (Y, W_1, W_2, W_3)$ be a $\alpha_T$ continuous open function .If $V$ is an $\alpha_T$ open set of $Y$ , then $f^{-1}(V)$ is $\alpha_T$ open in $X$ .

**Proof :** First ,let $V$ be $\alpha_T$ open set of $Y$ .There exist an $\alpha_T$ set $W$ in $Y$ .such that $V \subset W \subset spcl(V)$ .Since $f$ is tri open set ,we have $f^{-1}(V) \subset f^{-1}(W) \subset f^{-1}(cl(V)) \subset cl(f^{-1}(V))$ .since $f$ is $\alpha_T$ continuous, $f^{-1}(W)$ is $\alpha_T$ open set in $X$ .By theorem 4.18 , $f^{-1}(V)$ is $\alpha_T$ open set in $X$ .The proof of the second part is shown by using the fact of first part.

**Theorem 3.7:** The following are equivalent for a function $f:(X,P_1,P_2,P_3) \to (Y,W_1,W_2,W_3)$:

a) $f$ is $\alpha_T$ continuous function ;

b) the inverse image of each $\alpha_T$ closed set of $Y$ is $\alpha_T$ closed in $X$ ;

c) For each $x \in X$ and each tri open set $V$ in $W$ containing $f(x)$ ,there exist an $\alpha_T$ open set $U$ of $X$ containing $x$ such that $f(U) \subset V$ ;

d) $pscl(f^{-1}(B)) \subset f^{-1}(pscl(B))$ for every subset $B$ of $Y$ .

e) $f(pscl(A)) \subset pscl(f(A))$ for every subset $A$ of $X$ .

**Theorem 3.8:** If $f:(X,P_1,P_2,P_3) \to (Y,W_1,W_2,W_3)$ and $g:(Y,W_1,W_2,W_3) \to (Z,\eta_1,\eta_2,\eta_3)$ be two $\alpha_T$ continuous function then $gof:(X,P_1,P_2,P_3) \to (Z,\eta_1,\eta_2,\eta_3)$ may not be $\alpha_T$ continuous function .

**Theorem 3.9:** Let $f:(X,T_1,T_2,T_3) \to (Y,W_1,W_2,W_3)$ be bijective .Then the following conditions are equivalent:

i) $f$ is a $\alpha_T$ open continuous function.

ii) $f$ is $\alpha_T$ closed continuous function and

iii) $f^{-1}$ is $\alpha_T$ continuous function.

**Proof:**(i)$\to$(ii) Suppose $B$ is a tri closed set in $X$ .Then $X-B$ is an tri open set in $X$ .Now by (i) $f(X-B)$ is a $\alpha_T$ open set in $Y$ .Now since $f^{-1}$ is bijective so $f(X-B) = Y - f(B)$ .Hence $f(B)$ is a $\alpha_T$ closed set in $Y$ .Therefore $f$ is a $\alpha_T$ closed continuous function.

(ii)$\to$(iii) Let $f$ is an $\alpha_T$ closed map and $B$ be tri closed set of $X$ .Since $f^{-1}$ is bijective so $(f^{-1})^{-1}(B)$ which is an $\alpha_T$ closed set in $Y$ . Hence $f^{-1}$ is $\alpha_T$ continuous function.

(iii)$\to$(i) Let $A$ be a tri open set in $X$ .Since $f^{-1}$ is a $\alpha_T$ continuous function so $(f^{-1})^{-1}(A) = f(A)$ is a $\alpha_T$ open set in $Y$ . Hence $f$ is $\alpha_T$ open continuous function.

**Theorem 3.10:** Let $X$ and $Y$ are two tri topological spaces. Then $f:(X,T_1,T_2,T_3) \to (Y,W_1,W_2,W_3)$ is $\alpha_T$ continuous function if one of the followings holds:

i) $f^{-1}(ps\operatorname{int}(B)) \subseteq ps\operatorname{int}(f^{-1}(B))$ , for every tri open set $B$ in $Y$ .

ii) $pscl(f^{-1}(B)) \subseteq f^{-1}(pscl(B))$, for every tri open set $B$ in $Y$.

**Proof:** Let $B$ be any tri open set in $Y$ and if condition (i) is satisfied then $f^{-1}(p\,s\,\text{int}(B)) \subseteq ps\,\text{int}(f^{-1}(B))$.

We get $f^{-1}(B) \subseteq ps\,\text{int}(f^{-1}(B))$ .Therefore $f^{-1}(B)$ is a tri pre semi open set in $X$ .Hence $f$ is tri pre semi continuous function. Similarly we can prove (ii).

**Theorem 3.11:** A function $f:(X,T_1,T_2,T_3) \to (Y,W_1,W_2,W_3)$ is called $\alpha_T$ open continuous function if and only if $f(ps\,\text{int}(A)) \subseteq ps\,\text{int}(f(A))$, for every tri open set $A$ in $X$.

**Proof:** Suppose that $f$ is a $\alpha_T$ open continuous function.

since $ps\,\text{int}(A) \subseteq A$ so $f(ps\,\text{int}(A)) \subseteq f(A)$.

By hypothesis $f(ps\,\text{int}(A))$ is an tri semi open set and $ps\,\text{int}(f(A))$ is largest $\alpha_T$ open set contained in $f(A)$ so $f(ps\,\text{int}(A)) \subseteq ps\,\text{int}(f(A))$.

Conversely, suppose $A$ is an tri open set in $X$ .So $f(ps\,\text{int}(A)) \subseteq ps\,\text{int}(f(A))$.

Now since $A = ps\,\text{int}(A)$ so $f(A) \subseteq ps\,\text{int}(f(A))$ .Therefore $f(A)$ is a $\alpha_T$ open set in $Y$ and $f$ is $\alpha_T$ open continuous function.

**Theorem 3.12:** A function $f:(X,T_1,T_2,T_3) \to (Y,W_1,W_2,W_3)$ is called $\alpha_T$ closed continuous function if and only if $pscl(f(A)) \subseteq f(ps\,cl(A))$, for every tri closed set $A$ in $X$.

**Proof:** Suppose that $f$ is a $\alpha_T$ closed continuous function. since $A \subseteq pscl(A)$ so $f(A) \subseteq f(pscl(A))$ .By hypothesis, $f(pscl(A))$ is a $\alpha_T$ closed set and $pscl(f(A))$ is smallest $\alpha_T$ closed set containing $f(A)$ so $pscl(f(A)) \subseteq f(pscl(A))$.

Conversely, suppose $A$ is an tri closed set in $X$ .So $pscl(f(A)) \subseteq f(pscl(A))$.

Since $A = pscl(A)$ so $pscl(f(A)) \subseteq f(A)$ .Therefore $f(A)$ is a $\alpha_T$ closed set in $Y$ and $f$ is $\alpha_T$ closed continuous function.

**Theorem 3.13:** Let $(X,T_1,T_2,T_3)$ and $(Y,W_1,W_2,W_3)$ be two tri topological space. Then, $f: X \to Y$ is pre semi continuous function if and only if $f(pscl(A)) \subset pscl(f(A))\ \forall A \subset X$.

**Proof:** Suppose $f: X \to Y$ is pre semi continuous function. Since $pscl[f(A)]$ is tri closed in $Y$ .Then by theorem (3.4) $f^{-1}[pscl(f(A))]$ is tri closed in $X$,

$pscl(f^{-1}(psclf(A))) = f^{-1}(psclf(A)) \;----(1).$

Now : $f(A) \subset pscl(f(A)),\ A \subset f^{-1}(f(A)) \subset f^{-1}(psclf(A))$.

Then $pscl(A) \subset pscl(f^{-1}(psclf(A))) = f^{-1}(psclf(A))$ by (1).

ISSN (O) 2454-9665
ISSN (P) 2454-0663

Then $f(pscl(A)) \subset pscl(f(A))$.

Conversely, Let $f(pscl(A)) \subset pscl(f(A)) \ \forall A \subset X$.

Let $F$ be $\alpha_T$ closed set in $Y$ ,so that $pscl(F) = F$. Now $f^{-1}(F) \subset X$ ,by hypothesis,

$f(pscl(f^{-1}(F))) \subset pscl(f(f^{-1}(F)) \subset pscl(F) = F$.

Therefore $pscl(f^{-1}(F) \subset f^{-1}(F)$. But $f^{-1}(F) \subset pscl(f^{-1}(F)$ always.

Hence $pscl(f^{-1}(F) = f^{-1}(F)$ and so $f^{-1}(F)$ is $\alpha_T$ closed in $X$.

Hence by theorem (3.4) $f$ is $\alpha_T$ continuous function.

**Theorem 3.14 :** Let $(X, T_1, T_2, T_3)$ and $\left(Y, W_1, W_2, W_3\right)$ be two tri topological spaces. Then, $f : X \to Y$ is $\alpha_T$ continuous function if and only if $pscl(f^{-1}(B)) \subset f^{-1}(pscl(B)) \forall B \subset Y$.

**Proof:** Suppose $f : X \to Y$ is $\alpha_T$ continuous. Since $pscl(B)$ is $\alpha_T$ closed in $Y$ ,then by theorem (3.4) $f^{-1}(pscl(B))$ is $\alpha_T$ closed in $X$ and therefore , $pscl(f^{-1}(pscl(B))) = f^{-1}(pscl(B))$.........(2)

Now, $B \subset pscl(B)$, then $f^{-1}(B) \subset f^{-1}(pscl(B))$ ,then $pscl(f^{-1}(B)) \subset pscl(f^{-1}(pscl(B))) = f^{-1}(psclB)$ by (2)

Conversely: Let the condition hold and let $F$ be any tri closed set in $Y$ so that $pscl(F) = F$. By hypothesis, $pscl(f^{-1}(F)) \subset f^{-1}(pscl(F)) = f^{-1}(F)$ .But $f^{-1}(F) \subset pscl(f^{-1}(F))$ always.Hence $pscl(f^{-1}(F)) = f^{-1}(F)$ and so $f^{-1}(F)$ is $\alpha_T$ closed in $X$. It follows from theorem (3.4) that $f$ is $\alpha_T$ continuous function.

**Theorem 3.15:** Let $(X, T_1, T_2, T_3)$ and $\left(Y, W_1, W_2, W_3\right)$ be two tri topological spaces. Then, $f : X \to Y$ is $\alpha_T$ continuous function if and only if $f^{-1}(ps\,\mathrm{int}(B)) \subset ps\,\mathrm{int}(f^{-1}(B)) \quad \forall B \subset Y$.

**Proof:** Let $f : X \to Y$ be a tri continuous. Since $\mathrm{int}(B)$ is $\alpha_T$ open in $Y$, then by theorem (3.3) $f^{-1}(ps\,\mathrm{int}(B))$ is $\alpha_T$ open in $X$ and therefore , $ps\,\mathrm{int}(f^{-1}(ps\,\mathrm{int}(B))) = f^{-1}(ps\,\mathrm{int}(B))$.........(3)

Now, $ps\,\mathrm{int}(B) \subset B$, then $f^{-1}(ps\,\mathrm{int}(B)) \subset f^{-1}(B)$ ,then $ps\,\mathrm{int}(f^{-1}(ps\,\mathrm{int}(B))) \subset ps\,\mathrm{int}(f^{-1}(B))$ by (3)

**Conversely:** Let the condition hold and let $G$ be any $\alpha_T$ open set in $Y$ so that $ps\,\mathrm{int}(G) = G$. By hypothesis, $f^{-1}(ps\,\mathrm{int}(G)) \subset ps\,\mathrm{int}\, f^{-1}(G)$ .Since $f^{-1}(ps\,\mathrm{int}(G)) = f^{-1}(G)$ then $f^{-1}(G) \subset ps\,\mathrm{int}(f^{-1}(G))$ But $ps\,\mathrm{int}(f^{-1}(G)) \subset f^{-1}(G)$ always and so $ps\,\mathrm{int}(f^{-1}(G)) = f^{-1}(G)$.Therefore $f^{-1}(G)$ is $\alpha_T$ open in $X$. Consequently by theorem (3.3) $f$ is $\alpha_T$ continuous function.

## IV. CONCLUSION

We studied new form of pre semi open set in tri topological space. We also studied $\alpha_T$ continuous function in tri topological space. It is established that composition of any two tri pre semi open sets is again a tri pre semi open set in tri topological space .In tri pre semi continuity, inverse image of every tri open is tri pre semi open set.

## REFERENCES

[I] Hameed N.F. & Mohammed Yahya Abid ,Certain types of separation axioms in tri topological spaces, Iraqi journal of science, 2011,Vol 52,(2),212-217.

[II] Jelic M., A decomposition of pairwise continuity. *J. Inst. Math. Comput. Sci. Math. Ser,1990*, 3, 25-29.

[III] Kelly J.C , Bitopological spaces,Proc.LondonMath.Soc.,1963,3, 17-89 .

[IV] Khedr F.H. , Al-Areefi S.M. & Noiri T. ,Pre continuity and semi pre continuity in bitopological spaces. *Indian J. Pure and Appl. Math.*,1992, 23, 625-633.

[V] Kovar, M,On 3-Topological version of Thet- Reularity, Internat.J. Matj, Sci. ,2000,23(6),393-398.

[VI] Levine N.,semi open sets and semi –continuity in topological spaces, Amer. Math.,1963, 70,36-41.

[VII] Mashhour A.S.,I.A. Hasanein and S.N. El-Deep, $\alpha$ -continuous and $\alpha$ -open mappings, Acta Math, Hungar , 1981,41, 3-4,213-218.

[VIII] Njastad O ,On some classes of nearly open sets ,Pacific J. Math. ,1965, 15 ,961-970.

[IX] Palaniammal S**. ,**Study of Tri topological spaces, Ph.D Thesis, **,** 2011.

[X] Tapi U.D. ,R. Sharma and B. Deole, Semi open sets and pre open sets in tri topological open sets, i-manager's journal's on mathematics, 2016,5 (3).