NANO REGULAR GENERALIZED STAR STAR b- CLOSED SETS IN NANO BITOPOLOGICAL SPACES

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ABSTRACT

In this paper, we introduce the concept of Nano Regular Generalized star star b- closed sets in Nano Bitopological Spaces and we discuss some basic properties also reformulate the axioms, in particular we investigate the characteristics of $\tau_1\tau_2Nrg^{**}b$- closed sets whose results are given in detail.

Key words $Nrg^{**}b -$ closed sets , $\tau_1\tau_2Nrg^{**}b$-closed sets.

1.INTRODUCTION

General topology is vast has many different ramifications and interactions. In the analysis and visualization of all types of field data, topology based methods play a predominant role. The notions of closed sets are the simple concepts and beginning point of various great theories, which is exactly investigated in topology often. The most basic and conventional divisions of topology is point set topology, which establishes the basic aspects of topology and also highlights the regular and normal spaces. Pawlak introduced the rough topology[4]

Lellish Thivagar[1] introduced a nano topological space respect to a subset X of an universe which is defined in terms of lower approximation and upper approximation and boundary region . The elements of a Nano topological space with are called the Nano open set. It originates from the Greek word ' Nanos' which means 'dwarf' in its modern scientific sense, an order to magnititude-one billionth. The Topology is named as Nano topology so because of its size, since it has at most five elements.Vasantha kannan and Indirani introduced the Concept of Nano Regular Generalized star star b- closed sets in Nano topological Spaces. In this paper, we discuss the $\tau_1\tau_2$Nano regular generalized star star b-Closed sets in Nano bitopological spaces.

2.PRELIMINARIES

Definition-2.1[2]Let$U$ be a non-empty finite set of objects called the universe and R be an equivalence relation on U named as the indiscernibility relation. Then U is divided into disjoint equivalence classes.Elements belonging to the same equivalence class are said to be indiscernible with one another. The pair (U, R) is said to be the approximation space. Let $X \subseteq U$.

(i) The lower approximation of X with respect to R is the set of all objects, which can be for certain classified as X with respect to R and it is denoted by $L_R(X)$. That is, $L_R(X) = \bigcup_{x\in U}\{R(x): R(x) \subseteq X\}$, where $R(x)$ denotes the equivalence class determined by $x \in U$.

(ii)The upper approximation of X with respect to R is the set of all objects, which can be possibly classified as X with respect to R and it is denoted by $U_R(X)$. That is, $U_R(X) = \bigcup_{x\in U}\{R(x): R(x) \cap X \neq \emptyset\}$ where $R(x)$ denotes the equivalence class determined by $x \in U$.

(iii) The boundary region of X with respect to R is set of all objects, which can be classified neither in$X$nor not in$X$ with respect to R and it is denoted by$B_R(X)$.That is, $B_R(X) = U_R(X) - L_R(X)$.

Property-2.2[2] If (U, R) is an approximation space and $X, Y \subseteq U$, then

$(i)L_R(X) \subseteq X \subseteq U_R(X)$

$(ii)L_R(\emptyset) = U_R(\emptyset) = \emptyset$

$(iii)L_R(U) = U_R(U) = U$

$(iv)U_R(X \cup Y) = U_R(X) \cup U_R(Y)$

$(v)\ U_R(X \cap Y) \subseteq U_R(X) \cap U_R(Y)$

$(vi)L_R(X \cup Y) \supseteq L_R(X) \cup L_R(Y)$

$(vii)L_R(X \cap Y) = L_R(X) \cap L_R(Y)$

$(viii)L_R(X) \subseteq L_R(Y)$ and $U_R(X) \subseteq U_R(Y)$ whenever $X \subseteq Y$

$(ix) U_R(X^C) = [L_R(X)]^C$ and $L_R(X^C) = [U_R(X)]^C$ $(x) U_R(U_R(X)) = L_R(U_R(X)) = U_R(X)$

$(xi) L_R(L_R(X)) = U_R(L_R(X)) = L_R(X)$

Definition-2.3[2] Let U be a non-empty, finite universe of objects and R be an equivalence relation on U. Let $X \subseteq U$. $\tau_R(X) = \{U, \emptyset, L_R(X), U_R(X), B_R(X)\}$. Then $\tau_R(X)$ satisfies the following axioms:

(i) U and $\emptyset \in \tau_R(X)$.

(ii) The union of the elements of any sub collection of $\tau_R(X)$ is in $\tau_R(X)$.

(iii) The intersection of the elements of any finite sub collection of $\tau_R(X)$ is in $\tau_R(X)$. That is, $\tau_R(X)$ is a topology on U, called as the Nano topology with respect to X. Elements of Nano topology are known as the Nano open sets in U and $(U, \tau_R(X))$ is called the Nano topological space. Elements of $(\tau_R(X))^C$ are called as Nano closed sets.

Definition-2.4[2] Let $(U, \tau_R(X))$ be a Nano topological space with respect to X where $X \subseteq U$ and if $A \subseteq U$, then

(i) The Nano interior of A is defined as the union of all Nano open subsets of A and it is denoted by $Nint(A)$. That is, $Nint(A)$ is the largest Nano open subset of A.
(ii) The Nanoclosure of A is defined as the intersection of all Nano closed sets containing A and is denoted by $Ncl(A)$. That is $Ncl(A)$ is the smallest Nano closed set containing A.

Definition-2.5 $\tau_1\tau_2$ Nano regular open in X if A = τ_1Nint[τ_2Ncl(A)]

Definition-2.6 $\tau_1\tau_2$ Nano pre open in X if A⊆τ_1Nint[τ_2Ncl(A)]

Definition-2.7 $\tau_1\tau_2$ Nano semi open in X if A⊆τ_1Ncl[τ_2Nint(A)]

Definition-2.8 $\tau_1\tau_2$ Nano b open in X if $A \subseteq \tau_2 NCl(\tau_1 Nint(A)) \cup \tau_1 Nint(\tau_2 Ncl(A))$.

Definition-2.9 $\tau_1\tau_2$ Nano α open in X if $A \subseteq \tau_1 Nint(\tau_2 NCl(\tau_1 Nint(A)))$.

Definition-2.10 $\tau_1\tau_2$ Ng closed in X, if τ_2Ncl(A) ⊆U whenever A⊆U and U is Nano open in τ_1.

Definition-2.11 $\tau_1\tau_2$ Ng* closed in X, if τ_2Ncl(A) ⊆U whenever A⊆U and U is Nano g-open in τ_1.

Definition-2.12 $\tau_1\tau_2$ Ngα closed in X, if τ_2Nαcl(A) ⊆U whenever A⊆U and U is Nano αopen in τ_1.

Definition-2.13 $\tau_1\tau_2$ Ngp closed in X, if τ_2Npcl(A) ⊆U whenever A⊆U and U is Nano open in τ_1.

Definition-2.14 $\tau_1\tau_2$ Ngpr closed in X, if τ_2Npcl(A) ⊆U whenever A⊆U and U is Nano regular open in τ_1.

Definition-2.15 $\tau_1\tau_2$Nrg* closed in X, if τ_2Ncl(A) ⊆U whenever A⊆U and U is Nano regular open in τ_1.

Definition-2.16 $\tau_1\tau_2$Nrg*b-closed in X, if τ_2Nbcl(A) ⊆U whenever A⊆U and U is Nrg* open in τ_1.

Definition-2.17 Let A be a subset of a Nano bitopological space $(U,\tau_1\tau_2(X))$, the intersection of all $\tau_1\tau_2Nrg^{**}b$-closed sets containing A is called $\tau_2Nrg^{**}b$-closure of A. That is $\tau_2Nrg^{**}bcl(A) = \cap\{F: F$ is $\tau_2Nrg^{**}b$-closed in $U, A\subseteq F\}$.

3. $\tau_1\tau_2Nrg^{**}b$ −CLOSED SETS IN NANO BITOPOLOGICAL SPACES

Definition-3.1 A Subset A of a Nano bitopological space $(U,\tau_1\tau_2(X))$ is called Nano regular generalized star star b-closed set (briefly $\tau_1\tau_2Nrg^{**}b$-closed) if $\tau_2Nrg^{*}bcl(A)\subseteq Y$ whenever $A\subseteq Y$ and Y is Nano open in $(U,\tau_1(X))$. The collection of all $\tau_1\tau_2Nrg^{**}b$-closed subsets of U is denoted by $\tau_1\tau_2NRG^{**}BC(U,X)$.

Theorem 3.2 Every τ_2Nano closed set is $\tau_1\tau_2Nrg^{**}b$-closed.

Proof. Let A be τ_2Nano closed in $(U,\tau_1\tau_2(X))$ and Y be τ_1Nano open in $(U,\tau_1\tau_2(X))$ such that $A\subseteq Y$. Since A is τ_2Nanoclosed, $\tau_2Ncl(A)=A\subseteq Y$. Since "every τ_2Nano closed set is $\tau_1\tau_2Nrg^{*}b$-closed", $\tau_2Nrg^{*}bcl(A)\subseteq\tau_2Ncl(A)=A$. Therefore $\tau_2Nrg^{*}bcl(A)\subseteq Y$. Hence A is $\tau_1\tau_2Nrg^{**}b$-closed.

Theorem3.3

(i) Every $\tau_1\tau_2$Nano semi closed set is $\tau_1\tau_2Nrg^{**}b$-closed.

(ii) Every $\tau_1\tau_2$Nano pre closed set is $\tau_1\tau_2Nrg^{**}b$-closed.

(iii) Every $\tau_1\tau_2$Nano α closed set is $\tau_1\tau_2Nrg^{**}b$-closed.

(iv) Every $\tau_1\tau_2$Nano regular closed set is $\tau_1\tau_2Nrg^{**}b$-closed.

Proof. (i) Let A be $\tau_1\tau_2$Nano semi closed in $(U,\tau_1\tau_2(X))$ and Y be Nano $\tau_1$open in $(U,\tau_1\tau_2(X))$ such that $A\subseteq Y$. Since A is τ_2Nanosemi closed, $\tau_2Nscl(A)=A\subseteq Y$. Since "every $\tau_1\tau_2$Nano semi closed set is $\tau_1\tau_2Nrg^{*}b$-closed", $\tau_2Nrg^{*}bcl(A)\subseteq\tau_2Nscl(A)=A$. Therefore $\tau_2Nrg^{*}bcl(A)\subseteq Y$. Hence A is $\tau_1\tau_2Nrg^{**}b$-closed.

Proof for the results (ii) to (iv) are similar to (i).

Remark 3.4 Reverse implications of the above theorems need not be true as seen from the following example.

Example 3.5: $U=\{a,b,c,d\}$ with $U/R_1=\{\{a\},\{b,c\},\{d\}\}$ and $X=\{a,c\}\subseteq U$. Then the Nano topology $\tau_1(X)=\{U,\emptyset,\{a\},\{b,c\},\{a,b,c\}\}$ and $U/R_2=\{\{b\},\{a,c\},\{d\}\}$ and $X=\{a,b,c\}\subseteq U$. Then the Nano topology $\tau_2(X)=\{U,\emptyset,\{a,b,c\}\}$.

The sets $\{a,d\}$ and $\{b,d\}$ are $\tau_1\tau_2 Nrg^{**}b$-closed but not τ_2Nano closed.

The sets $\{a,b,d\}$ and $\{c,d\}$ are $\tau_1\tau_2 Nrg^{**}b$-closed but not τ_2 Nano semi closed.

The sets $\{a,d\}$and$\{b,c,d\}$ is$\tau_1\tau_2 Nrg^{**}b$-closed but not τ_2 Nano pre closed.

The sets $\{b,d\}$ and $\{a,c,d\}$ are $\tau_1\tau_2 Nrg^{**}b$-closed but not τ_2Nano αclosed.

The sets $\{d\}$ and $\{c,d\}$ are $\tau_1\tau_2 Nrg^{**}b$-closed but not τ_2 Nano regular closed.

Theorem3.6 Every $\tau_1\tau_2$Nano g-closed set is $\tau_1\tau_2 Nrg^{**}b$-closed.

Proof. Let A be$\tau_1\tau_2$ *Nano* g-closed in $(U,\tau_1\tau_2(X))$ and Y beτ_1Nano open in $(U,\tau_1\tau_2(X))$ such that $A\subseteq Y$. Since A is τ_2 *Nano* g-closed, $\tau_2 Ncl(A)\subseteq Y$.Since"every $\tau_1\tau_2$Nano closed set is$\tau_1\tau_2 Nrg^{*}b$-closed", $\tau_2 Nrg^{*}bcl(A)\subseteq\tau_2 Ncl(A)\subseteq Y$. Therefore $\tau_1\tau_2 Nrg^{*}bcl(A)\subseteq Y$. Hence A is $\tau_1\tau_2 Nrg^{**}b$-closed.

Theorem 3.7 Every $\tau_1\tau_2$Nanog^{*}-closed set is $\tau_1\tau_2 Nrg^{**}b$-closed.

Proof. Let A be $\tau_1\tau_2$Nanog^{*}-closed in $(U,\ \tau_1\tau_2(X))$. Therefore $\tau_2 Ncl(A)\subseteq Y$ whenever $A\subseteq Y$ and Y is τ_1Nano g-open in $(U,\ \tau_1\tau_2(X))$. As every τ_1Nano open set is τ_1Nano $g$open, we get $\tau_2 Ncl(A)\subseteq Y$ whenever $A\subseteq Y$ and Y is τ_1*Nano* open in $(U,\ \tau_1\tau_2(X))$. But it is true that "every $\tau_1\tau_2$Nano closed set is $\tau_1\tau_2 Nrg^{*}b$-closed", $\tau_2 Nrg^{*}bcl(A)\subseteq\tau_2 Ncl(A)\subseteq Y$. Therefore $\tau_1\tau_2 Nrg^{*}bcl(A)\subseteq Y$. Hence A is $\tau_1\tau_2 Nrg^{**}b$-closed.

Theorem 3.8 Every $\tau_1\tau_2$Nano$g\alpha$closed set is $\tau_1\tau_2 Nrg^{**}b$-closed.

Proof. Let A be $\tau_1\tau_2$Nano $g\alpha$-closed in $(U,\ \tau_1\tau_2(X))$. Therefore $\tau_2 N\alpha cl(A)\subseteq Y$ whenever $A\subseteq Y$ and Y is τ_1Nano α-open in $(U,\ \tau_1\tau_2(X))$. As every τ_1Nano open set is τ_1Nano α-open, we get $\tau_2 N\alpha cl(A)\subseteq Y$ whenever $A\subseteq Y$ and Y is τ_1Nano open in $(U,\ \tau_1\tau_2(X))$. But it is true that "every $\tau_1\tau_2$Nano α-closed set is $\tau_1\tau_2 Nrg^{*}b$-closed", $\tau_2 Nrg^{*}bcl(A)\subseteq\tau_2 N\alpha cl(A)\subseteq Y$. Therefore $\tau_1\tau_2 Nrg^{*}bcl(A)\subseteq Y$. Hence A is $\tau_1\tau_2 Nrg^{**}b$-closed.

Remark 3.9 Reverse implications of the above theorems need not be true as seen from the following example

Example 3.10 Let $U=\{a,b,c,d\}$ with $U/R_1=\{\{a\},\{b\},\{c,d\}\}$ and $X=\{a,b\}\subseteq U$. Then the Nano topology $(X)=\{U,\emptyset,\{a,b\}\}$ *and* $U/R_2=\{\{b\},\{a,c\},\{d\}\}$ and $X=\{a,b,c\}\subseteq U$. Then the Nano topology $\tau_2(X)=\{U,\emptyset,\{a,b,c\}\}$.

The set $\{a\}$ is $\tau_1\tau_2 Nrg^{**}b$-closed but not $\tau_1\tau_2$Nano g-closed.

The sets$\{b,d\}$ and $\{b\}$ are $\tau_1\tau_2 Nrg^{**}b$-closed but not $\tau_1\tau_2$Nano g^{*}-closed.

The set$\{a,d\}$is $\tau_1\tau_2 Nrg^{**}b$-closed but not $\tau_1\tau_2$Nano $g\alpha$-closed.

Theorem 3.11 Every $\tau_1\tau_2$Nanogp-closed set is $\tau_1\tau_2 Nrg^{**}b$-closed.

Proof. Let$A$ be $\tau_1\tau_2$Nano gp-closed in $(U,\ \tau_1\tau_2(X))$ and Y be τ_1Nano open in $(U,\ \tau_1\tau_2(X))$ such that $A\subseteq Y$. Since A is $\tau_1\tau_2$Nano gp-closed, $\tau_2 Npcl(A)\subseteq Y$.Since "every $\tau_1\tau_2$Nano pre closed set is $\tau_1\tau_2 Nrg^*b$-closed", $\tau_2 Nrg^*bcl(A) \subseteq \tau_2 Npcl(A) \subseteq Y$. Therefore $\tau_1\tau_2 Nrg^*bcl(A) \subseteq Y$. Hence A is $\tau_1\tau_2 Nrg^{**}b$-closed.

Remark 3.12 Reverse implicationof the above theorem need not be true as seen from the following example.

Example 3.13$U = \{a,b,c,d\}$ with $U/R_1 = \{\{a\},\{b,c\},\{d\}\}$ and $X = \{a,c\} \subseteq U$. Then the Nano topology $\tau_1(X) = \{U,\emptyset,\{a\},\{b,c\},\{a,b,c\}\}$ and $U/R_2 = \{\{b\},\{a,c\},\{d\}\}$ and $X = \{a,b,c\} \subseteq U$. Then the Nano topology $\tau_2(X) = \{U,\emptyset,\{a,b,c\}\}$.Then the sets $\{a,b,d\}$ and $\{b,d\}$are $\tau_1\tau_2 Nrg^{**}b$-closed but not $\tau_1\tau_2$Nanogpclosed.

Remark 3.14 The $\tau_1\tau_2 Nrg^{**}b$-closed set is independent with the Nano gpr-closed set and Nanorg^*-closed set as shown by the following example.

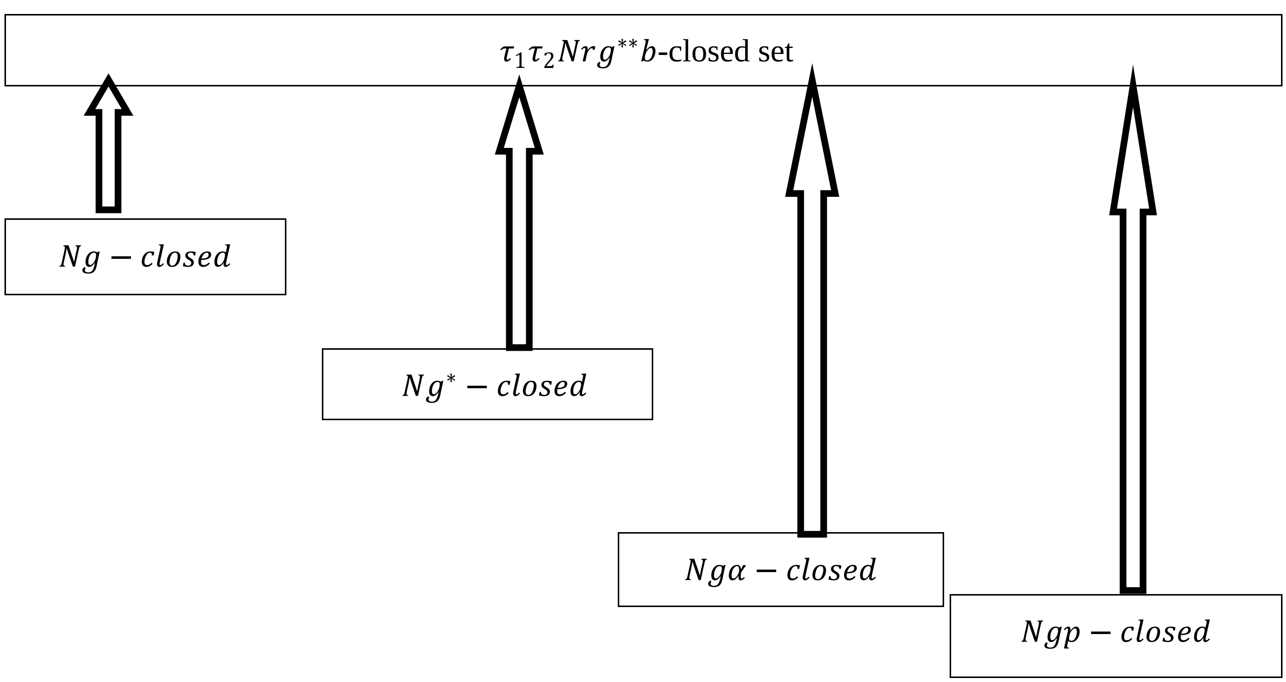
Example 3.15$U = \{a,b,c,d\}$ with $U/R_1 = \{\{a\},\{b,c\},\{d\}\}$ and $X = \{a,c\} \subseteq U$. Then the Nano topology $\tau_1(X) = \{U,\emptyset,\{a\},\{b,c\},\{a,b,c\}\}$and $U/R_2 = \{\{b\},\{a,c\},\{d\}\}$ and $X = \{a,b,c\} \subseteq U$. Then the Nano topology $\tau_2(X) = \{U,\emptyset,\{a,b,c\}\}$.

The set$\{a,d\}$ is $\tau_1\tau_2 Nrg^{**}b$-closed but not $\tau_1\tau_2$Nano gpr-closed and the set $\{a,b\} and \{b,c\}$ is $\tau_1\tau_2$Nano gpr-closed but not $\tau_1\tau_2 Nrg^{**}b$-closed.

Also the set $\{c,d\}$ is $\tau_1\tau_2 Nrg^{**}b$-closed but not $\tau_1\tau_2$Nano rg^*-closed and the set $\{a,b,c\}$ is $\tau_1\tau_2$Nano rg^*-closed but not $\tau_1\tau_2 Nrg^{**}b$-closed.

Diagram 3.16

Implications of $\tau_1\tau_2 Nrg^{**}b$-closed set



4.CHARACTERISTICS OF $\tau_1\tau_2 Nrg^{**}b$ -CLOSED SETS

Theorem 4.1 For a $\tau_1\tau_2 Nrg^{**}b$-closedset A, $\tau_2 Nrg^{*}bcl(A) \cap A^c$ contains no non-emptyNano closed set, and the converse is true if the intersection of Nano closed set and a $\tau_1\tau_2 Nrg^{*}b$-closed set is a Nano closed set.

Proof. Given that A is $\tau_1\tau_2 Nrg^{**}b$-closed. Let U' be a Nano closed set in U such that $\tau_2 Nrg^{*}bcl(A) \cap A^c \supseteq U'$ … … … … … … (1)

To Prove. $U' = \emptyset$.Since A is $\tau_1\tau_2 Nrg^{**}b$-closed , $\tau_2 Nrg^{*}bcl(A) \subseteq Y$ whenever $A \subseteq Y$ and Y is Nano open in U.From (1) $U' \subseteq A^c \Rightarrow U' \subseteq U - A \Rightarrow A \subseteq U - U'$. Therefore $\tau_2 Nrg^{*}bcl(Z) \subseteq U - U'$, since $U - U'$ is Nano open and A is $Nrg^{**}b$-closed. Therefore $U' \subseteq U - \tau_2 Nrg^{*}bcl(A)$. Again from (1)$U' \subseteq \tau_2 Nrg^{*}bcl(A)$.Therefore $U' \subseteq \tau_2 Nrg^{*}bcl(A) \cap \left(U - \tau_2 Nrg^{*}bcl(A)\right)$. But it is obvious that $\tau_2 Nrg^{*}bcl(A)$ and $U - \tau_2 Nrg^{*}bcl(A)$ are disjoint. Therefore $U' = \emptyset$.

Conversely, assume that $\tau_2 Nrg^{*}bcl(A) \cap A^c$ contains no non-emptyNano closed set.

To prove. A is $\tau_1\tau_2 Nrg^{**}b$-closed in U.

Let $A \subseteq Y$ and Y is Nano open in U. Suppose that $\tau_2 Nrg^{*}bcl(A) \nsubseteq Y$,

$\tau_2 Nrg^{*}bcl(A) \cap Y^c$ is a non-empty Nano closed set of $\tau_2 Nrg^{*}bcl(A) \cap A^c$. Which is a Contradiction. Therefore $\tau_2 Nrg^{*}bcl(A) \subseteq Y$ whenever $A \subseteq Y$ and Y is Nano open in U. Hence A is $\tau_1\tau_2 Nrg^{**}b$-closed in U.

Theorem4.2 If A is $\tau_1\tau_2 Nrg^{**}b$-closed and $A \subseteq A' \subseteq \tau_2 Nrg^{*}bcl(A)$ then A' is also $\tau_1\tau_2 Nrg^{**}b$-closed.

Proof. Given that A is $\tau_1\tau_2 Nrg^{**}b$-closed, $\tau_2 Nrg^{*}bcl(A) \subseteq Y$ whenever $A \subseteq Y$ and Y is τ_1Nano open in U. Also it is given that $A \subseteq A' \subseteq \tau_2 Nrg^{*}bcl(A)$.

To prove. A' is $\tau_1\tau_2 Nrg^{**}b$-closed in U.Let $A' \subseteq Y$ and Y is τ_1Nano open in U. As $A \subseteq Y$ and A is $\tau_1\tau_2 Nrg^{**}b -$ closed in U, $\tau_2 Nrg^{*}bcl(A) \subseteq Y$.But it is given that $A' \subseteq \tau_2 Nrg^{*}bcl(A)$which implies $\tau_2 Nrg^{*}bcl(A') \subseteq \tau_2 Nrg^{*}bcl(A) \subseteq Y$.Therefore $\tau_2 Nrg^{*}bcl(A') \subseteq Y$ whenever $A' \subseteq Y$ and Y is τ_1Nano open in U.Hence A' is also $\tau_1\tau_2 Nrg^{**}b$-closed in U.

Remark 4.3 $\tau_2 Nrg^{*}bcl(U - A) \subseteq U - U' \Rightarrow \tau_2 Nrg^{*}bcl(A^C) \subseteq U'^c$ that is $\tau_2 Nrg^{*}bcl(A^c) \subseteq U'^c$ whenever $A^c \subseteq U'^c$ and U'^c is τ_1Nano open in U. Therefore A^c is $\tau_1\tau_2 Nrg^{**}b$-closed in U.

Theorem4.4 A set A is $\tau_1\tau_2 Nrg^{**}b$-open in U if and only if $U' \subseteq \tau_1 Nrg^{*}bint(A)$ whenever U' is τ_2Nano closed set and $U' \subseteq A$.

Proof. Given that A is $\tau_1\tau_2 Nrg^{**}b$-open in U, A^c is $\tau_1\tau_2 Nrg^{**}b$-closed in U.

To prove. $U' \subseteq \tau_1 Nrg^{*}bint(A)$ whenever $U' \subseteq A$ and U' is τ_2Nano closed in U.

Let $U^{'}$ is τ_2Nano closed set and $U^{'} \subseteq A$ and $U - A \subseteq U - U^{'}$.Therefore $\tau_2 Nrg^{*}bcl(U - A) \subseteq U - U^{'}$, as $U - A$ is $\tau_1\tau_2 Nrg^{**}b$-closed and $U - U^{'}$ is τ_1Nano open. By remark(4.3), $U - \tau_1 Nrg^{*}bint(A) \subseteq U - U^{'}$. Hence $U^{'} \subseteq \tau_1 Nrg^{*}bint(A)$.

Conversely, we assume that $U^{'} \subseteq \tau_1 Nrg^{*}bint(A)$ whenever $U^{'}$ is τ_2Nano closed set and $U^{'} \subseteq A$.Let $A^c \subseteq U^{'c}$ and $U^{'c}$ is τ_1Nano open in U. Now $U^{'} \subseteq \tau_1 Nrg^{*}bintA$

$$\Rightarrow U - U^{'} \supseteq U - \tau_1 Nrg^{*}bint(A)$$

$$\Rightarrow U - \tau_1 Nrg^{*}bint(A) \subseteq U - U^{'}.$$

By Remark(4.3),$\tau_2 Nrg^{*}bcl(U - A) \subseteq U - U^{'} \Rightarrow \tau_2 Nrg^{*}bcl(A^C) \subseteq U^{'c}$ that is$\tau_2 Nrg^{*}bcl(A^c) \subseteq U^{'c}$ whenever $A^c \subseteq U^{'c}$ and $U^{'c}$ is τ_1Nano open in U. Therefore A^c is $\tau_1\tau_2 Nrg^{**}b$-closed in U. Hence A is $\tau_1\tau_2 Nrg^{**}b$-open in U.

5.REFERENCES.

[1] LellisThivagar M and Carmel Richard, On Nano forms of weakly open sets, International Journal of Mathematics and statistics Invention, 1(1), (2013), 31-37.

[2] LellisThivagar M and Carmel Richard, On Nano Continuity, Mathematical Theory and Modelling, 3(7), (2013), 32-37.

[3] Levin N, Generalized closed sets in topology, Rend. Circ. Mat. Palermo, 19(2), (1970), 89-96.

[4].M.Lellis Thivagar and Carmel Richard, Note on nano topological spaces, Communicated.

[5] Pawlak Z,Rough sets, International journal of information and computer sciences, 11,(1982), 341-356.

[6]Reilly and. Vamanamurthy, On α −sets in topological spaces, Tamkang J.Math., 16, 1985, (7-11).

[7] Sindu K, Indirani K, On regular generalized star b-closed sets in topological spaces., IJMA,4(10),2013,85-92

[8]Smitha M.G, Indirani K, On regular generalized star b-closed sets in nano topological spaces., International Journal of Physics and Mathematics scicences,5(3),2015,22-26

[9]Vasanthakannan G, Indirani K, Nano regular generalized star star b-closed sets in nanotopological spaces., International journal of Mathematical archieve.,7(10),2016,115-122