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Some New Form Of Nano Locally Closed Sets In Nano Topological Spaces

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Abstract

The aim of this paper, we introduce Nλψg-locally closed set, NλΨg-locally closed continuous functions and NλΨg - locally closed irresolute functions nano topological spaces and some relationship between them.

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Key words : NλψGLC-set, NλψGLC -continuous and NλψGLC –irresolute functions.

1 Introduction

M.K.R.S.Veerakumar [6] was introduced the notion of Ψ closed sets in topological spaces. Maki [3] introduced the notion of Λ-sets in topological spaces in 1986. Λ-set is a set A which is equal to its kernel, i.e., to the intersection of all open supersets of A. Lellis Thivagar introduced [2] nano topological space with respect to a subset X of a universe which is defined in terms of lower and upper approximation of X. The elements of nano topological space are called nano open sets. He has also defined nano closed sets, nano interior and nano closure of a set. He also introduced the weak forms of nano open sets. P.Subbulakshmi and N.R.Santhi Maheswari [5] nano $N\Lambda_{\Psi}(A)$ sets, nano $N\Lambda^{*}_{\Psi}(A)$ sets, nano Λ_{Ψ} -set and nano Λ^{*}_{Ψ} -set in nano topological spaces and investigate some of their properties and we defined [7] $N(\boldsymbol{\Lambda},\boldsymbol{\Psi})$ -closed sets , $N(\boldsymbol{\Lambda},\boldsymbol{\Psi})$ -open sets and NλΨg-closed sets. Moreover we introduced [8] NλΨg -continuous functions and NλΨg-irresolute functions in nano topological spaces. In this paper, we discuss about the concept of Nλψg -locally closed sets in nano topological spaces. Also we describe NλΨg – locally closed continuous function and NλΨg -locally closed irresolute function in nano topological spaces. We study some of its characterisation and discuss their relationship between them.

2 Preliminaries

Definition 2.1. [3] Let U be the Universe and R be an equivalence relation U and $\tau_R(X) = \{U, \varphi, L_R(X), U_R(X), B_R(X)\}$ where $X \subseteq U$. $\tau_R(X)$ satisfies the following axioms:

(1) U and $\varphi \in \tau_R(X)$.
(2) The union of elements of any subcollection of $\tau_R(X)$ is in $\tau_R(X)$.
(3) The intersection of the elements of any finite subcollection of $\tau_R(X)$ is in $\tau_R(X)$.

We call $(U, \tau_R(X))$ is a nano topological space. The elements of $\tau_R(X)$ are called a open sets and the complement of a nano open set is called nano closed sets.

Throughout this paper $(U, \tau_R(X))$ is a nano topological space with respect to X where $X \subseteq U$, R is an equivalence relation on U , U/R denotes the family of equivalence classes of U by R.

Definition 2.2. [3] If $(U, \tau_R(X))$ is a nano topological space with respect to X . Where $X \subseteq G$ and if $A \subseteq G$,then

- The nano interior of the set A is defined as the union of all nano open subsets contained in A and is denoted by Nint(A) , Nint(A) is the largest nano open subset of A.
- The nano closure of the set A is defined as the intersection of all nano closed sets containing A and is denoted by Ncl(A) . Ncl(A) is the smallest nano closed set containing A.

Definition 2.3. [3] Let $(U, \tau_R(X))$ be a nano topological space and $A \subseteq G$.Then A is said to be

(i) Nano semi-open if $A \subseteq$ Ncl(Nint(A))
(ii) Nano semi-closed if Nint(Ncl(A)) $\subseteq$ A

Definition 2.4. [6] Let A be a subset of a nano topological space $(U, \tau_R(X))$. A subset $N\Lambda_\Psi(A)$ is defined as $N\Lambda_\Psi = \cap \{H/A \subseteq H \text{ and } H \in N\psi\, O(U, \tau_R(X))\}$.

Definition 2.5. [6] A subset A of a nano topological space $(U, \tau_R(X))$ is called a $N\Lambda_\Psi(A)$ -set if $A = N\Lambda_\Psi(A)$. The set of all $N\Lambda_\Psi(A)$ -sets is denoted by $N\Lambda\psi(U, \tau_R(X))$.

Definition 2.6. [7] Let A be a subset of a nano topological space $(U, \tau_R(X))$. A subset $N(\Lambda, \Psi)$ closed if A = B ∩ C , where B is $N\Lambda_\Psi$ set and C is a $N\psi$ closed set. The family of all $N(\Lambda, \Psi)$-closed sets is denoted by $N\Lambda_\Psi C(U, \tau_R(X))$.

Definition 2.7. Let $(U, \tau_R(X))$ be a nano topological space and $A \subseteq G$. Then A is said to be

1. Nano generalized closed (briefly Ng) [1] if Ncl(A) $\subseteq$ G whenever $A \subseteq G$ and G is nano-open in U .

2. Nano semi generalized closed (briefly Nsg) [1] if $Nscl(A) \subseteq G$ whenever $A \subseteq G$ and G is nano-semi open in U .
3. Nano ψ -closed [9] (briefly Nψ -closed) if $Nscl(A) \subseteq G$ whenever $A \subseteq G$ and G is Nsg-open in U .
4. Nano λψgeneralized closed [7] (briefly Nλψg -closed) if $N\psi cl(A) \subseteq G$ whenever $A \subseteq G$ and G is $N(\Lambda, \psi)$ open in U .

Theorem 2.8. [7] Let $(U, \tau_R(X))$ be a nano topological spaces. Then

1. Every nano closed set is Nλψg -closed.
2. Every nano open set is Nλψg -open.

Theorem 2.9 [7]

1. Arbitrary intersection of Nλψg - closed sets is Nλψg - closed.
2. Arbitrary union of Nλψg -open sets is Nλψg -open.

Definition 2.10. [2] A subset S of a topological space $(U, \tau_R(X))$ is called nano locally closed (briefly NLC) set if $S = G \cap H$ where G is nano open and H is nano closed.

Definition 2.11. [2] A function $f : (U, \tau_R(X)) \rightarrow (V, \tau'_R(Y))$ is said be NLC- continuous if $f^{-1}(G)$ is NLC set in $(U, \tau_R(X))$ for each closed set G of $(V, \tau'_R(Y))$.

Definition 2.12. [2] A function $f : (U, \tau_R(X)) \rightarrow (V, \tau'_R(Y))$ is said be NLC- irresolute if $f^{-1}(G)$ is NLC set in $(U, \tau_R(X))$ for each NLC set G of $(V, \tau'_R(Y))$.

3 Nλψg- Locally closed sets

Definition 3.1. A subset S of a nano topological space $(U, \tau_R(X))$ is said to be a Nλψg -locally closed set (briefly NλψGLC-set) if $S = G \cap H$ where G is Nλψg-open and H is Nλψg -closed.
The class of all NλψGLC sets in $(U, \tau_R(X))$ is denoted by $N\lambda\psi GLC(U, \tau_R(X))$.

Definition 3.2. A subset S of a nano topological space $(U, \tau_R(X))$ is said to be $N\lambda\psi GLC^*$ if there exist a Nλψg-open set G and a nano closed set H of $(U, \tau_R(X))$ such that $S = G \cap H$.
The class of all $N\lambda\psi GLC^*$ sets in $(U, \tau_R(X))$ is denoted by $N\lambda\psi GLC^*(U, \tau_R(X))$.

Definition 3.3. A subset S of a nano topological space $(U, \tau_R(X))$ is said to be $N\lambda\psi GLC^{**}$ if there exist a nano open set G and a Nλψg -closed set H of $(U, \tau_R(X))$ such that $S = G \cap H$.
The class of all $N\lambda\psi GLC^{**}$ sets in $(U, \tau_R(X))$ is denoted by $N\lambda\psi GLC^{**}(U, \tau_R(X))$.

Theorem 3.4. If a subset S of $(U, \tau_R(X))$ is nano locally closed then it is a NλψGLC set, $N\lambda\psi GLC^*$set and $N\lambda\psi GLC^{**}$ set.

Proof. Let S be a nano locally closed subset of U. Then S = G ∩ H , where G is nano open and H is nano closed in $(U, \tau_R(X))$. By theorem 2.8, S is a NλψGLC set, $N\lambda\psi GLC^{*}$ set and $N\lambda\psi GLC^{**}$ set.

Remark 3.5. The converse of the above theorem need not be true as seen from the following example.

Example 3.6. Let U = {a, b, c, d} and with U/R = {{c}, {d}, {a, b}} and X = {b, c} . Then $\tau_R(X)$ = {U, φ, {c}, {a, b}, {a, b, c}} . Then NLC sets = {U, φ, {c}, {d}, {a, b}, {c, d}, {a, b, c}, {a, b, d}} , $N\lambda\psi GLC(U,\tau_R(X))$ = P(X) , $N\lambda\psi GLC^{*}(U,\tau_R(X))$ = {U, φ, {a}, {b}, {c}, {d}, {a, b}, {a, c}, {b, c}{c, d}, {a, b, c}, {a, b, d}, {a, c, d}, {b, c, d}} and $N\lambda\psi GLC^{**}(U,\tau_R(X))$ = {U, φ, {a}, {b}, {c}, {d}, {a, b}, {a, d}, {b, d}, {c, d}, {a, b, d}, {a, c, d}, {b, c, d}, {a, b, c}} . Here, {a} is $N\lambda\psi GLC$, $N\lambda\psi GLC^{*}$ and $N\lambda\psi GLC^{**}$ but not NLC .

Theorem 3.7. If a subset S of $(U,\tau_R(X))$ is $N\lambda\psi GLC^{*}$ then it is a $N\lambda\psi GLC$ set.

Proof. Let S be a $N\lambda\psi GLC^{*}$ set. Then $S = G \cap H$, where G is an $N\lambda\psi g$ –open set in $(U,\tau_R(X))$ and H is a nano closed set in $(U,\tau_R(X))$. By theorem 2.8, S is $N\lambda\psi GLC$ set.

Remark 3.8. The converse of the above theorem need not be true as shown in the following example.

Example 3.9. Example 3.6, {b, d} is $N\lambda\psi GLC$ set but not in $N\lambda\psi GLC^{**}$ set.

Theorem 3.10. If a subset S of $(U,\tau_R(X))$ is $N\lambda\psi GLC^{**}$ then it is a $N\lambda\psi GLC$ set.

Proof. Let S be a $N\lambda\psi GLC^{**}$ set. Then $S = G \cap H$, where G is an nano open set in $(U,\tau_R(X))$ and H is a $N\lambda\psi g$-closed set in . By theorem 2.8, S is $N\lambda\psi GLC$ set.

Remark 3.11. The converse of the above theorem need not be true as shown in the following example.

Example 3.12. Example 3.6, {b, c} is $N\lambda\psi GLC$ set but not in $N\lambda\psi GLC^{**}$set.

Theorem 3.13. If $S \in N\lambda\psi GLC(U,\tau_R(X))$ and $T \in N\lambda\psi g$ -closed in $(U,\tau_R(X))$, then $S \cap T \in N\lambda\psi GLC(U,\tau_R(X))$.

Proof. Since $S \in N\lambda\psi GLC(U,\tau_R(X))$, there exist a $N\lambda\psi g$-open set G and a $N\lambda\psi g$-closed set H such that $S = G \cap H$. Now $S \cap T = (G \cap H) \cap T = G \cap (H \cap T)$. Since G is $N\lambda\psi g$-open and $H \cap T$ is $N\lambda\psi g$-closed, $S \cap T \in N\lambda\psi GLC(U,\tau_R(X))$.

Theorem 3.14. If $S \in N\lambda\psi GLC^{*}(U,\tau_R(X))$ and T is nano closed in $(U,\tau_R(X))$, $S \cap T \in N\lambda\psi GLC^{*}(U,\tau_R(X))$.

Proof. Since $S \in N\lambda\psi GLC^{*}(U,\tau_R(X))$, there exist a $N\lambda\psi g$-open set G and a nano closed set H such that S = G ∩ H . Since T is a nano closed set, we have $S \cap T = (G \cap H) \cap T = G \cap (H \cap T)$. Since H is $N\lambda\psi g$-open and $H \cap T$ is nano closed, $S \cap T \in N\lambda\psi GLC^{*}(U,\tau_R(X))$.

Theorem 3.15. If $S \in N\lambda\psi GLC^{**}\big(U,\tau_R(X)\big)$ and T is $N\lambda\psi g$-closed (resp nano open) in $\big(U,\tau_R(X)\big)$, then $S \cap T \in N\lambda\psi GLC^{**}(U,\tau_R(X))$.

Proof. Since $S \in N\lambda\psi GLC^{**}(U,\tau_R(X))$, there exist an nano open set G and a $N\lambda\psi g$ -closed set H such that $S = G \cap H$. Now $S \cap T = (G \cap H) \cap T = G \cap (H \cap T)$. Since G is nano open and $H \cap T$ is $N\lambda\psi g$-closed, $S \cap T \in N\lambda\psi GLC^{**}(U,\tau_R(X))$.

In this case T being a nano open set, we have $S \cap T = (G \cap H) \cap T = (G \cap T) \cap H$. Since $G \cap T$ is open and H is $N\lambda\psi g$ -closed, $S \cap T \in N\lambda\psi GLC^{**}(U,\tau_R(X))$.

4 $N\lambda\psi GLC$ - Continuous Functions

Definition 4.1. A function $f : (U,\tau_R(X)) \to (V,\tau'_R(Y))$ is said to be $N\lambda\psi GLC$-continuous (resp. $N\lambda\psi GLC^{*}$ - continuous, $N\lambda\psi GLC^{**}$ -continuous) if $f^{-1}(G) \in N\lambda\psi GLC(U,\tau_R(X))$ (resp. $f^{-1}(G) \in N\lambda\psi GLC^{*}(U,\tau_R(X))$, $f^{-1}(G) \in N\lambda\psi GLC^{**}(U,\tau_R(X))$) for each nano closed set G in $(V,\tau'_R(Y))$.

Theorem 4.2. Let $f : (U,\tau_R(X)) \to (V,\tau'_R(Y))$ be a function. Then we have the following:
(i) If f is NLC-continuous, then f is $N\lambda\psi GLC$-continuous, $N\lambda\psi GLC^{*}$ - continuous and $N\lambda\psi GLC^{**}$ - continuous.
(ii) If f is NλψGLC* - continuous function, then f is $N\lambda\psi GLC$- continuous.
(iii) If f is $N\lambda\psi GLC^{**}$ -continuous function, then f is $N\lambda\psi GLC$- continuous.

Proof. (i) Suppose that $f : (U,\tau_R(X)) \to \big(V,\tau'_R(Y)\big)$ is NLC- continuous. Let G be a nano closed set of U. Then $f^{-1}(G)$ is a nano locally closed set in U. By theorem 3.4, it follows that f is $N\lambda\psi GLC$ - continuous (resp. $N\lambda\psi GLC^{*}$- continuous and $N\lambda\psi GLC^{**}$-continuous).

(ii) Let $f : (U,\tau_R(X)) \to (V,\tau'_R(Y))$be a $N\lambda\psi GLC^{*}$ - continuous function. Let G be a nano closed set of U. Then $f^{-1}(G)$ is $N\lambda\psi GLC^{*}$ set in U. By theorem 3.7, it follows that f is $N\lambda\psi GLC^{*}$ - continuous is $N\lambda\psi GLC$ -continuous.

(iii) Let $f : (U, \tau_R(X)) \rightarrow (V, \tau'_R(Y))$ be a $N\lambda\psi GLC^{**}$- continuous function. Let G be a nano closed set of U. Then $f^{-1}(G)$ is $N\lambda\psi GLC^{**}$ set in U. By theorem 3.10, it follows that f is $N\lambda\psi GLC^{**}$ - continuous is $N\lambda\psi GLC$ -continuous.

Remark 4.3. The converse of the above theorem need not be true as seen from the following examples.

Example 4.4. (i) Let {a, b, c, d} with U/R = {{a}, {b}, {c, d}} and X = {a, d} . Then $\tau_R(X)$= {U, φ, {a}, {c, d}, {a, c, d}} . Let V = {a,b,c,d} with V/R ={{c}, {d}, {a, b}} and Y = {b, c} . Then $\tau'_R(Y)$= {V, φ, {c}, {a, b}, {a, b, c}}. Define a function $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ as f(a) = b, f(b) = a , f(c) =d and f(d) = c . Then f is $N\lambda\psi GLC$ -continuous, $N\lambda\psi GLC^*$ - continuous, $N\lambda\psi GLC^{**}$ -continuous but not NLC continuous.

(ii) Let {a, b, c, d} with U/R = {{a},{b,c, d}} and X = {a, d} . Then $\tau_R(X)$= {U, φ, {b, c, d}} . Let V = {a,b,c,d} with V/R ={{b},{c},{a,d}} and Y = {b, c} . Then $\tau'_R(Y)$= {V, φ, {b}, {a, d}, {a, b, d}}. Define a function $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ as f(a) = a, f(b) =b , f(c) =c and f(d) = d . Then f is $N\lambda\psi GLC$ –continuous but not $N\lambda\psi GLC^*$-continuous.

(iii) Let {a, b, c, d} with U/R = {{a}, {b,c, d}} and X = {b,c} . Then $\tau_R(X)$= {U, φ, {b, c, d}} . Let V = {a,b,c,d} with V/R ={{c}, {d}, {a, b}} and Y = {b, c} . Then $\tau'_R(X)$= {V, φ, {c}, {a, b}, {a, b, c}}. Define a function $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ as f(a) = a, f(b) = b , f(c) =d and f(d) = c . Then f is $N\lambda\psi GLC$ –continuous but not $N\lambda\psi GLC^{**}$ -continuous.

Theorem 4.7. If $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ and $f : (V, \tau'_R(X)) \rightarrow (W, \tau''_R(Z))$ are any two functions. Then
(i) $g \circ f$ is $N\lambda\psi GLC$-continuous if f is $N\lambda\psi GLC$- continuous and g is nano continuous.
(ii) $g \circ f$ is $N\lambda\psi GLC^*$- continuous if f is $N\lambda\psi GLC^*$- continuous and g is nano continuous.
(iii) $g \circ f$ is $N\lambda\psi GLC^{**}$ - continuous if f is $N\lambda\psi GLC^{**}$- continuous and g is nano continuous.

Proof. (i) Let G be a nano closed set in $(W, \tau''_R(Z))$. Since g is nano continuous, $g^{-1}(G)$ is nano closed set in $(V, \tau'_R(X))$. Again, since f is $N\lambda\psi GLC$ - continuous, $f^{-1}(g^{-1}(G))$ is $N\lambda\psi GLC$ in $(U, \tau_R(X))$. Thus $g \circ f$ is $N\lambda\psi GLC$- continuous function.

(ii) Let G be a nano closed set in $(W, \tau''_R(Z))$. Since g is nano continuous, $g^{-1}(G)$ is nano closed in $(V, \tau'_R(X))$. Since f is $N\lambda\psi GLC^*$ - continuous, $f^{-1}(g^{-1}(G))$ is $N\lambda\psi GLC^*$ in $(U, \tau_R(X))$. Thus $g \circ f$ is $N\lambda\psi GLC^*$- continuous function.

(iii) Let G be a nano closed set in $(W, \tau''_R(Z))$. Since g is nano continuous, $g^{-1}(G)$ is nano closed in $(V, \tau'_R(X))$. Since f is $N\lambda\psi GLC^{**}$ - continuous, $f^{-1}(g^{-1}(G))$ is $N\lambda\psi GLC^{**}$ in $(U, \tau_R(X))$. Thus $g \circ f$ is $N\lambda\psi GLC^{**}$-continuous function.

5 $N\lambda\psi GLC$- Irresolute Functions

Definition 5.1. A function $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ is said to be $N\lambda\psi GLC$-irresolute (resp. $N\lambda\psi GLC^*$ - irresolute, $N\lambda\psi GLC^{**}$ - irresolute) if the inverse image of $N\lambda\psi GLC$ set (resp. $N\lambda\psi GLC^*$ set, $N\lambda\psi GLC^{**}$set) in $(V, \tau'_R(X))$ is $N\lambda\psi GLC$ set (resp. $N\lambda\psi GLC^*$, $N\lambda\psi GLC^{**}$ set) in $(U, \tau_R(X))$.

Theorem 5.2. If a function $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ is NLC- irresolute, then f is $N\lambda\psi GLC$-irresolute (resp. $N\lambda\psi GLC^*$- irresolute and $N\lambda\psi GLC^{**}-$ irresolute).

Proof. Suppose that f is NLC- irresolute. Let G be a nano locally closed set of $(U, \tau_R(X))$. Then $f^{-1}(G)$ is a nano locally closed set in $(U, \tau_R(X))$. By theorem 3.4, it follows that f is $N\lambda\psi GLC$-irresolute (resp. $N\lambda\psi GLC^*$ - irresolute and $N\lambda\psi GLC^{**}$- irresolute).

Remark 5.3. The converse of the above theorem need not be true as seen from the following examples.

Example 5.4. Let {a, b, c, d} with U/R = {{a}, {b, c, d}} and X = {a, c}. Then $\tau_R(X)$ = {U, φ, {a}, {b, c, d}}. Let V = {a, b, c, d} with V/R' = {{a}, {b}, {c, d}} and Y = {a, d} . Then $\tau'_R(Y)$ = {V, φ, {a}, {c, d}, {a, c, d}}. Define a function $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ as f(a) = c , f(b) = d , f(c) = a and f(d) = b . Then f is $N\lambda\psi GLC$ -irresolute, $N\lambda\psi GLC^*$ -irresolute, $N\lambda\psi GLC^{**}$-irresolute but not NLC irresolute.

Theorem 5.5. Let $f : (U, \tau_R(X)) \rightarrow \left(V, \tau'_R(Y)\right)$ and $g : (V, \tau'_R(Y)) \rightarrow (Z, \tau''_R(Z))$ be any two functions. Then

(i) $g \circ f : (U, \tau_R(X)) \rightarrow (Z, \tau''_R(Z))$ is NλψGLC - irresolute if g is NλψGLC- irresolute and f is NλψGLC- irresolute.

(ii) $g \circ f : (U, \tau_R(X)) \rightarrow (Z, \tau''_R(Z))$ is NλψGLC- continuous if g is NλψGLC-continuous and f is NλψGLC-irresolute.

Proof. (i) Let $G \in N\lambda\psi GLC(W, \tau''_R(Z))$. Since g is NλψGLC- irresolute, $g^{-1}(G)$ is NλψGLC in $\left(V, \tau'_R(Y)\right)$. As f is NλψGLC- irresolute, $f^{-1}(g^{-1}(G))$ is NλψGLC in $(U, \tau_R(X))$. That is $(g \circ f)^{-1}(G) \in N\lambda\psi GLC(U, \tau_R(X))$. Thus $g \circ f$ is NλψGLC -irresolute.

(ii) Let G be a nano closed set in $(W, \tau''_R(Z))$. Since g is NλψGLC - continuous, $g^{-1}(G)$ is NλψGLC in $(V, \tau'_R(Y))$. Again, since f is NλψGLC - irresolute, $f^{-1}(g^{-1}(G))$ is NλψGLC in $(U, \tau_R(X))$. Thus $g \circ f$ is NλψGLC -continuous.

Theorem 5.6. Let $f: (U, \tau_R(X)) \rightarrow (V, \tau'_R(Y))$ and $g: (V, \tau'_R(Y)) \rightarrow (W, \tau''_R(Z))$ be any two functions. Then
(i) $g \circ f$ is NλψGLC*- irresolute if f and g are NλψGLC*- irresolute.
(ii) $g \circ f$ is NλψGLC**- irresolute if f and g are NλψGLC**- irresolute.
(iii) $g \circ f$ is NλψGLC*- continuous if f is NλψGLC*- irresolute and g is NλψGLC*- continuous.
(iv) $g \circ f$ is NλψGLC**- continuous if f is NλψGLC**- irresolute and g is NλψGLC**- continuous.

Proof. (i) Let $G \in$ NλψGLC* $(W, \tau''_R(Z))$. Since g is NλψGLC*- irresolute, $g^{-1}(G)$ is NλψGLC* in $(V, \tau'_R(Y))$. As f is NλψGLC*- irresolute, $f^{-1}(g^{-1}(G))$ is NλψGLC* in $(U, \tau_R(X))$. That is $(g \circ f)^{-1}(G) \in$ NλψGLC*$(U, \tau_R(X))$. Thus $g \circ f$ is NλψGLC*-irresolute.

(ii) Let $G \in$ NλψGLC** $(W, \tau''_R(Z))$. Since g is NλψGLC**- irresolute, $g^{-1}(G)$ is NλψGLC** in $(V, \tau'_R(Y))$. As f is NλψGLC**- irresolute, $f^{-1}(g^{-1}(G))$ is NλψGLC** in $(U, \tau_R(X))$. Hence $g \circ f$ is NλψGLC** - irresolute.

(iii) Let G be a nano closed set in $(W, \tau''_R(Z))$. Since g is NλψGLC*- continuous, $g^{-1}(G)$ is NλψGLC* in $(V, \tau'_R(Y))$. Again, since f is NλψGLC*- irresolute, $f^{-1}(g^{-1}(G))$ is NλψGLC* in $(U, \tau_R(X))$. Hence $g \circ f$ is NλψGLC*- continuous.

(iv) Let G be a nano closed set in $(W, \tau''_R(Z))$. Since g is NλψGLC**- continuous, $g^{-1}(G)$ is NλψGLC** in $(V, \tau'_R(Y))$. Since f is NλψGLC** -irresolute, $f^{-1}(g^{-1}(G))$ is NλψGLC** in $(U, \tau_R(X))$. Hence $g \circ f$ is NλψGLC**- continuous.

References

[1] K. Bhuvaneshwari and K. Ezhilarasi,“ On Nano semi generalized and Nano generalized semi-closed sets”, IJMCAR, 4(3) (2014), 117-124.
[2] M.Ganster and relly, IL,“ Locally closed sets and LC- continuous functions”, Internal Journal of Mathematical Science.12(3) (1989), 417-424.
[3] M. Lellis Thivagar and Carmel Richard,“ On Nano forms of weakly open sets”, International Journal of Mathematics and Statistics Invention,1(1) (2013), 31-37.
[4] H.Maki, “Generalized -sets and the associated closure operator”, Special Issue in Commemoration of Prof. Kazusada Ikedas Retirement (1986), 139-146.
[5] Z. Pawlak, “Rough sets”, International journal of computer and information sciences, 11(5)(1982), 341-356.

[6] P.Subbulakshmi and N.R.Santhi Maheswari , “On $N\Lambda_{\psi}$ -sets and $N\Lambda_{\psi}^{*}$ -sets in Nano Topological Spaces”, (Communicated).
[7] P.Subbulakshmi and N.R.Santhi Maheswari , “On Nλψg-closed Sets in nano topological spaces”, (Communicated).
[8] P.Subbulakshmi and N.R.Santhi Maheswari , “On Nano λψg –continuous functions in nano topological spaces”, (Communicated).
[9] M.K.R.S. Veera kumar, “Between semi closed sets and semi pre closed sets”,Rend.Istit.Mat.Univ.Trieste XXXII, (2000), 25-41.