Asia Mathematika
Volume: 4 Issue: 2 , (2020) Pages: 109 – 116
Available online at **www.asiamath.org**

Decomposition of $n\alpha$-continuity and $n^{*}\mu_{\alpha}$-continuity

S. Ganesan*, **C. Alexander** , **M. Sugapriya** and **A. N. Aishwarya**
PG & Research Department of Mathematics,
Raja Doraisingam Government Arts College, Sivagangai-630561, Tamil Nadu, India.
(Affiliated to Alagappa University, Karaikudi, Tamil Nadu, India)

Received: 19 Jul 2020 • **Accepted:** 03 Aug 2020 • **Published Online:** 20 Aug 2020

Abstract: The aim of this paper, we introduce the concepts of $n^{\iota}\eta$-sets, $n^{\iota\iota}\eta$-sets, $n^{\iota}\eta$-continuity, $n^{\iota\iota}\eta$-continuity & to find decomposition of nα continuity & $n^{*}\mu_{\alpha}$ continuity repectively in nano topological spaces.

Key words: $n\eta$-sets, $n^{\iota}\eta$-set, n$^{\iota\iota}\eta$-set, $n\eta$-continuityt, $n^{\iota}\eta$-continuity & $n^{\iota\iota}\eta$-continuity

1. Introduction

Jayalakshmi and Janaki [5] introduced and studied the notions of nt-sets, nA-sets & nB-sets in nano topological spaces. Recently, Ganesan [4] introduced & studied $n\alpha$B-sets, $n\eta$-sets, $n\eta\zeta$-sets & to find a decomposition of nano continuity. In this paper, we introduce & study the notions of $n^{\iota}\eta$-sets, $n^{\iota\iota}\eta$-sets, $n^{\iota}\eta$-continuity, $n^{\iota\iota}\eta$-continuity & obtain decomposition of $n\alpha$ continuity & $n^{*}\mu_{\alpha}$ continuity. Moreover the study of $n^{\iota}\eta$-sets, $n^{\iota\iota}\eta$-sets led to some decomposition nano continuity are extensively developed and used in computer science & digital topology.

2. Preliminaries

Definition 2.1. [7]

If (J, $\tau_R(P)$) is the nano topological space with respect to P where P $\subseteq$ J & if M $\subseteq$ J, then

(i) The n-interior of the set M is defined as the union of all n-open subsets contained in M and it is denoted by ninte(M). That is, ninte(M) is the largest n-open subset of M.

(ii) The n-closure of the set M is defined as the intersection of all n-closed sets containing M and it is denoted by nclo(M). That is, nclo(M) is the smallest n-closed set containing M.

Definition 2.2. [7]

A subset M of a space (J, $\tau_R(P)$) is called:

(i) $n\alpha$-closed if nclo(ninte(nclo(M))) $\subseteq$ M.

(ii) n-semi-closed if ninte(nclo(M)) $\subseteq$ M.

(iii) n-pre-closed if nclo(ninte(M)) $\subseteq$ M.

*Correspondence: asiamathematika@gmail.com

(iv) n-regular-closed if nclo(ninte(M)) = M.

The complements of the above mentioned n-closed are called their respective n-open.

Definition 2.3. A subset M of a space (J, $\tau_R(P)$) is called:

(i) a nt-set [5] if ninte(nclo(M)) = ninte(M).

(ii) an nA-set [5] if M = S ∩ G where S is n-open and G is a n-regular-closed.

(iii) a nB-set [5] if M = S ∩ G where S is n-open and G is a nt-set.

(iv) a n-locally closed set [1] if M = S ∩ G where S is n-open and G is n-closed.

(v) an nαB-set [4] if M = S ∩ G where S is $n\alpha$-open and G is a nt-set.

(vi) an $n\eta$-set [4] if M = S ∩ G where S is n-open and G is an $n\alpha$-closed.

Collection of nt-sets (respectively nA-sets, nB-sets, n-locally closed sets, $n\alpha$B-set, $n\eta$-set) in J is noted that nt(J) (respectively nA(J), nB(J), nLC(J), nαB(J), $n\eta$(J)).

Definition 2.4. A subset M of a space (J, $\tau_R(P)$) is called

(i) a $n\hat{g}$-closed [6] if nclo(M) ⊆ T whenever M ⊆ T and T is n-semi-open in (J, $\tau_R(P)$). The complement of $n\hat{g}$-closed set is called $n\hat{g}$-open.

(ii) n*gs-closed [2] if nsclo(M) ⊆ T whenever M ⊆ T and T is $n\hat{g}$-open in (J, $\tau_R(P)$). The complement of n*gs-closed set is called n*gs-open.

(iii) $n^*\mu_\alpha$-closed [2] if $n\alpha$clo(M) ⊆ T whenever M ⊆ T and T is n*gs-open in (J, $\tau_R(P)$). The complement of $n^*\mu_\alpha$-closed set is called $n^*\mu_\alpha$-open.

(iv) $n^*\mu_p$-closed [2] if npclo(M) ⊆ T whenever M ⊆ T and T is n*gs-open in (J, $\tau_R(P)$). The complement of $n^*\mu_p$-closed set is called $n^*\mu_p$-open.

Proposition 2.1. *(i) Every $n\alpha$-open is $n^*\mu_\alpha$-open [2].*

(ii) Every $n^*\mu_\alpha$-open is $n^*\mu_p$-open [2].

(iii) Every $n^*\mu_\alpha$-continuous is $n^*\mu_p$-continuous [3].

Theorem 2.1. *(i) Every n-closed is Nt-set [5].*

(ii) Every n-α closed is n-semi-closed [9].

(iii) Every nt-set is nB-set [5].

Theorem 2.2. [5]

(i) M is nt-set iff it is n-semi-closed.

(ii) Intersection two nt-sets is also a nt-set.

3. $n^{\iota}\eta$-sets & $n^{\iota\iota}\eta$-sets

Definition 3.1. A subset M of a space J is called

(i) an $n^{\iota}\eta$-set if M = S ∩ G where S is n*gs-open and G is $n\alpha$-closed.

(ii) an $n^{\iota\iota}\eta$-set if M = S ∩ G where S is $n^*\mu_{\alpha}$-open and G is a nt-set.

Collection of all $n^{\iota}\eta$-sets (respectively $n^{\iota\iota}\eta$-sets) in J will be note that $n^{\iota}\eta$(J) (respectively $n^{\iota\iota}\eta$(J)).

Proposition 3.1. *Every $n\eta$-set is $n^{\iota}\eta$-set.*

Proof. Take E be $n\eta$-set. Then E = S ∩ G, where S is n-open and G is $n\alpha$-closed. Since every n-open is n*gs open, S is n*gs open. Hence E is $n^{\iota}\eta$-set. □

Example 3.1. *Take $J = \{1, 2, 3, 4\}$ with $J/R = \{\{3\}, \{4\}, \{1, 2\}\}$ & $P = \{2\}$. The $n\tau_R(P) = \{\phi, \{1, 2\}, J\}$. Then $n^{\iota}\eta$-sets are ϕ, J, $\{1\}$, $\{2\}$, $\{3\}$, $\{4\}$, $\{1, 2\}$, $\{1, 3\}$, $\{1, 4\}$, $\{2, 3\}$ $\{2, 4\}$, $\{3, 4\}$, $\{1, 2, 3\}$, $\{1, 2, 4\}$ & $n\eta$-set are ϕ, J, $\{3\}$, $\{4\}$, $\{1, 2\}$, $\{3, 4\}$. However, it is clear that $\{1, 3\}$ is $n^{\iota}\eta$-set but it is not $n\eta$-set.*

Proposition 3.2. *Every $n\alpha B$-set is $n^{\iota\iota}\eta$-set.*

Proof. Take E be $n\alpha$B-set. Then E = S ∩ G, where S is $n\alpha$-open and G is nt-set. Since every $n\alpha$-open set is $n^*\mu_{\alpha}$-open, S is $n^*\mu_{\alpha}$-open. Hence E is $n^{\iota\iota}\eta$-set. □

Example 3.2. *Take J & $n\tau_R(P)$ see Example 3.1. Then $n^{\iota\iota}\eta$-set are ϕ, J, $\{1\}$, $\{2\}$, $\{3\}$, $\{4\}$, $\{1, 2\}$, $\{3, 4\}$, $\{1, 2, 3\}$, $\{1, 2, 4\}$ & $n\alpha B$-set are ϕ, J, $\{3\}$, $\{4\}$, $\{1, 2\}$, $\{3, 4\}$, $\{1, 2, 3\}$, $\{1, 2, 4\}$. However, it is clear that $\{1\}$ is $n^{\iota\iota}\eta$-set but it is not $n\alpha B$-set.*

Proposition 3.3. *Every $n^*\mu_{\alpha}$-open set is $n^{\iota\iota}\eta$-set.*

Proof. Using Definitions 2.4(iii) and 3.1(ii). □

Example 3.3. *Take J & $n\tau_R(P)$ see Example 3.2. Then $n^*\mu_{\alpha}$-open are ϕ, J, $\{1\}$, $\{2\}$, $\{1, 2\}$, $\{1, 2, 3\}$, $\{1, 2, 4\}$. It is clear that $\{3, 4\}$ is $n^{\iota\iota}\eta$-set but it is not $n^*\mu_{\alpha}$-open.*

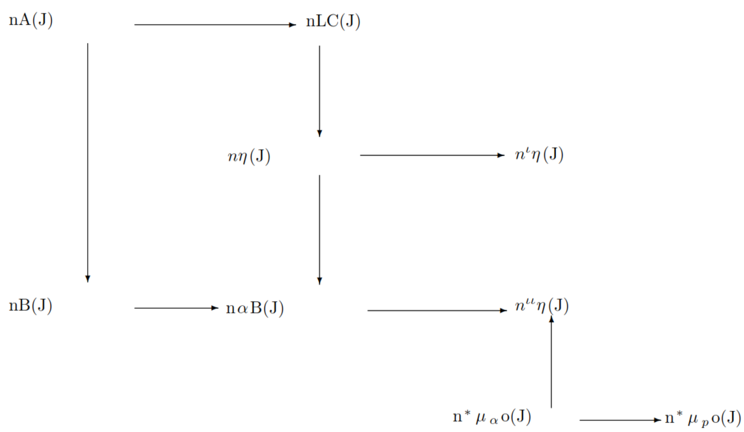
Remark 3.1. *(i) $n^{\iota}\eta$-sets & $n^*\mu_{\alpha}$-closed are independent.*
(ii) $n^{\iota\iota}\eta$-sets & $n^*\mu_{p}$-closed are independent.

Example 3.4. *(i) Take J & $n\tau_R(P)$ see Example 3.1. Then $n^*\mu_{\alpha}$-closed are ϕ, J, $\{3\}$, $\{4\}$, $\{3, 4\}$, $\{1, 3, 4\}$, $\{2, 3, 4\}$. However, it is clear that $\{1, 3, 4\}$ is $n^*\mu_{\alpha}$-closed but not $n^{\iota}\eta$-set & also it is clear that $\{1, 2, 3\}$ is $n^{\iota}\eta$-set but not $n^*\mu_{\alpha}$-closed in (J, $\tau_R(P)$).*
(ii) Let J & $n\tau_R(P)$ see Example 3.2. Then $n^*\mu_{p}$-closed are ϕ, J, $\{1\}$, $\{2\}$, $\{3\}$, $\{4\}$, $\{1, 3\}$, $\{1, 4\}$, $\{2, 3\}$, $\{2, 4\}$, $\{3, 4\}$, $\{1, 3, 4\}$, $\{2, 3, 4\}$. However, it is clear that $\{1, 3\}$ is $n^*\mu_{p}$-closed but not $n^{\iota\iota}\eta$-set & also it is clear that $\{1, 2, 4\}$ is $n^{\iota\iota}\eta$-set but not $n^*\mu_{p}$-closed in (J, $\tau_R(P)$).

Remark 3.2. *We discuss above results see the diagram.*

where none of these implications is reversible as shown by [4].

Theorem 3.1. *For a subset M of a space J, the following conditions are equivalent.*



(i) M is an $n^{\iota}\eta$-set.

*(ii) M = S ∩ $n\alpha$ clo(M) for some n*gs-open S.*

Proof. (i)→ (ii) Since M is an $n^{\iota}\eta$-set, then M = S ∩ G, where S is n*gs-open and G is $n\alpha$ closed. So, M ⊆ S and M ⊆ G. Hence $n\alpha$clo(M) ⊆ $n\alpha$clo(G). Therefore M ⊆ S ∩ $n\alpha$clo(M) ⊆ S ∩ $n\alpha$clo(G) = S ∩ G = M. Thus, M = S ∩ $n\alpha$clo(M).
(ii)→ (i) It is obvious because $n\alpha$clo(M) is $n\alpha$-closed. (Since M is $n\alpha$-closed iff M = $n\alpha$clo(M)). □

Remark 3.3. *Intersection of two $n^{\iota}\eta$-sets is an $n^{\iota}\eta$-set.*

Remark 3.4. *Union of two $n^{\iota}\eta$-sets need not be an $n^{\iota}\eta$-set.*

Example 3.5. *Take J & $n\tau_R(P)$ see Example 3.1. However, it is clear that {1, 3}, {4} are $n^{\iota\iota}\eta$-sets in (J, $\tau_R(P)$) but their union {1, 3, 4} is not an $n^{\iota}\eta$-set in (J, $\tau_R(P)$).*

Theorem 3.2. *For a subset M of a space J, the following conditions are equivalent:*

(i) M is $n\alpha$-closed.

(ii) M is an $n^{\iota}\eta$-set and $n^*\mu_{\alpha}$-closed.

Proof. (i)→ (ii) This is obvious.
(ii) → (i) Since M is an $n^{\iota}\eta$-set, then using Theorem 3.1, M = S ∩ $n\alpha$clo(M) where S is n*gs- open in J. So, M ⊆ S and since M is $n^*\mu_{\alpha}$-closed, then $n\alpha$clo(M) ⊆ S. Therefore, $n\alpha$clo(M) ⊆ S ∩ $n\alpha$clo(M) = M. Hence, M is $n\alpha$-closed. □

Remark 3.5. *Intersection of two $n^{\iota\iota}\eta$-sets is an $n^{\iota\iota}\eta$-set.*

Remark 3.6. *Union of two $n^{\iota\iota}\eta$-sets need not be an $n^{\iota\iota}\eta$-set.*

Example 3.6. *Take J & $n\tau_R(P)$ see Example 3.2. However, it is clear that {2}, {4} are $n^{\iota\iota}\eta$-sets in (J, $\tau_R(P)$) but their union {2, 4} is not an $n^{\iota\iota}\eta$-set in (J, $\tau_R(P)$).*

Theorem 3.3. *For a subset M of a space J, the following conditions are equivalent.*

(i) M is $n^*\mu_{\alpha}$-open.

(ii) M is an $n^{\iota\iota}\eta$-set and $n^*\mu_{p}$-open.

Proof. Necessity: This is obvious.
Sufficiency: Assume that M is $n^*\mu_{p}$-open and an $n^{\iota\iota}\eta$-set in J. Then M = S ∩ G where S is $n^*\mu_{\alpha}$-open and G is a nt-set in J. Take H ⊆ M, where H is n*gs-closed in J. Since M is $n^*\mu_{p}$-open in J, H ⊆ npinte(M) = M ∩ ninte(nclo(M)) = (S ∩ G) ∩ ninte[nclo(S ∩ G)] ⊆ S ∩ G ∩ ninte(nclo(S)) ∩ ninte(nclo(G)) = S ∩ G ∩ ninte(nclo(S)) ∩ ninte(G), since G is a nt-set. This implies, H ⊆ ninte(G). Note that S is $n^*\mu_{\alpha}$-open and that H ⊆ S. So, H ⊆ $n\alpha$inte(S). Therefore, H ⊆ $n\alpha$inte(S) ∩ ninte(G) = $n\alpha$inte(M). Hence M is $n^*\mu_{\alpha}$-open. □

4. $n^{\iota}\eta$-continuity & $n^{\iota\iota}\eta$-continuity

Definition 4.1. A map i : (J, $\tau_R(P)$) → (L, $\tau'_R(Q)$) is called:

(i) nA-continuous [10, 11] if i^{-1}(T) is an nA-set in J for each n-open T of L.

(ii) nB-continuous [10, 11] if i^{-1}(T) is an nB-set in J for each n-open T of L.

(iii) $n\alpha$-continuous [8] if i^{-1}(T) is an n-α open in J for each n-open T of L.

(iv) n-LC-continuous [1] if i^{-1}(T) is an n-locally closed in J for each nano open T of L.

(v) $n\alpha$B-continuous [4] if i^{-1}(T) is an nαB-set in J for each n-open T of L.

(vi) $n\eta$-continuous [4] if i^{-1}(T) is an $n\eta$-set in J for each n-open T of L.

(vii) $n^*\mu_{\alpha}$-continuous [3] (respectively $n^*\mu_{p}$-continuous [3]) if i^{-1}(T) is an $n^*\mu_{\alpha}$-open (respectively $n^*\mu_{p}$-open) in J for each n-open T of L.

Definition 4.2. A map i : (J, $\tau_R(P)$) → (L, $\tau'_R(Q)$) is called a $n^{\iota}\eta$-continuous (respectively $n^{\iota\iota}\eta$- continuous if i^{-1}(T) is an $n^{\iota}\eta$-set (respectively $n^{\iota\iota}\eta$-set) in J for each n-open subset T of L.

Definition 4.3. A map i : (J, $\tau_R(P)$) → (L, $\tau'_R(Q)$) is called a $n^{\iota}\eta^{\iota}$-continuous if i^{-1}(T) is an $n^{\iota}\eta$-set in J for each n-closed subset T of L.

Remark 4.1. *It is clear that, a map i : (J, $\tau_R(P)$) → (L, $\tau'_R(Q)$) is $n\alpha$-continuous iff i^{-1}(T) is an $n\alpha$ closed set in J for each n-closed T of L.*

Proposition 4.1. *Every $n\eta$-continuous is $n^{\iota}\eta$-continuous.*

Proof. Using Proposition 3.1. □

Example 4.1. *Take J & $n\tau_R(P)$ see Example 3.1. Take L = {1, 2, 3, 4} with L/ R'= {{1}, {3}, {2, 4}} and Q= {1, 2}. Then $n\tau'_R(Q)$ = {ϕ, {1}, {2, 4}, {1, 2, 4}, L}. Define i : (J, $\tau_R(P)$) → (L, $\tau'_R(Q)$) be the identity map. However, it is $n^{\iota}\eta$-continuous but not $n\eta$-continuous, since i^{-1} ({2, 4})= {2, 4} is not $n\eta$-set.*

Proposition 4.2. *Every $n\alpha B$-continuous is $n^{\iota\iota}\eta$-continuous.*

Proof. Using Proposition 3.2. □

Example 4.2. *Take J = {1, 2, 3}, with J/ R= {{3}, {1, 2}, {2, 1}} & P= {1, 2}. Then* $n\tau_R(P)$ *= {ϕ, {1, 2}, J}. Take L = {1, 2, 3} with L/ R'= {{1}, {2, 3}} & Q = {1}. Then* $n\tau'_R(Q)$ *= {ϕ, {1}, L}. Then* $n^{\iota\iota}\eta$*-sets are ϕ, J, {1}, {2}, {3}, {1, 2} &* $n\alpha B$*-sets are ϕ, J, {3}, {1, 2}. Define i : (J,* $\tau_R(P)$*) → (L,* $\tau'_R(Q)$*) be the identity map. However, it is* $n^{\iota\iota}\eta$*-continuous but not* $n\alpha B$*-continuous, since* i^{-1} *({1})= {1} is not* $n\alpha B$*-set.*

Proposition 4.3. *Every* $n^*\mu_\alpha$*-continuous is* $n^{\iota\iota}\eta$*-continuous.*

Proof. Using Proposition 3.3. □

Example 4.3. *Take J,* $n\tau_R(P)$ *& i see Example 4.2. Take L = {1, 2, 3} with L/ R'= {{3}, {1, 2}} & Q = {3}. Then* $n\tau'_R(Q)$ *= {ϕ, {3}, L}. Then* $n^{\iota\iota}\eta$*-sets are ϕ, J, {1}, {2}, {3}, {1, 2} &* $n^*\mu_\alpha$*-open sets are ϕ, J, {1}, {2}, {1, 2}. Define i : (J,* $\tau_R(P)$*) → (L,* $\tau'_R(Q)$*) be the identity map. However, it is* $n^{\iota\iota}\eta$*-continuous but not* $n^*\mu_\alpha$*-continuous, since* i^{-1} *({3})= {3} is not* $n^*\mu_\alpha$*-open set.*

Remark 4.2. *(i)* $n^*\mu_p$ *continuity &* $n^{\iota\iota}\eta$ *continuity are independent.*
(ii) $n^*\mu_\alpha$ *continuity &* $n^\iota\eta^\iota$ *continuity are independent.*
(iii) $n^\iota\eta$ *continuity &* $n^\iota\eta^\iota$ *continuity are independent.*

Example 4.4. *Take J,* $n\tau_R(P)$*, L,* $n\tau'_R(Y)$ *& i see Example 4.3. Then* $n^{\iota\iota}\eta$*-sets are ϕ, J, {1}, {2}, {3}, {1, 2} &* $n^*\mu_p$*-open set are ϕ, J, {1}, {2}, {1, 2}, {1, 3}, {2, 3}. Define i : (J,* $\tau_R(P)$*) → (L,* $\tau'_R(Q)$*) be the identity map. However, it is* $n^{\iota\iota}\eta$*-continuous but not* $n^*\mu_p$*-continuous, since* i^{-1} *({3})= {3} is not* $n^*\mu_p$*-open.*

Example 4.5. *Take J = {1, 2, 3}, with J/ R= {{2}, {1, 3}, {3, 1}} & P = {1, 3}. Then* $n\tau_R(P)$ *= {ϕ, {1, 3}, J}. Take L = {1, 2, 3} with L/ R'= {{3}, {1, 2}, {2, 1}} & Q = {1, 2}. Then* $n\tau'_R(Q)$ *= {ϕ, {1, 2}, L}. Then* $n^{\iota\iota}\eta$*-sets are ϕ, J, {1}, {2}, {3}, {1, 3} &* $n^*\mu_p$*-open sets are ϕ, J, {1}, {3}, {1, 2}, {1, 3}, {2, 3}. However, it is* $n^*\mu_p$*-continuous but not* $n^{\iota\iota}\eta$*-continuous, since* i^{-1} *({1, 2})= {1, 2} is not* $n^{\iota\iota}\eta$*-set.*

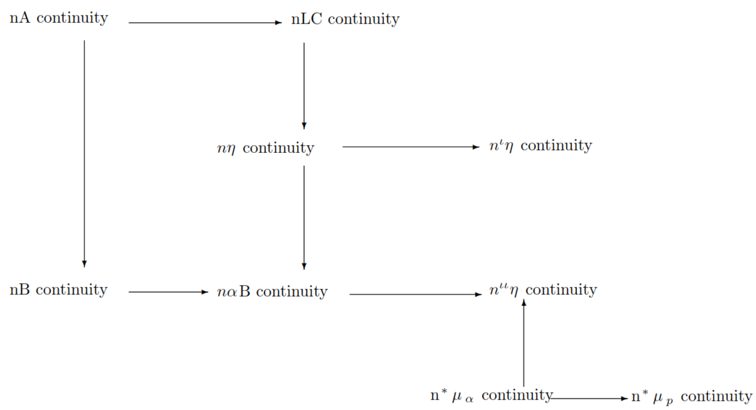
Example 4.6. *Take J = {1, 2, 3}, with J/ R= {{1}, {2, 3}, {3, 2}} & P= {2, 3}. Then* $n\tau_R(P)$ *= {ϕ, {2, 3}, J}. Take L,* $n\tau'_R(Q)$*, & i see Example 4.3. Then* $n^*\mu_\alpha$*-open sets are ϕ, J, {2}, {3}, {2, 3} &* $n^\iota\eta$*-set are ϕ, J, {1}, {2}, {3}, {2, 3}. However, it is* $n^*\mu_\alpha$*-continuous but not* $n^\iota\eta^\iota$*-continuous, since* i^{-1} *({1, 2}) = {1, 2} is not* $n^\iota\eta$*-set.*

Example 4.7. *Take J,* $n\tau_R(P)$*, & i see Example 4.3. Take L = {1, 2, 3} with L/ R'= {{1}, {2, 3}, {3, 2}} & Q = {2, 3} . Then* $n\tau'_R(Q)$ *= {ϕ, {2, 3}, L}. Then* $n^\iota\eta$*-sets are ϕ, J, {1}, {2}, {3}, {1, 2} &* $n^*\mu_\alpha$*-open sets are ϕ, J, {1}, {2}, {1, 2}. However, it is* $n^\iota\eta^\iota$*-continuous but not* $n^*\mu_\alpha$*-continuous, since* i^{-1} *({2, 3})= {2, 3} is not* $n^*\mu_\alpha$*-open.*

Example 4.8. *Take J,* $n\tau_R(P)$*, L,* $n\tau'_R(Q)$ *& i see Example 4.6. However, it is* $n^\iota\eta$*-continuous but not* $n^\iota\eta^\iota$*-continuous, since* i^{-1} *({1, 2})= {1, 2} is not* $n^\iota\eta$*-set.*

Example 4.9. *Take J,* $n\tau_R(P)$*, L,* $n\tau'_R(Q)$ *& i see Example 4.5. Then* $n^\iota\eta$*-sets are ϕ, J, {1}, {2}, {3}, {1, 3}. However, it is* $n^\iota\eta^\iota$*-continuous but not* $n^\iota\eta$*-continuous, since* i^{-1} *({1, 2})= {1, 2} is not* $n^\iota\eta$*-set.*

Remark 4.3. *From the above discussions we obtain the following diagram where $A \to B$ represents A implies B, but not conversely.*



Theorem 4.1. *Map i : $(J,\ \tau_R(P)) \to (L,\ \tau'_R(Q))$, the following conditions are equivalent.*

(i) *i is $n\alpha$-continuous.*

(ii) *i is $n^*\eta^*$-continuous & $n^*\ \mu_{\ \alpha}$-continuous.*

Proof. Using Definitions 4.1(7), 4.3, Remark 4.4 & Theorem 3.2, the proof is immediate. □

Theorem 4.2. *Map i : $(J,\ \tau_R(P)) \to (L,\ \tau'_R(Q))$, the following conditions are equivalent.*

(i) *i is $n^*\ \mu_{\ \alpha}$-continuous.*

(ii) *i is $n^{\iota\iota}\eta$-continuous & $n^*\ \mu_{\ p}$-continuous.*

Proof. Using Theorem 3.3, the proof is immediate. □

Acknowledgment

The authors would like to thank the editors and the anonymous reviewers for their valuable comments and suggestions which have helped immensely in improving the quality of the paper.

References

[1] K. Bhuvaneswari and K. Mythili Gnanapriya, Nano Generalized locally closed sets and NGLC-Continuous Functions in Nano Topological Spaces, International Journal Mathematics and its Applications, 4(1-A) (2016), 101-106.

[2] S. Ganesan, C. Alexander, M. Sugapriya and A. N. Aishwarya, On new classes of some nano closed sets, MathLab Journal., in press.

[3] S. Ganesan, C. Alexander, M. Sugapriya and A. N. Aishwarya, $N^*\ \mu$-continuous in nano topological spaces, Journal of New Theory (Accepted).

[4] S. Ganesan, Some new results on the decomposition of nano continuity, MathLab Journal., in press.

[5] A. Jayalakshmi and C. Janaki, A new form of nano locally closed sets in nano topological spaces, Global Journal of Pure and Applied Mathematics, 13(9) (2017), 5997-6006.

[6] R. Lalitha and A. Francina Shalini, On nano generalized $\wedge$-closed and open sets in nano topological spaces, International Journal of Applied Research, 3(5) (2017), 368 – 371.

[7] 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.

[8] D . A . Mary, I. Arockiarani, On characterizations of nano rgb-clased sets in nano topological spaces, Int. J. Mod. Eng. Res. 5 (1) (2015) 68–76.

[9] A. A. Nasef, A. I. Aggour, S. M. Darwesh, On some classes of nearly open sets in nano topological spaces, Journal of the Egyptian Mathematical Society 24 (2016), 585-589.

[10] P. Sathishmohan, V. Rajendran, S. Brindha and P. K. Dhanasekaran, Between nano-closed and nano semi-closed, Nonlinear Studies, (25)(4), (2018), 899-909.

[11] P. Sathishmohan1, V. Rajendran and S. Brindha, Decompositions of NAB-continuity and nano weak AB-continuity, Malaya Journal of Matematik, (S)1, (2019), 375-384.