Some Properties of Fuzzy Neutrosophic Generalized Semi Continuous Mappings and Alpha Generalized Continuous Mapping

Shaymaa F. Matar¹
Anas A. Hijab²*

²Department of Mathematics, College of Education for Pure Sciences, Tikrit University, Iraq.

Keywords: Fuzzy neutrosophic topological space, Fuzzy neutrosophic generalized semi closed set, Fuzzy neutrosophic alpha generalized closed set, Fuzzy neutrosophic generalized semi mapping as continuous, Fuzzy neutrosophic alpha generalized mapping as continuous.

Introduction:
Zadeh (1965) introduced fuzzy concept set ¹. Chang ² later made use of this concept to present the concept of fuzzy topological space in 1968. Atanassov in 1986 ³ developed the fuzzy concept set into the concept of fuzzy intuitionistic set. At this new study, the concept gives membership degree and non-membership degree functions. In 1997 ⁴, the intuitionistic fuzzy topological space concept was presented via Coker relying on the concept of intuitionistic fuzzy set. In 2013 the concept of fuzzy neutrosophic set was presented via Arockiarani Sumathi and Martina Jency, this set provides membership degree, non-membership degree and indeterminacy degree. Additionally, the fuzzy neutrosophic topological space has been defined via them in 2014 ⁵. The concept of intuitionistic fuzzy alpha generalized mapping as continuous and intuitionistic fuzzy alpha generalized irresolute mapping has is studied in 2014 via Sakthivel ⁶.

At the current study, the concept of fuzzy neutrosophic generalized semi closed set, fuzzy neutrosophic alpha generalized closed set, fuzzy neutrosophic generalized semi- mapping as continuous and fuzzy neutrosophic alpha generalized mapping as continuous has been introduced.

Preliminaries:

Definition 1. ⁷: Suppose X is a non-empty constant set. The fuzzy set as neutrosophic (Briefly, FN), βN is an object with form βN = {< ω, μβN (ω), σβN (ω), νβN (ω) : ω ∈ X} while the functions μβN, σβN, νβN : X → [0, 1] denoted membership function degree (named μβN (ω)), indeterminacy function degree (named σβN (ω)) and non-membership degree (named νβN (ω)) respectively of every element ω ∈ X to the set βN and 0 ≤ μβN (ω) + σβN (ω) + νβN (ω) ≤ 3 for every ω ∈ X.

Remark 1. ⁷: SFN βN = {< ω, μβN (ω), σβN (ω), νβN (ω) : ω ∈ X} might be indenthewly to an ordered triple < ω, μβN (ω), σβN (ω), νβN (ω) > in [0, 1] on X.

Definition 2. ⁷: Suppose X is a non-empty set and the SFN βN and γN is in the form:

βN = {< ω, μβN (ω), σβN (ω), νβN (ω) : ω ∈ X} and,
γN = {< ω, μγN (ω), σγN (ω), νγN (ω) : ω ∈ X} on X.

So that:
i. βN ⊆ γN when μβN (ω) ≤ μγN (ω), σβN (ω) ≤ σγN (ω) and νβN (ω) ≥ νγN (ω) for all ω ∈ X.
Briefly, fuzzy neutrosophic subsets in X satisfying axioms as follows:

i. \(0^N = 1^N = \varnothing \in \tau^N\).

ii. \(\beta N \cap \beta N2 \in \tau^N\) for every \(\beta N1, \beta N2 \in \tau^N\).

iii. \(U \beta N \in \tau^N, \forall \{ \beta N1, i \in J \} \subseteq \tau^N\).

In such case, the pair \((X, \tau^N)\) is said to be fuzzy neutrosophic space topological (Briefly, T\(\text{FN}\)). The elements of \(\tau^N\) are fuzzy neutrosophic open set (Briefly, OS\(\text{FN}\)). The complement of OS\(\text{FN}\) in the T\(\text{SFN}\) (X, \(\tau^N\)) is fuzzy neutrosophic closed set (Briefly, CS\(\text{FSN}\)).

**Definition 4.** Suppose \((X, \tau^N)\) is T\(\text{SFN}\) and \(\beta N = \langle \omega, \mu N(\omega), \nu N(\omega), \gamma N(\omega) \rangle = \text{S}FN\) in X. So that, the fuzzy \(\beta N\) neutrosophic closure (Briefly, Cl\(\text{FN}\)) and fuzzy \(\beta N\) neutrosophic interior (Briefly, In\(\text{FN}\)) are defined via:

\[\text{Cl}_{\text{FN}}(\beta N) = \cap \{ C_N: C_N \in \text{CS}FN \in X \text{ and } \beta N \subseteq C_N \}, \]

\[\text{In}_{\text{FN}}(\beta N) = \cup \{ O_N: O_N \in \text{OS}FN \in X \text{ and } O_N \subseteq \beta N \}.\]

Known that, Cl\(\text{FN}\) (\(\beta N\)) be CS\(\text{FSN}\) and In\(\text{FN}\) (\(\beta N\)) be OS\(\text{FN}\) in X. Moreover:

i. \(\text{Cl}_{\text{FN}}(\beta N) \in \text{S}FN\) in X, when \(\text{Cl}_{\text{FN}}(\beta N) = \beta N\).

ii. \(\text{In}_{\text{FN}}(\beta N) \in \text{S}FN\) in X, when \(\text{In}_{\text{FN}}(\beta N) = \beta N\).

**Proposition 1.** Suppose \((X, \tau^N)\) be T\(\text{SFN}\) and \(\beta N, \gamma N \in \text{S}FN\) in X. Then, those properties follow hold:

i. \(\text{In}_{\text{FN}}(\beta N) \subseteq \beta N \in \text{Cl}_{\text{FN}}(\beta N)\).

ii. \(\beta N \subseteq \gamma N \Rightarrow \text{In}_{\text{FN}}(\beta N) \subseteq \text{In}_{\text{FN}}(\gamma N)\) and \(\beta N \subseteq \gamma N \Rightarrow \text{Cl}_{\text{FN}}(\beta N) \subseteq \text{Cl}_{\text{FN}}(\gamma N).\)

iii. \(\text{In}_{\text{FN}}(\text{Cl}_{\text{FN}}(\beta N)) = \text{Cl}_{\text{FN}}(\text{In}_{\text{FN}}(\beta N))\) and \(\text{Cl}_{\text{FN}}(\text{In}_{\text{FN}}(\beta N)) = \text{In}_{\text{FN}}(\text{Cl}_{\text{FN}}(\beta N))\).

iv. \(\text{In}_{\text{FN}}(\beta N \cap \gamma N) = \text{In}_{\text{FN}}(\beta N) \cap \text{In}_{\text{FN}}(\gamma N)\) and \(\text{Cl}_{\text{FN}}(\beta N \cap \gamma N) = \text{Cl}_{\text{FN}}(\beta N) \cap \text{Cl}_{\text{FN}}(\gamma N).\)

v. \(\text{In}_{\text{FN}}(\varnothing^N) = \varnothing^N \text{ and } \text{Cl}_{\text{FN}}(\varnothing^N) = \varnothing^N.\)

vi. \(\text{In}_{\text{FN}}(\varnothing^N) = \varnothing^N \text{ and } \text{Cl}_{\text{FN}}(\varnothing^N) = \varnothing^N.\)

**Definition 5.** The \(\text{S}FN\) (\(\beta N\)) in T\(\text{SFN}\) (X, \(\tau^N\)) is called:

i. Fuzzy neutrosophic closed regular set (Briefly, RCS\(\text{FN}\)), when \(\beta N = \text{Cl}_{\text{FN}}(\text{In}_{\text{FN}}(\beta N))\).

ii. Fuzzy neutrosophic pre closed set (Briefly, PCS\(\text{FN}\)), when \(\text{Cl}_{\text{FN}}(\text{In}_{\text{FN}}(\beta N)) \subseteq \beta N\).

iii. Fuzzy neutrosophic semi open set (Briefly, SOS\(\text{FN}\)), when \(\beta N \subseteq \text{Cl}_{\text{FN}}(\text{In}_{\text{FN}}(\beta N))\).

iv. Fuzzy neutrosophic semi closed set (Briefly, SCS\(\text{FN}\)), when \(\text{In}_{\text{FN}}(\text{Cl}_{\text{FN}}(\beta N)) \subseteq \beta N\).

v. Fuzzy neutrosophic \(\alpha\) open set (Briefly, \(\alpha\)OS\(\text{FN}\)), when \(\beta N \subseteq \text{In}_{\text{FN}}(\text{Cl}_{\text{FN}}(\text{In}_{\text{FN}}(\beta N))).\)
Know that αClFN (βN) is CSFN and αInFN (βN) is OSFN in X. Moreover,
a. βN is αCSFN in X whenf αClFN (βN) = βN.
b. βN is αOSFN in X whenf αInFN (βN) = βN.

Definition 10. : Fuzzy neutrosophic subset βN of TFSFN (X, τN) is called:
i. Fuzzy neutrosophic γ closed set (Briefly, γCSFN), such that ClFN((InFN (βN)) ∩ InFN(ClFN (βN)) ⊆ βN.
ii. Fuzzy neutrosophic generalized semi closed set (Briefly, GSCSFN ), when SCI(FN(βN) ⊆ UN such that, βN ⊆ UoN and UoN is OSFN in X.
iii. Fuzzy neutrosophic alpha generalized closed set (Briefly, αGCSFN), when αClFN (βN) ⊆ UN such that, βN ⊆ UoN and UoN is OSFN in X.

Theorem 1. : For every SFSFN, the statements as following are true in general:
i. Every CSFN is αGCSFN.
ii. Every RCSFN is αGCSFN.
iii. Every αCSFN is αGCSFN.
iv. Every αGCSFN is GSCSFN.

Proof:
i. Suppose βN = < ω, μFN (ω), σFN (ω), νFN (ω) > be CSFN in the TFSFN (X, τN).
So that via deinition 4. (i). Hence ClFN (βN) = βN ...
(1).
Now, suppose the UoN is OSFN such that, βN ⊆ UoN. Since αclFN (βN) ≤ ClFN (βN) via definition 4.
and definition 9. ii. So, αClFN (βN) ⊆ ClFN (βN) = βN ⊆ UoN. Hence, βN is αGCSFN in (X, τN).
ii. Suppose βN = < ω, μFN (ω), σFN (ω), νFN (ω) > be RCSFN in the TFSFN (X, τN).
So that, ClFN (InFN(βN)) = βN ...
(2).
Suppose the UoN be OSFN such that, βN ⊆ UoN. From (1) and (2), ClFN (βN) = βN.
That βN is CSFN in X. So by (i), αClFN (βN) ⊆ ClFN (βN) = βN ⊆ UoN. Hence, βN is αGCSFN in (X, τN).
iii. Suppose βN = < ω, μFN (ω), σFN (ω), νFN (ω) > be αCSFN in the TFSFN (X, τN).
So that, αClFN (βN) = βN. Now, assume the UoN is OSFN i.e., βN ⊆ UoN. So, αInFN (βN) = βN ⊆ UoN.
Hence, βN is αGCSFN in (X, τN).
iv. Suppose βN = < ω, μFN (ω), σFN (ω), νFN (ω) > be αCSFN in the TFSFN (X, τN).
So that, αClFN (βN) ⊆ UoN. Where, UoN is OSFN such that, βN ⊆ UoN.
So, ClFN (InFN (ClFN (βN))) ⊆ UoN. That is InFN (ClFN (βN)) ⊆ UoN. Therefore, SCI(FN (βN)) ⊆ UoN. Where, UoN is OSFN such that, βN ⊆ UoN. Hence, βN is GSCSFN in (X, τN).

Remark 2. : The foregoing theorem converse is not true as illustrated in the following examples:
Example 1.:
i. Suppose X= {c, d} defined SFSFN βN in X as follows:
βN = < ω, 0.2, 0.2, 0.5, 0.5, 0.5, 0.6, 0.6, 0.6 >. The family τN = {Nc, N1, N2} is TFSFN. When take, ΦN = < ω, 0.3, 0.2, 0.5, 0.5, 0.5, 0.6, 0.6, 0.6 >. So that, ΦN is αGCSFN , but not CSFN.
ii. Take i. So that, ΦN is αGCSFN, but not RCSFN.
iii. Also take (i). So that, ΦN is αGCSFN, but not αCSFN.
iv. Assume X= {c, d} defined by SFSFN βN in X as following:
βN = < ω, 0.2, 0.3, 0.5, 0.5, 0.5, 0.4, 0.5, 0.6 >. The family τN = {Nc, N1, N2} is TFSFN. When take, ΦN = < ω, 0.1, 0.5, 0.5, 0.5, 0.5, 0.6, 0.6, 0.6 >. So that, ΦN is GSCSFN, but not αGCSFN.

Fuzzy Neutrosophic Generalized Semi Mapping as continuous and Fuzzy Neutrosophic Alpha Generalized Mapping as continuous
In the current section, the concept of fuzzy neutrosophic generalized semi mapping as continuous and fuzzy neutrosophic alpha generalized mapping as continuous has been introduced.

Definition 11. : Suppose (X, τNω) and (Y, τNΔ) are 2 TFSFN. So, a mapping f : (X, τNω) → (Y, τNΔ) is called:
i. Fuzzy neutrosophic γ continuous (γ con. F.Δ), when f⁻¹(βN) is γ CSFN in (X, τNω) for each CSFN in (Y, τNΔ).
ii. Fuzzy neutrosophic generalized semi continuous (GSCSF.Δ), when f⁻¹(βN) is GSCSFN in (X, τNω) for each CSFN in (Y, τNΔ).
iii. Fuzzy neutrosophic α generalized continuous (αGcon. F.Δ), when f⁻¹(βN) is αGCSFN in (X, τNω) for each CSFN in (Y, τNΔ).

Theorem 2.:
i. Every Con.F.Δ is αGcon.F.Δ.
ii. Every αCon.F.Δ is αGcon.F.Δ.
iii. Every αGcon.F.Δ is GSCSFN.F.Δ.

Proof:
i. Suppose f : (X, τNω) → (Y, τNΔ) is con.F.Δ mapping. Take βN is CSFN in Y.
Therefore f is con.F.Δ mapping f⁻¹(βN) is CSFN in X (definition 8. i). Since every CSFN is αGCSFN in Theorem 2. i. So, f⁻¹(βN) is αGCSFN in X. Thus, f is αGcon.F.Δ.
ii. Suppose f : (X, τNω) → (Y, τNΔ) is αcon.F.Δ mapping. Take βN is CSFN in Y. So that, via hypothesis f⁻¹(βN) is αCSFN in X (definition 8. iii). Since every αCSFN is αGCSFN in (Theorem 2. iii). So, f⁻¹(βN) is αGCSFN in X. Hence, f is αGcon.F.Δ.
iii. Suppose f : (X, τNω) → (Y, τNΔ) is αGcon.F.Δ mapping. Take βN is CSFN in Y. So that, via
hypothesis $f^{-1}(\beta_0)$ is $\alpha\text{GCS}_{\text{FN}}$ in X (definition 10. iii). Since every $\alpha\text{GCS}_{\text{FN}}$ is $\text{GCS}_{\text{FN}}$ (Theorem 2. 1v). So, $f^{-1}(\beta_0)$ is $\text{GCS}_{\text{FN}}$ in X. Hence, f is $\text{GSC}_{\text{FN}}$.

**Remark 3.** The foregoing theorem converse is not true as illustrated in the following example:

**Example 2.**

i. Suppose X= {c, d}, Y= {e, g}.

- Defined, $\beta_{N1} = \langle(0.2, 0.6), (0.3, 0.5), (0.6, 0.2)\rangle$.
  - $\beta_{N2} = \langle(0.6, 0.2), (0.5, 0.3), (0.3, 0.2)\rangle$.

So, that, the family $\tau_{\text{Nw}} = \{0^N, 1^N, \beta_{N1}\}$ and $\tau_{\text{Nf}} = \{0^N, 1^N, \beta_{N2}\}$ are $T_{\text{FN}}$ on X and Y respectively.

Defining a mapping $f : (X, \tau_{\text{Nw}}) \rightarrow (Y, \tau_{\text{Nf}})$ via $f(c) = e$ and $f(d) = g$.

**Proof:** Suppose $\beta_N$ is OS$_{\text{FN}}$ in Y. Such implicates $(\beta_N)$ is $\text{CS}_{\text{FN}}$ in Y. Therefore, $f$ is $\alpha\text{GCS}_{\text{FN}}$. So that $f^{-1}(\beta_0)$ is $\alpha\text{GCS}_{\text{FN}}$ in X. Therefore, $f^{-1}(\beta_0) = f^{-1}(\beta_0)^{\tau_{\text{Nw}}}$, hence $f^{-1}(\beta_0)$ is $\alpha\text{GOS}_{\text{FN}}$ in X.

**Theorem 4.** Suppose f : (X, $\tau_{\text{Nw}}^\gamma$) → (Y, $\tau_{\text{Nf}}^\gamma$) is mapping and $f^{-1}(\beta_0)$ is $\text{RCS}_{\text{FN}}$ in X for every $\text{CS}_{\text{FN}}$ in Y. Then f is $\alpha\text{GCon}_{\text{FN}}$ mapping.

**Proof:** Suppose $\beta_N$ is $\text{CS}_{\text{FN}}$ in Y. So that $f^{-1}(\beta_0)$ is $\text{RCS}_{\text{FN}}$ in X. Since Every $\text{RCS}_{\text{FN}}$ is $\alpha\text{GCS}_{\text{FN}}$ (Theorem 2. ii). So, $f^{-1}(\beta_0)$ is $\alpha\text{GCS}_{\text{FN}}$ in X. Hence, f is $\alpha\text{GCon}_{\text{FN}}$ mapping.

**Remark 4.**

i. The relationship between Pcon$_{\text{FN}}$ and $\alpha\text{GCon}_{\text{FN}}$ is independent.

ii. The relationship between $\gamma \text{ con}_{\text{FN}}$ and $\alpha\text{GCon}_{\text{FN}}$ is independent.

And this can be illustrated in the next example:

**Example 3.**

i. Suppose X= {c, d}, Y= {e, g}.

- Defined, $\beta_{N1} = \langle(0.1, 0.2), (0.4, 0.6), (0.5, 0.6), (0.2, 0.6)\rangle$.
  - $\beta_{N2} = \langle(0.8, 0.5), (0.4, 0.2), (0.6, 0.8), (0.4, 0.4)\rangle$.

So, that, the family $\tau_{\text{Nw}} = \{0^N, 1^N, \beta_{N1}\}$ and $\tau_{\text{Nf}} = \{0^N, 1^N, \beta_{N2}\}$ are $T_{\text{FN}}$ on X and Y respectively.

Defining a mapping $f : (X, \tau_{\text{Nw}}^\gamma) \rightarrow (Y, \tau_{\text{Nf}})$ via $f(c) = e$ and $f(d) = g$.

**Proof:** Suppose $\beta_N$ is OS$_{\text{FN}}$ in Y. Such implicates $(\beta_N)$ is $\text{CS}_{\text{FN}}$ in Y. Therefore, $f$ is $\alpha\text{GCS}_{\text{FN}}$. So that $f^{-1}(\beta_0)$ is $\alpha\text{GCS}_{\text{FN}}$ in X. Therefore, $f^{-1}(\beta_0) = f^{-1}(\beta_0)^{\tau_{\text{Nw}}^\gamma}$, hence $f^{-1}(\beta_0)$ is $\alpha\text{GOS}_{\text{FN}}$ in X.

ii. Suppose X= {c, d}, Y= {e, g}.

- Defined, $\beta_{N1} = \langle(0.1, 0.2), (0.4, 0.6), (0.5, 0.6), (0.2, 0.6)\rangle$.
  - $\beta_{N2} = \langle(0.8, 0.5), (0.4, 0.2), (0.6, 0.8), (0.4, 0.4)\rangle$.

So, that, the family $\tau_{\text{Nw}} = \{0^N, 1^N, \beta_{N1}\}$ and $\tau_{\text{Nf}} = \{0^N, 1^N, \beta_{N2}\}$ are $T_{\text{FN}}$ on X and Y respectively.

Defining a mapping $f : (X, \tau_{\text{Nw}}) \rightarrow (Y, \tau_{\text{Nf}})$ via $f(c) = e$ and $f(d) = g$.

**Proof:** Suppose $\beta_N$ is OS$_{\text{FN}}$ in Y. Such implicates $(\beta_N)$ is $\text{CS}_{\text{FN}}$ in Y. Therefore, $f$ is $\alpha\text{GCS}_{\text{FN}}$. So that $f^{-1}(\beta_0)$ is $\alpha\text{GCS}_{\text{FN}}$ in X. Therefore, $f^{-1}(\beta_0) = f^{-1}(\beta_0)^{\tau_{\text{Nw}}}$, hence $f^{-1}(\beta_0)$ is $\alpha\text{GOS}_{\text{FN}}$ in X.

So, the family $\tau_{\text{Nw}} = \{0^N, 1^N, \beta_{N1}\}$ and $\tau_{\text{Nf}} = \{0^N, 1^N, \beta_{N2}\}$ are $T_{\text{FN}}$ on X and Y respectively.

Defining a mapping $f : (X, \tau_{\text{Nw}}) \rightarrow (Y, \tau_{\text{Nf}})$ via $f(c) = e$ and $f(d) = g$.

**Theorem 3.** A mapping $f : X \rightarrow Y$ is $\alpha\text{GCon}_{\text{FN}}$ if and only if the inverse image of each $\text{OS}_{\text{FN}}$ in Y is $\alpha\text{OS}_{\text{FN}}$ in X.
Assume $\Phi_N = \langle \xi, (0.3_{(c)}, 0.3_{(g)}), (0.4_{(c)}, 0.4_{(g)}), (0.7_{(g)}, 0.2_{(g)}) \rangle >$ is $\text{CS}_{\text{FN}}$ in $Y$. So, $f^{-1}(\Phi_N) = \langle \omega, (0.3_{(c)}, 0.3_{(d)}), (0.3_{(c)}, 0.4_{(d)}), (0.7_{(c)}, 0.2_{(d)}) \rangle >$ is $\gamma$ $\text{CS}_{\text{FN}}$ in $X$. Hence, $f$ is $\gamma$ con$_{\text{FN}}$, but not $\alpha$Gcon$_{\text{FN}}$.

2- Suppose $X= \{c, d\}$, $Y = \{e, g\}$. Defining, $\beta_{N1} = \langle \omega, (0.6_{(c)}, 0.2_{(d)}), (0.2_{(c)}, 0.4_{(d)}), (0.4_{(c)}, 0.8_{(d)}) \rangle >$ and $\beta_{N2} = \langle \xi, (0.3_{(c)}, 0.2_{(g)}), (0.8_{(c)}, 0.6_{(g)}), (0.6_{(c)}, 0.7_{(g)}) \rangle >$. So that, the family $\tau^{N\omega} = \{0^N, 1^N, \beta_{N1}\}$ and $\tau^{N\xi} = \{0^N, 1^N, \beta_{N2}\}$ are $T_{\text{FN}}$ on $X$ and $Y$, respectively. Defining a mapping $f : (X, \tau^{N\omega}) \to (Y, \tau^{N\xi})$ via $f(c) = e$ and, $f(d) = g$. Suppose $B_N = \langle \xi, (0.6_{(c)}, 0.7_{(g)}), (0.2_{(c)}, 0.4_{(g)}), (0.3_{(c)}, 0.2_{(g)}) \rangle >$ is $\text{CS}_{\text{FN}}$ in $Y$. So that, $f^{-1}(B_N) = \langle \omega, (0.6_{(c)}, 0.7_{(g)}), (0.2_{(c)}, 0.4_{(d)}), (0.3_{(c)}, 0.2_{(d)}) \rangle >$ is $\alpha$GCS$_{\text{FN}}$ in $X$.

Hence, $f$ is $\alpha$Gcon$_{\text{FN}}$, but not $\gamma$ con$_{\text{FN}}$.

Remark 5.: Fig. 1 shows the relationships when deferent fuzzy neutrosophic continuous in the fuzzy neutrosophic topology spaces and in general the converse is not true.

![Figure 1. Relationship with $\alpha$ Gcon$_{\text{FN}}$.](image)

**Conclusion:**

The aim of this research is to identify some new generalized mapping of fuzzy neutrosophic as continuous and tried to solve the trouble of branching or splitting with definitions of the generalized mapping of fuzzy neutrosophic and showing that generalized semi-continuous and fuzzy neutrosophic alpha generalized mapping as continuous is independent according to the examples and Figure 1. Founded some relationships that connect it and the reverse is not true always.

**Authors’ declaration:**

- Conflicts of Interest: None.
- We hereby confirm that all the Figures and Tables in the manuscript are mine ours. Besides, the Figures and images, which are not mine ours, have been given the permission for re-publication attached with the manuscript.
- Ethical Clearance: The project was approved by the local ethical committee in University of Tikrit.

Authors’ contributions statement:

S.F. Matar and A.A. Hijab contributed to the study and development most proofs, to the relations structure; revision, and approved the original manuscript.

**References:**

بعض خواص الدوال شبه المستمرة المعتممة. النايتروسوفيك الضبابية والدوال آلفا المستمرة المعتممة.

النايتروسوفيك الضبابية

نظام عبد الحافظ

1 مدرس في مديرية تربية صلاح الدين العامة، وزارة التربية، صلاح الدين، العراق.
2 قسم الرياضيات، كلية التربية للعلوم الصرفة، جامعة تكريت، صلاح الدين، العراق.

الخلاصة:
في هذا البحث عرفنا الدوال شبه المستمرة المعتممة النايتروسوفيك الضبابية والدوال آلفا المستمرة المعتممة نيتروسوفك الضبابية، واثبنا بعض المبرهنات المتعلقة بهذا المفهوم ومن ثم إيجاد العلاقة بين الدوال آلفا المستمرة المعتممة نيتروسوفك الضبابية، والدوال المستمرة نيتروسوفك الضبابية والدوال آلفا المستمرة نيتروسوفك الضبابية، والدوال المستمرة نيتروسوفك الضبابية والدوال آلفا المستمرة نيتروسوفك الضبابية، والدوال المستمرة نيتروسوفك الضبابية ودوال آلفا المستمرة نيتروسوفك الضبابية.

الكلمات المفتاحية: مجموعة نيتروسوفك الضبابية، فضاء النيتروسوفك الضبابية، المجموعات شبه المعتممة نيتروسوفك الضبابية، المجموعات المعتممة نيتروسوفك الضبابية، الدوال شبه المستمرة المعتممة نيتروسوفك الضبابية، الدوال آلفا المستمرة المعتممة نيتروسوفك الضبابية.