Generalization Fuzzy Completely Intra $\Gamma$-ideals in $\Gamma$-Semi Groups

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ABSTRACT

In this article, we study the concept of generalization fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi groups as a stronger form of fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi groups, we investigated some of basic properties, examples and characterizations of them. Also we discussed generalization of fuzzy completely intra $\Gamma$-ideals and we discussed generalization composition of fuzzy completely intra $\Gamma$-ideal are investigated.

keyword: $\Gamma$-semi groups, Fuzzy completely left (right) $\Gamma$-intra ideals, Fuzzy intra $\Gamma$-ideals, Fuzzy semi prime, completely regular $\Gamma$-semi group.

1. INTRODUCTION

Fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi groups was introduced by Vasantha. K. G, in (2015), where a nonempty fuzzy subset $\psi$ of $\mathcal{X}$ is called fuzzy completely intra $\Gamma$-ideals of $\mathcal{X}$ if it satisfies $\psi(u^2 \delta v^2 \beta w^2) \supseteq \psi(v)$, whenever $u, v, w \in \mathcal{X}$ and $\delta, \beta \in \Gamma$ [1]. We introduce the concept generalization fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi groups. The important concept of fuzzy bi $\Gamma$-ideals in $\Gamma$-semi groups has been introduced by Prince. W. D.R, Latha. K. B and Chandrasekaran. E, [4]. The concept of fuzzy ideals in $\Gamma$-semi groups in (2009), was introduced by Sardar. S. K and Majumder. S. K,[7]. Sardar. S. K and Davvaz. B and Majumder, S. K. considered a study on fuzzy interior ideal in $\Gamma$-semi groups, [6]. The purpose of this paper is as stated in the abstract.
2. PRELIMINARIES
In this section going to review some well-known notations which will be related with our work and which will be used in later sections of this paper.

Definition 2.1 :[2]
Let $\mathbb{N} = \{u, v, w, \ldots\}$ and $\Gamma = \{\alpha, \beta, \delta, \ldots\}$ be two nonempty sets. Then $\mathbb{N}$ is said to be $\Gamma$-semi group if there exists a mapping $\mathbb{N} \times \Gamma \times \mathbb{N} \rightarrow \mathbb{N}$ (images to be denoted by $u \alpha v$ ) satisfying

1. $u \delta v \in \mathbb{N}$.
2. $(u \beta v) \delta w = u \beta (v \delta w)$, whenever $u, v, w \in \mathbb{N}$, and $\beta, \delta \in \Gamma$.

Definition 2.2: [1]
A nonempty subset $I$ of a $\Gamma$-semi group $\mathbb{N}$ is said to be a sub-$\Gamma$-semi group of $\mathbb{N}$ if $I \subseteq \mathbb{N}$.

Definition 2.3: [4]
A $\Gamma$-semi group $\mathbb{N}$ is said to be left-zero (right-zero) if $u \delta v = u \beta (u \delta v = v)$, $\forall u, v \in \mathbb{N}$ and $\delta, \beta \in \Gamma$.

Remark 2.4: [11]
1. The characteristic function of a nonempty subset $C$ of $\mathbb{N}$ by $\psi_C$

$$\psi_C(x) = \begin{cases} 1 & \text{if } x \in C \\ 0 & \text{otherwise} \end{cases}$$

2. A mapping $\psi: \mathbb{N} \rightarrow [0, 1]$ is said to be fuzzy set of $\mathbb{N}$ and complement of $\psi$ denoted by $\psi^c$ is the fuzzy set in $\mathbb{N}$ given by $\psi^c(u) = 1 - \psi(u)$, $\forall u \in \mathbb{N}$.

Definition 2.5: [1]
A nonempty fuzzy subset $\psi$ of $\mathbb{N}$ is said to be fuzzy completely left-$\Gamma$-intra ideal of $\mathbb{N}$ if it satisfies $\psi(u^2 \delta v^2) \supseteq \psi(v)$, $\forall u, v \in \mathbb{N}$, and $\delta \in \Gamma$.

Definition 2.6: [1]
A nonempty fuzzy subset $\psi$ of $\mathbb{N}$ is said to be fuzzy completely right-$\Gamma$-intra ideal of $\mathbb{N}$ if it satisfies $\psi(u^2 \delta v^2) \supseteq \psi(u)$, $\forall u, v \in \mathbb{N}$, and $\delta \in \Gamma$.

Definition 2.7: [1]
A nonempty fuzzy subset $\psi$ of $\mathbb{N}$ is said to be fuzzy completely $\Gamma$-left-$\Gamma$-intra ideal (fuzzy completely $\Gamma$-right-$\Gamma$-intra ideal) of $\mathbb{N}$ if it satisfies $\psi(u^2 \alpha v^2 \beta w^2) \supseteq \psi(w)$ ($\psi(u^2 \delta v^2 \beta w^2) \supseteq \psi(u)$), $\forall u, v, w \in \mathbb{N}$, and $\alpha, \beta, \delta, \beta \in \Gamma$.

3. Generalization fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi group
In this section, we introduce and study the concept of generalization fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi group as a stronger from of fuzzy completely intra $\Gamma$-ideals in $\Gamma$-semi group. And we studied a basic properties of this concept. Furthermore, we obtain some results deals with this definition. Finally, we study the relationships between them. We start this section by the following definition.

Definition 3.1 :
Let \( \mathbb{K} = \{u, v, w, \ldots\} \) and \( \Gamma = \{\alpha, \beta, \delta, \ldots\} \) be two nonempty sets. Then \( \mathbb{K} \) is said to be a generalization \( \Gamma - \)semi group if \( \exists \) a mapping \( \mathbb{K} \times \Gamma \times \mathbb{K} \rightarrow \mathbb{K} \) (Images to denoted by \( u^n \alpha v^n \)) satisfying

1. \( u^n \delta v^n \in \mathbb{K} \)
2. \( (u^n \beta v^n)\delta w^n = u^n \beta (v^n \delta w^n), \forall u, v, w \in \mathbb{K}, \) and \( \beta, \delta \in \Gamma, \) for some \( n \in \mathbb{Z}^+ \).

**Definition 3.2:**
A nonempty subset \( I \) of a generalization \( \Gamma - \)semi group \( \mathbb{K} \) is said to be a generalization sub-semi group of \( \mathbb{K} \) if \( I^n I^n \subseteq I^n, \) for some \( n \in \mathbb{Z}^+ \).

**Example 3.3:**
Let \( \Gamma = \{(-1)^n: n \) is a positive integer \}. For any \( u, v \in \mathbb{Z}, \) and \( \delta \in \Gamma, \) define \( u^n \delta v^n = u^n. \delta. v^n \) where "." is the usual multiplication of \( \mathbb{Z}. \) Then \( \mathbb{Z} \) is a generalization \( \Gamma - \)semi group.

**Example 3.4:**
Let \( \mathbb{K} = \{n: n \) is an integer \} and \( \Gamma = \{n: n \) is a positive integer \}. Then \( \mathbb{K} \) is a generalization \( \Gamma - \)semi group under the usual multiplication next \( I = \{n: n \) is an even integers\}, we have \( I \) is a nonempty subset of \( \mathbb{K} \) and \( u^n \delta v^n \in I, \) \( \forall u, v \in I, \) for some \( n \in \mathbb{Z}^+ \) and \( \delta \in \Gamma, \) then \( I \) is a generalization sub \( \Gamma - \)semi group of \( \mathbb{K}. \)

**Definition 3.5:**
A generalization \( \Gamma - \)semi group \( \mathbb{K} \) is a generalization left--zero (generalization right--zero) if

\[
\forall u, v \in \mathbb{K}, \delta \in \Gamma, \text{ and for some } n \in \mathbb{Z}^+. \]

**Remark 3.6:**
Throughout the paper \( \mathbb{K} \) will denote a generalization \( \Gamma - \)semi group.

1. A generalization completely left (generalization completely right) --intra ideal of \( \mathbb{K} \) is a nonempty subset \( I \) of \( \mathbb{K}, \) s.t \( \mathbb{K}^n I^n \subseteq I^n \). If \( I \) is a both generalization completely left (generalization completely right) --intra ideal of \( \mathbb{K} \) then we say that \( I \) is a generalization \( \Gamma - \)ideal of \( \mathbb{K}, \) for some \( n \in \mathbb{Z}^+. \)
2. A generalization sub-semi group \( C \) of \( \mathbb{K} \) generalization completely intra \( \Gamma - \)ideal of \( \mathbb{K}, \) if \( \mathbb{K}^n C^n \subseteq C^n, \) for some \( n \in \mathbb{Z}^+. \)

**Remark 3.7:**
A generalization \( \Gamma - \)semi group \( \mathbb{K} \) is a generalization completely regular if \( \forall u \in \mathbb{K}, \exists v \in \mathbb{K} \) and \( \delta, \beta \in \Gamma \) s.t \( u^{2n} = u^{2n} \delta v^{2n} \beta u^{2n}, \) for some \( n \in \mathbb{Z}^+. \)

**Remark 3.8:**
Throughout the paper, define the set \( \Gamma = \{1\} \) be the generalization fuzzy semi prime and generalization anti--fuzzy semi prime of \( \mathbb{K}. \) A nonempty fuzzy subset \( \psi \) of \( \mathbb{K} \) is called a generalization fuzzy semi prime in \( \mathbb{K} \) if \( \psi(u^n) \geq \psi(u^{2n}), \) \( \forall u \in \mathbb{K}, \) and \( \Gamma = \{1\}. \) A non-empty fuzzy subset \( \psi \) of \( \mathbb{K} \) is said to be a generalization anti fuzzy semi prime in \( \mathbb{K} \) if \( \psi(u^{2n}) \geq \psi(u^n), \) \( \forall u \in \mathbb{K}, \) and \( \Gamma = \{1\}; \) for some \( n \in \mathbb{Z}^+. \)

**Definition 3.9:**
A nonempty fuzzy subset $\psi$ of $\mathfrak{X}$ is called generalization fuzzy completely left–intra ideal of $\mathfrak{X}$ if it is satisfies $\psi(u^{2n} \delta v^{2n}) \supseteq \psi(v^n)$, whenever $u, v \in \mathfrak{X}$, and $\delta \in \Gamma$, for some $n \in \mathbb{Z}^+$.

**Definition 3. 10:**
A nonempty fuzzy subset $\psi$ of $\mathfrak{X}$ is said to be generalization fuzzy completely right–intra ideal of $\mathfrak{X}$ if it is satisfies $\psi(u^{2n} \delta v^{2n}) \supseteq \psi(u^n)$, whenever $u, v \in \mathfrak{X}$, and $\delta \in \Gamma$, for some $n \in \mathbb{Z}^+$.

**Definition 3.11:**
A nonempty fuzzy subset $\psi$ of $\mathfrak{X}$ is said to be generalization fuzzy completely intra $\Gamma$ –ideal of $\mathfrak{X}$ if it is satisfies $\psi(u^{2n} \delta v^{2n} w^{2n}) \supseteq \psi(v^n)$, whenever $u, v, w \in \mathfrak{X}$, and $\delta, \beta \in \Gamma$, for some $n \in \mathbb{Z}^+$.

**Example 3. 12:**
Let $\mathfrak{X}$ be the set of all positive integers and $\Gamma$ the set of all positive even integers, then $\mathfrak{X}$ is a generalization $\Gamma$ –semi group where $u^n \delta v^n$ denote the usually multiplication of integers $u, \delta, v$ with $u, v \in \mathfrak{X}$, and $\delta \in \Gamma$, let $\psi$ be a generalization fuzzy completely intra $\Gamma$ –ideal of $\mathfrak{X}$ defined as follows
\[
\psi(u^n) = \begin{cases} 
1 & \text{if } u = 0 \\
0.1 & \text{if } u = 1, 2 \\
0.2 & \text{if } u > 2, n \in \mathbb{Z}^+.
\end{cases}
\]
Then the fuzzy subset $\psi$ is said to be a generalization fuzzy completely intra $\Gamma$ –ideal of $\mathfrak{X}$.

**Definition 3. 13:**
A nonempty fuzzy subset $\psi$ of $\mathfrak{X}$ is called generalization fuzzy completely $\Gamma$ –left–intra ideal (resp, generalization fuzzy completely $\Gamma$ –right–intra ideal) of $\mathfrak{X}$ if it is satisfies $\psi(u^{2n} \delta v^{2n} w^{2n}) \supseteq \psi(w^n)$, (resp, $\psi(u^{2n} \delta v^{2n} w^{2n}) \supseteq \psi(u^n)$), whenever $u, v, w \in \mathfrak{X}$, and $\delta, \beta \in \Gamma$, for some $n \in \mathbb{Z}^+$.

**Theorem 3. 14 :**
If $\mathfrak{X}$ is generalization completely regular $\Gamma$ –semigroup, then every generalization fuzzy completely intra $\Gamma$ –ideal of $\mathfrak{X}$ is a generalization fuzzy completely $\Gamma$ –left–intra ideal of $\mathfrak{X}$.

**Proof :**
Let $\psi$ be a generalization fuzzy completely intra $\Gamma$ –ideal of $\mathfrak{X}$ and $u, v, w \in \mathfrak{X}$ ; $\delta, \beta, \beta' \in \Gamma$. In this case because of an there exist $v, v' \in \mathfrak{X}$ and $\delta, \delta', \beta, \beta' \in \Gamma$ s.t $u^{2n}=u^{2n} \delta v^{2n} \beta u^{2n}$ and $v^{2n}=w^{2n} \beta' v'^{2n} \delta' w^{2n}$ (since generalization completely regular).

Now, $\psi(u^{2n} \delta v^{2n} \beta' w^{2n}) = \psi(u^{2n} \delta' (w^{2n} \beta' v'^{2n} \delta' w^{2n}) \beta u^{2n})$
\[
= \psi(u^{2n} \delta' w^{2n} \beta' (v'^{2n} \delta' w^{2n} \beta u^{2n}))
= \psi(u^{2n} \delta' w^{2n} \beta' w^{2n})
\]
(since $\psi$ generalization fuzzy completely intra $\Gamma$ –ideal).

Hence $\psi$ be a generalization fuzzy completely $\Gamma$ –left–intra ideal of $\mathfrak{X}$.

**Theorem 3. 15 :**
If $C$ is a generalization left–zero of $\mathcal{N}$ and $\psi$ be a generalization fuzzy completely left–intra ideal (generalization anti–fuzzy semi prime) of $\mathcal{N}$, then $\psi$ is a generalization fuzzy completely $\Gamma$–right–intra ideal of $\mathcal{N}$.

**Proof:**

Let $u, v \in C$, since $C$ is a generalization left–zero, $u^n = u^n \delta v^n$, whenever $\delta \in \Gamma$, for some $n \in Z^+$.

Now, $\psi(u^{2n} \delta v^{2n} \beta u^{2n}) = \psi(u^{2n} \delta(v^{2n} \beta u^{2n}))$

$\geq \psi(u^{2n} \delta v^n)$

$= \psi(u^n u^n \delta y^n)$

$= \psi(u^n (u^n \delta y^n)) = \psi(u^n u^n)$

$= \psi(u^{2n})$

$\psi(u^{2n} \delta v^{2n} \beta u^{2n}) \geq \psi(u^{2n}) \geq \psi(u^n)$

$\psi(u^{2n} \delta v^{2n} \beta u^{2n}) \geq \psi(u^n)$

Hence $\psi$ is a generalization fuzzy completely $\Gamma$–right–intra ideal of $\mathcal{N}$.

**Theorem 3.16:**

If $C$ is a generalization right–zero of $\mathcal{N}$ and $\psi$ be a generalization fuzzy completely right–intra ideal (generalization anti–fuzzy semi prime) of $\mathcal{N}$, then $\psi$ is a generalization fuzzy completely $\Gamma$–left–intra ideal of $\mathcal{N}$.

**Proof:**

Let $u, v \in C$, since $C$ is a generalization right–zero, $v^n = u^n \delta v^n$, whenever $\delta \in \Gamma$, for some $n \in Z^+$.

Now, $\psi(u^{2n} \delta v^{2n} \beta w^{2n}) = \psi((u^{2n} \delta v^{2n}) \beta w^{2n}))$

$\geq \psi(u^n \beta w^{2n})$

$= \psi((u^n \beta w^n) w^n) = \psi(w^n w^n)$

$= \psi(w^{2n})$

$\psi(u^{2n} \delta v^{2n} \beta w^{2n}) \geq \psi(w^{2n}) \geq \psi(w^n)$

$\psi(u^{2n} \delta v^{2n} \beta w^{2n}) \geq \psi(w^n)$

Hence $\psi$ is a generalization fuzzy completely $\Gamma$–left–intra ideal of $\mathcal{N}$.

**Theorem 3.17:**

Suppose that $\psi$ is a nonempty fuzzy subset of $\mathcal{N}$ and $\psi$ be a generalization fuzzy completely intra $\Gamma$–ideal of $\mathcal{N}$ then the generalization $\delta = cut_{\psi_\delta}$ of $\psi$ is a generalization completely intra $\Gamma$–ideal of $\mathcal{N}$ whenever $\delta \in [0, 1]$ provided it is nonempty.

**Proof:**

Suppose that $\psi$ be a generalization fuzzy completely intra $\Gamma$–ideal of $\mathcal{N}$ and $\delta \in [0, 1]$ be s.t $\psi_\delta$ is nonempty. Let $v \in \psi_\delta$ and $\psi(v^n) \geq \delta$, for some $n \in Z^+$.

Now, since $\psi$ is a generalization fuzzy completely intra $\Gamma$–ideal of $\mathcal{N}$, hence $\psi(u^{2n} \delta v^{2n} \beta w^{2n}) \geq \psi(v^n) \geq \delta$

Consequently $\delta u^{2n} \beta w^{2n} \in \psi_\delta$.

Hence we conclude that $\psi_\delta$ is an generalization completely intra $\Gamma$–ideal of $\mathcal{N}$.
4. Generalization Composition Of Fuzzy Completely Intra $\Gamma$ – Ideal

In this section, we introduce and study the concept of generalization composition of fuzzy completely intra $\Gamma$ – ideal as a stronger from of composition of fuzzy completely intra $\Gamma$ – ideal.

**Definition 4.1:**
Let $\psi$, $\lambda$ be two generalization fuzzy completely intra $\Gamma$ – ideal of $\mathbb{N}$ then the product $\psi \circ \lambda$ is defined as

$$(\psi \circ \lambda) (e^{2n}) = \sup_{e^{2n} = u^{2n} \delta v^{2n}} \left[ \min \{\psi(u^{2n}), \lambda(v^{2n})\}; u, v \in \mathbb{N}; \delta \in \Gamma, \text{ for some } n \in Z^+ \right]$$

If for any $u, v \in \mathbb{N}$ and for any $\delta \in \Gamma$, $e^{2n} \neq u^{2n} \delta v^{2n}$

**Theorem 4.2:**
Suppose that $\psi$ is a generalization fuzzy completely intra $\Gamma$ – ideal and generalization fuzzy semi prime of $\mathbb{N}$, then $\psi \circ \psi \circ \mu \subseteq \psi$, where $\mu$ is the characteristic function of $\mathbb{N}$.

**Proof:**
Let $\psi$ be a generalization fuzzy completely intra $\Gamma$ – ideal of $\mathbb{N}$, let $e \in \mathbb{N}$, suppose $e^{2n} = u^{2n} \beta v^{2n}$ and $u^{2n} = p^{2n} \delta q^{2n}$, for some $n \in Z^+$.

Then

$$\sup_{e^{2n} = u^{2n} \beta v^{2n}} \left[ \min \left\{ \sup_{e^{2n} = u^{2n} \beta v^{2n}} \left[ \min \{\psi(q^{2n}), \mu(v^{2n})\} \right], \sup_{u^{2n} = p^{2n} \delta q^{2n}} \min \{1, \psi(q^{2n})\} \right] \right] = \sup_{e^{2n} = u^{2n} \beta v^{2n}} \min \{\psi(q^{2n}), 1\}$$

Now, since $\psi$ be a generalization fuzzy completely intra $\Gamma$ – ideal of $\mathbb{N}$, $\psi(p^{2n} \delta q^{2n} \beta v^{2n}) \geq \psi(q^{2n})$.

Hence $\sup_{e^{2n} = u^{2n} \beta v^{2n}} \min \{\psi(q^{2n}), 1\} \leq \psi(p^{2n} \delta q^{2n} \beta v^{2n}) = \psi(u^{2n} \beta v^{2n}) = \psi(e^{2n})$

**Theorem 4.3:**
Suppose that $\psi$ is an anti–generalization fuzzy semi prime of $\mathbb{N}$ and, $\psi \circ \psi \circ \mu \subseteq \psi$ in $\mathbb{N}$, then $\psi$ be a generalization fuzzy completely intra $\Gamma$ – ideal of $\mathbb{N}$, where $\mu$ is the characteristic function of $\mathbb{N}$.

**Proof:**
Let $\mu \circ \psi \circ \mu \subseteq \psi$, let $e \in \mathbb{K}$. If $\exists u, v, w \in \mathbb{K}$ and $\delta, \beta \in \Gamma$ s.t $e^{2n} = u^{2n} \delta v^{2n} \beta w^{2n}$, for some $n \in Z^+$. Then $\psi(u^{2n} \delta v^{2n} \beta w^{2n}) = \psi(e^{2n})$

\[\geq \left( \mu \circ \psi \circ \mu \right)(u^{2n} \delta v^{2n} \beta w^{2n}) \]

\[\geq \min \{ \mu(u^{2n}), \psi(v^{2n}), \mu(w^{2n}) \} \]

\[\geq \min \{ \min \{ \mu(u^{2n}), \psi(v^{2n}), \mu(w^{2n}) \} \} \]

\[= \min \{ \min \{ 1, \psi(v^{2n}), \mu(w^{2n}) \} \} \]

\[= \min \{ \psi(v^{2n}), 1 \} \]

\[\geq \min \{ \psi(v^{n}), 1 \} = \psi(v^n) \]

Thus $\psi(u^{2n} \delta v^{2n} \beta w^{2n}) \geq \psi(v^n)$

Hence $\psi$ be a generalization fuzzy completely intra $\Gamma$--ideal of $\mathbb{K}$.

**Theorem 4.4:**

Let $\psi$ is a generalization fuzzy completely left--intra ideal and generalization fuzzy semi prime of $\mathbb{K}$, then $\mu \circ \psi \subseteq \psi$, where $\mu$ is the characteristic function of $\mathbb{K}$.

**Proof:**

Let $\psi$ a generalization fuzzy completely intra $\Gamma$--ideal of $\mathbb{K}$. let $e \in \mathbb{K}$, if $\exists u, v \in \mathbb{K}$ and $\delta, \beta \in \Gamma$ s.t $e^{2n} = u^{2n} \delta v^{2n}$, for some $n \in Z^+$.

Then $\left( \mu \circ \psi \right)(e^{2n}) = \sup_{u^{2n} = e^{2n}} \left[ \min \{ \mu(u^{2n}), \psi(v^{2n}) \} \right]$

\[= \sup_{u^{2n} = e^{2n}} \left[ \min \{ \mu(v^{2n}), \psi(v^{2n}) \} \right] \]

\[\leq \sup_{u^{2n} = e^{2n}} \min \{ 1, \psi(v^{2n}) \} \]

\[\leq \sup_{u^{2n} = e^{2n}} \min \{ \mu(u^{2n}), \psi(v^{2n}) \} \]

\[= \min \{ \psi(e^{2n}), 1 \} = \psi(e^{2n}) \]

Other wise $(\mu \circ \psi)(e^{2n}) = 0$

\[\leq \psi(e^{2n}) \]

Then $\mu \circ \psi \subseteq \psi$.

**Theorem 4.5:**

Let $\psi$ is a generalization anti--fuzzy semi prime of $\mathbb{K}$ and $\mu \circ \psi \subseteq \psi$ in $\mathbb{K}$ then $\psi$ be a generalization fuzzy completely left--intra ideal of $\mathbb{K}$, where $\mu$ is the characteristic function of $\mathbb{K}$.

**Proof:**

Let $\mu \circ \psi \subseteq \psi, u, v \in \mathbb{K}$ and $\delta \in \Gamma$.

we have $\psi(u^{2n} \delta v^{2n}) \geq (\mu \circ \psi)(u^{2n} \delta v^{2n})$ , for some $n \in Z^+$.

\[\geq \min \{ \mu(u^{2n}), \psi(v^{2n}) \} \]

\[= \min \{ 1, \psi(v^{2n}) \} \]

\[\geq \min \{ 1, \psi(v^{2n}) \} \]

\[= \psi(v^{2n}) \]

Other wise $\psi(u^{2n} \delta v^{2n}) \geq \psi(v^n)$,

Hence $\psi$ be a generalization fuzzy completely left--intra ideal of $\mathbb{K}$.
Conclusions

The main results of this paper are the following:

1- If $\mathfrak{N}$ is generalization completely regular $\Gamma$-semi group, then every generalization fuzzy completely intra $\Gamma$-ideal of $\mathfrak{N}$ is a generalization fuzzy completely $\Gamma$-left intra ideal of $\mathfrak{N}$.

2- If $C$ is a generalization left-zero of $\mathfrak{N}$ and $\psi$ be a generalization fuzzy completely left-intra ideal (generalization anti-fuzzy semi prime) of $\mathfrak{N}$, then $\psi$ is a generalization fuzzy completely $\Gamma$-right-intra ideal of $\mathfrak{N}$.

3- If $C$ is a generalization right-zero of $\mathfrak{N}$ and $\psi$ be a generalization fuzzy completely right-intra ideal (generalization anti-fuzzy semi prime) of $\mathfrak{N}$, then $\psi$ is a generalization fuzzy completely $\Gamma$-left-intra ideal of $\mathfrak{N}$.

4- Suppose that $\psi$ is a generalization fuzzy completely intra $\Gamma$-ideal and generalization fuzzy semi prime of $\mathfrak{N}$, then $\mu \circ \psi \circ \mu \subseteq \psi$, where $\mu$ is the characteristic function of $\mathfrak{N}$.

5- Let $\psi$ is a generalization fuzzy completely left-intra ideal and generalization fuzzy semi prime of $\mathfrak{N}$, then $\mu \circ \psi \subseteq \psi$, where $\mu$ is the characteristic function of $\mathfrak{N}$.

REFERENCES

[1] Vasantha. K. G, Fuzzy Completely Intra $\Gamma$-ideals In Semi Group, International Journal of Mathematical Archive-6 (1),(2015) 25-30.

[2] Kuroki. N, On Fuzzy Semigroups, Information Sciences. 53(1991), 203-236.

[3] Majumder. S. K and Sardar. S. K, On Properties of fuzzy ideals in Po-Semigroup, Armenian Journal of Mathematics, 2(2009), No.2, 65-72.

[4] Prince Williams. D .R, Latha. K. B. and Chandrasekaran. E. Fuzzy bi$\Gamma$-ideals in $\Gamma$-Semigroup, Hacettepe Journal of Mathematics and Statistics, 38(2009), No.1, 1-15.

[5] Rosenfeld.A, Fuzzy Group, J. Math. Anal. Appl., 35(1971), 512-517.

[6] Sardar. S. K, and Bijan. D, and Majumder. S.M, A study on fuzzy interior ideals in $\Gamma$-semigroups, comput. Math. Appl., 60(2010), 90-94.

[7] Sardar. S. K and Majumder. S. K, On fuzzy ideals in $\Gamma$- semigroups, int. J. Algebra., 16(2009), No.3, 775-784.
[8] Sen. M. K. and seth. A, On Po - $\Gamma$- Semigroups, Bull. Cal. Math. Soc., 85(1993), 445-450.
[9] Sen. M. K and Saha. N. K., On $\Gamma$- Semigroups, Bull. Cal. Math. Soc., 78(1986), No.3, 180-186.
[10] Uckun. M, Mehmet. A and Jun. Y. B, intuitionistic Fuzzy Sets in $\Gamma$- Semigroups, Bull. Korean Math. Soc., 44(2007), No.2, 359-367.
[11] Zadeh. L. A, Fuzzy Sets, Information and Control , 8(1965), 338-353.