International J.Math. Combin. Vol.2(2026), 99-110

Support Edge Irregularity of FSG

L.Subhalakshmi

Research Scholar, Reg. No. 21212052092001
PG and Research Department of Mathematics, G Venkataswamy Naidu College Kovilpatti
Affiliated to Manonmaniam Sundaranar University, Abishekapatti-627 012
Tirunelveli, Tamil Nadu, India

N.R.Santhi Maheswari

PG and Research Department of Mathematics
G Venkataswamy Naidu College Kovilpatti, Tirunelveli-628502, Tamil Nadu, India

E-mail: lakshmansubha2@gmail.com, nrsmaths@yahoo.com

Abstract: Herein, we define, support of the edges of an FSG and the total support of the edges of an FSG. We also discuss support edge and support edge totally irregular FSG and support edge neighbourly irregular and support edge totally neighbourly irregular FSGs. A relative study of support edge irregularity and support edge neighbourly irregularity of an FSG is made. Some properties of the support edge irregular FSGs are considered and studied.

Key Words: Support edge of FSG, support edge neighbourly irregular FSG, support edge irregular FSG, support edge total irregular FSG.

AMS(2010): 05C12, 03E72, 05C72.

§1. Introduction

The soft set theory as developed by Molodtstov deals with uncertainity and indefinite objects, and its notions was given by him in [6] 1999. Maji.et al [5] merged soft sets with fuzzy which proved much effective and defined basic operations on them with some applications to it. Akram & Nawaz investigated properties of fuzzy soft graphs [7]. Akilandeswari introduced degree of edges in a FSG and edge regular FSG [9] and its properties. Somasundari introduced support of a vertex in FSG [10] and detailed about support neighbourly irregular FSG. We here have defined the support of an edge in an FSG and carried out study of support edge neighbourly irregular FSGs.

§2. Preliminaries

Go through the following to go through the work.

Definition 2.1 *A FGG is nonempty set V with, $\sigma : V \to [0,1]$ and $\mu : V \times V \to [0,1]$:* $\forall$

[1]Received November 17, 2025, Accepted June 6, 2026

$u, v \in V,\ \mu(uv) \leq \sigma(u) \wedge \sigma(v)$.

Definition 2.2 *A pair* $(\mathscr{F}, \mathscr{A})$ *is a soft set over the universal set* $\mathscr{U}$*, where* $\mathscr{A} \subseteq \mathscr{E}$ *and* $\mathscr{F} : a \to \mathscr{P}(U)$.

Definition 2.3 *An FSG* $\widetilde{G} = (\mathscr{G}^*, \mathscr{F}, \mathscr{K}, \mathscr{A})$*, a 4-tuple that*

(1) $\mathscr{G}^*$ *is crisp graph;*

(2) $\mathscr{A}$ *is the parameter set;*

(3) $\widetilde{\mathscr{F}}, \mathscr{A}$ *is FSS over vertex set;*

(4) $\widetilde{\mathscr{K}}, \mathscr{A}$ *is FSS over edge set.*

The pair $\left(\widetilde{\mathscr{F}}(a), \widetilde{\mathscr{K}}(a)\right)$ *is FG (subgraph) of* $\mathscr{G}^*, \forall\ a \in \mathscr{A}$ *'*

The membership value of the edge in an FSG is

$$\widetilde{\mathscr{K}}(a)(xy) \leq min\left\{\widetilde{\mathscr{F}}(a)(x), \widetilde{\mathscr{F}}(a)(y)\right\}$$

and a FSG $\left(\widetilde{\mathscr{F}}(a), \widetilde{\mathscr{K}}(a)\right)$ can be denoted as $\widetilde{\mathscr{H}}(a)$.

Definition 2.4 *If* $\widetilde{G}$ *is an FSG, then the vertex degree of* x *is*

$$d_{\widetilde{G}}(x) = \sum_{a_i \in A} (\sum_{x \neq y} \widetilde{\mathscr{K}}(a_i)(xy)).$$

Definition 2.5 *If* $\widetilde{G}$ *is an FSG, then edge degree of* xy *is given as*

$$d_{\widetilde{G}}(xy) = d_{\widetilde{G}}(x) + d_{\widetilde{G}}(y) - 2(\sum_{a_i \in A} \widetilde{\mathscr{K}_{a_i}}(xy)).$$

Definition 2.6 *If* $\widetilde{G}$ *is an FSG, then total degree of* xy *is*

$$td_{\widetilde{G}}(xy) = d_{\widetilde{G}}(xy) + \sum_{a_i \in A} \widetilde{\mathscr{K}_{a_i}}(xy).$$

It can be also expressed as

$$td_{\widetilde{G}}(xy) = d_{\widetilde{G}}(x) + d_{\widetilde{G}}(y) - (\sum_{a_i \in A} \widetilde{\mathscr{K}_{a_i}}(xy)).$$

Definition 2.7 *An FSG* $\widetilde{G}$ *is irregular if* $\widetilde{\mathscr{H}}(e)$ *is irregular for all* $a \in \mathscr{A}$.

Definition 2.8 *The support* $(two - degree)$ *of a vertex* x *in an FSG* $\widetilde{G}$ *is, addition of degrees of its adjacent vertices & given as* $s_{\widetilde{G}}(x)$*, whereas its total support is given as*

$$ts_{\widetilde{G}}(x) = s_{\widetilde{G}}(x) + \sum_{a_i \in A} \widetilde{\mathscr{F}}(a_i)(x).$$

§3. Support and Total Support of an Edge in FSG

Definition 3.1 *The support* $(2-degree)$ *of a edge in a FSG is the sum of edge degrees of edges which are adjacent to given edge and can be defined as*

$$s_{\widetilde{G}}(uv) = \sum_{e_i \in N(uv), a_i \in A} \widetilde{\mathscr{K}}(a_i)(uv).$$

Definition 3.2 *The total support of an edge in an FSG is found as*

$$ts_{\widetilde{G}}(uv) = s_{\widetilde{G}}(uv) + \sum_{a_i \in A} \mathscr{K}(a_i)(uv).$$

Example 3.3 Consider the following graphs

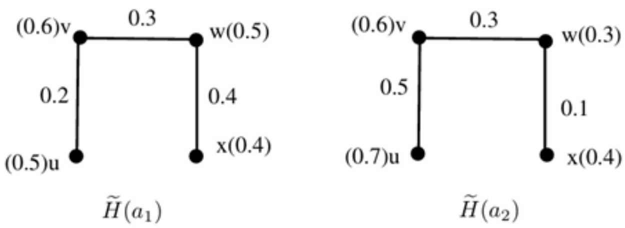


Figure 3.1.

Here the degree of vertex are $d_{\widetilde{G}}(u) = 0.2+0.5 = 0.7$,$d_{\widetilde{G}}(v) = 1.3$,$d_{\widetilde{G}}(w) = 1.1$,$d_{\widetilde{G}}(x) = 0.5$

Table 1. FSS for Figure 3.1

$\widetilde{F}$	u	v	w	x	$\widetilde{K}$	uv	vw	wx
(a_1)	0.5	0.6	0.5	0.4	(a_1)	0.2	0.3	0.4
(a_2)	0.7	0.6	0.3	0.4	(a_2)	0.5	0.3	0.1

The degree of the edges are given as $d_{\widetilde{G}}(uv) = 0.6$, $d_{\widetilde{G}}(vw) = 1.2$,$d_{\widetilde{G}}(wx) = 0.6$ and the support of the edges are calculated as $s_{\widetilde{G}}(uv) = d_{\widetilde{G}}(vw) = 1.2$, $s_{\widetilde{G}}(vw) = 0.6 + 0.6 = 1.2$, $s_{\widetilde{G}}(wx) = d_{\widetilde{G}}(vw) = 1.2$.

The total support of the edges are calculated as $ts_{\widetilde{G}}(uv) = s_{\widetilde{G}}(uv) + \sum \widetilde{K}_{a_i}(uv) = 1.2 + 0.7 = 1.9$, $ts_{\widetilde{G}}(vw) = s_{\widetilde{G}}(vw) + \sum \widetilde{K}_{a_i}(vw) = 1.2 + 0.6 = 1.8$, $ts_{\widetilde{G}}(wx) = s_{\widetilde{G}}(wx) + \sum \widetilde{K}_{a_i}(wx) = 1.2 + 0.5 = 1.7$.

Definition 3.4 *A FSG is support edge irregular (s-EI) if* $\exists$ *atleast an edge in the graph, whose adjacent edges are with different edge supports.*

Definition 3.5 *A FSG is support totally edge irregular (s-TEI) when there exist at least one edge in the graph adjacent to edges with distinct total edge support.*

Example 3.6 Consider the following FSG

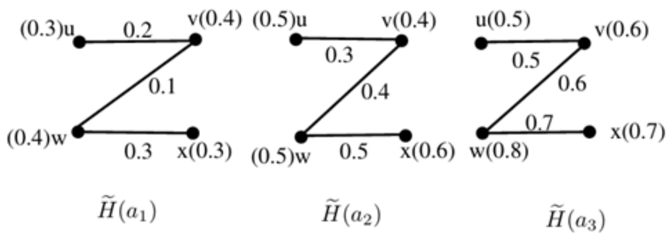


Figure 3.2.

Table 2. FSS for Figure 3.2

$\widetilde{F}$	u	v	w	x	$\widetilde{K}$	uv	vw	wx
(a_1)	0.3	0.4	0.4	0.3	(a_1)	0.2	0.1	0.3
(a_2)	0.5	0.4	0.5	0.6	(a_2)	0.3	0.4	0.5
(a_3)	0.5	0.6	0.8	0.7	(a_3)	0.5	0.6	0.7

The degree of the edges are found as $d_{\widetilde{G}}(uv) = 1.1$, $d_{\widetilde{G}}(vw) = 2.5$, $d_{\widetilde{G}}(wx) = 1.1$ and the support of the edges are given as $s_{\widetilde{G}}(uv) = 2.5$, $s_{\widetilde{G}}(vw) = 2.2$, $s_{\widetilde{G}}(wx) = 2.5$. The total support of the edges are given as $ts_{\widetilde{G}}(uv) = 3.5$, $ts_{\widetilde{G}}(vw) = 3.3$, $ts_{\widetilde{G}}(wx) = 1.0$. The 2 adjacent edges in the given example donot have same edge support, so it is s-EI FSG, also considering the total support of the edges, no 2 adjacent edges are alike, hence it is s-TEI FSG.

Remark 3.7 The support edge irregular FSG need not be support totally edge irregular FSGs and vice versa.

Example 3.8 Consider the FSG

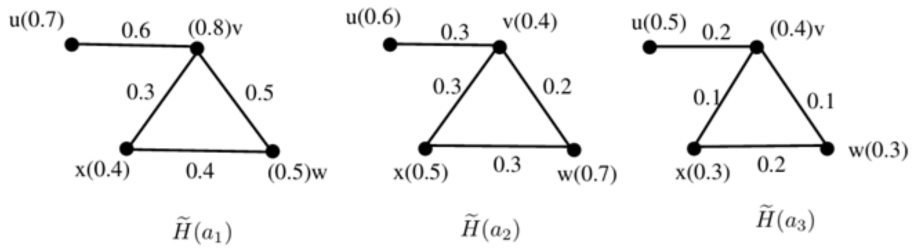


Figure 3.3.

Table 3. FSS for Figure 3.3

$\widetilde{F}$	u	v	w	x	$\widetilde{K}$	uv	vw	wx	vx
(a_1)	0.7	0.8	0.5	0.4	(a_1)	0.6	0.5	0.4	0.3
(a_2)	0.6	0.4	0.7	0.5	(a_2)	0.3	0.2	0.3	0.3
(a_3)	0.5	0.4	0.3	0.3	(a_3)	0.2	0.1	0.2	0.1

Here, the degree of edges are $d_{\widetilde{G}}(uv) = 1.5$, $d_{\widetilde{G}}(vw) = 2.7$, $d_{\widetilde{G}}(wx) = 1.5$, $d_{\widetilde{G}}(vx) = 2.8$ and the support of the edges are $s_{\widetilde{G}}(uv) = 5.5$, $s_{\widetilde{G}}(vw) = 5.8$, $s_{\widetilde{G}}(wx) = 5.5$, $s_{\widetilde{G}}(vx) = 5.7$.

The support of adjacent edges are not same, so it is support edge irregular FSG and the total support of the edges are $ts_{\widetilde{G}}(uv) = 6.6$, $ts_{\widetilde{G}}(vw) = 6.6$, $ts_{\widetilde{G}}(wx) = 6.4$, $ts_{\widetilde{G}}(vx) = 6.4$.

Here, the adjacent edges uv and vw have same total edge support, so it is not support totally edge irregular FSG.

Example 3.9 Consider the Example 3.3, in which the support of edges are same but the total support of edges are distinct. Thus it is support totally edge irregular FSG and not support edge irregular FSG.

Remark 3.10 If $\widetilde{G}$ is a FSG and suppose $\widetilde{\mathscr{K}}$ is constant $\forall a_i \in A$, then the given graph is not support edge irregular and support totally edge irregular FSG.

Remark 3.11 The support and support totally edge irregularity of the FSG is independent of the values of $\widetilde{\mathscr{F}}\ (a_i)\ \forall\ a_i \in A$.

§4. Support Edge and Support Totally Neighbourly Edge Irregular FSG

Definition 4.1 *A FSG $\widetilde{G}$ is support-neighbourly edge irregular (s-NEI), if no 2 adjacent edges have same edge supports.*

Example 4.2 Consider the FSG

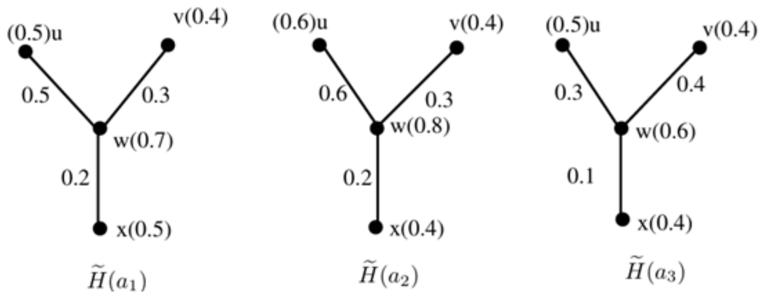


Figure 4.1.

Table 3 FSS for Figure 4.1

$\widetilde{F}$	**u**	**v**	**w**	**x**	$\widetilde{K}$	**uw**	**vw**	**wx**
(a_1)	0.5	0.4	0.7	0.5	(a_1)	0.5	0.3	0.2
(a_2)	0.6	0.4	0.8	0.4	(a_2)	0.6	0.3	0.2
(a_3)	0.5	0.4	0.6	0.4	(a_3)	0.3	0.4	0.1

Here, the degree of edges are $d_{\widetilde{G}}(uw) = 0.1$, $d_{\widetilde{G}}(vw) = 0.5$, $d_{\widetilde{G}}(wx) = 1.0$ and the support of the edges are $s_{\widetilde{G}}(uw) = 1.5$, $s_{\widetilde{G}}(vw) = 1.1$, $s_{\widetilde{G}}(wx) = 0.6$. Here, no pair of adjacency edges have same support, thus it is s-NEI FSG.

Definition 4.3 *A FSG $\widetilde{G}$ is support-totally NEI (s-TNEI), if no* 2 *adjacent edges have same total edge supports.*

Example 4.4 In the Example 4.2, the total support of edges are as $ts_{\widetilde{G}}(uw) = 2.9$, $s_{\widetilde{G}}(vw) = 2.1$, $s_{\widetilde{G}}(wx) = 1.1$ and here the total edge support of no two adjacent edges are same, thus it is s-TNEI FSG.

Remark 4.5 A s-NEI FSG need not be s-TNEI and vice versa.

Example 4.6 Consider the Example 3.8, which is s-NEI but not s-TNEI as the edges uv and vw, adjacent to each other have same total edge support. Thus it is only a s-NEI FSG.

Consider the Example 3.3, in which support of all edges are same and the total edge support of no 2 adjacent edges are same, thus it is only s-TNEI FSG.

Example 4.7 Consider the following FSG.

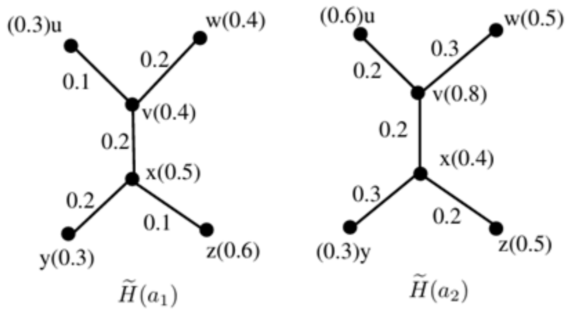


Figure 4.2.

Table 5. FSS for Figure 4.2

$\widetilde{F}$	u	v	w	x	y	z	$\widetilde{K}$	uv	vw	vx	xy	xz
(a_1)	0.3	0.4	0.4	0.5	0.3	0.6	(a_1)	0.1	0.2	0.2	0.2	0.1
(a_2)	0.6	0.8	0.5	0.4	0.3	0.5	(a_2)	0.2	0.3	0.2	0.3	0.2

The degree of edges are given as $d_{\widetilde{G}}(uv) = 0.9$, $d_{\widetilde{G}}(vw) = 0.7$, $d_{\widetilde{G}}(vx) = 1.6$, $d_{\widetilde{G}}(xy) = 0.7$, $d_{\widetilde{G}}(xz) = 0.9$ and the support of the edges are $s_{\widetilde{G}}(uv) = 2.3$, $s_{\widetilde{G}}(vw) = 2.5$, $s_{\widetilde{G}}(vx) = 3.2$, $s_{\widetilde{G}}(xy) = 2.5$, $s_{\widetilde{G}}(xz) = 2.3$.

The total support of the edges are $ts_{\widetilde{G}}(uv) = 2.6$, $ts_{\widetilde{G}}(vw) = 3.0$, $ts_{\widetilde{G}}(vx) = 3.6$, $ts_{\widetilde{G}}(xy) = 3.0$, $ts_{\widetilde{G}}(xz) = 2.6$. Notice that the above is an example of FSG which is both s-NEI and s-TNEI FSG. Generally, we have

Theorem 4.8 *A s-NEI FSG is always support edge irregular FSG.*

Proof Let $\widetilde{G}$ be a FSG. Assume it is s-NEI, then no 2 adjacent edges have same edge support $\Rightarrow \exists$ atleast one edge, adjacent to edges with different supports. $\Rightarrow \widetilde{G}$ is support edge irregular FSG. $\square$

Theorem 4.9 *A s-TNEI FSG is always support totally edge irregular FSG.*

Proof The proof similar to that of Theorem 4.8. $\square$

Remark 4.10 A FSG in which the support of all edges are distinct, is a s-NEI and it is s-TNEI depending on values of $\sum_{a_i \in A} \widetilde{\mathscr{K}}(a_i)(e_i)$.

Theorem 4.11 *If $\widetilde{G}$ is a FSG, and support of all edges are same, then $\widetilde{G}$ is s-TNEI $\Leftrightarrow$ $\sum \widetilde{\mathscr{K}}(a_i)(e_i)$ are distinct, $\forall$ $a_i \in A$ and $e_i \in E$.*

Proof Suppose $\widetilde{G}$ is a FSG, and support of all edges are same is given i.e., $s_G(e_i) = k$, $\forall e_i \in E$. Suppose $\widetilde{G}$ is s-TNEI, then no 2 nearby edges have same total edge support $\Rightarrow \exists$ at least pair of edges with different total edge supports, let e_i and e_j be such edges,

$$\begin{aligned}
& ts_{\widetilde{G}}(e_m) \neq ts_{\widetilde{G}}(e_n) \\
& \Rightarrow s_{\widetilde{G}}(e_m) + \sum \widetilde{\mathscr{K}}(a_i)(e_m) \neq s_{\widetilde{G}}(e_n) + \sum \widetilde{\mathscr{K}}(a_i)(e_n) \\
& \Rightarrow k + \sum \widetilde{\mathscr{K}}(a_i)(e_m) \neq k + \sum \widetilde{\mathscr{K}}(a_i)(e_n) \\
& \Rightarrow \sum \widetilde{\mathscr{K}}(a_i)(e_m) \neq \sum \widetilde{\mathscr{K}}(a_i)(e_n).
\end{aligned}$$

Therefore,

$$\sum \widetilde{\mathscr{K}}(a_i)(e_i)$$

are all distinct.

Conversely, suppose we take $\sum \widetilde{\mathscr{K}}(a_i)(e_i)$ are all distinct, and suppose $\widetilde{G}$ is not s-TNEI, then $\exists$ at least one edge with total edge support same as its adjacent edges, let total support of the edges e_m and e_n are same

$$\begin{aligned}
& \Rightarrow ts_{\widetilde{G}}(e_m) = ts_{\widetilde{G}}(e_n) \\
& \Rightarrow s_{\widetilde{G}}(e_m) + \sum \widetilde{\mathscr{K}}(a_i)(e_m) = s_{\widetilde{G}}(e_n) + \sum \widetilde{\mathscr{K}}(a_i)(e_n) \\
& \Rightarrow k + \sum \widetilde{\mathscr{K}}(a_i)(e_m) = k + \sum \widetilde{\mathscr{K}}(a_i)(e_n) \\
& \Rightarrow \sum \widetilde{\mathscr{K}}(a_i)(e_m) = \sum \widetilde{\mathscr{K}}(a_i)(e_n),
\end{aligned}$$

which enable us to know the assumption that $\sum \widetilde{\mathscr{K}}(a_i)(e_i)$ are distinct. Thus, $\widetilde{G}$ is s-TNEI FSG. $\square$

Theorem 4.12 *Let $\widetilde{G}$, is a FSG, and if $\widetilde{\mathscr{H}}(a) = (\widetilde{\mathscr{F}}(a), \widetilde{\mathscr{K}}(a))$ is s-NEI FSG as well as $\widetilde{G}$.*

Proof Suppose $\widetilde{G}$ is not s-NEI FSG, then $\exists$ a pair of edges having same edge support. Let e_m and e_n be such

$$\begin{aligned}
& \Rightarrow s_{\widetilde{G}}(e_m) = s_{\widetilde{G}}(e_n) \\
& \Rightarrow \sum s_{\widetilde{H}_{a_i}}(e_m) = \sum s_{\widetilde{H}_{a_i}}(e_n) \\
& \Rightarrow s_{\widetilde{H}_{a_i}}(e_m) = s_{\widetilde{H}_{a_i}}(e_n)
\end{aligned}$$

for any $a_i \in A$, which enables us to get the assumption. Thus $\widetilde{G}$ is s-NEI FSG. $\square$

Theorem 4.13 *Let $\widetilde{G}$, is a FSG, and if $\widetilde{\mathscr{H}}(a) = (\widetilde{\mathscr{F}}(a), \widetilde{\mathscr{K}}(a))$ is s-TNEI FSG as well as $\widetilde{G}$.*

Proof The proof is same as above theorem. □

Remark 4.14 The converse of both theorems is not necessarily true.

Example 4.15 Consider the Example 3.8 in where the FSG $\widetilde{G}$ is s-NEI and the $H(a_3)$ is

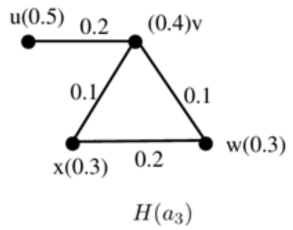


Figure 4.3.

Here, the degree of edges are $d_{\widetilde{G}}(uv) = 0.2$, $d_{\widetilde{G}}(vw) = 0.5$, $d_{\widetilde{G}}(wx) = 0.2$, $d_{\widetilde{G}}(xv) = 0.5$ and the support of the edges are $s_{\widetilde{G}}(uv) = 1.0$, $s_{\widetilde{G}}(vw) = 0.9$, $s_{\widetilde{G}}(wx) = 1.0$, $s_{\widetilde{G}}(xv) = 0.9$. Here, the edges vw and vx which are adjacent have same edge support, thus it is not s-NEI FSG.

Example 4.16 Consider the FSG

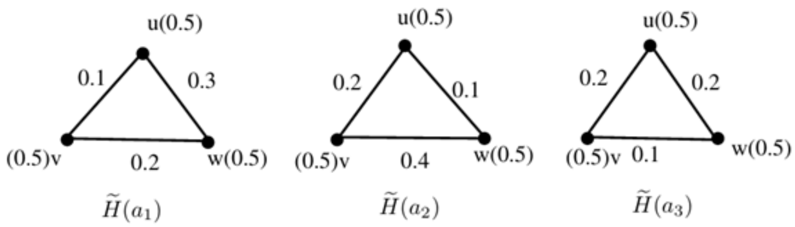


Figure 4.4.

The given FSG is s-TNEI, since the total support of edges are given as $ts_{\widetilde{G}}(uv) = 2.8$, $ts_{\widetilde{G}}(vw) = 3.2$, $ts_{\widetilde{G}}(uw) = 3.0$. But consider $\widetilde{H}(a_3)$ whose edge degree are $d_{\widetilde{G}}(uv) = 0.3$, $d_{\widetilde{G}}(vw) = 0.4$, $d_{\widetilde{G}}(wu) = 0.3$ and support of edges are $s_{\widetilde{G}}(uv) = 0.7$, $s_{\widetilde{G}}(vw) = 0.6$, $s_{\widetilde{G}}(wu) = 0.7$ and total support of edges are $ts_{\widetilde{G}}(uv) = 0.9$, $ts_{\widetilde{G}}(vw) = 0.7$, $ts_{\widetilde{G}}(uw) = 0.9$, which cleary tells that $\widetilde{H}(a_3)$ is not s-NEI and s-TNEI FSG.

Remark 4.17 The s-NEI FSG is independent of $\widetilde{\mathscr{F}}(a_i)$, where $a_i \in A$

Example 4.18 Considering the Example 4.17, which is s-NEI and s-TNEI we find the value of $\widetilde{\mathscr{F}}(a_i)$, where $a_i \in A$ are same and the support edge irregularity of FSG does not depend on it.

Theorem 4.19 *A fuzzy soft cycle of length n, and $\widetilde{\mathscr{K}}(a_i)$ are distinct for all $a_i \in A$, then it is not s-NEI and s-TNEI FSG.*

Theorem 4.20 *If $\widetilde{G}$ is FS cycle, of length $2m+2$, where $m \geq 1$, with the value of $\widetilde{\mathscr{K}}(a_i)(e_i)$ for alternative edges are same, then, $\widetilde{G}$ is s-NEI and s-TNEI FSG.*

Proof Let $x_1, x_2, \cdots, x_n$ be the vertices of FS cycle and $e_1, e_2, \cdots, e_n$ be its edges. Let

$$\widetilde{\mathscr{K}}(a_i)(e_i) = \begin{cases} m_1, & i \text{ is odd}, \\ m_2, & i \text{ iseven}. \end{cases}$$

The degree of edges are then $d_{\widetilde{G}}(e_i) = m_1 + m_2, \forall e_i \in E$. Let $x_i's$ nearby vertices be x_j and x_k, then $d_{\widetilde{G}}(x_i x_j) = m_1 + m_2 + m_1 + m_2 - 2(m_1) = 2m_2$ and $d_{\widetilde{G}}(x_i x_k) = 2m_1$. Now support of these edges $s_{\widetilde{G}}(x_i x_j) = d_G(x_i x_k) + d_G(x_j x_l) = 2m_2 + 2m_2 = 4m_2$, where x_l is nearby x_j in the cycle. Similarly for the edge $x_i x_k$, the support is $s_{\widetilde{G}}(x_i x_j) = 4m_1$. This happens for all the edges in cycle with alternate edges having edge supports $4m_1$ and $4m_2$, thus making it s-NEI FSG.

The total support of the edge $x_i x_k$ is $5m_2$, and for $x_i x_j$ it is $5m_1$, and it hold for all edges in an even FS cycle, thus it is s-TNEI FSG. □

§5. Application of FSG in Analysing a Given Situation Using Edge Degree

The solutions of all practical problems can be solved by representing them in the form of graphs. While considering the behavioural study, certain factors influence the ideas and thoughts of others generally. This can be studied with the help of influence diagram in form of graphs, where the vertices and edges are represented based on the group taken for behavioural study. Here we take up certain factors from the society and find how social media influence them. We take the vertices sets as the factors existing the society and the membership values define its social media influence, while the edges connecting each factor show influence of these factors on each other due to social media. We use the FSG model to find out which factor has the most influence by the social media and which factor gets more impacted by others. We consider the parameters like disagreement and comply between the used factors. We consider the factors like politics, entertainment, humanrace, commerce, development, working environment and evaluate their influence on each other in a society through social media. A survey conducted gives the following results.

(1) The politics has an effect on the nature of the human race because of the social media as it provides a medium to communicate and link people and it also influences the development and work nature as these has become a matter of debate openly and sovcial media through various means provide entertainment.

(2) The entertainment industry has now become a part of business and social media helps in gaining a lot of popularity and it attracts a humongous audience and encourages them to be a part of it.

(3) The working environment depends on the population in a given region and social media provides abundant opportunities to look for jobs for the human race.

(4) The development activities take place based on the working environment of a area and depends on the nature of people living in the area. Here again the development opportunities are availed through social medias.

(5) The commerce industry has grown abundantly in recent years with help of social media

and affects the population, and development of a region.

(6) The human race is important factor in the society for all the other factors considered here depend on the population in the given region.

Considering the directed graph with vertex set

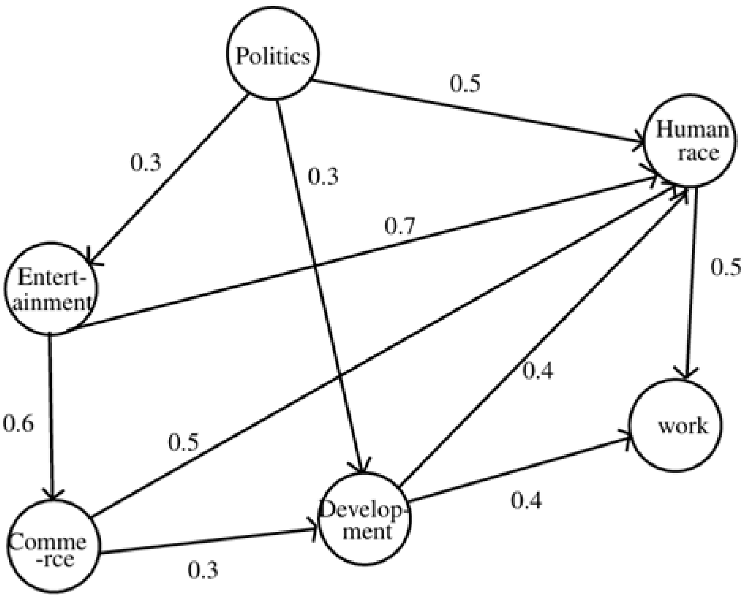
$$V = \{\text{polity}, \text{entertainment}, \text{commerce}, \text{work}, \text{development}, \text{humanrace}\}$$

and it represents the factors existing in the society. The directed edges represent influence of social media on other factors based on our parameters. We set the parameters as $A = \{a_1, a_2\}$, where a_1 = positive influence, a_2 = negative influence. A FS graph is represented below. The membership degree of edges represents the disagreement of a factor in the society. For example membership of edge between politics and human race in $\widetilde{H}(a_1)$ is 0.5, i.e., 50 % positive effect of media over the human population . If there is no link it means no influence between the factors due to media. The degree of membership can be interpresented as % of influence.

Table 6. Fuzzy soft set over the edges

$\widetilde{K}$	$\vec{PD}$	$\vec{PE}$	$\vec{PH}$	$\vec{HW}$	$\vec{DW}$	$\vec{CD}$	$\vec{CH}$	$\vec{EC}$	$\vec{EH}$	$\vec{DH}$
(a_1)	0.3	0.3	0.5	0.5	0.4	0.3	0.5	0.6	0.1	0.4
(a_2)	0.3	0.5	0.5	0.3	0.2	0.2	0.3	0.2	0.4	0.4

The representation of data is given as below.



$H(a_1)$

Figure 5.1.

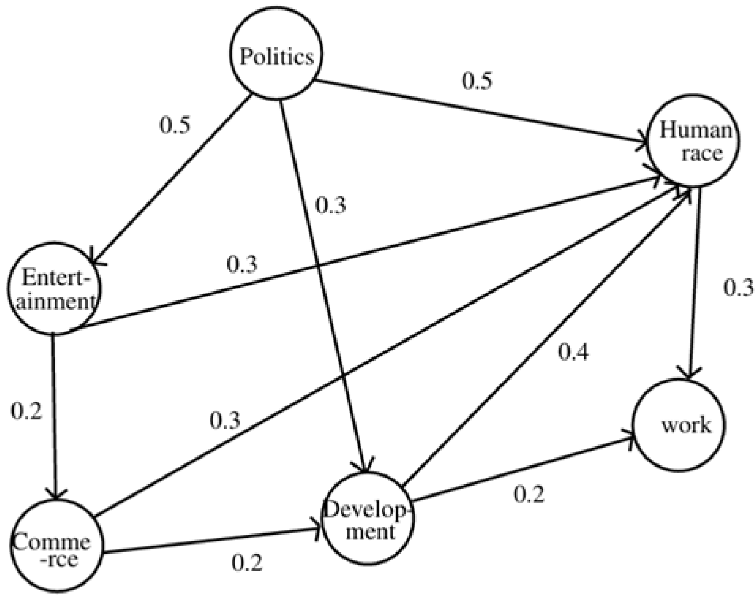


Figure 5.2.

The degree of vertices are given as $d(P) = 2.4$, $d(E) = 2.1$, $d(H) = 3.9$, $d(W) = 1.4$, $d(D) = 2.5$, $d(C) = 2.1$ which shows that Human race has greater media influence over the other factors. The edge degree of vertices are given as $d(PD) = 3.4$, $d_(PE) = 2.9$, $d(PH) = 4.3$, $d(HW) = 3.7$, $d(DW) = 2.7$, $d(CD) = 3.6$, $d(CH) = 4.2$, $d(EC) = 2.6$, $d(EH) = 5.0$, $d(DH) = 4.8$.

We infer from above that, entertainment affects the human race more through social media interaction. That is 50% of impact on entertainment on the population. Whereas the impact of entertainment over commerce through media is the least i.e., 26% from the above observation. Thus we can conclude that human race has greater impact of social media as they help to inter connect wide range of people through a common platform.

References

[1] Amei Yu, Mei Lu and Feng Tian, On the Spectral radius of graphs, *Linear Algebra and its Applications*, 387 (2004), 41-49.

[2] Dasong Cao, Bounds on eigen values and chromatic numbers, *Linear algebra and its applications*, 270(1998), 1-13.

[3] Gary Chartrand, Paul Erdos, Ortrud R. Oellermann, How to define an irregular graphs, *College. Math. Journal*, 19(1988).

[4] N.R. Santhi Maheswari and K. Amutha, Support neighbourly edge irregular graphs, *International Journal of Recent Technology and Engineering*, 8(3), September (2019).

[5] P. K. Maji, A. R. Roy and R. Biswas, An application of soft sets in a decision making problem, *Computers and Mathematics with Applications*, 44(89) (2002), 10771083.

[6] D. Molodtsov, Soft set theory-First results, *Computers and Mathematics with Applications*, 37(4-5) (1999) 19-31.

[7] Muhammad Akram and Saira Nawaz, On fuzzy soft graphs, *Italian Journal of Pure and Applied Mathematics-N.* 34(2015), 497-514.

[8] B.Akilandeswari, On edge regular fuzzy soft graph, *International Journal for Research in Applied Science & Engineering Technology*, 2019, 1479-88.

[9] J. Krishnaveni and N.R. Santhi Maheswari, On support neighbourly irregular fuzzy graphs, *International Journal of Advanced Research in Engineering and Technology*, 11(1), 2020, pp. 147-154.

[10] B.Somasundari and S.Mariammal, On support neighbourly irregular fuzzy soft graphs, *National Seminar Proceedings*, (2022), 144-161.

[11] A.Nagoor Gani and S.R.Latha, On irregular fuzzy graphs, *Applied Mathematical Sciences*, Vol.6(2012), pp.517-523.

[12] L.Subha Lakshmi and N.R.Santhi Maheswari, On pseudo highly and pseudo strongly edge irregular graphs, *Proceedings of International Conference- ICRRMCSA'22*, (2022), 61-69.

[13] N.R.SanthiMaheswari and K.Amutha, Stepwise edge irregular graphs, *Advances in Mathematics:Scientific Journal* (Special issue), No.3(2019), pp.766-771.

[14] N.R.Santhi Maheswari and C.Sekar, On strongly edge irregular fuzzy graphs, *Kragujevac journal of Mathematics*, Vol.40, No.1(2016), pp.125-135.

[15] N.R.Santhi Maheswari and C.Sekar, On edge irregular fuzzy graphs, *International Journal of Mathematics and Soft Computing*, Vol.6, No.2(2016), pp.131-143.

[16] L.Subha Lakshmi and N.R.Santhi Maheswari, A novel approach to solving Fuzzy assignment problem, *International Journal of Mathematical Archive* (accepted), 2022,