Design and analysis of inverse fuzzysoft set for triangular and trapezoidal membership function in decision making

C Kavitha, Christina Prabakaran
1 Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu, India.
2 Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu, India.

Email: 1 ceekavi@gmail.com
Email: 2 christinajemimah18@gmail.com

Abstract: Decision making plays a vital role within uncertain, imprecise situations in recent years. A numerical actualize called soft set by Molodtsov was started to bargain uncertain condition. Herein article, inverse triangular and trapezoidal fuzzy soft set theory is analyzed in decision making. Inverse fuzzysoft set theory is an extension of fuzzy soft set theory which gives deeper insights in decision making and gives a technique to portray the character of each object in the universe. An application of inverse triangular and trapezoidal fuzzy soft set is established in the course of case study in multi-criteria decision making.

Keywords: fuzzy soft set, inverse fuzzy soft set, inverse triangular membership function, inverse trapezoidal membership function, max-min, min-max

1. Introduction.

In 1999, Molodtsov [1] proposed the soft set hypothesis which is a theory of fuzzy set hypothesis to oversee uncertainty in a parametric manner. The majority of the genuine issues depend on uncertain circumstances. The conversation of the application in decision making issue with soft set theory [2,3] boomed in recent years. Moreover it made with fuzzy soft set hypothesis and in like manner through IFSS [4,5,6]. Simultaneously, the fuzzy soft set with participation work in dynamic were created [7,8,9]. A preface to inverse fuzzy soft set was presented by Khalil and Hassan in 2019 [10].

Here we present the possibility of inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set. The proposal of inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set gives more clearness over the vagueness or uncertainty over the subsets of the general set.

The remainder of the paper is composed as follows: Segment 2 involves the perception of inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set. In Segment 3, the created calculation and the usage of inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set in dynamic issue is determined. Finally, Segment 4 involves the conclusion.

2. Triangular and Trapezoidal membership functions for inverse fuzzy soft set

2.1 Inverse trapezoidal fuzzy soft sets

2.1.1 Definition. Let U be the universal set and trapezoidal fuzzy subset is denoted by \( \tilde{F} \). Regard as the mapping \( \tilde{F}: \tilde{F}(U) \rightarrow J^{E} \) where the trapezoidal fuzzy parameters are denoted by \( J^{E} \).

In trapezoidal fuzzy subsets the membership function are represented by trapezoidal fuzzy numbers which is piecewise linear and the linguistic variable are shown in Figure 1.
2.1.2. Example. A soft skill trainer gives a report of the skills of five trainees $U = \{h_1, h_2, h_3, h_4, h_5\}$ who have attended the soft skill training session. The trainer rates the trainees under the following four parameters of set $E = \{e_1, e_2, e_3, e_4\}$ which stands for communication, adaptability, creativity and time management respectively. The inverse trapezoidal fuzzy soft set $(\tilde{F}, \tilde{F}(U))$ is represented by the rule of conversion between linguistic variables and numerical variables as illustrated in Figure 1.

\[
\tilde{F}(h_i) = \{e_1/(0.5,0.7,0.7,1), e_2/(0.0,0.3,0.3,0.5), e_3/(0.7,1,1,1), e_4/(0.0,0.3,0.3,0.5)\},
\]

\[
(\text{h}_2) = \{e_1/(0.0,0.3,0.3,0.5), e_2/(0.5,0.7,0.7,1), e_3/(0.0,0.3,0.3,0.5), e_4/(0.5,0.7,0.7,1)\},
\]

\[
\tilde{F}(h_3) = \{e_1/(0.7,1,1,1), e_2/(0.0,0.3,0.3,0.5), e_3/(0.5,0.7,0.7,1), e_4/(0.0,0.3,0.3,0.5)\},
\]

\[
\tilde{F}(h_4) = \{e_1/(0.7,1,1,1), e_2/(0.0,0.3,0.3,0.5), e_3/(0.5,0.7,0.7,1), e_4/(0.0,0.3,0.3,0.5)\},
\]

\[
\tilde{F}(h_5) = \{e_1/(0.2,0.5,0.5,0.8), e_2/(0.0,0.3,0.3,0.5), e_3/(0.5,0.7,0.7,1), e_4/(0.5,0.7,0.7,1)\}.
\]

2.3 Inverse triangular fuzzy soft sets
2.3.1. Definition. Let $\tilde{F}(U)$ be the set of all triangular fuzzy subsets of $U$ and $\tilde{T}_E$ be the set of all triangular fuzzy parameter sets, a pair $(\tilde{\sigma}, \tilde{T}(U))$ is defined as an inverse triangular fuzzy soft set over $E$, where $\tilde{\sigma}$ is a mapping given by $\tilde{\sigma}: \tilde{T}(U) \rightarrow \tilde{T}_E$.

The triangular fuzzy numbers in the triangular fuzzy subsets have the membership function which is piecewise linear and triangular capturing the vagueness of those linguistic assessments as in Figure 1.

2.3.2. Example. Consider the 2.1.2. Example, we have the inverse triangular fuzzy soft set $(\tilde{\sigma}, \tilde{T}(U))$ through of the rule of conversion between linguistic variables and numerical variables as illustrated in Figure 1.

\[
\tilde{\sigma}(h_1) = \{e_1/(0.5,0.7,0.7,1), e_2/(0.0,0.3,0.3,0.5), e_3/(0.7,1,1,1), e_4/(0.0,0.3,0.3,0.5)\}
\]

\[
\tilde{\sigma}(h_2) = \{e_1/(0.0,0.3,0.3,0.5), e_2/(0.5,0.7,0.7,1), e_3/(0.0,0.3,0.3,0.5), e_4/(0.5,0.7,0.7,1)\}
\]

\[
\tilde{\sigma}(h_3) = \{e_1/(0.7,1,1,1), e_2/(0.0,0.3,0.3,0.5), e_3/(0.5,0.7,0.7,1), e_4/(0.0,0.3)\}
\]

\[
\tilde{\sigma}(h_4) = \{e_1/(0.7,1,1,1), e_2/(0.0,0.3,0.3,0.5), e_3/(0.5,0.7,0.7,1), e_4/(0.0,0.3,0.3,0.5)\}
\]

\[
\tilde{\sigma}(h_5) = \{e_1/(0.2,0.5,0.5,0.8), e_2/(0.0,0.3,0.3,0.5), e_3/(0.5,0.7,0.7,1), e_4/(0.5,0.7,0.7,1)\}.
\]
3. Application of inverse fuzzy soft, inverse trapezoidal fuzzy soft and inverse triangular fuzzy soft set

A further softset called inverse fuzzy soft set was proposed utilizing the documentation of max-min and min-max in choice – making issue by Khalil A M and Hassan N (2019). In this portion, we acquaint a methodology with dynamic built on the inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set utilizing the way to deal with inverse fuzzy soft set. The new recommendation on inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set gets the lack of definition of the linguistic assessments with more prominent clarity. In coming up next are the basic documentations which portray the maxmin and minmax decision for the inverse trapezoidal fuzzy soft sets and inverse triangular fuzzy soft sets.

3.1. Definition. Let $J^E$ is the collection of all trapezoidal fuzzy parameter sets and $\mu_p \in J^E$. The maxmin decision for an inverse trapezoidal fuzzy soft set $(\tilde{F}, \tilde{P}(U))$ of $\mu_p$ clarify as $F^+(\mu_p)(v) = \vee_{e \in \tilde{F}} \left[ \tilde{F}(v)(e) \land \mu_p(e) \right]$ for all $v \in \tilde{P}(U)$ also, we indicate it by $F^+(\mu_p)(v)$.

3.2. Definition. Let $J^E$ is the collection of all trapezoidal fuzzy parameter sets and $\mu_p \in J^E$. The minmax decision for an inverse trapezoidal fuzzy soft set $(\tilde{F}, \tilde{P}(U))$ of $\mu_p$ is clarified as $F^-(\mu_p)(v) = \wedge_{e \in \tilde{F}} \left[ \tilde{F}(v)(e) \lor \mu_p(e) \right]$ for all $v \in \tilde{P}(U)$. Moreover we indicate it by $F^-(\mu_p)(v)$.

3.3. Example. Consider 2.1.2. Example, a trapezoidal fuzzy parameter set $\mu_p \in J^E$ is defined as follows: $\mu_p(e_1) = (0.7,1,1,1), \mu_p(e_2) = (0.5,0.7,0.7,1), \mu_p(e_3) = (0.7,1,1,1), \mu_p(e_4) = (0.5,0.7,0.7,1)$.

Now the maxmin and minmax decision for inverse trapezoidal fuzzy soft sets is acquired as defined in 3.1. definition and 3.2. definition as follows:

$F^+(\mu_p)(h_1) = (0.7, 1, 1, 1)$, $F^-(\mu_p)(h_1) = (0.5, 0.7, 0.7, 1)$

$F^+(\mu_p)(h_2) = (0.5, 0.7, 0.7, 1)$, $F^-(\mu_p)(h_2) = (0.5, 0.7, 0.7, 1)$

$F^+(\mu_p)(h_3) = (0.7, 1, 1, 1)$, $F^-(\mu_p)(h_3) = (0.5, 0.7, 0.7, 1)$

$F^+(\mu_p)(h_4) = (0.7, 1, 1, 1)$, $F^-(\mu_p)(h_4) = (0.5, 0.7, 0.7, 1)$

$F^+(\mu_p)(h_5) = (0.5, 0.7, 0.7, 1)$, $F^-(\mu_p)(h_5) = (0.5, 0.7, 0.7, 1)$

Note that $F^+(\mu_p) \not\subseteq F^-(\mu_p)$.

The above definitions are used to build the algorithm for inverse trapezoidal fuzzy soft set.
3.4. Algorithm for inverse trapezoidal fuzzy soft set

1. Enter the inverse trapezoidal fuzzy soft set \( (\tilde{F}, \tilde{P}(U)) \).

2. Trapezoidal fuzzy parameter set is calculated using the membership function \( \mu_p \in \mathcal{F} \) such that
   \[
   (\mu_p)(e_i) = \max \{ \tilde{F}(e_i)(h_j) : h_j \in \tilde{P}(U) \}.
   \]

3. To calculate inverse trapezoidal fuzzy soft set apply maxmin concept
   \[
   F^+(\mu_p)(v) = \bigvee_{e \in E} [\tilde{F}(v)(e) \wedge \mu_p(e)].
   \]

4. To calculate inverse trapezoidal fuzzy soft set apply minmax concept
   \[
   F^-(\mu_p)(v) = \bigwedge_{e \in E} [\tilde{F}(v)(e) \vee \mu_p(e)].
   \]

5. To calculate the choice value apply the formula
   \[
   \zeta_i = F^+(\mu_p)(h_j) + F^-(\mu_p)(h_j) : h_j \in \tilde{P}(U).
   \]

6. Finally the optimal decision is to select \( h_m \in \tilde{P}(U) \) if \( \zeta_i = \max \zeta_i \).

7. If there should be an occurrence of \( m \) having more than one worth then the \( h_m \) to be selected can be any one of the \( h_m \) value.

3.4.1. An illustrative example for inverse trapezoidal fuzzy soft set

Expect that a soft aptitude mentor gives a report of the abilities of five learners \( U = \{h_1, h_2, h_3, h_4, h_5\} \) who have gone to the soft ability train meeting. The mentor rates the learners under the accompanying three parameters set \( E = \{e_1, e_2, e_3\} \) which stands for communication, adaptability and creativity respectively. Five trainees are denoted by \( F \) \( h_i \in U \) and to evaluate the three parameters set \( e_i \in E \) (where \( i = 1, 2, 3, 4, 5 \) and \( j = 1, 2, 3 \)). Presently input the inverse trapezoidal fuzzy soft set \( (\tilde{F}, \tilde{P}(U)) \) as shown below.

| \( U \) | \( e_1 \) | \( e_2 \) | \( e_3 \) |
|-------|-------|-------|-------|
| \( h_1 \) | (0.5, 0.7, 0.7, 1) | (0.7, 1, 1, 1) | (0.5, 0.7, 0.7, 1) |
| \( h_2 \) | (0.2, 0.5, 0.5, 0.8) | (0.3, 0.3, 0.5) | (0.3, 0.3, 0.5) |
| \( h_3 \) | (0.3, 0.3, 0.3, 0.5) | (0.3, 0.3, 0.5) | (0.2, 0.5, 0.5, 0.8) |
| \( h_4 \) | (0.5, 0.7, 0.7, 1) | (0.2, 0.5, 0.5, 0.8) | (0.3, 0.3, 0.5) |
| \( h_5 \) | (0.0, 0.0, 0.3) | (0.2, 0.5, 0.5, 0.8) | (0.0, 0.0, 0.3) |

In Step 2, the estimations of the trapezoidal fuzzy parameter \( \mu_p(e_i) \), for the specified inverse trapezoidal fuzzy soft set \( (\tilde{F}, \tilde{P}(U)) \) is as follows:

\[
\mu_p(e_1) = (0.5, 0.7, 0.7, 1), \mu_p(e_2) = (0.7, 1, 1, 1), \mu_p(e_3) = (0.5, 0.7, 0.7, 1).
\]
The maxmin and minmax choice for the inverse trapezoidal fuzzy soft sets is obtained as characterized in 3.1 definitions and 3.2 definitions as follows:

\[ F^+(\mu_p)(h_1) = (0.7, 1, 1, 1), \quad F^-(\mu_p)(h_1) = (0.5, 0.7, 0.7, 1) \]

\[ F^+(\mu_p)(h_2) = (0.2, 0.5, 0.5, 0.8), \quad F^-(\mu_p)(h_2) = (0.5, 0.7, 0.7, 1) \]

\[ F^+(\mu_p)(h_3) = (0.2, 0.5, 0.5, 0.8), \quad F^-(\mu_p)(h_3) = (0.5, 0.7, 0.7, 1) \]

\[ F^+(\mu_p)(h_4) = (0.5, 0.7, 0.7, 1), \quad F^-(\mu_p)(h_4) = (0.5, 0.7, 0.7, 1) \]

\[ F^+(\mu_p)(h_5) = (0.2, 0.5, 0.5, 0.8), \quad F^-(\mu_p)(h_5) = (0.7, 1, 1, 1) \]

Presently we assess the decision estems as built in the calculation and the outcomes are as demonstrated as follows.

| \( U \) | \( c_1 \) | \( c_2 \) | \( c_1 \) | \( F^+(\mu_p) \) | \( F^-(\mu_p) \) | Choice value |
|-------|-------|-------|-------|------|------|-------------|
| \( h_1 \) | (0.5, 0.7, 0.7, 1) | (0.7, 1, 1, 1) | (0.5, 0.7, 0.7, 1) | (0.7, 1, 1, 1) | (0.5, 0.7, 0.7, 1) | = (1.2, 1.7, 1.7, 2) |
| \( h_2 \) | (0.2, 0.5, 0.5, 0.8) | (0.2, 0.5, 0.5, 0.8) | (0.3, 0.3, 0.3, 0.5) | (0.2, 0.5, 0.5, 0.8) | (0.5, 0.7, 0.7, 1) | = (0.7, 1, 1, 1.2) |
| \( h_3 \) | (0.2, 0.5, 0.5, 0.8) | (0.2, 0.5, 0.5, 0.8) | (0.3, 0.3, 0.3, 0.5) | (0.2, 0.5, 0.5, 0.8) | (0.5, 0.7, 0.7, 1) | = (0.7, 1, 1, 1.2) |
| \( h_4 \) | (0.5, 0.5, 0.5, 0.8) | (0.5, 0.5, 0.5, 0.8) | (0.0, 0.0, 0.0, 0.3) | (0.2, 0.5, 0.5, 0.8) | (0.7, 1, 1, 1) | = (0.9, 1, 1.5, 1.5) |
| \( h_5 \) | (0.5, 0.5, 0.5, 0.8) | (0.5, 0.5, 0.5, 0.8) | (0.0, 0.0, 0.0, 0.3) | (0.2, 0.5, 0.5, 0.8) | (0.7, 1, 1, 1) | = (0.9, 1, 1.5, 1.5) |

From the above Table 2, unmistakably the maximum of the decision estems is \( \vec{z}_1 = (1.2, 1.7, 1.2, 1.7) \). Subsequently, the optimal choice to be chosen is the trainee \( h_1 \).

3.5. Definition. Let \( \mathbb{I}^E \) is the set of all triangular fuzzy parameter sets and \( \mu_p \in \mathbb{I}^E \). Then the maxmin decision for an inverse triangular fuzzy soft set \( (\mathbb{D}, \hat{P}(U)) \) of \( \mu_p \) and it is defined as

\[
F^+(\mu_p)(w) = \bigvee_{e \in E} \left[ \mathbb{D}(w)(e) \wedge \mu_p(e) \right] \text{ for all } w \in \hat{P}(U) \text{ and we represent it by } F^+(\mu_p)(w).
\]

3.6. Definition. Let \( \mathbb{I}^E \) is the set of all triangular fuzzy parameter sets and \( \mu_p \in \mathbb{I}^E \). Then the minmax decision for an inverse triangular fuzzy soft set \( (\mathbb{D}, \hat{P}(U)) \) of \( \mu_p \) and it is defined as

\[
F^-(\mu_p)(w) = \bigwedge_{e \in E} \left[ \mathbb{D}(w)(e) \lor \mu_p(e) \right] \text{ for all } w \in \hat{P}(U) \text{ and we represent it by } F^-(\mu_p)(w).
\]
3.7. Example. Consider 2.3.2. Example, a triangular fuzzy parameter set $\mu_P \in \mathcal{P}$ is defined as follows:

$$
\begin{align*}
\mu_P(e_1) &= (0.7, 1, 1), \\
\mu_P(e_2) &= (0.5, 0.7, 1), \\
\mu_P(e_3) &= (0.7, 1, 1), \\
\mu_P(e_4) &= (0.5, 0.7, 1).
\end{align*}
$$

Presently the maxmin and minmax choice for inverse triangular fuzzy soft sets is procured as characterized in 3.5. definition and 3.6. definition as follows:

$$
\begin{align*}
F^+(\mu_P)(h_1) &= (0.7, 1, 1), \\
F^-(\mu_P)(h_1) &= (0.5, 0.7, 1), \\
F^+(\mu_P)(h_2) &= (0.5, 0.7, 1), \\
F^-(\mu_P)(h_2) &= (0.5, 0.7, 1), \\
F^+(\mu_P)(h_3) &= (0.7, 1, 1), \\
F^-(\mu_P)(h_3) &= (0.5, 0.7, 1), \\
F^+(\mu_P)(h_4) &= (0.7, 1, 1), \\
F^-(\mu_P)(h_4) &= (0.5, 0.7, 1), \\
F^+(\mu_P)(h_5) &= (0.5, 0.7, 1), \\
F^-(\mu_P)(h_5) &= (0.5, 0.7, 1).
\end{align*}
$$

Note that $F^+(\mu_P) \not\subseteq F^-(\mu_P)$.

The above definitions are utilized to assemble the calculation for inverse triangular fuzzy soft set.

3.8. Algorithm for inverse triangular fuzzy soft set

1. Enter the inverse triangular fuzzy soft set $\left(\mathcal{F}, \mathcal{P}(U)\right)$.

2. Assess the triangular fuzzy parameter set using the condition $\mu_p \in \mathcal{P}$ such that

$$
\left(\mu_p\right)(e_i) = \max \left\{ \mathcal{P}(e_i) : h_i \in \mathcal{P}(U) \right\}.
$$

3. Apply a maxmin decision for inverse triangular fuzzy soft set using the formula

$$
F^+(\mu_p)(w) = \vee_{e \in E} \left[ \mathcal{F}(w)(e) \land \mu_p(e) \right].
$$

4. Apply a minmax decision for inverse triangular fuzzy soft set using the formula

$$
F^-(\mu_p)(w) = \wedge_{e \in E} \left[ \mathcal{F}(w)(e) \lor \mu_p(e) \right].
$$

5. To calculate the choice value $z_i = F^+(\mu_p)(h_i) + F^-(\mu_p)(h_i) : h_i \in \mathcal{P}(U)$.

6. Finally the optimal decision is to select $h_n \in \mathcal{P}(U)$ if $z_i = \max z_i$.

7. In the event of $m$ having more than one worth then the $h_n$ to be chosen can be any of the $h_n$ value.

3.8.1. An illustrative example for inverse triangular fuzzy soft set
Deem the illustrative model for inverse trapezoidal fuzzy soft set and input the inverse triangular fuzzy soft set as shown below.

### Table 3. Inverse triangular fuzzy soft set \((\widetilde{\mathcal{F}}, \mathcal{F}(U))\).

| \(U\)  | \(e_1\)     | \(e_2\)     | \(e_3\)     |
|-------|-------------|-------------|-------------|
| \(h_1\)  | \((0.5, 0.7, 1)\)  | \((0.7, 1, 1)\)  | \((0.5, 0.7, 1)\)  |
| \(h_2\)  | \((0.2, 0.5, 0.8)\)  | \((0.3, 0.5)\)  | \((0.5, 0.3, 0.5)\)  |
| \(h_3\)  | \((0.0, 0.3)\)  | \((0.2, 0.5, 0.8)\)  | \((0.0, 0.3)\)  |
| \(h_4\)  | \((0.5, 0.7, 1)\)  | \((0.2, 0.5, 0.8)\)  | \((0.2, 0.5, 0.8)\)  |
| \(h_5\)  | \((0.0, 0.3)\)  | \((0.2, 0.5, 0.8)\)  | \((0.0, 0.3)\)  |

After entering the data's, in Step 2, the estimations of the triangular fuzzy parameter \(\mu_p(e_i)\), for the specified inverse triangular fuzzy soft set \((\widetilde{\mathcal{F}}, \mathcal{F}(U))\), is as follows:

\[
\mu_p(e_1) = (0.5, 0.7, 1), \quad \mu_p(e_2) = (0.7, 1, 1) \quad \text{and} \quad \mu_p(e_3) = (0.5, 0.7, 1).
\]

Then apply maxmin and minmax choice for the inverse triangular fuzzy soft sets which is obtained as characterized in 3.5 definition and 3.6 definition as follows:

\[
F^+(\mu_p)(h_1) = (0.7, 1, 1), \quad F^-(\mu_p)(h_1) = (0.5, 0.7, 1)
\]
\[
F^+(\mu_p)(h_2) = (0.2, 0.5, 0.8), \quad F^-(\mu_p)(h_2) = (0.5, 0.7, 1)
\]
\[
F^+(\mu_p)(h_3) = (0.2, 0.5, 0.8), \quad F^-(\mu_p)(h_3) = (0.5, 0.7, 1)
\]
\[
F^+(\mu_p)(h_4) = (0.5, 0.7, 1), \quad F^-(\mu_p)(h_4) = (0.5, 0.7, 1)
\]
\[
F^+(\mu_p)(h_5) = (0.2, 0.5, 0.8), \quad F^-(\mu_p)(h_5) = (0.7, 1, 1)
\]

Presently we assess the decision esteems \(\hat{U}\), as built in the calculation and the outcomes are as demonstrated as follows.

### Table 4. The consequences of the choice calculation.

| \(U\)  | \(e_1\)     | \(e_2\)     | \(e_3\)     | \(F^+(\mu_p)\)     | \(F^-(\mu_p)\)     | Choice value       |
|-------|-------------|-------------|-------------|---------------------|---------------------|-------------------|
| \(h_1\)  | \((0.5, 0.7, 1)\)  | \((0.7, 1, 1)\)  | \((0.5, 0.7, 1)\)  | \((0.7, 1, 1)\)  | \((0.5, 0.7, 1)\)  | \((1.2, 1.7, 2)\)  |
| \(h_2\)  | \((0.2, 0.5, 0.8)\)  | \((0.3, 0.5)\)  | \((0.3, 0.5)\)  | \((0.2, 0.5, 0.8)\)  | \((0.5, 0.7, 1)\)  | \((0.7, 1.2, 1.8)\)  |
| \(h_3\)  | \((0.0, 0.3)\)  | \((0.2, 0.5, 0.8)\)  | \((0.0, 0.3)\)  | \((0.2, 0.5, 0.8)\)  | \((0.5, 0.7, 1)\)  | \((0.7, 1.2, 1.8)\)  |
| \(h_4\)  | \((0.5, 0.7, 1)\)  | \((0.2, 0.5, 0.8)\)  | \((0.0, 0.3)\)  | \((0.5, 0.7, 1)\)  | \((0.5, 0.7, 1)\)  | \((1, 1.4, 2)\)  |
| \(h_5\)  | \((0.0, 0.3)\)  | \((0.2, 0.5, 0.8)\)  | \((0.0, 0.3)\)  | \((0.2, 0.5, 0.8)\)  | \((0.7, 1, 1)\)  | \((0.9, 1.5, 1.8)\)  |
From the above Table 4, plainly the maximum of the decision esteems is $\tilde{z}_1^L=(1.2,1.7,2)$. In this way, the optimal choice to be chosen is the trainee $h_1$.

4. Conclusion

In this paper, we present another idea of the inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set reached out from inverse fuzzy soft set. Subsequently decision making problems were solved on inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set models. The decision propels and the estimation of the decision technique for inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set were loosened up from the created advances and count of inverse fuzzy soft set. The proposed approach of inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set will give in an objective determination result got particularly from the information given by the inclination issue. At last, to show the appropriateness by utilizing the developed calculation with maxmin and minmax choice, an illustrative model is utilized for both inverse trapezoidal fuzzy soft set and inverse triangular fuzzy soft set.

References

[1] DMolodtsov, ‘Soft Set Theory-First Results’, Computers and Mathematics with applications, Vol.37 (1999) 19-31.
[2] Maji PK, Roy AR and Biswas R ‘Soft Set Theory’, Computer and Mathematics with Applications, Vol.45 (2003) 555-562.
[3] Roy AR and Maji PK (2007) ‘A Fuzzy Theoretic Approach to Decision Making Problems’, Journal of Computational and Applied Mathematics, Vol.203, 412-418.
[4] Sooraj TR Mohanty RK and Tripathy BK (2016) ‘Fuzzy Soft Set Theory and its Application in Group Decision Making’, Advances in Intelligent Systems and Computing, Vol.452, 171-178.
[5] Sooraj TR, Mohanty RK and Tripathy BK (2017) ‘Improved Decision Making through IFSS’, Proceedings of SCI Conference, Visakhapatnam, India.
[6] Sooraj TR, Mohanty RK and Tripathy BK (2016) ‘A New Approach to Fuzzy Soft Set Theory and its Application in Decision Making’, Advances in Intelligent System and Computing, Vol.411, 307-315.
[7] Zhi Xiao, Sisi Xia, Ke Gong, Dan Li, ‘The Trapezoidal Fuzzy Soft Set and its Application in MCDM’, Applied Mathematical Modelling, Vol.36 (2012) 5844-5855.
[8] TanliKuang, Zhi Xiao, ‘A Multi-Criteria Decision Making approach based on Triangle-Valued Fuzzy Soft Sets’, Journal of Convergence Information Technology, Vol.7 (2012).
[9] Shyi-Ming Chen, ‘A New Method for Tool Steel Materials Selection under Fuzzy Environment’, Fuzzy Sets and Systems, Vol.92 (1997) 265-274.
[10] Khalil AM and Hassan N, (2019) ‘Inverse Fuzzy Soft Set and its Application in Decision Making’, Int. J. Information and Decision Sciences, Vol.11, No.1, pp. 73-92.
[11] NCagman, SEnginoglu and FCitak, ‘Fuzzy soft set theory and its applications’, Iranian Journal of Fuzzy Systems, Vol.8, No.3, (2011) pp.137-147
[12] AEdward Samuel and MBalamurugan, ‘Fuzzy Max-Min Composition Technique in Medical Diagnosis’, Applied Mathematical Sciences, Vol.6, 2012, No.35, 1741-1746.
[13] Khalil AM and Hassan N (2017b), ‘A Note on Possibility Multi-Fuzzy Soft Set and Its Applications in Decision Making’, Journal of Intelligent and Fuzzy systems, Vol.32, No.3, pp.2309-2314.