BAB I

KESIMPULAN

Berdasarkan bab pembahasan definisi, operasi dan operator pada *Interval-Valued Hesitant Fuzzy Set (IVHFS)* dapat disimpulkan:

1) Definisi himpunan kabur *hesitant* bernilai interval (*Interval-Valued Hesitant Fuzzy Set /IVHFS)* sebagai berikut:

$$\tilde{A} = \{\langle x_i, \tilde{h}_{\tilde{A}}(x_i)\rangle | x_i \in X, i = 1, 2, ..., n\},$$

dimana $\tilde{h}_{\tilde{A}}(x_i)$ merupakan himpunan dari beberapa subinterval yang berbeda pada interval $[0, 1]$ yang menotasikan derajat keanggotaan *IVHFS* di $x \in X$ pada $\tilde{A}$.

2) Sifat-sifat operasi pada elemen kabur *hesitant* bernilai interval (*Interval-valued hesitant fuzzy set/IVHFE*) sebagai berikut:

(a) $\tilde{h}_1 \oplus \tilde{h}_2 = \tilde{h}_2 \oplus \tilde{h}_1$;

(b) $\tilde{h}_1 \otimes \tilde{h}_2 = \tilde{h}_2 \otimes \tilde{h}_1$;

(c) $\lambda(\tilde{h}_1 \oplus \tilde{h}_2) = \lambda\tilde{h}_1 \oplus \lambda\tilde{h}_2, \lambda > 0$;

(d) $(\tilde{h}_1 \otimes \tilde{h}_2)^\lambda = (\tilde{h}_1)^\lambda \otimes (\tilde{h}_2)^\lambda, \lambda > 0$;

(e) $\lambda_1\tilde{h} \oplus \lambda_2\tilde{h} = (\lambda_1 + \lambda_2)\tilde{h}, \lambda_1, \lambda_2 > 0$;

(f) $\tilde{h}^{\lambda_1} \otimes \tilde{h}^{\lambda_2} = \tilde{h}^{(\lambda_1+\lambda_2)}, \lambda_1, \lambda_2 > 0$;

(g) $\tilde{h}_1^c \cup \tilde{h}_2^c = (\tilde{h}_1 \cap \tilde{h}_2)^c$;

(h) $\tilde{h}_1^c \cap \tilde{h}_2^c = (\tilde{h}_1 \cup \tilde{h}_2)^c$;

(i) $(\tilde{h}^c)^\lambda = (\lambda\tilde{h})^c$;

(j) $\lambda(\tilde{h}^c) = (\tilde{h}^\lambda)^c$;

(k) $\tilde{h}_1^c \oplus \tilde{h}_2^c = (\tilde{h}_1 \otimes \tilde{h}_2)^c$;

(l) $\tilde{h}_1^c \otimes \tilde{h}_2^c = (\tilde{h}_1 \oplus \tilde{h}_2)^c$.

3) Bentuk operator-operator :

Misalkan diketahui suatu *Interval-Valued Hesitant Fuzzy Set (IV-HFS)* $\tilde{H}$ dan $\tilde{h}_j$ adalah suatu *Interval-Valued Hesitant Fuzzy Element (IVHFE)* dari $\tilde{H}$ dan $\mathbf{w} = (w_1, w_2, ..., w_n)^T$ adalah vektor bobot dari $\tilde{h}_j$, dimana $j = 1, 2, ..., n$ dengan $w_j \in [0, 1], \sum_{j=1}^{n} w_j = 1$ dan $\lambda > 0$, maka:

1. *Operator Generalized Interval-Valued Hesitant Fuzzy Weight Averaging (GIVHFWA) dengan pemetaan:*

$$\text{GIVHFWA} : \tilde{H}^n \longrightarrow \tilde{H}$$

$$\text{GIVHFWA}\ (\tilde{h}_1, \tilde{h}_2, ..., \tilde{h}_n) = \left(\oplus_{j=1}^{n} \left(w_j \tilde{h}_j^\lambda\right)\right)^{\frac{1}{\lambda}}$$

$$= \left\{ \left[\left(1 - \prod_{j=1}^{n} (1 - (\tilde{\gamma}_j^L)^\lambda)^{w_j}\right)^{\frac{1}{\lambda}}, \left(1 - \prod_{j=1}^{n} (1 - (\tilde{\gamma}_j^U)^\lambda)^{w_j}\right)^{\frac{1}{\lambda}} \right] | \tilde{\gamma}_1 \in \tilde{h}_1, \tilde{\gamma}_2 \in \tilde{h}_2, ..., \tilde{\gamma}_n \in \tilde{h}_n \right\}$$

2. *Operator Generalized Interval-Valued Hesitant Fuzzy Weight Geometric (GIVHFWG) dengan pemetaan:*

$$\text{GIVHFWG}: \tilde{H}^n \longrightarrow \tilde{H}$$

$$\text{GIVHFWG}\ (\tilde{h}_1, \tilde{h}_2, ..., \tilde{h}_n) = \frac{1}{\lambda}\left(\otimes_{j=1}^{n} \left(\lambda \tilde{h}_j\right)^{w_j}\right)$$

$$= \left\{ \left[1 - \left(1 - \prod_{j=1}^{n} (1 - (1 - \tilde{\gamma}_j^L)^\lambda)^{w_j}\right)^{\frac{1}{\lambda}}, 1 - \left(1 - \prod_{j=1}^{n} (\tilde{\gamma}_j^U)^\lambda)^{w_j}\right)^{\frac{1}{\lambda}} \right] | \tilde{\gamma}_1 \in \tilde{h}_1, \tilde{\gamma}_2 \in \tilde{h}_2, ..., \tilde{\gamma}_n \in \tilde{h}_n \right\}.$$

Misalkan diketahui suatu *Interval-Valued Hesitant Fuzzy Set (IVHFS)* $\tilde{H}$. $\tilde{h}_j$ adalah suatu *Interval-Valued Hesitant Fuzzy Element (IVHFE)* dari $\tilde{H}$ dengan $j = 1, 2, ..., n$, $\tilde{h}_{\sigma(j)}$ terbesar ke-j dari $\tilde{h}_j$, $\omega = (\omega_1, \omega_2, ..., \omega_n)^T$ adalah suatu vektor yang bersesuaian sedemikian sehingga $w_j \in [0, 1]$ dan $\sum_{j=1}^{n} w_j = 1$, $\lambda > 0$, maka:

1.*Operator Generalized Interval-Valued Hesitant Fuzzy Weight Ordered Averaging (GIVHFOWA) dengan pemetaan:*

$$GIVHFOWA : \tilde{H}^n \longrightarrow \tilde{H}$$

$$\text{GIVHFOWA } (\tilde{h}_1, \tilde{h}_2, ..., \tilde{h}_n) = \left(\oplus_{j=1}^{n} \omega_j \tilde{h}^{\lambda}_{\sigma(j)}\right)^{\frac{1}{\lambda}}$$

$$= \{[(1 - \prod_{j=1}^{n}(1 - (\tilde{\gamma}^{L}_{\sigma(j)})^{\lambda})^{\omega_j})^{\frac{1}{\lambda}}, (1 - \prod_{j=1}^{n}$$

$$(1 - (\tilde{\gamma}^{U}_{\sigma(j)})^{\lambda})^{\omega_j})^{\frac{1}{\lambda}}] | \tilde{\gamma}_{\sigma(1)} \in \tilde{h}_{\sigma(1)}, \tilde{\gamma}_{\sigma(2)}$$

$$\in \tilde{h}_{\sigma(2)}, ..., \tilde{\gamma}_{\sigma(n)} \in \tilde{h}_{\sigma(n)}\}$$

2. *Operator Generalized Interval-Valued Hesitant Fuzzy Ordered Weight Geometric (GIVHFOWG) dengan pemetaan:*

$$GIVHFOWG : \tilde{H}^n \longrightarrow \tilde{H}$$

$$\text{GIVHFOWG } (\tilde{h}_1, \tilde{h}_2, ..., \tilde{h}_n) = \frac{1}{\lambda}\left(\otimes_{j=1}^{n}(\lambda \tilde{h}_{\sigma(j)})^{\omega_j}\right)$$

$$= \{[1 - (1 - \prod_{j=1}^{n}(1 - (1 - \tilde{\gamma}^{L}_{\sigma(j)})^{\lambda})^{\omega_j})^{\frac{1}{\lambda}},$$

$$1 - (1 - \prod_{j=1}^{n}(1 - (1 - \tilde{\gamma}^{U}_{\sigma(j)})^{\lambda})^{\omega_j})^{\frac{1}{\lambda}}] | \tilde{\gamma_{\sigma(1)}}$$

$$\in \tilde{h}_{\sigma(1)}, \tilde{\gamma}_{\sigma(2)} \in \tilde{h}_{\sigma(2)}, ..., \tilde{\gamma}_{\sigma(n)} \in \tilde{h}_{\sigma(n)}\}$$