Correction to: Redefinition of the concept of fuzzy set based on vague partition from the perspective of axiomatization

Xiaodong Pan¹ · Yang Xu¹

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I recently found that several errors occur in the statement of Definition 5.2 in Section 5 in the paper “Redefinition of the concept of fuzzy set based on vague partition from the perspective of axiomatization”.

As it had been pointed out at the end of Section 4 of this paper that “the set of vague attribute values is defined as a free algebra on the elementary set of vague attribute values”, and fuzzy sets are mathematical formulation for vague attribute values, hence, the set of fuzzy sets in U can be seen as freely generated by a vague partition of U .

Based on this consideration, Definition 5.2 of this paper can be corrected as follows:

Definition 5.2 Let $U = [a, b] \subset \mathbb{R}$ and $\tilde{U} = \{\mu_{A_1}(x), \dots, \mu_{A_n}(x)\}$, $n \in \mathbb{N}^+$, a vague partition of U . The set $\mathcal{F}(\tilde{U})$ of fuzzy sets in U with respect to $\tilde{U}$ consists of the following elements:

- (1) if there exists $i \in \bar{n}$ such that $\mu_A(x) = \mu_{A_i}(x)$ for all $x \in U$, then $A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;
- (2) if $\mu_A(x) = \bar{\mu}(x) = 1$ for all $x \in U$, then $A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;
- (3) if $\mu_A(x) = \underline{\mu}(x) = 0$ for all $x \in U$, then $A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;

- (4) if $A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$ and $r \in \mathbb{Q}^+$, then $A^r = \{(x, (\mu_A(x))^r) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;
- (5) if $A = \{(x, \mu_A(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$, and N is a strong negation on $[0, 1]$, then $A^N = \{(x, (\mu_A(x))^N) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;
- (6) if $A = \{(x, \mu_A(x)) \mid x \in U\}$, $B = \{(x, \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$, and $\otimes$ is a triangular norm, then $A \cap_{\otimes} B = \{(x, \mu_A(x) \otimes \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;
- (7) if $A = \{(x, \mu_A(x)) \mid x \in U\}$, $B = \{(x, \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$, and $\oplus$ is a triangular conorm, then $A \cup_{\oplus} B = \{(x, \mu_A(x) \oplus \mu_B(x)) \mid x \in U\} \in \mathcal{F}(\tilde{U})$;
- (8) $\mathcal{F}(\tilde{U})$ not include other elements.

In fact, $\mathcal{F}(\tilde{U})$ can be considered as a function space based on $\tilde{U}$.

We apologize to the readers for any inconvenience these errors might have caused.

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✉ Xiaodong Pan
 xdpan1@163.com

¹ School of Mathematics, Southwest Jiaotong University, West Section, High-Tech Zone, Chengdu 611756, Sichuan, People's Republic of China