

Complex Belief Entropy for Complex Evidence Theory

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Abstract

In this paper, taking advantages of the characteristics of complex basic belief assignment (CBBA) in complex evidence theory, a new belief entropy is proposed to measure the total uncertainty in complex evidence theory.

Keywords: Complex evidence theory; Complex belief entropy; Interference

1. The proposed method

Definition. (Complex belief entropy)

For a complex basic belief assignment (CBBA) \mathbb{M} in the frame of discernment $X = \{X_1, X_2, \dots, X_n\}$, its total uncertainty measure, is defined as:

$$\mathbb{E}(\mathbb{M}) = \left\| - \sum_{A \subseteq X} \mathbb{M}(A) \log \frac{\mathbb{M}(A)}{2^{|A|} - 1} \right\|, \quad (1)$$

where $|A|$ means the cardinality of A or the number of elements in A ; $\|\cdot\|$ is the modulus length function.

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