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) \( M \) in the frame of discernment \( X = \{X_1, X_2, \cdots, X_n\} \), its total uncertainty measure, is defined as:

\[
E(M) = \| - \sum_{A \subseteq X} M(A) \log \frac{M(A)}{2^{|A|} - 1} \|, \tag{1}
\]

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

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