

Identification of a fuzzy measure that meets redundancy among criteria in Multicriteria Decision Making Problems

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Fuzzy measure is an innovative and useful tool to model the interaction of criteria in a multicriteria decision making (MCDM) environment. However, to determine the weight of each one of 2^n subsets of a finite set that has cardinality n is complicated. Larbani et al. relieve this complexity by constructing a fuzzy measure which has been developed based on the evaluation of interdependence coefficients between criteria. On the other hand the structure of the set function has been referring the superadditivity among criteria and fortunately the construction of the function is convenient with the structure of superadditive fuzzy measures. In contrast to this case it is not an easy issue to obtain a fuzzy measure that refers subadditivity between criteria by using a set function with similar structure. As it is necessary to use a negative interaction index for each pair of criteria to ensure redundancy between singletons; keeping the monotonicity and subadditivity is more complicated. In this talk we are concerned with this crucial problem. We present independent necessary and sufficient conditions to attain a fuzzy measure from this set function. Later, we discuss these conditions and we support the results with explanatory numerical examples.