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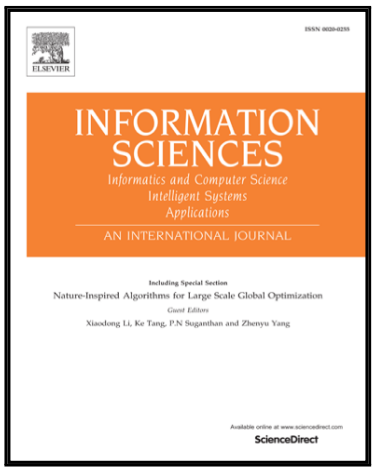

Hyperbolic scales involving appetites-based intuitionistic multiplicative preference relations for group decision making

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Hyperbolic scales involving appetites-based intuitionistic multiplicative preference relations for group decision making

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Abstract

Preference relations based on various numerical scales have become powerful techniques to express the decision maker's preference information over alternatives or criteria. Existing numerical scales are not always fitted with practical situations, for example, it is difficult for a single value in a numerical scale to simultaneously express the support and objection evidence; therefore, a constant numerical scale cannot reflect the appetites of different decision makers well and the grades between preference degrees are not or only partly asymmetrically distributed. Thus, in this paper, we use parameterized hyperbolic scales to express the preference information, and propose a novel hyperbolic scale-based intuitionistic multiplicative preference relation to suit the above situations. Basic operations on the proposed scale are developed, based on which the hyperbolic scale-based intuitionistic multiplicative weighted geometric operator and the hyperbolic scale-based intuitionistic multiplicative power geometric operator are proposed to aggregate the hyperbolic scale-based intuitionistic multiplicative preference information; and desirable properties are further discussed. Then a method is provided to solve group decision making with hyperbolic scale-based intuitionistic multiplica-

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