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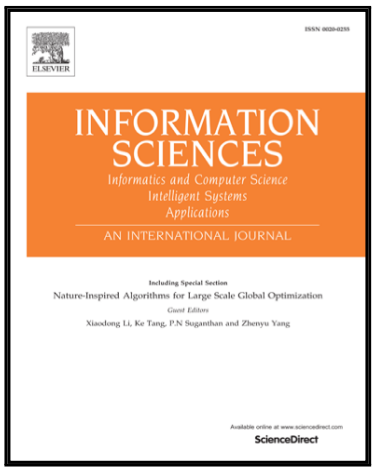

THE ARITHMETIC OF CONTINUOUS Z-NUMBERS

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THE ARITHMETIC OF CONTINUOUS Z-NUMBERS

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Abstract

In order to deal with imprecision and partial reliability of real-world information, Prof. Zadeh suggested the concept of a Z-number $Z=(A,B)$, as an ordered pair of continuous fuzzy numbers A and B. The first describes a linguistic value, and the second one is the associated reliability. Unfortunately, up to day there is no works devoted to arithmetic of continuous Z-numbers in existence. An original formulation of operations over continuous Z-numbers proposed by Zadeh includes complex non-linear variational problems. We propose an alternative approach which has a better computational complexity and accuracy tradeoff. The proposed approach is based on linear programming and other simple optimization problems. We developed basic arithmetic operations such as addition, subtraction, multiplication and division, and some algebraic operations as maximum, minimum, square and square root of continuous Z-numbers. Vast compendium of examples shows validity of the suggested approach.

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