

Complex multi-fuzzy relation for decision making using uncertain periodic data

Abstract

We introduce a new type of relations called complex multi-fuzzy relation (CMFR). The novelty of CMFR lies in the ability of complex multi- membership functions to achieve more range of values while handling uncertainty of data that is periodic in nature. The application of complex multi-fuzzy sets is then discussed in determining: the influence of modern methods of education on student performance, and the time required for the former to affect the latter. A comparison between different existing relations and CMFR to show the ascendancy of our proposed CMFR is provided. Thereafter, a few related concepts such as complement, union, intersection and inverse along with several propositions are discussed, followed by the composition of CMFR along with some related theorems. Finally the notions of symmetric, transitive, reflexive, and equivalence complex multi-fuzzy relations are established in our work.

Keywords: Complex Multi-Fuzzy Set, Complex Multi-Fuzzy Relation, Multi-Fuzzy Set, Complex Fuzzy Set, Decision Making.

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