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IMPACT OF FIXED-POINT THEOREMS IN M-FUZZY METRIC SPACE

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ABSTRACT

Fixed point theorems in M-fuzzy metric spaces represent a significant intersection of fuzzy set theory and metric space theory, offering profound insights into the behavior of mappings in the presence of uncertainty and imprecision. In M-fuzzy metric spaces, distances between elements are measured using fuzzy numbers or fuzzy sets, allowing for a more flexible representation of proximity. Fixed point theorems tailored to M-fuzzy metric spaces provide conditions under which mappings possess fixed points, considering the fuzziness inherent in the space. These theorems are crucial for establishing the existence and uniqueness of fixed points for mappings defined on M-fuzzy metric spaces, thereby facilitating the analysis of fuzzy operators and functions. Moreover, they contribute to the development of algorithmic techniques for solving equations and optimization problems in the context of fuzzy environments. By bridging fuzzy set theory with metric space theory, fixed point theorems in M-fuzzy metric spaces play a vital role in advancing both theoretical understanding and practical applications in fields such as computer science, engineering, and decision-making under uncertainty.