



Study of Fixed Point Theorems in Fuzzy Metric Spaces

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Abstract : Fixed point theorems are the most important tools for providing existence and uniqueness of the solution of various mathematics models (different, integral, partial differential equation and variational inequalities) representing different phenomena suitable for different fields such as steady state temperature distribution, chemical reaction, neutron transport theory, economic theories, epidemics and flow of fluids. At present this field has been recognized as one of the active field of research.

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Fixed point theorems is one of the most fruitful and effective tools in mathematics which has enormous applications within as well as outside the mathematics. Despite noted improvements in computer skill and its remarkable success in facilitating many areas of research, there will stands one major short coming: computers are not designed to handle situations wherein uncertainties are involved. To deal with uncertainty. We need techniques other than classical ones wherein some specific logic is required.

Introduction : In 1922, S. Banach put forward the first fixed point theorem in metric space for contraction mapping. Contraction mapping gives rise to several other mappings, namely contractive, no expansive, Lipchitz's etc. and all of them are continuous. Nearly four decades after introduction of Banach's fixed point theorem, M.Edelstein (1961) made an extensive generalization of it and established a class of new fixed point theorems for a special class of mappings in metric spaces.

Since then, a number of generalization of contraction mapping principle have been established by different mathematicians leading to a volume of fixed point theorems in metric spaces and it is continued till now. Of course, there are other fixed point theorems such as J.Caristi's (1975, 1976) fixed point theorem related to arbitrary mapping.

With the introduction of the concept "Fuzzy Set" by Lofty A. Zadeh in 1965, new horizon was opened in the sky of human knowledge. His way of defining 'Fuzziness' in closely related to process of human thinking and reasoning and so is a tool for generating decisions in uncertainty. In one word, fuzzy set provides scope to express uncertainty or vagueness suitably in a mathematical way. Gradually fuzzy set theory has entered into almost all the disciplines of science, technology and humanities and now a days it is an extremely versatile interdisciplinary