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# A STUDY OF FIXED POINT THEOREMS IN DIFFERENT TYPES OF METRIC SPACES

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## ABSTRACT

Fixed point theorems constitute fundamental tools in the analysis of various types of metric spaces, illuminating the behavior of mappings and offering insights into the underlying geometry. In Euclidean spaces, classic fixed point theorems like the Banach Fixed Point Theorem provide foundational results, crucial for establishing the existence and uniqueness of fixed points for contraction mappings. In more general metric spaces, such as complete metric spaces, fixed point theorems like the Brouwer Fixed Point Theorem offer profound implications, showcasing the existence of fixed points for continuous mappings without contraction properties. Additionally, in probabilistic metric spaces, where distances are measured with probability distributions, fixed point theorems contribute to understanding stochastic processes and random mappings. Moreover, in fuzzy metric spaces, which accommodate uncertainty and imprecision through fuzzy sets, fixed point theorems tailored to these spaces help elucidate the behavior of fuzzy mappings and operators. Across these diverse types of metric spaces, fixed point theorems play a pivotal role in advancing theoretical understanding and practical applications, spanning fields from pure mathematics to applied sciences.