# Abstract

Thesis: Chaotic Properties of Dynamical Systems

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The study of interrelationships between different notions of chaos has been a major focus of researchers in recent decades, especially within the context of compact metric spaces. In this thesis, we investigate the chaotic properties of dynamical systems over general topological spaces, as well as for multidimensional discrete-time dynamical systems. Primarily, our study deals with the notions of distributional chaos and specification property.

We examine the relationship between the topological notions of specification property and distributional chaos defined for a uniformly continuous self-map defined on uniform spaces and prove that for such maps topological weak specification property implies topological distributional chaos of type 1. Additionally, we study the invariance of topological distributionally scrambled set for maps on uniform spaces having topological weak specification property. Further, we introduce and study the notion of topological distributional chaos in a sequence for a uniformly continuous self-map defined on uniform space. We also introduce the notion of a topological specification point for uniformly continuous surjective self-maps on uniform spaces and study the connection between pointwise topological specification property and the other notions of chaos. Moreover, we study some weaker forms of specification for maps defined on uniform spaces and examine the limiting behavior of a topological specification point under orbital convergence of maps.

Further, the relationship between the notions of distributional chaos and specification property is explored for a continuous $\mathbb{Z}^d$-actions defined on compact metric spaces. We also introduce and study the notion of $k$-type distributional chaos in a sequence for a continuous $\mathbb{Z}^d$-action on a compact metric space.