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Simple dynamical systems

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Abstract

In this paper, we study the class of simple systems on $\mathbb{R}$ induced by homeomorphisms having finitely many non-ordinary points. We characterize the family of homeomorphisms on $\mathbb{R}$ having finitely many non-ordinary points upto (order) conjugacy. For $x, y \in \mathbb{R}$, we say $x \sim y$ on a dynamical system $(\mathbb{R}, f)$ if x and y have same dynamical properties, which is an equivalence relation. Said precisely, $x \sim y$ if there exists an increasing homeomorphism $h : \mathbb{R} \to \mathbb{R}$ such that $h \circ f = f \circ h$ and $h(x) = y$. An element $x \in \mathbb{R}$ is ordinary *in $(\mathbb{R}, f)$ if its equivalence class $[x]$ is a neighbourhood of it.*

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1. Introduction

A dynamical system is a pair (X, f) where X is a metric space and f is a continuous self map on X. Two dynamical systems (X, f), (Y, g) are said to be topological conjugate if there exists a homeomorphism $h : X \to Y$ (called topological conjugacy) such that $h \circ f = g \circ h$. The properties of dynamical systems which are preserved by topological conjugacies are called dynamical properties.

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