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by

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ITERATED FUNCTION SYSTEMS WITH THE AVERAGE SHADOWING PROPERTY

MEHDI FATEHI NIA

Abstract. The average shadowing property is considered for set-valued dynamical systems, generated by parameterized iterated function systems (IFSs), which are uniformly contracting, or conjugacy, or products of such ones. We also prove that if a continuous surjective IFS $\mathcal{F}$ on a compact metric space X has the average shadowing property, then every point x is chain recurrent. Moreover, we introduce some examples and investigate the relationship between the original shadowing property and the shadowing property for an IFS. For example, we prove that the Sierpinski IFS has the average shadowing property. Then we show that there is an IFS $\mathcal{F}$ on S^1 such that $\mathcal{F}$ does not satisfy the average shadowing property, but every point x in S^1 is chain recurrent.

1. Introduction

The shadowing property of a dynamical system is one of the most important notions in dynamical systems (see [12], [15]). The notion of the average shadowing property was introduced by Michael Blank [6] in order to study chaotic dynamical systems, which is a good tool to characterize Anosov diffeomorphisms. The average shadowing property was further studied by several authors, with particular emphasis on connections with other notions from topological dynamics, or more narrowly, shadowing theory (e.g., see [10], [11], [13]).

Iterated function systems (IFSs) are used for the construction of deterministic fractals and have found numerous applications, in particular,

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