http://topology.auburn.edu/tp/

TOPOLOGY PROCEEDINGS

Volume 46, 2015

Pages 67–72

http://topology.nipissingu.ca/tp/

On the Stability of Orbits for Iterated Function Systems

by

Alireza Zamani Bahabadi

Electronically published on April 17, 2014

Topology Proceedings

Web:	http://topology.auburn.edu/tp/
Mail:	Topology Proceedings Department of Mathematics & Statistics Auburn University, Alabama 36849, USA
E-mail:	topolog@auburn.edu
ISSN:	0146-4124

http://topology.auburn.edu/tp/
http://topology.nipissingu.ca/tp/

TOPOLOGY PROCEEDINGS
Volume 46 (2015)
Pages 67-72

E-Published on April 17, 2014

ON THE STABILITY OF ORBITS FOR ITERATED FUNCTION SYSTEMS

ALIREZA ZAMANI BAHABADI

Abstract. In this paper, we consider the stability of orbits for iterated function systems. Precisely, we prove that there is a residual set $\mathcal{R} \subset \mathcal{H}(X) \times \mathcal{H}(X)$ such that for every $(f_0, f_1) \in \mathcal{R}$, $IFS(f_0, f_1)$ is weak orbitally stable, 1-inverse weak orbitally stable, and w-orbitally stable, where $w \in \Sigma^2$. As well, we show that for every $(f_0, f_1) \in \mathcal{H}(X) \times \mathcal{H}(X)$, $IFS(f_0, f_1)$ is 2-inverse weak orbitally stable.

1. Introduction

Stability is an important topic in the theory of dynamical systems. Nominally, this means that after a small perturbation, the dynamical invariants do not change too much. Another interesting notion of stability, due to Zeeman and Floris Takens, is tolerance stable (see [6], [7]): A diffeomorphism f is tolerance stable if the corresponding orbit's structure varies only a little after small perturbations. Zeeman's tolerance stability conjecture expresses that tolerance stable diffeomorphisms are generic in the space of all diffeomorphisms with C^1-topology. The tolerance stable is well known generically for homeomorphisms and, by it, the genericity of weak shadowing and weak inverse shadowing properties was obtained (see [5], [3]). The tolerance stable became a motivation for us to study the stability of orbits for iterated function systems. The study of iterated function systems plays an important role for understanding certain dynamical systems. It has also a remarkable role in producing fractals and chaos game [1]. In [2], David Broomhead, Demetris Hadjiloucas,

2010 *Mathematics Subject Classification.* 54H20.

Key words and phrases. Iterated function systems, orbitally stable, weak orbitally stable.