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RELATIVE METRIC SPACES

M. Malziri* and M. R. Molaei*†

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Abstract

In this paper the notion of a *relative metric space*, as a mathematical model compatible with a physical phenomena, is considered. The notion of relative topological entropy for relative semi-dynamical systems on a relative metric space is studied. It is proved that *observational topological entropy* is an invariant object up to a relative conjugate relation.

Keywords: Observer, Relative structure, Molecular lattice, Relative topology, Observational topological entropy.

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1. Introduction

The theory of fuzzy systems [16] was the reason for considering new theories of uncertainty [2, 3]. The recent mathematical results of fuzzy theory [16] in topology [1, 4, 10, 11, 12, 13, 14], and geometry [7] created a new approach to considering *space*. An *Observer*, as one of the main objects which determines the uncertainty of a space X, can be considered as a fuzzy set $\mu : X \to [0, 1]$. Any mathematical model according to the viewpoint of an observer μ is called a *relative model* [4, 5, 6, 8].

There is a space description using fuzzy theory which is called *fuzzy metric spaces* [1, 10]. In this paper relative metric spaces are introduced as another approach for *considering space* by using an observer. A method for constructing relative topologies via a relative metric space is presented. The notion of relative entropy for relative semi-dynamical systems created by a relative continuous map on a relative metric space is considered. The relative entropy for the iteration of a relative continuous map is studied.

*Department of Mathematics, University of Kerman (Shahid Bahonar), 76169-14111, Kerman, Iran. E-mail: (M. R. Molaei) mrmolaei@mail.uk.ac.ir

†Corresponding Author.