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THE INVERSE LIMIT NONAUTONOMOUS DISCRETE DYNAMICAL SYSTEM, I

GERARDO ACOSTA AND MANUEL SANCHIS

Abstract. In this paper, the first dedicated by the authors to this topic, we introduce the notion of the inverse limit nonautonomous discrete dynamical system (inverse limit NDS) of an inverse sequence $(X_n, h_{\infty,n})_n$ of nonautonomous discrete dynamical systems, which generalizes the notions of the inverse limit dynamical system and of the natural extension of an autonomous discrete dynamical system (X, f), using the shift map of f (see François Blanchard, et al. [J. Reine Angew. Math. 547 (2002), pp. 51–68]. Then we start a systematic study of the inverse limit NDS, by considering both set-theoretical and topological properties.

1. Introduction

A *map* is a continuous function. An *autonomous discrete dynamical system* (ADS) is a pair (X, f) where X is a topological space and $f\colon X \to X$ is a map. A *nonautonomous discrete dynamical system* (NDS) is a pair (X, f_∞), where X is a topological space and $f_\infty = (f_n)_n$ is a sequence so that, for each $n \in \mathbb{N}$, $f_n\colon X \to X$ is a map. When $f\colon X \to X$ is a map and f_∞ is the constant sequence $(f, f, \ldots, f, \ldots)$, the pair (X, f_∞) is the ADS (X, f). Hence, any ADS is an NDS. NDSs were introduced in 1996

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