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by

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INFINITE SPECIFICATION AND DISTRIBUTIONAL CHAOS IN THE BAIRE SPACE

JASMIN MOHN AND BRIAN E. RAINES

Abstract. Both distributional chaos and the specification property have been the subject of much inquiry in dynamical systems in the last 50 years. Several results link the two properties in compact dynamical systems. In this paper, we focus our study on the connection between the specification property and distributional chaos on a non-compact dynamical system. Specifically, we examine these properties on a shift space over a countable alphabet with the product topology and the usual shift map, which is known as the Baire space. We show that in this context a subshift with the infinite specification property must have distributional chaos.

1. Introduction

The specification property was first introduced by Rufus Bowen in 1971 to determine the distribution of periodic points for Axiom A diffeomorphisms [3]. Since then the specification property has been well studied. We say a mapping $f : X \to X$ has the *specification property* if for every finite sequence of points $x^1, x^2, ..., x^n \in X$ there is a point, $p \in X$, whose orbit is arbitrarily close to the orbit of each point for any specified length of time provided the transition time is greater than a specified constant. For a more precise definition see the next section. While this is a strong condition, many maps have this property. For example, any continuous map on the interval with topological mixing has the specification property [2]. Furthermore, there is both a stronger and a weaker version of the specification property. The weaker notion of the specification property, known as the weak specification property, was introduced in 1978 by

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