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RESEARCH ARTICLE

Global dynamics of the Hořava–Lifshitz cosmological system

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Abstract
Using the qualitative theory of the differential equations we describe the global dynamics of the cosmological model based on Hořava–Lifshitz gravity in a Friedmann–Lemaître–Robertson–Walker space time with zero curvature and without the cosmological constant term.

Keywords Hořava–Lifshitz · Global dynamics · Cosmology · Poincaré compactification

1 Introduction

Ten years ago Hořava [1] put forward a theory of spacetime asymmetric gravity, which is similar to Lifshitz's scalar field theory. If the spatial dimension in Lifshitz's scalar field theory has a weight of one, then the time dimension has a weight of three. Therefore this theory is also known as Hořava–Lifshitz gravity. It ignited a great deal of research on the possible application of this theory in cosmology and black hole physics (see [2–5] or the review articles [6,7] and the references therein).

With or without detailed-balance conditions, Leon and Saridakis [8] carried out a detailed phase space analysis of Hořava–Lifshitz cosmology, and found that the universe governed by Hořava gravity had late-time solutions compatible with observations. They also presented several results on the stability of de Sitter solutions in Hořava–Lifshitz cosmology by using the central manifold theory [9]. Furthermore Saridakis [10] reviewed some general aspects of Hořava–Lifshitz cosmology and

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