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Abstract In this paper, we study the anisotropic Bianchi type-VI_0 metric filled with dark matter and anisotropic ghost dark energy. We have solved the Einstein's field equations by considering hybrid expansion law (HEL) for the average scale factor. It is found that at later times the universe becomes spatially homogeneous, isotropic and flat. From a state finder diagnosis, it is found that our model is having similar behavior like ΛCDM model at late phase of cosmic time.

Keywords Bianchi type-VI_0. Hybrid expansion law. Ghost dark energy. State finder pair.

1 Introduction

The last two decades of research made in observational cosmology have brought about a revolution in our understanding of the universe. The cosmological observations such as type Ia supernovae (SNe Ia) (Riess et al., 1998; Perlmutter et al., 1999), galaxy red shift surveys (Fedeli et al., 2009), cosmic microwave background radiation (Caldwell and Doran, 2004; Huang et al., 2006), large scale structure (Daniel et al., 2008) suggest that the universe is undergoing a phase of late cosmic acceleration. For this acceleration a new type of energy with negative pressure is supposed to be responsible which is commonly known as dark energy (DE) (Peebles and Ratra, 2003).

In physical cosmology and astronomy, the simplest model for dark energy is the cosmological constant (Λ). The cosmological constant corresponds to a fluid with a constant equation of state $\omega = -1$ and is consistent with all observational data. But from the theoretical point of view it is plagued with the fine tuning and cosmic coincidence problem (Weinberg, 1989; Overduin and Coperstock, 1998). For these reasons the cosmological constant with dynamical character is preferred over the constant cosmological constant. To further investigate the true nature of dark energy and the accelerated expansion of the universe, many dynamical dark energy models have been proposed, such as Quintessence (Barreiro et al.,