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Bianchi Type-VIh Cosmological Model with Quadratic EOS in f(R, T) Theory

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ABSTRACT

In this paper, we study the spatially homogenous and anisotropic Bianchi type-VIh cosmological model in $f(R,T)$ modified theory with variable cosmological term Λ. Solutions are found by assuming forms of the function $f(R,T)$ as $f(R,T) = f_1(R) + f_2(T)$ and with a quadratic equation of state. It is found that some of which are decelerating and others accelerating. Here, the cosmological parameter is not constant, but it is taken as variable, which can solve the cosmological constant problem.

Keywords : Cosmological Model, Equation of State, f(R,T) Theory, Bianchi Type VIh.

I. INTRODUCTION

The most successful theory in application to cosmology is the theory of General relativity (GR). Until recently, our mental picture of the universe was based more on our philosophical prejudices (or religious beliefs) than on observational data [1]. Cosmology refers to study of the origin of the universe, it's structure evolution, and future of the universe as a whole based upon the interpretations of astronomical observations at different wave-lengths through laws of physics. Relativistic cosmological models are described as the exact solutions of the EFEs that help in understanding the important features of our universe. Many generalizations of EFEs have been proposed in last few decades. Einstein's general theory of relativity (GR) is considered as one of the most beautiful structures of theoretical physics. Among several theories of gravitation, GR has been designated as the most successful one. In fact, GR is regarded as a geometric theory of gravitation. Mathematical elegance and outstanding formal beauty using tools of Riemannian geometry are the characteristics of Einstein's theory of gravitation. It leads to gravitational action. In 1917, Einstein introduced the cosmological constant L as the universal repulsion to make the universe static in accordance with a generally accepted picture of that time.

For better understanding, researchers proposed various generalizations of general theory relativity, viz., bimetric theory, scalar tensor theory, $f(G), f(R,G), f(R), f(T)$ and $f(R,T)$ gravitational theories. From these, some theories have been studied to learn the behavior of dark energy and its aspects related to the cosmological constant problem. One of the most popular alternatives to Einstein's theory of gravitation is the $f(R,T)$ theory and was proposed by

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