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Energy constraints and the phenomenon of cosmic evolution in the f(T,B) framework
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Abstract
In this paper, we investigate the cosmological evolution in a new modified teleparallel gravity that connects both f(T) and f(R) theories with a boundary term B, called f(T,B) gravity. To this purpose, we assume flat Friedmann-Robertson-Walker (FRW) geometry filled with perfect fluid matter contents. We formulate the general energy constraints for two cases in this gravity: one is for a general function of f(T,B), and the other is for a particular form of it given by - T + F(B). Further, we explore the validity of these energy bounds by specifying different forms of f(T, B) and F(B) functions obtained by the reconstruction scheme for de Sitter, power-law, Λ CDM and phantom cosmological models. In order to constrain the free model parameters, we examine these energy bounds with the help of region graphs. We also explore the evolution of the effective equation of state (EoS) ωeff for both cases and compare theoretical results with the observational data. It is found that the effective EoS represents the phantom phase or the quintessence state of accelerating universe in all cases, which is consistent with observational data. © 2018, Società Italiana di Fisica and Springer-Verlag GmbH Germany, part of Springer Nature.

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