

UDC 524.834

Teleparallel gravity and the role of nonminimal boundary couplings

Kadam S.A.

k.siddheshwar47@gmail.com

Department of Mathematics, School of CS & AI, SR University, Warangal,
Telangana 506371, India

Abstract. In this study, we have described an autonomous dynamical system within a broad scalar-tensor gravity context. This context includes the overall configuration of non-minimally coupled scalar field functions for both the torsion scalar (T) and the boundary term (B). We have investigated three well-founded forms of potential functions and limited the model parameters through dynamical system analysis. This analysis has been essential to select cosmologically viable models. We have examined the behavior of dynamical parameters, including equation-of-state parameters, as well as the standard density parameters for radiation, matter, and dark energy (DE) to evaluate their alignment with current observational data. The phase space diagrams are provided to illustrate the stability conditions of the respective critical points. The Universe is clearly undergoing a late-time cosmic acceleration phase through the DE-dominated critical points. Furthermore, we test our results with the most widely accepted Λ CDM model. The findings are further analyzed using the cosmological datasets of Supernovae Ia and the Hubble rate $H(z)$.

Keywords: Sorkin-Schutz formalism, $f(T, \phi)$ gravity, Autonomous Dynamical System Analysis