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Noether symmetry in teleparalle extended gravity

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Abstract

In this paper, we study the $f(T,\tau)$ modified gravity theory, where T and τ represent the scalar-torsion and trace of energy-momentum tensor, respectively. According to our cosmological study, we show that the $f(T,\tau)$ gravity theory has a good agreement with observations. Function type for $f(T,\tau)$ can be determined by several factors. The most important motivation for determining $f(T,\tau)$ is that the Lagrangian of model follows the Noether continues symmetry; therefore, according to the Noether approach, we try to determine the function of $f(T,\tau)$. Moreover, the proposed model should behave in agreement with observations in terms of phenomenology. As a result, we compared the predictions of the model with observation constrains, for example, the cosmic microwave background and Hubble diagram can be mentioned. In this paper, we study the $f(T,\tau)$ gravity in the FRW space-time. So, we achieved the effective Lagrangian with respect to independent variables, scale factor a, scalar-torsion T and trace of energy-momentum tensor τ. After imposing the Noether symmetry to Lagrangian, we can introduce the suitable form for the function. . Then, we calculated the Noether conservative quantity for the model.

Keywords: cosmology, modified gravity, scalar-torsion, teleparallel gravity

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