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Cosmological models based on modified teleparallel gravity with higher derivative torsion terms

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Abstract. This report reviews the studies performed in the High Order Teleparallel Gravity (HO TG). In particular, the investigations of models using methods of qualitative analysis of differential equations show the presence of stable solutions for exponential and power-law evolution of the scale factor for a certain choice of the Lagrangian density [4]. The viability of the model by studying the energy conditions in terms of the cosmographical parameters like Hubble, deceleration, jerk, snap and lerk ones are also considered [5].

Keywords: teleparallel gravity, cosmological models, gravitation waves

Introduction. Within the framework of the HO TG, holographic models of dark energy were considered, with the correspondence scheme to construct models in the underlying scenario using various scale factor forms; the reconstructed functions were found through the equation of state parameter [6].

Methods and materials; results. The study of gravitational waves in the HO TG showed a difference from a similar model in the Einstein gravity with higher (6-th order) derivatives. It was shown that in the weak field approximation there are three states of polarization are found: the two standard + and × polarizations, namely 2-helicity massless transverse tensor polarizations, and a 0-helicity massive, with partly transverse and partly longitudinal scalar polarization [7].

Conclusion. It is important to note that a parameterized post-Newtonian limit of modified teleparallel gravity with higher torsion derivatives is proposed. In particular, it is important to consider the second order post-Newtonian approximation or a parameterized post-Newtonian cosmological structure, where additional perturbative modes arising from general modifications of teleparallel gravity can lead to new observable imprints [8].

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