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## The hybrid cosmology in the scalar-tensor representation of $f(\mathcal{G}, T)$ gravity

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The  $f(\mathcal{G}, T)$  theory of gravity is recast in terms of the  $\phi$  and  $\psi$  fields within the scalar-tensor formulation, where  $\mathcal{G}$  is the Gauss-Bonnet term and T denotes the trace of the energy-momentum tensor. The general aspects of the introduced reformulation are discussed and the reconstruction of the cosmological scenarios is presented, focusing on the so-called hybrid evolution. As a result, the scalar-tensor  $f(\mathcal{G}, T)$  theory is successfully reconstructed for the early and late time approximations with the corresponding potentials. The procedure of recovering the  $f(\mathcal{G}, T)$  theory in the original formulation is performed for the late time evolution and a specific quadratic potential. The scalar-tensor formulation introduced herein not only facilitates the description of various cosmic phases but also serves as a viable alternative portrayal of the  $f(\mathcal{G}, T)$  gravity which can be viewed as an extension of the well-established scalar Einstein-Gauss-Bonnet gravity.

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