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Early and Late time cosmology in Modified gravity with interacting fluids

Abstract : We study evolution of the universe in modified theories of gravity. The dynamics of the universe is explored in the following theories (i) $f(R) = R + \gamma R^2 + \beta R^{\delta}$ where β , γ , δ are arbitrary constants, (ii) f(R, GB) = R + f(GB), GB is the Gauss-Bonnet term : $GB = R^{\alpha\beta\gamma\delta}R_{\alpha\beta\gamma\delta} - 4R^{\alpha\beta}R_{\alpha\beta} + R^2$, where $R^{\alpha\beta\gamma\delta}$, $R^{\alpha\beta}$ and R are Riemann Tensor, Ricci tensor and Ricci scalar respectively. We investigate late time behaviour of the Universe in both the theories and estimate the model parameters. In the second case, GB term coupled with a free scalar field (ϕ) in the presence of interacting fluid we obtain a realistic cosmological model. The role of exponential interaction is explored to understand the transition of the decelerated universe to the present accelerated universe.

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