

Can Horndeski Genesis be Nonpathological?

We present a minimal setup within the framework of Horndeski gravity that can describe a nonpathological Genesis scenario. Our setup allows for a fully stable transition to the kination epoch, during which General Relativity (GR) is restored. This Genesis scenario circumvents the no-go theorem at the cost of encountering the risk of strong coupling in the past. Interestingly, our scenario admits two different regimes for the background solution for Hubble parameter at the Genesis stage: power-law behavior and manifestly non-power-law behavior. We explicitly show that, in both regimes, our model remains within unitarity bounds. In most cases, the tensor spectrum is blue-tilted. Then, we adopt a mechanism with a spectator field that allows for a red-tilted scalar power spectrum. We also suggest a deformation of the model that enables us to achieve sufficiently small values for the r ratio. Finally, we discuss the geodesic (in)completeness of the current model.

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