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Theory: Scale-invariant inflation

Monday, September 4, 2023 4:30 PM (15 minutes)

Fundamental scale invariance has been proposed as a new theoretical principle beyond renormalizability. Besides its highly predictive power, a scale-invariant formulation of gravity could provide a natural explanation for the long-standing hierarchy problem and interesting applications in cosmology.
We present a globally scale-invariant model of quadratic gravity and study its solutions in a spatially flat Robertson-Walker metric. The system admits a dynamical flow from an unstable to a stable fixed point, where scale symmetry gets spontaneously broken, and a mass scale —the Planck mass —is classically generated. This trajectory is compatible with an arbitrarily long stage of inflation which is investigated both at the classical level and at first order in perturbation theory. We further consider the possibility of generating primordial magnetic fields in this context.

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