Scalar-tensor cosmological models

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(Received 28 March 1995)

We analyze the qualitative behavior of scalar-tensor cosmologies with an arbitrary monotonic $\omega(\Phi)$ function. In particular, we are interested in scalar-tensor theories distinguishable at early epochs from general relativity (GR) but leading to predictions compatible with solar-system experiments. After extending the method developed by Lorentz-Petzold and Barrow, we establish the conditions required for convergence towards GR at $t\rightarrow\infty$. Then, we obtain all the asymptotic analytical solutions at early times which are possible in the framework of these theories. The subsequent qualitative evolution, from these asymptotic solutions until their later convergence towards GR, is analyzed by means of numerical computations. From this analysis, we are able to establish a classification of the different qualitative behaviors of scalar-tensor cosmological models with an arbitrary monotonic $\omega(\Phi)$ function. © *1996 The American Physical Society.*

PACS number(s): 04.50.+h, 04.80.Cc, 98.80.Cq, 98.80.Hw
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