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Nonlocal Inflation

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Abstract

The inflationary paradigm has been extremely successful in accounting for cosmological observations, however, it still lacks a firm motivation from fundamental theory. Attempts to embed inflation into theories of physics beyond the standard model, such as string theory, have been stymied by the difficulty of constructing flat scalar field potentials. I will discuss how this difficulty can be evaded by taking advantage of the higher derivative structure of string field theory. I will show that these nonlocal inflation models are predictive, they generically lead to nongaussian signatures in the cosmic microwave background. At the formal level, these theories have a rich mathematical structure. After discussing the complications that can arise when working with high derivative theories I will describe some recent progress in understanding the initial value problem for infinite order differential equations.