Asymptotic de Sitter Modes for the Early Universe Inflation

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Abstract

The recent observational data from Planck about inflation indicate that our universe was nearly de Sitter space-time in the early times which results in an approximate scale-invariant spectrum. These observational data from scalar spectral index and curved space-time symmetry condition stimulate us to use quasi-de Sitter modes during inflation. To obtain the alternative modes, for the first time, we use the asymptotic expansion of the Hankel functions up to the higher order. In this paper, we review the results due to selection of the generalized form of the asymptotic de Sitter inflationary modes, such as higher order corrections of power spectrum and particle creation, trans-Planckian corrections, equation of state, and non-minimal coupling inflation. These results are general and in flat and de Sitter limit confirm the conventional results. Finally, to reconstruct the modes we fit the power spectrum of temperature anisotropies with ΛCDM model and Planck data.

Keywords: Cosmic Inflation, Initial Modes, Power Spectrum

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