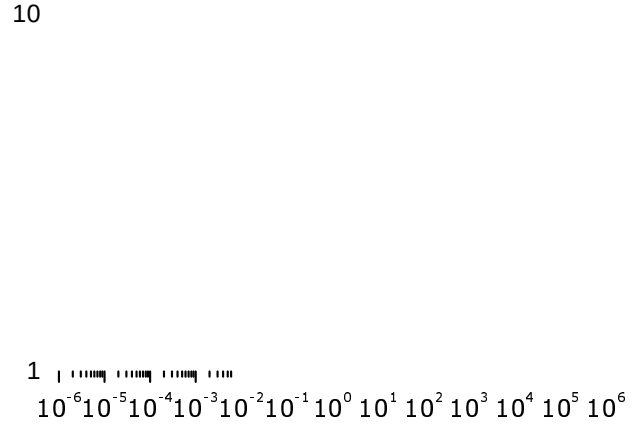
Lambda-in ation versus


10
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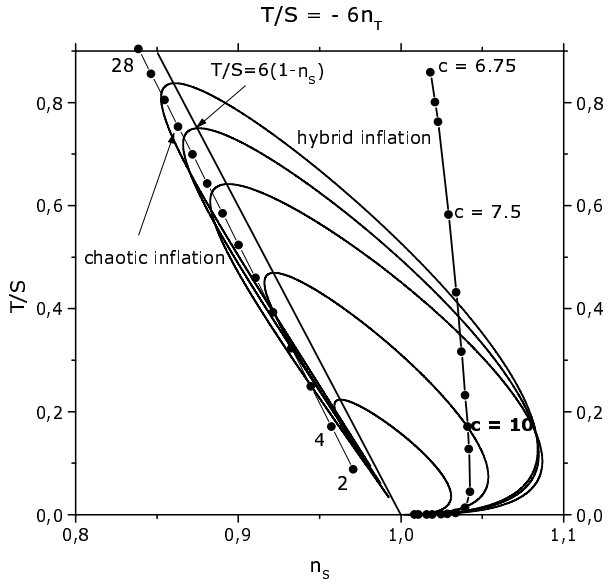

Figure 2: T/S versus $n_{\rm S}$ and c in Lambda-inflation.

After simple calculations we derive the following equation:

$$(1 + \mathrm{T/S}) \left(\frac{q_{k_1}}{q_{k_2}} \right)^2 = 1, \tag{6}$$

The numerical solution of this equation can be approximated by the linear fit:

$$\ln \frac{k_1}{k_{cr}} = 0.32\, c - 1.92, \tag{7}$$

the statistical error is in the last digits of both numbers. An important consequence of this solution is that the critical scale should be higher than the COBE scale, thus the former is either close to or out of the present horizon.

Figure 2 presents the corresponding T/S evaluated by means of the famous consistency relation T/S$\simeq -6n_{\rm T}$. The inflationary models, located along the line with solid circles (marked by "c=..."), satisfy both observational tests mentioned above. Assuming that T/S is not large (T/S< 0.5) we may constrain $n_{\rm S}$ ($1 < n_{\rm S} < 1.05$) and inflationary parameter c ($c > 8$).

Recall that $n_{\rm S}$ is estimated at COBE scale and can vary at different scales. Figure 3 demonstrates the running parameter $\partial n_{\rm S}/\partial \ln k$. On this

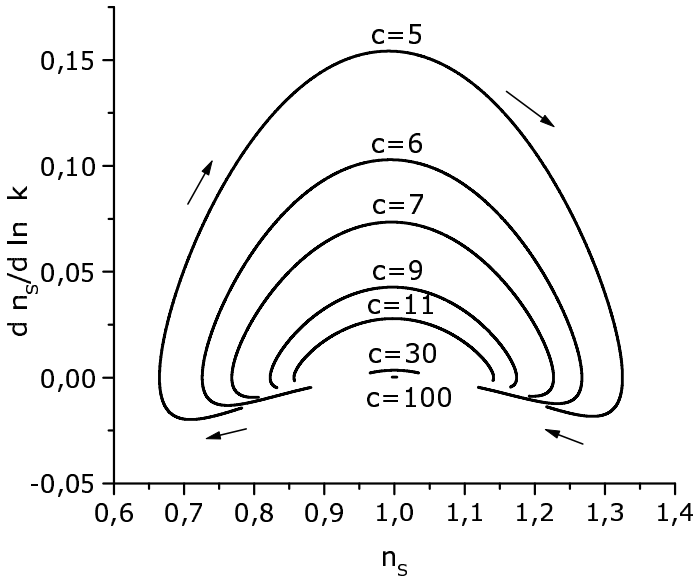

Figure 3: $\partial n_{\rm S}/\partial \ln k$ versus $n_{\rm S}$ in Lambda-inflation.

figure k/k_{cr} is the affine parameter which varies as shown by arrows. We see that the density perturbation slope at LSS scale (k_2) depends on c and can vary from 1 till 1.2.

4 Discussion

The demonstrated example of Λ-inflation favors slightly blue spectra of density perturbations ($n_{\rm S}\gtrsim 1$). However, phenomenological constraints for $n_{\rm S}$ based on LSS observational data, while consistent with $n_S \simeq 1$, are still uncertain about the sign of $(n_S - 1)$. E.g., galaxy cluster data prefer $n_S > 1$ [17], whereas galactic surveys indicate slightly red spectra ($n_{\rm S} < 1$) (e.g. [13]). Certainly, better data are required to delimit the slope of the fundamental spectrum. If future analysis reveals a blue spectrum, the Λ-inflation model will gain strong support as the theory of the very early Universe.

Acknowledgments

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