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Clocking the End of Inflation

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Making observable predictions for cosmic inflation requires determining when the wavenumbers of astrophysical interest today exited the Hubble radius during the inflationary epoch. These instants are commonly evaluated using the slow-roll approximation and measured in e-folds $\Delta N = N - N_{\text{end}}$, in reference to the e-fold N_{end} at which inflation ended. Slow roll being necessarily violated towards the end of inflation, both the approximated trajectory and N_{end} are determined at, typically, one or two e-folds precision. Up to now, such an uncertainty has been innocuous, but this will no longer be the case with the forthcoming cosmological measurements. In this work, we introduce a new and simple analytical method, on top of the usual slow-roll approximation, that reduces uncertainties on ΔN to less than a tenth of an e-fold.

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