Erratum: Inflation and cosmological dynamics in $f(R)$ gravity **[Phys. Rev. D **96**, 103518 (2017)]**

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In the original paper, we made a few typos. On page 2, Eq. (15) should be replaced by

$$F = 1 + \alpha n R^{n-1} - \beta(2-n)R^{1-n}. \quad (1)$$

On page 3, Eq. (24) should be replaced by [1]

$$r < 0.11, \quad n_s = 0.968 \pm 0.006. \quad (2)$$

On page 3, we miscalculated the condition for n [Eq. (25)]. It should be replaced by

$$1.965 < n < 2.015. \quad (3)$$

Under condition (3), we revalidate whether the conditions that each era can exist satisfy. By using the conditions in Table I on page 8, we obtain

$$1.965 < n < 2. \quad (4)$$

Although we made a mistake, the condition for n [Eq. (25)] by considering the cosmological evolution after inflation, we conclude that we obtain the same condition for n to be a viable model.

In the original paper, when we evaluated the relation between the tensor-to-scalar ratio r , the spectral index n_s , and the model parameter n , we considered only $n < 2$. This is because we were not able to calculate for $n \geq 2$ in the Jordan frame. Then, to evaluate whether the model we used (Eq. (7) on page 2) is consistent with the Planck data for $n > 2$, we recalculate the tensor-to-scalar ratio r and the spectral index n_s in the Einstein frame. In the Einstein frame, the slow-roll parameters are written by

$$\epsilon \equiv \frac{1}{2} \left(\frac{V_{,\phi}}{V} \right)^2, \quad \eta \equiv \frac{1}{2} \frac{V_{,\phi\phi}}{V}, \quad (5)$$

where V is Eq. (33) on page 4, $V_{,\phi} \equiv \frac{dV}{d\phi}$ and $V_{,\phi\phi} \equiv \frac{d^2V}{d\phi^2}$. The tensor-scalar ratio r and spectral index n_s are written by using the above slow-roll parameters:

$$r = 16\epsilon, \quad n_s = 1 - 6\epsilon + 2\eta. \quad (6)$$

In the case $f(R) = R + \alpha R^n$ model (Eq. (7) on page 2), these parameters are written by [2]

$$\epsilon = \frac{4E^2(2-n)^2}{3(n-1)^2(F-1)^2}, \quad (7)$$

$$\eta = \frac{4(2-n)[2(2-n)E^2 - nE + n]}{3(n-1)^2(F-1)^2}, \quad (8)$$

where $E \equiv e^{4(2-n)N/(3n)}$ and N is e-folds. In Fig. 1, we plot the relation between r , n_s and n given by Eqs. (7) and (8), and compare them with the Planck data [1]. Then we obtain Eq. (3).

FIG. 1. Theoretical relations between r , n_s and n in the Einstein frame with observational constraint by Planck satellite [1]. The color bar corresponds to the range of n . We plot the n at 0.05 intervals.

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- [1] Planck Collaboration, *Astro. & Astrophys.* **594**, A20 (2016).
- [2] H. Motohashi, *Phys. Rev. D* **91**, 064016 (2015).