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Backreaction of cosmological perturbations

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We investigate the backreaction of nonlinear perturbations on the global evolution of the Universe within the cosmic screening approach. To this end, we have considered the second-order scalar perturbations. An analytical study of these perturbations followed by a numerical evaluation shows that, first, the corresponding average values have a negligible backreaction effect on the Friedmann equations and, second, the second-order correction to the gravitational potential is much less than the first-order quantity. Consequently, the expansion of perturbations into orders of smallness in the cosmic screening approach is correct. [https://doi.org/10.1016/j.physletb.2023.137797]

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