

## Growth index implementations for different parameterizations of modified gravity

The growth rate of linear perturbations is well described using a simple parametric function  $f = \Omega_m^\gamma$ , where a detection of deviation of the growth index  $\gamma$  from fiducial  $\sim 0.55$  would indicate a deviation from General Relativity.  $\gamma$  was designated in Euclid red book as one of the parameters that could be well measured, alone or when mixed with other cosmological parameters like the dark energy equation of state  $w$ .

However, if we want to use it consistently in different Euclid probes alone or combined with CMB data, it needs to be explicitly related to parameterizations of the metric gravitational potentials that are able to describe the evolution of the perturbations unambiguously. The  $\gamma$  parametrization lacks also a relation to other approaches that could describe a wider space of theories of modified gravity like effective fields approaches (EFT).

We discuss methods and show results of implementing the growth index in cosmic linear anisotropy integrators and solver codes and their modified gravity extensions for different background evolution like LCDM or  $w_0 w_a$ . We show also preliminary forecasts of  $\gamma$  using Euclid probes. Finally we talk about the work in progress in trying to relate and implement the growth index to EFT extensions of the previous cosmic codes

### Summary

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