

# Fitting functions for the nonlinear power spectrum in coupled dark energy models and its application to forecasts of galaxy redshift surveys

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(Dated: 20.06.2014)

## Abstract

We find fitting functions that describe the nonlinear matter power spectrum obtained from the CoDECS N-body simulations in coupled Dark Energy models. The fitting functions are obtained for the case of a constant coupling between DM and DE, and an exponential scalar field potential. Their validity is demonstrated for all available simulations in the redshift range  $z=0-1.6$  and wave modes below  $k=10 \text{ h/Mpc}$ . These formulas can be used in principle to test the predictions of this cDE model in the nonlinear regime without the need for additional computing-intensive N-body simulations. In this paper we use these fitting functions to perform forecasts on the constraining power of future galaxy-redshift surveys on the coupling parameter, using the Fisher matrix method for weak lensing and the galaxy power spectrum.