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Constraining M_ν with the Bispectrum II: the Information Content of the Galaxy Bispectrum

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ABSTRACT

Keywords: cosmology: —

1. INTRODUCTION

intro goes here

2. SIMULATIONS

Very brief description of the simulations. Just highlight the numbers

3. HALO OCCUPATION DISTRIBUTION

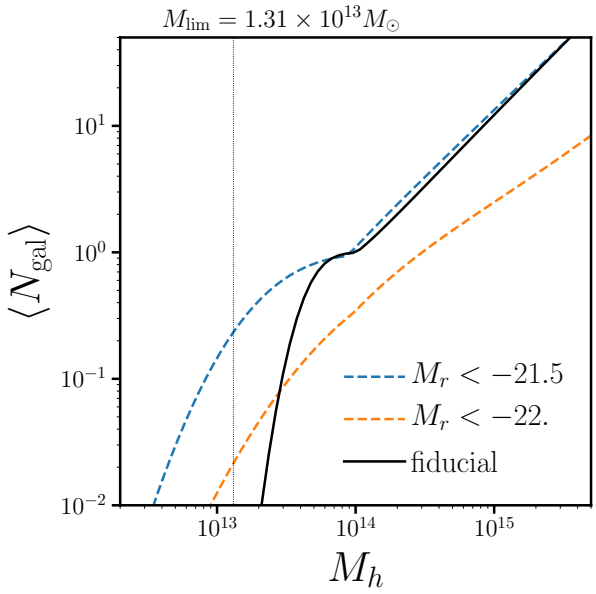

Figure 1.

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We're interested in quantifying the information content of the galaxy bispectrum. With a perturbation theory approach, this would involve incorporating a bias model for galaxies (*e.g.* **???**). Instead, in our simulation based approach we use the halo occupation distribution (HOD) framework (*e.g.* **?????**).HOD models statistically populate galaxies in dark matter halos by specifying the probability of a given halo hosting a certain number of galaxies. This statistical prescription for connecting galaxies to halos has been remarkably successful in reproducing the observational statistics of galaxies (*e.g.* galaxy clustering) and, as a result, is the standard approach for constructing simulated galaxy mock catalogs in galaxy clustering analyses to estimate covariance matrices and test systematic effects (*e.g.* **??**). More importantly, HOD models in simulations for build galaxy clustering emulators (see the Aemulus project **?**). Emulation, as we mention above, is one of the most promising approaches for modeling small scale galaxy clustering and is what we're trying to forecast in this work.

In the simplest HOD models, the probability of a given halo hosting N galaxies of a certain class is dictated by its halo mass — $P(N|M_h)$ (*e.g.* **?**). We use the standard $P(N|M_h)$ model from **?**, which has been ubiquitously used in galaxy clustering analyses (*e.g.* **?**). The model specifies the number of central and satellite galaxies in halos based on

$$\langle N_{\rm cen}\rangle = \frac{1}{2}\left[1 + {\rm erf}\left(\frac{\log M_h - \log M_{\rm min}}{\sigma_{\log M}}\right)\right] \tag{1}$$

$$\langle N_{\rm sat}\rangle = \langle N_{\rm cen}\rangle \left(\frac{M_h - {M_0}^{\alpha}}{M_1}\right). \tag{2}$$

describe $M_{\rm min}$, $\sigma_{\log M}$, M_0, M_1, α. In the **?** model, the number of galaxies in a halo does not depend on any halo properties besides M_h. However, if a secondary property is correlated with the spatial distribution of halos, TODO

- This is the framework used to construct simulated mock catalogs and used ubiquitously in galaxy clustering analyses. Moreover, it's used for emulator set ups (Aemulus), which as we mention earlier is the only hopes for accurately modeling the high k.
- We use the standard **?** model, which has been used extensively. Discuss the obvious shortcomings of the model. However, **?** did not find strong evidence for assembly bias and we're going for simplicity here.
- description of the halo mass constraints we're dealing with and how this prevents us from directly using best-fit HOD parameters from the literature. In fact, due to this constraint we modify the HOD parameters.
- plots showing how our HOD choice compares to HODs of the SDSS samples. Some handwavy arguments about how it shouldn't matter too much.

4. RESULTS

5. SUMMARY

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APPENDIX

REFERENCES