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# Towards a Likelihood-Free Inference Analysis of KiDS-1000 Cosmic Shear

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Likelihood-free inference (LFI) allows to evaluate non-trivial likelihood functions, while making it possible to fully propagate all uncertainties from the data vectors to the final inferred parameters. Nevertheless, this necessitates computationally optimised yet realistic forward simulations which are not trivial to procure for a cosmic shear analysis (Jeffrey et al. 2020).

In this work, we propose such a forward simulation pipeline which produces observable Pseudo-Cls from lognormal random galaxy and shear fields. The pipeline reproduces a realistic KiDS-1000 shear catalogue by sampling galaxies and their shapes from the galaxy and shear fields while factoring in the survey's mask and redshift distributions. For added realism, other observational effects, such as survey variable depth, can be included in the simulations. For our LFI pipeline, we opt to obtain Pseudo-Cl cosmic shear observables from these catalogues, since they allow for similar accuracy and precision in the cosmological inference as with other probes (Loureiro et al. 2021) while being more efficient to calculate. We find that the pipeline is internally consistent and produces realistic data vectors towards a likelihood-free analysis of KiDS-1000 cosmic shear.

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