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HySBI - Hybrid Simulation-Based Inference

Thursday, November 30, 2023 4:30 PM (15 minutes)

We present a novel methodology for hybrid simulation-based inference (HySBI) for large scale structure analysis in cosmology. Our approach combines perturbative analysis on the large scales which can be modeled analytically from first principles, with simulation based implicit inference (SBI) on small, non-linear scales that cannot be modeled analytically. As a proof-of-principle, we apply our method to dark matter density fields to constrain cosmology parameters using power spectrum on the large scales, and power spectrum and wavelet coefficients on small scales. We highlight how this hybrid approach can mitigate the computational challenges in applying SBI to the future cosmological surveys, and discuss the roadmap to extend this approach for analyzing survey data.

Primary author: Dr MODI, Chirag (Flatiron Institute)

Co-author: PHILCOX, Oliver (Columbia University)

Presenter: Dr MODI, Chirag (Flatiron Institute)

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