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Efficient combination of Likelihood-Based and Simulation-Based Inference: application to Planck+Euclid analyses

Simulation-based inference (SBI) allows amortized Bayesian inference for simulators with implicit likelihoods. However, some explicit likelihoods cannot easily be reformulated as simulators, hindering its integration into combined analyses within the SBI framework. One key example in cosmology is given by the Planck CMB likelihoods. In this talk, I will present a simple method to construct an effective simulator for any explicit likelihood using posterior samples from a previously converged MCMC run. To illustrate this method, I conduct a joint cosmological analysis that combines the full Planck CMB likelihoods with a simulator for an Euclid-like galaxy survey. This result opens up the possibility of performing massive global scans combining explicit and implicit likelihoods in a hyper-efficient way.

AI keywords

Simulation-based inference; Likelihood-based inference; AI for handling nuisance parameters

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Track Classification: Simulations & Generative Models