THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

Statistics Colloquium

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"Calibration and aggregation in simulation-based inference"

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Jones 303, 5747 S. Ellis Avenue

Abstract

Simulation is a powerful way to specify models in modern scientific computing, while the likelihood-free setting imposes new challenges for inference and calibration. To start, I present a cosmology example of galaxy clustering analysis using simulation-based inference and normalizing flows. To diagnose the inference accuracy, I present "discriminative calibration", a general classifier approach to check Bayesian computation including simulation-based inference and Markov chain Monte Carlo. The classifier performance is a consistent estimate of a family of divergence measures, including the classical classifier two-sample test as a special case. This discriminative calibration generally has a higher power than the rank-based test. Rather than an end in itself, a diagnostic is a way toward model improvement. To incorporate posterior approximations from different inference algorithms or flow architectures and improve the final inference quality, I present "simulation based stacking". As a general framework to combine probabilistic inferences or models, this stacking strategy combines densities, simulation draws, confidence intervals, and moments, and addresses the overall precision, calibration, coverage, and bias at the same time.

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