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## Palestra 8: Efficient Sampling of Challenging Distributions for Cosmological and Astrophysical Analyses

Friday 16 June 2023 15:30 (1 hour)

In the era of cosmological analyses confronted with complex distributions and a multitude of nuisance parameters, efficient sampling methods are essential for accurate inference. This presentation introduces the Approximate Posterior Ensemble Sampler (APES), a novel algorithm designed to generate samples from challenging target distributions that are traditionally difficult to handle using Markov Chain Monte Carlo (MCMC) techniques. APES leverages kernel density estimation and radial basis interpolation to construct an adaptive proposal, enabling fast convergence of the chains and reduced autocorrelation times. By comparing APES with the affine invariance ensemble sampler using the stretch move, we demonstrate the superior performance of APES in various contexts. Notably, on the Rosenbrock function, APES achieves an impressive autocorrelation time 140 times smaller than its counterpart. This presentation highlights the practicality of APES as a scalable solution for sampling complex distributions, offering a significant advantage for upcoming cosmological surveys dealing with new systematics and an abundance of nuisance parameters.

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