

Approximate Bayesian Computation and novel Bayesian approaches in cosmostatistics

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Gibbs-ABC

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Approximate Bayesian computation methods are useful for generative models with intractable likelihoods. These methods are however sensitive to the dimension of the parameter space, requiring exponentially increasing resources as this dimension grows. To tackle this difficulty, we explore a Gibbs version of the ABC approach that runs component-wise approximate Bayesian computation steps aimed at the corresponding conditional posterior distributions, and based on summary statistics of reduced dimensions. While lacking the standard justifications for the Gibbs sampler, the resulting Markov chain is shown to converge in distribution under some partial independence conditions. The associated stationary distribution can further be shown to be close to the true posterior distribution and some hierarchical versions of the proposed mechanism enjoy a closed form limiting distribution. Experiments also demonstrate the gain in efficiency brought by the Gibbs version over the standard solution.

<https://arxiv.org/abs/1905.13599>

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