

On the use of ABC-MCMC with inflated tolerance and post-correction

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Abstract

The Markov chain Monte Carlo (MCMC) implementation of ABC is often sensitive to the tolerance parameter: low tolerance leads to poor mixing and large tolerance entails excess bias. We propose an approach that involves using a relatively large tolerance for the MCMC sampler to ensure sufficient mixing, and post-processing of the output which leads to estimators for a range of finer tolerances. We introduce an approximate confidence interval for the related post-corrected estimators and propose an adaptive ABC-MCMC algorithm, which finds a balanced tolerance level automatically based on acceptance rate optimization. Our experiments suggest that post-processing-based estimators can perform better than direct MCMC targeting a fine tolerance, that our confidence intervals are reliable, and that our adaptive algorithm can lead to reliable inference with little user specification.

References

M. Vihola, J. Franks (2020). On the use of approximate Bayesian computation Markov chain Monte Carlo with inflated tolerance and post-correction, *Biometrika*, 107(2):381–395. <https://doi.org/10.1093/biomet/asz078>