



Inference in Kingman's Coalescent with Particle Markov Chain Monte Carlo Method

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We propose a new algorithm to do posterior sampling of Kingman's coalescent, based upon the Particle Markov Chain Monte Carlo methodology. Specifically, the algorithm is an instantiation of the Particle Gibbs Sampling method, which alternately samples coalescent times conditioned on coalescent tree structures, and tree structures conditioned on coalescent times via the conditional Sequential Monte Carlo procedure. We implement our algorithm as a C++ package, and demonstrate its utility via a parameter estimation task in population genetics on both single- and multiple-locus data. The experiment results show that the proposed algorithm performs comparable to or better than several well-developed methods.

Subjects: **Machine Learning (stat.ML)**; Populations and Evolution (q-bio.PE)

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