THE NUMBER OF MCMC DRAWS NEEDED TO COMPUTE BAYESIAN CREDIBLE BOUNDS

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ABSTRACT

Bayesian credible bounds produced from Markov chain Monte Carlo (MCMC) procedures contain Monte Carlo error and thus may require a long chain in order to have a reasonable degree of repeatability. This is especially true when there is a substantial amount of autocorrelation in the chain realization. Repeatability would be important in some applications where it would be undesirable to report numerical values containing substantial Monte Carlo error in the least significant digits. The endpoints of a credible interval correspond to quantiles of the empirical distribution of the MCMC draws from the marginal posterior distribution of the quantity of interest. Our goal is to provide an algorithm to choose the number of MCMC draws that will provide, with high probability, a specified amount of precision (i.e., the number of correct significant digits) in the interval endpoints.