MCMC and Likelihood Methods

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Bayesian methods are increasingly popular, largely due to the attractiveness of Markov Chain Monte Carlo (MCMC). Most of the interest is in so-called “objective Bayes” methods using “uninformative priors”. Clearly this is related in some degree to likelihood inference. A primary issue is the contrast between integrating out, versus maximizing out, nuisance parameters. There are interesting connections between this issue and modern developments in higher-order likelihood asymptotics. In particular, the profile likelihood has shortcomings that can be reduced in a general manner, and these improvements are related to integrating out, rather than maximizing out, nuisance parameters.