

Title: Objective Bayesian Analysis for Gaussian Random Fields with Nugget Effects

Abstract: Objective priors, especially reference priors have been well-known for geostatistical data since Berger, et al. (2001). The current results are mainly for the case without nugget effects or measurement errors. In practice, this is rarely the case. A long-standing problem is to develop objective Bayes inference for spatially correlated data with nugget effects. In this paper, objective priors for such cases are systematically studied. In addition to the Jeffreys prior, reference priors are derived by both ``exact'' and asymptotic marginalization. Interestingly, not all Jeffreys and reference priors yield proper posterior distributions. The conditions are sought for the propriety of the posteriors. Simulation study is given to compare the objective priors by frequentist coverage probabilities of the one-sided credible intervals.