Parameters Estimation in Hydrologic Frequency Analysis Based on Bayesian Method

The precision and reliability of parameter estimation are influenced with uncertainty of hydrologic data in hydrologic frequency analysis. In this paper, Bayesian method and curve fitting method are coupled to analyse uncertainties of parameter estimation, and Markov Chain Monte Carlo (MCMC) simulation method based on adaptive metropolis (AM) algorithm is introduced to calculate the Bayesian equation. Type Pearson distribution (P-distribution) is taken an example to discuss and analyse the uncertainties of parameter estimation with several measurement data.

Meanwhile, the influence of sample size and historical information is quantitatively demonstrated for parameter estimation from the view of uncertainties. It shows that Bayesian method can not only offers estimate parameters, but also analyse their uncertainties, and it can be considered in hydrologic design for the uncertainty of parameter estimation.