

## An Estimating Parameter of the Mean in Normal Distribution by Maximum Likelihood, Bayes, and Markov Chain Monte Carlo Methods

**Authors :** Autcha Araveeporn

**Abstract :** This paper is to compare the parameter estimation of the mean in normal distribution by Maximum Likelihood (ML), Bayes, and Markov Chain Monte Carlo (MCMC) methods. The ML estimator is estimated by the average of data, the Bayes method is considered from the prior distribution to estimate Bayes estimator, and MCMC estimator is approximated by Gibbs sampling from posterior distribution. These methods are also to estimate a parameter then the hypothesis testing is used to check a robustness of the estimators. Data are simulated from normal distribution with the true parameter of mean 2, and variance 4, 9, and 16 when the sample sizes is set as 10, 20, 30, and 50. From the results, it can be seen that the estimation of MLE, and MCMC are perceivably different from the true parameter when the sample size is 10 and 20 with variance 16. Furthermore, the Bayes estimator is estimated from the prior distribution when mean is 1, and variance is 12 which showed the significant difference in mean with variance 9 at the sample size 10 and 20.

**Keywords :** Bayes method, Markov chain Monte Carlo method, maximum likelihood method, normal distribution

**Conference Title :** ICMSE 2016 : International Conference on Mathematics and Statistical Engineering

**Conference Location :** Rome, Italy

**Conference Dates :** September 15-16, 2016