STA 3180 Statistical Modelling: Markov Chain Monte Carlo

Topic: Markov Chain Monte Carlo

I. Introduction to Markov Chain Monte Carlo

A. Definition of Markov Chain Monte Carlo

B. Overview of the MCMC Algorithm

C. Examples of MCMC Applications

II. MCMC Sampling

A. Metropolis-Hastings Algorithm

1. Steps of the Algorithm

2. Good Problem Solving Strategies: Understand the concept of acceptance probability and how it affects the sampling process.

B. Gibbs Sampling

1. Steps of the Algorithm

2. Good Problem Solving Strategies: Understand the concept of conditional distributions and how they are used in Gibbs sampling.

III. MCMC Diagnostics

A. Convergence Diagnostics

1. Steps of the Algorithm

2. Good Problem Solving Strategies: Understand the concept of convergence and how to assess it using trace plots and autocorrelation plots.

B. Autocorrelation

1. Steps of the Algorithm

2. Good Problem Solving Strategies: Understand the concept of autocorrelation and how to use it to assess the quality of the MCMC samples.