Chapter 9.7 Using JAGS

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Chapter 9 Simulation by Markov Chain Monte Carlo

Introduction

- There has been an effort to develop general-purpose Bayesian computing software.
- One of the earliest Bayesian simulation-based computing software was BUGS (for Bayesian inference Using Gibbs Sampling) and we illustrate a similar package JAGS (for Just Another Gibbs Sampler).
- In using JAGS, one defines a Bayesian model by writing a short script. One then inputs this script together with data and prior parameter values in a single R function from the `runjags` package. This function simulates from the MCMC algorithm for a specified number of samples.

Normal sampling model

- Consider the problem of estimating the mean Buffalo snowfall assuming Normal sampling with both the mean and standard deviation unknown and independent priors.
- Express the parameters of the Normal distribution as μ and the precisionϕ.

Repeat Process

- If this process is repeated for each draw from the posterior distribution, then one obtains 5000 samples of size 20 drawn from the predictive distribution.
- The function `sapply()` is used together with `postpred_sim()` to simulate 5000 samples that are stored in the matrix `ypred`.

```
ypred <- t(sapply(1:5000, postpred_sim))
```

Graph

- Figure on next slide displays histograms of the predicted snowfalls from eight of these simulated samples and the observed snowfall measurements are displayed in the lower right panel.
- The center and spread of the observed snowfalls appear to be similar in appearance to the eight predicted snowfall samples from the fitted model.