Introduction to rjags

Just Another Gibbs Sampler

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```
setwd("C:/E/brucebcampbell-git/bayesian-learning-with-R")
library(rjags)
N <- 2000
x <- rnorm(N, 0, 5)

write.table(x, file = "example1.data",
    row.names = FALSE, col.names = FALSE)

jags <- jags.model("jags_normal_model.bug",
    data = list(x = x, N = N), n.chains = 10,
    n.adapt = 100)
```

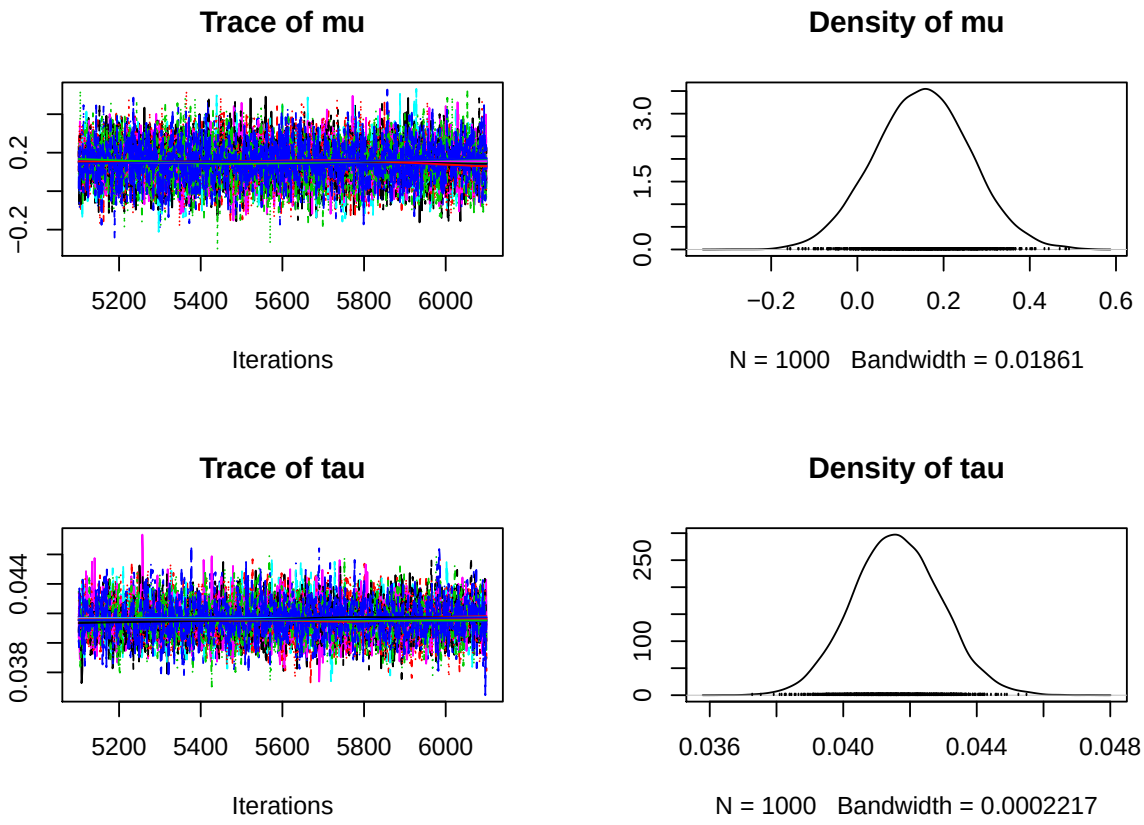
```
## Compiling model graph
##    Resolving undeclared variables
##    Allocating nodes
## Graph information:
##    Observed stochastic nodes: 2000
##    Unobserved stochastic nodes: 2
##    Total graph size: 2009
##
## Initializing model
```

```
update(jags, 1000)

jags.samples(jags, c("mu", "tau"), 4000)
```

```
## $mu
## mcarray:
## [1] 0.1507268
##
## Marginalizing over: iteration(4000),chain(10)
##
## $tau
## mcarray:
## [1] 0.04159309
##
## Marginalizing over: iteration(4000),chain(10)
```

Coda can be used to provide debugging information for JAGS

```
library(coda)

samples <- coda.samples(jags, c("mu", "tau"),
    1000)
plot(samples)
```



Beta Binomial Model in JAGS

```
n      <- 20
Y      <- 4
a      <- 3
b      <- 1
model_string <- "model{

  # Likelihood
  Y ~ dbinom(theta,n)

  # Prior
```

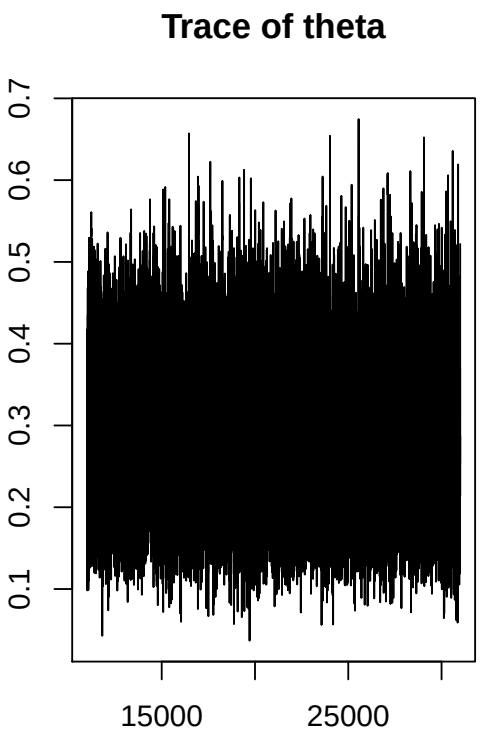
```
  theta ~ dbeta(a, b)
}"
model <- jags.model(textConnection(model_string),
                    data = list(Y=Y,n=n,a=a,b=b))
```

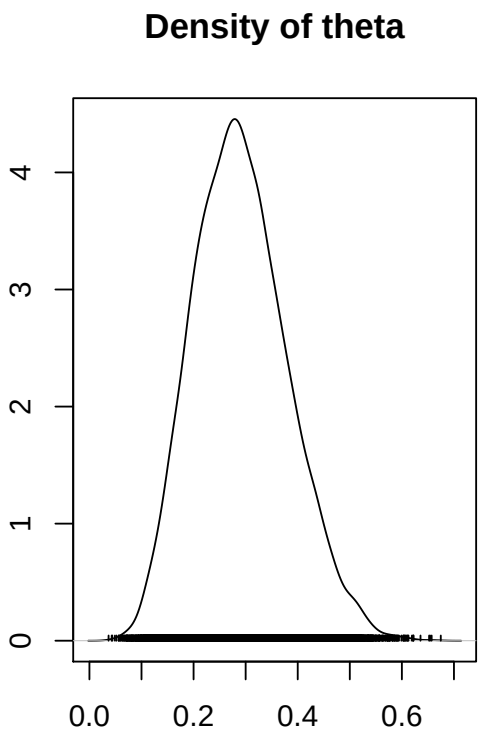
```
## Compiling model graph
##    Resolving undeclared variables
##    Allocating nodes
## Graph information:
##    Observed stochastic nodes: 1
##    Unobserved stochastic nodes: 1
##    Total graph size: 5
##
## Initializing model
```

```
update(model, 10000, progress.bar="none"); # Burnin for 10000 samples

samp <- coda.samples(model,
        variable.names=c("theta"),
        n.iter=20000, progress.bar="none")

summary(samp)
```

```
##
## Iterations = 11001:31000
## Thinning interval = 1
## Number of chains = 1
## Sample size per chain = 20000
##
## 1. Empirical mean and standard deviation for each variable,
##    plus standard error of the mean:
##
##           Mean             SD       Naive SE Time-series SE
##      0.2903912      0.0894785      0.0006327      0.0007984
##
## 2. Quantiles for each variable:
##
##   2.5%    25%    50%    75%  97.5%
## 0.1326 0.2256 0.2851 0.3485 0.4789
```

```
plot(samp)
```


Trace of theta
0.1
0.2
0.3
0.4
0.5
0.6
0.7
15000
25000
Iterations


Density of theta
0
1
2
3
4
0.0
0.2
0.4
0.6
N = 20000 Bandwidth = 0.01309