AMS206 Homework3

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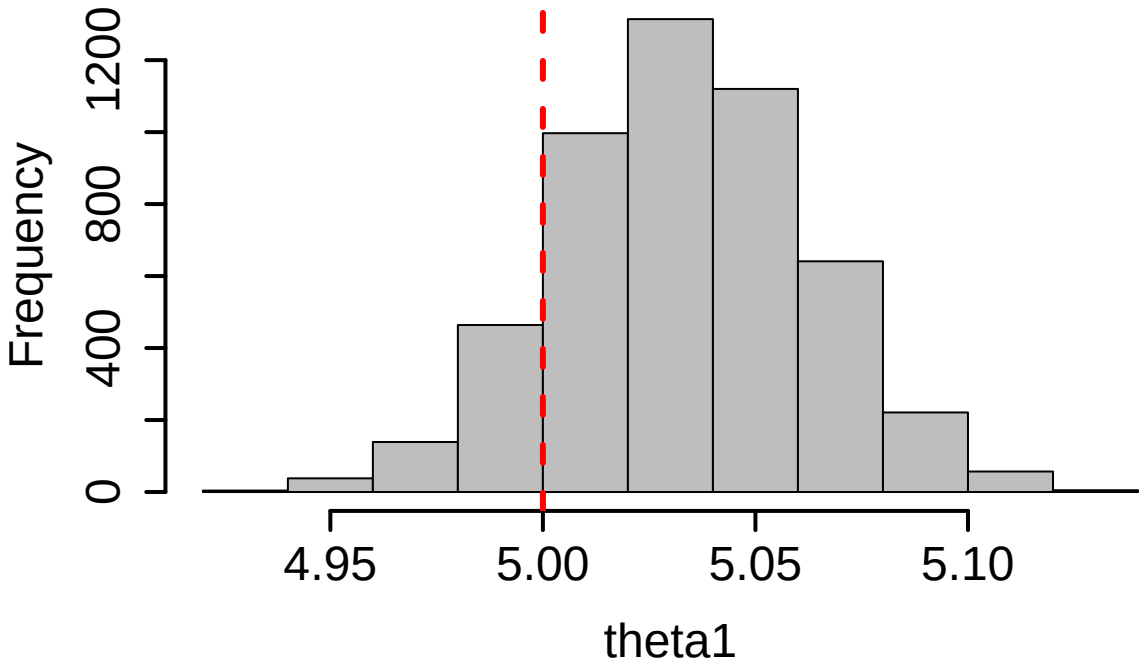
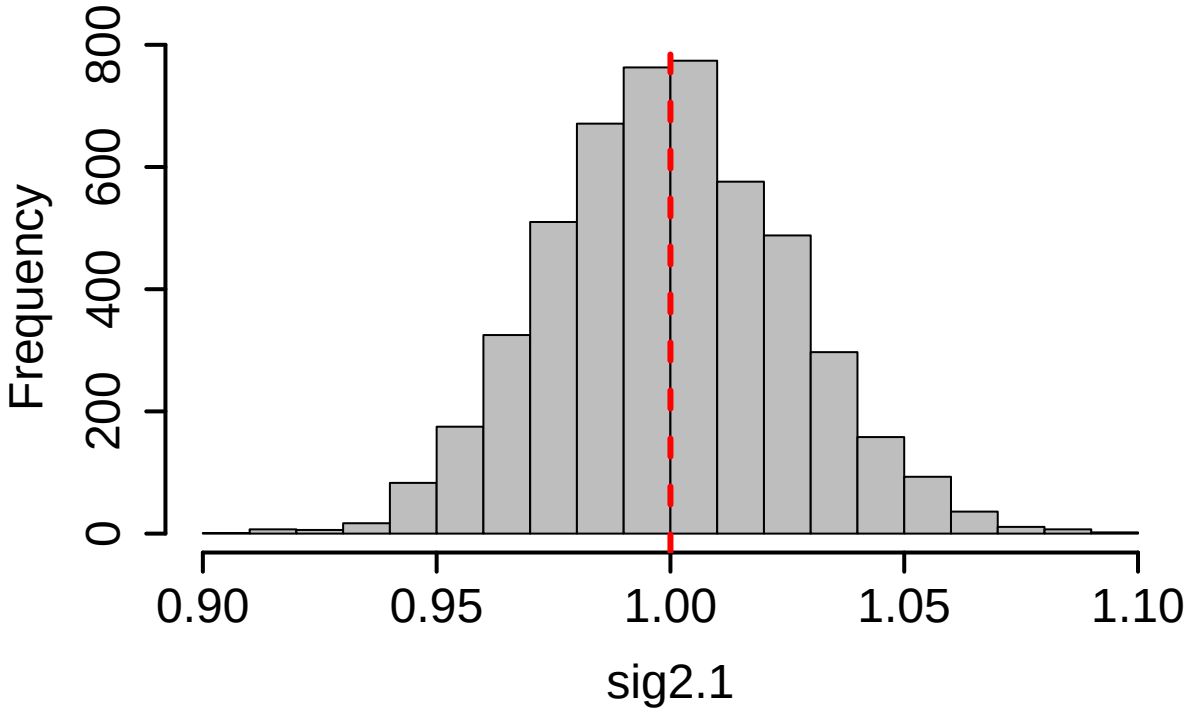
2/27/2019

```r
# set the number of observations and true value of parameters
n <- 1000
theta <- 5
sigma2 <- 1
# generate dataset
x <- rnorm(n, theta, sqrt(sigma2)) #set the number of MC samples
N <- 5000
#i. set hyperparameters for fairly informative priors
theta0 <- theta
k0 <- 0.01
a <- 1000+1
b <- sigma2/(a-1)
#calculate posterior parameters
m <- (theta0 + n*k0*mean(x))/(1+n*k0)
alpha <- a + n/2
beta <- 1/b + sum(x^2)/2 + theta0^2/(2*k0) - (theta0 + n*k0*mean(x))^2/(2*k0*(1+n*k0))
#MC simulation
sig2.1 <- 1/rgamma(N, alpha, beta)
theta1 <- rnorm(N, m, sqrt(sig2.1/(1/k0 + n)))
```




Frequency
0
200
400
600
800
0.90
0.95
1.00
1.05
1.10
sig2.1