Gibbs Sampling with RJAGS

```
library(rjags)
```

```
## Loading required package: coda
```

```
## Linked to JAGS 4.3.0
```

```
## Loaded modules: basemod,bugs
```

```
library(coda)

set.seed(1999)
n<-1000
lambda <- 5
data<-rpois(n, lambda)
barplot(table(data)/n,col="blue",main="Poisson distribution n=1000")
```


Poisson distribution n=1000
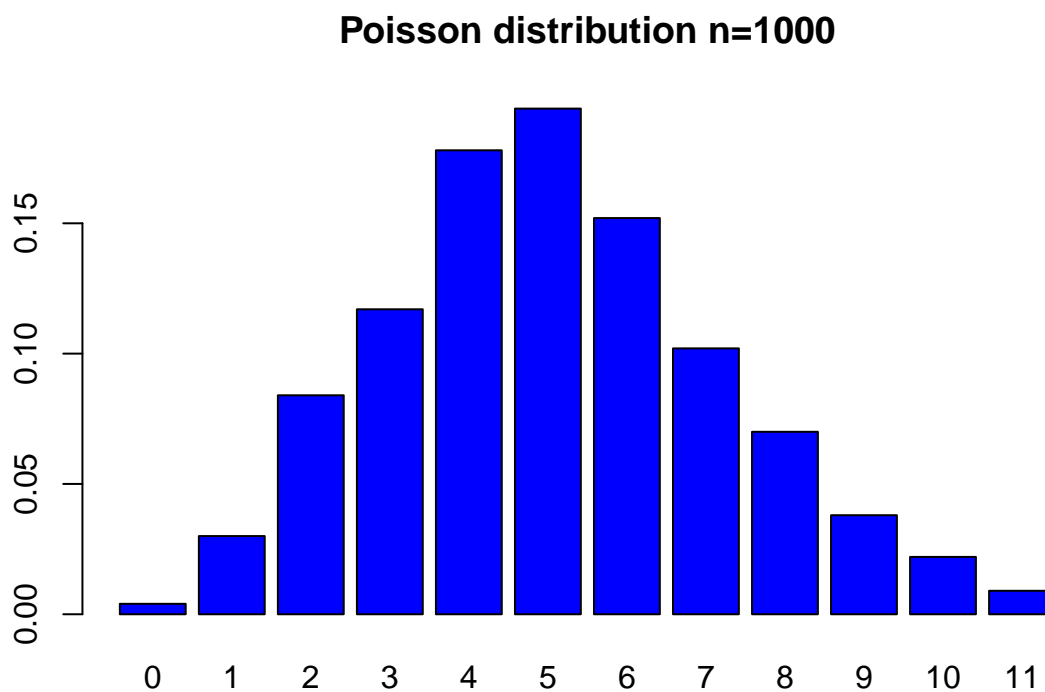
```
y=data
Ntotal = length(y)
dataList = list( y=y, Ntotal = Ntotal)
```

```r
modelString = "
  model {
    for (i in 1:Ntotal){
      y[i] ~ dpois(theta)
    }
    theta ~ dgamma(5,1)
  }
"
writeLines(modelString,con="TEMPmodel.txt")
```

MLE value

```r
thetaInit = sum(y)/length(y)
initList = list(theta=thetaInit)
```

resample MLE for resampled data (multiple chain)

$$\widehat{\lambda}_{\mathrm{MLE}} = \frac{1}{n} \sum_{i=1}^{n} k_i$$

```r
initsList = function(){
  resampledY = sample(y, replace =TRUE)
  thetaInit = sum(resampledY)/length(resampledY)
  thetaInit = 0.001 + 0.998*thetaInit
  return(list(theta=thetaInit))
}
```

```r
jagsModel = jags.model(file="TEMPmodel.txt", data=dataList, inits=initsList,n.chains=3,
                       n.adapt=500)
```

```
## Compiling model graph
##    Resolving undeclared variables
##    Allocating nodes
## Graph information:
##    Observed stochastic nodes: 1000
##    Unobserved stochastic nodes: 1
##    Total graph size: 1004
##
## Initializing model
```

```r
update(jagsModel, n.iter=500)
```

```r
codaSamples = coda.samples(jagsModel, variable.names=c("theta"), n.iter=3334)
```

```r
setwd("~/Summer_Research/week/week 5/data")
source("DBDA2E-utilities.R")
```

```
##
## *******************************************************************
## Kruschke, J. K. (2015). Doing Bayesian Data Analysis, Second Edition:
## A Tutorial with R, JAGS, and Stan. Academic Press / Elsevier.
## *******************************************************************
```
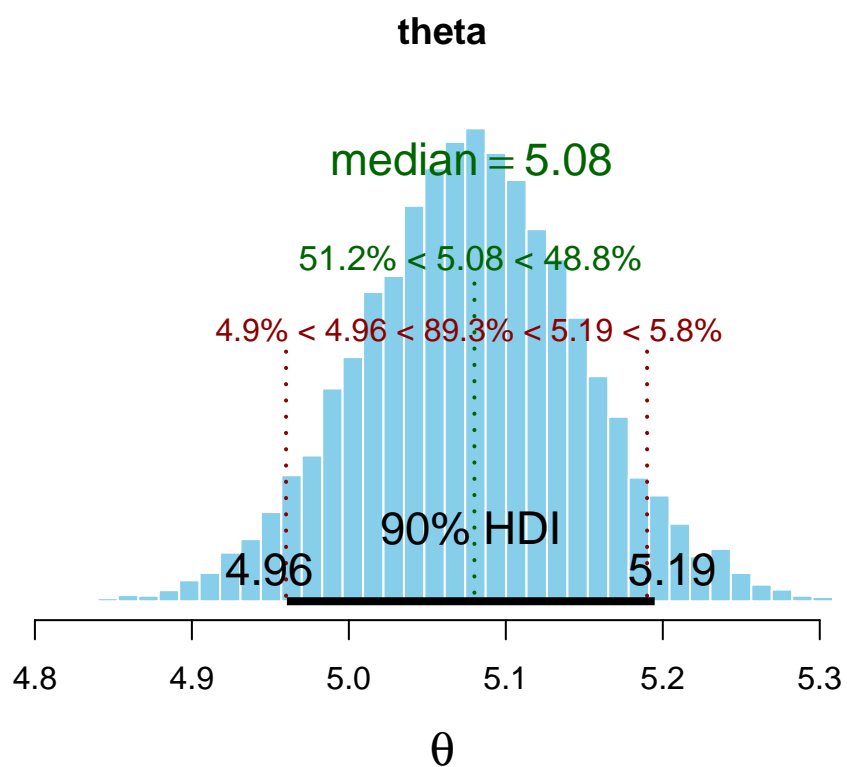
```r
diagMCMC(codaObject = codaSamples,parName="theta")
```

```r
plotPost(codaSamples[,"theta"],main="theta",xlab=bquote(theta),cenTend="median",compVal=5.08,ROPE = c(4
```

theta

median = 5.08

51.2% < 5.08 < 48.8%

4.9% < 4.96 < 89.3% < 5.19 < 5.8%

90% HDI

4.96   5.19

θ

```
##          ESS     mean   median    mode hdiMass    hdiLow  hdiHigh compVal
## theta  10002 5.077978 5.078077  5.0782     0.9  4.960528 5.194841    5.08
##        pGtCompVal ROPElow ROPEhigh    pLtROPE    pInROPE    pGtROPE
## theta   0.4882024    4.96     5.19 0.04869026 0.8929214 0.05838832
```