

STA 243 Assignment 4

6.

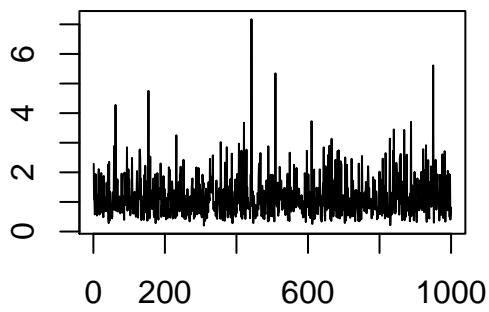
$\text{Gamma}(k, \theta)$ has mean $k\theta$

we can draw y_i from $\text{Gamma}(k, x_{i-1}/k)$ or $\text{Gamma}(x_{i-1}/\theta, \theta)$

generate y_i from $q(y|x_{i-1})$ which is $\text{gamma}(k, x_{i-1}/k)$ or $\text{gamma}(x_{i-1}/\theta, \theta)$

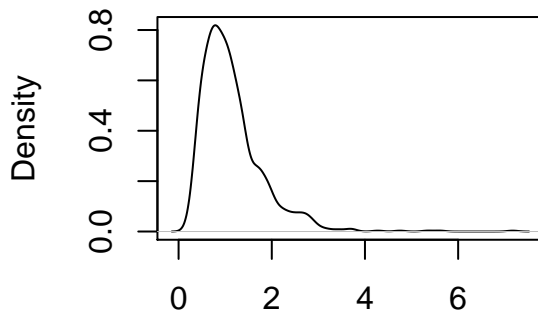
here is some plot of our output.

using Gamma(2,x/2)



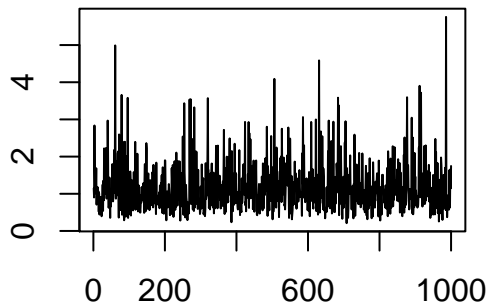
iteration

using Gamma(2,x/2)



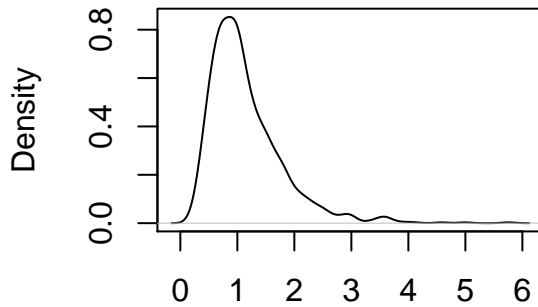
N = 1000 Bandwidth = 0.1171

using Gamma(10,x/10)



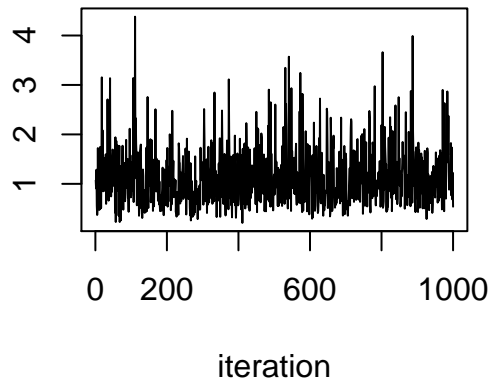
iteration

using Gamma(10,x/10)

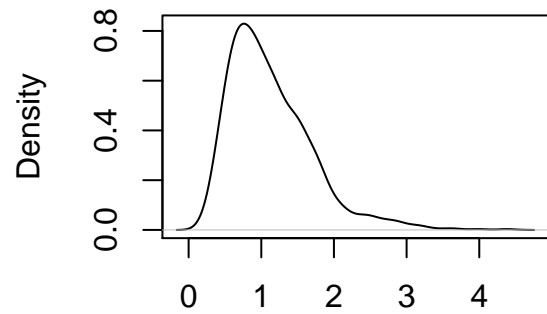


N = 1000 Bandwidth = 0.1202

using Gamma(2,x/2)

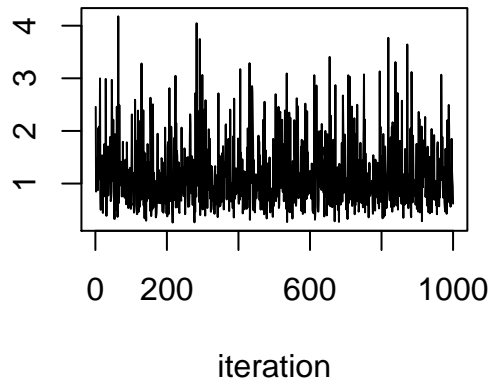


using Gamma(2,x/2)

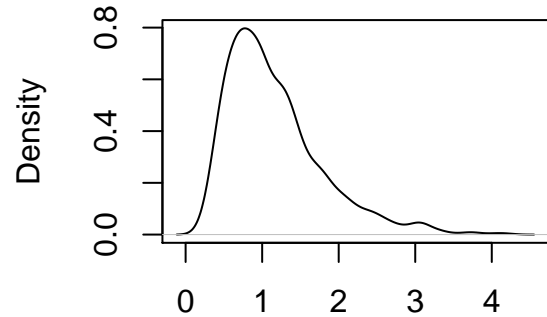


N = 1000 Bandwidth = 0.1246

using Gamma(10,x/10)



using Gamma(10,x/10)



N = 1000 Bandwidth = 0.1249

Here is the table showing the mean of the sample and the mean of 1/sample

##	sample.mean	X1.sample.mean
## True value	1.154701	1.116025
## Gamma(2,x/2)	1.146745	1.152220
## Gamma(10,x/10)	1.153957	1.127742
## Gamma(x/2,2)	1.130115	1.132655
## Gamma(x/10,10)	1.163459	1.124961

they are similar enough with each other and it seems all of them provide reasonable estimates.