Part 1.4

Fangzhou Yang

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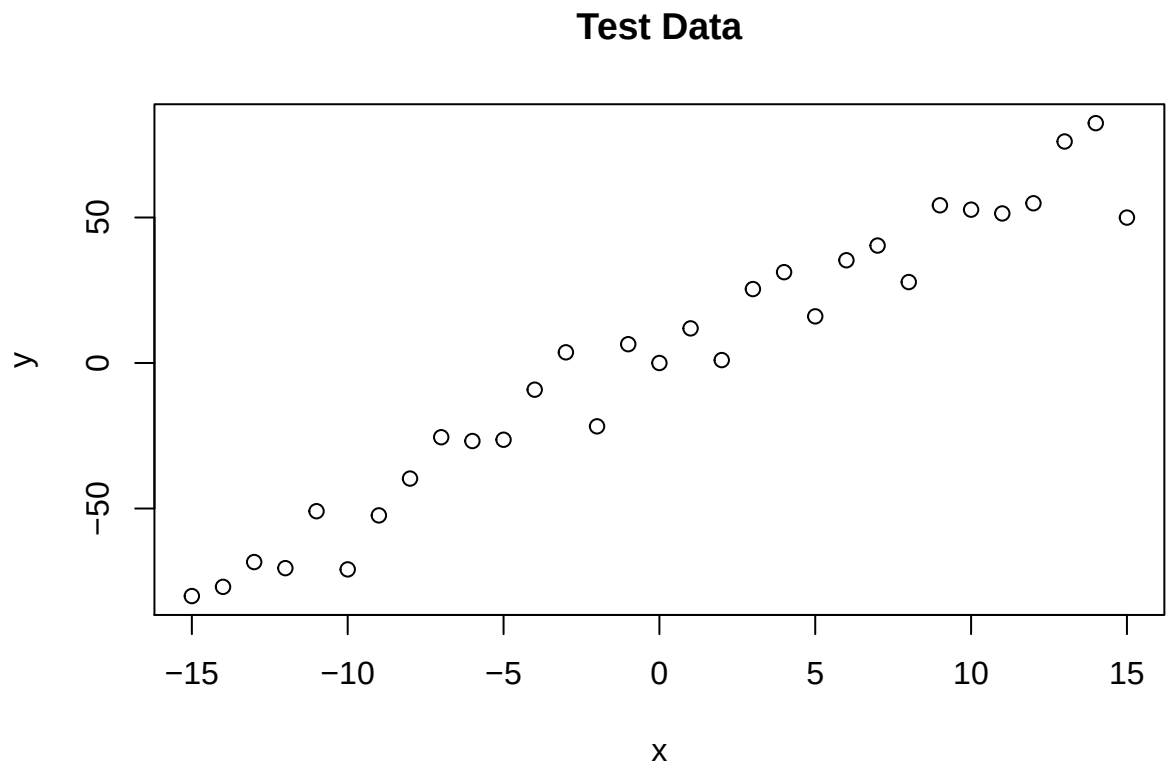
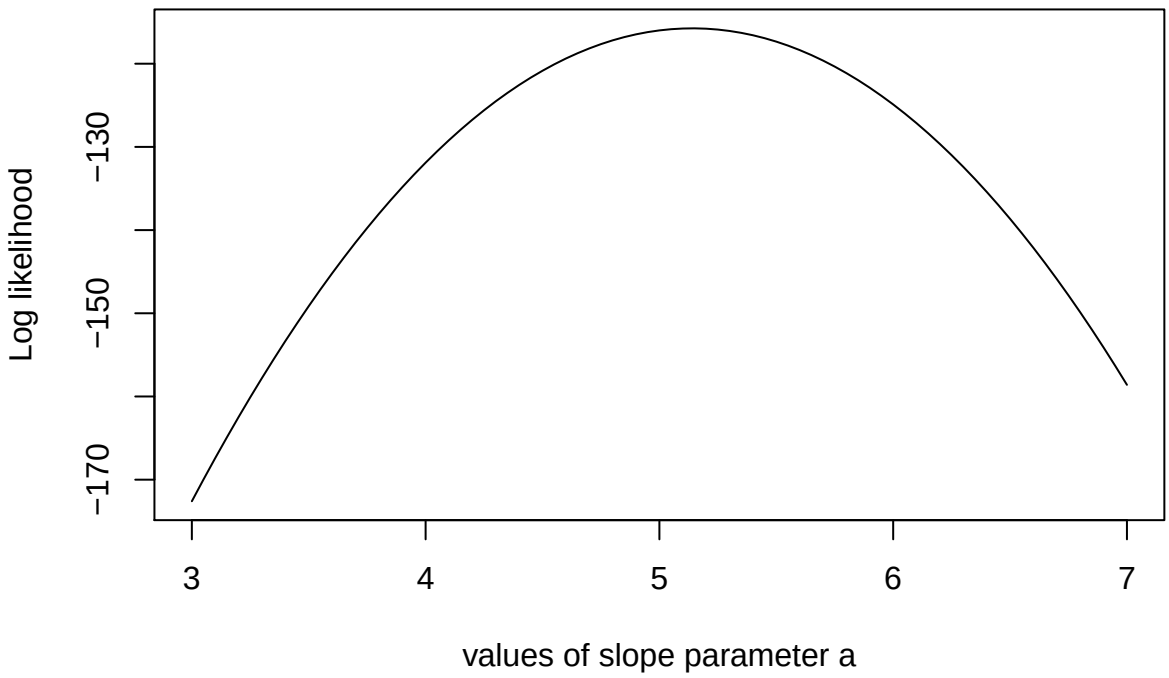
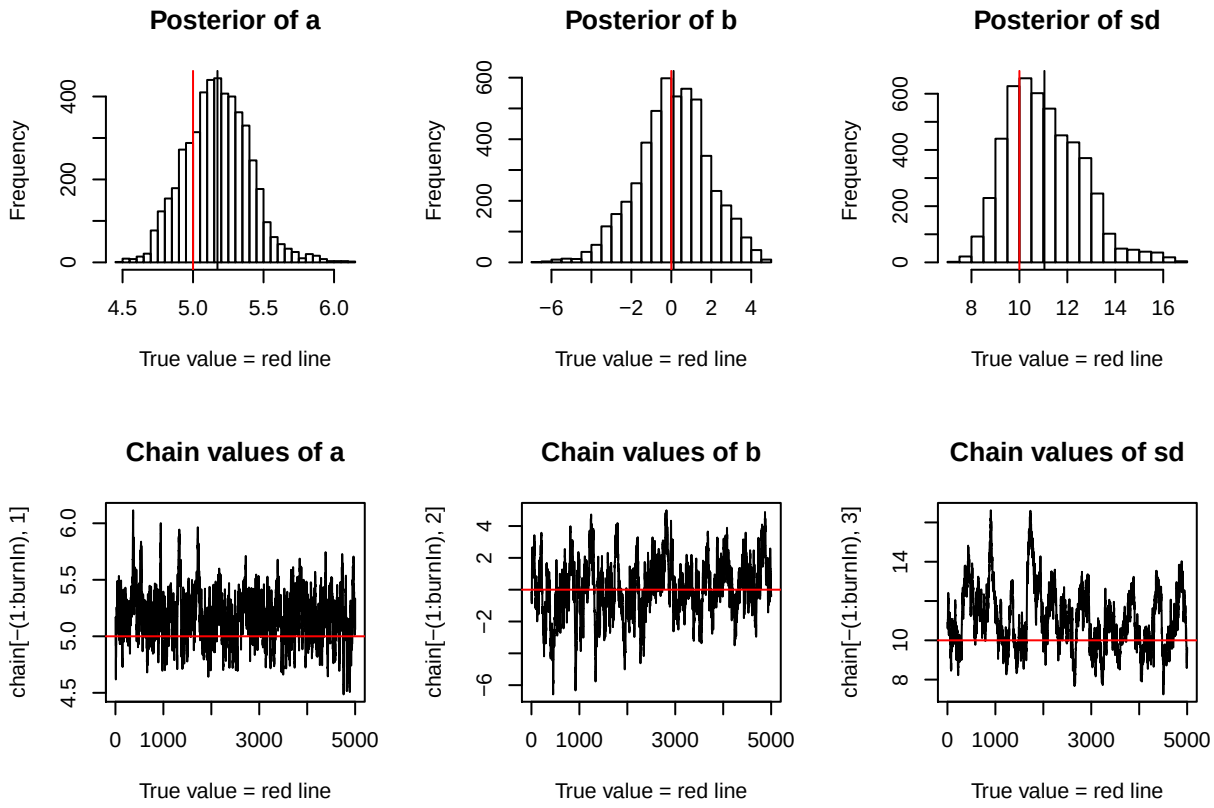
```
source("Source.R")
trueA <- 5
trueB <- 0
trueSd <- 10
sampleSize <- 31

x <- (-(sampleSize-1)/2):((sampleSize-1)/2)
y <-  trueA * x + trueB + rnorm(n=sampleSize,mean=0,sd=trueSd)
plot(x,y,main="Test Data")
```




```
slopelikelihoods=lapply(seq(3, 7, by=.05), slopevalues )
plot (seq(3, 7, by=.05), slopelikelihoods , type="l",
      xlab = "values of slope parameter a", ylab = "Log likelihood")
```




```
startvalue = c(4,0,10)
chain = run_metropolis_MCMC(startvalue, 10000)
burnIn = 5000
acceptance = 1-mean(duplicated(chain[-(1:burnIn),]))
fit_13(chain,burnIn,trueA,trueB,trueSd)
```




```r
summary(lm(y~x))
```

```
##
## Call:
## lm(formula = y ~ x)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -27.186  -6.496   1.239   8.564  19.045
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.04434    1.87971   0.024    0.981
## x            5.14105    0.21016  24.463   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 10.47 on 29 degrees of freedom
## Multiple R-squared:  0.9538, Adjusted R-squared:  0.9522
## F-statistic: 598.4 on 1 and 29 DF,  p-value: < 2.2e-16
```