R 기말고사

이진휘(202115821)

12/21/2021

library(tidyverse)

1번

```
E <- rnorm(1000, mean=0, sd=1)
head(E)
```

```
## [1]  1.15163990 -1.17118083 -0.76910018 -0.06093788  0.09642735  0.18768077
```

```
#1-2
library(dplyr)
```

```
##
## 다음의 패키지를 부착합니다: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
t<-c()
for(i in 1:1000) t[i]=(2*pi*i/1000)
t[1]
```

```
## [1] 0.006283185
```

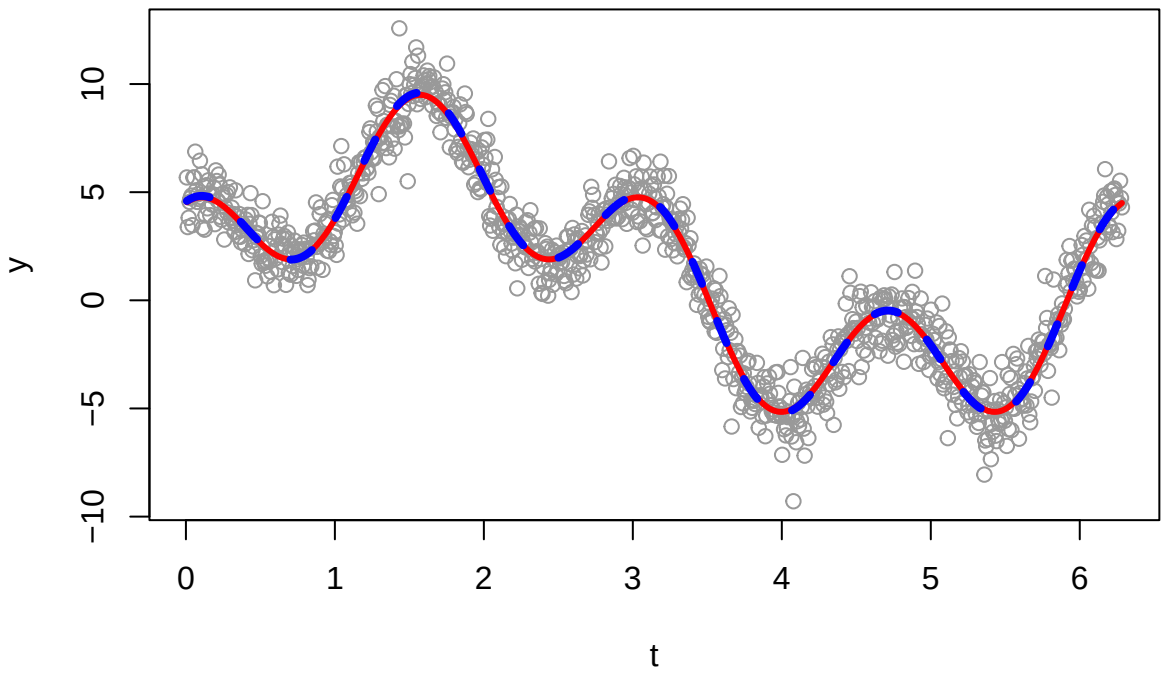
```r
x_1=c()
for(i in 1:1000)x_1[i]=sin(t[i])

x_2=c()
for(i in 1:1000)x_2[i]=cos(4*t[i])
#1-3
y<-c()
for(i in 1:1000)y[i]= 1.5 + 5*x_1[i] + 3*x_2[i] + E[i]
plot(t,y,col='gray60')

#1-4
D<-rep(1,1000)
X<-cbind(D,x_1,x_2)

#1-5
ceta<-c(1.5,5,3)
beta<-cbind(ceta)
Xbeta= X %*% beta
V<-as.vector(Xbeta)
lines(t,V,lwd=3,col='red')
#1-6
ymat<-matrix(y, byrow=FALSE, ncol=1)
Xt<-t(X)
XTT<-Xt%*%X
Xtt<-solve(XTT)
XTTT<-Xtt%*%Xt
betahat<-XTTT%*%ymat
ansvec<-X%*%betahat
VVV<-as.vector(ansvec)
head(VVV)  #betahat과 beta는 비슷한(거의같은) 값을 가진다.
```

```
## [1] 4.594889 4.623645 4.650474 4.675379 4.698363 4.719428
```

```r
head(V)
```

```
## [1] 4.530468 4.559041 4.585719 4.610504 4.633398 4.654406
```

```r
#1-7
lines(t,VVV,col='blue',lty=2,lwd=4)
```

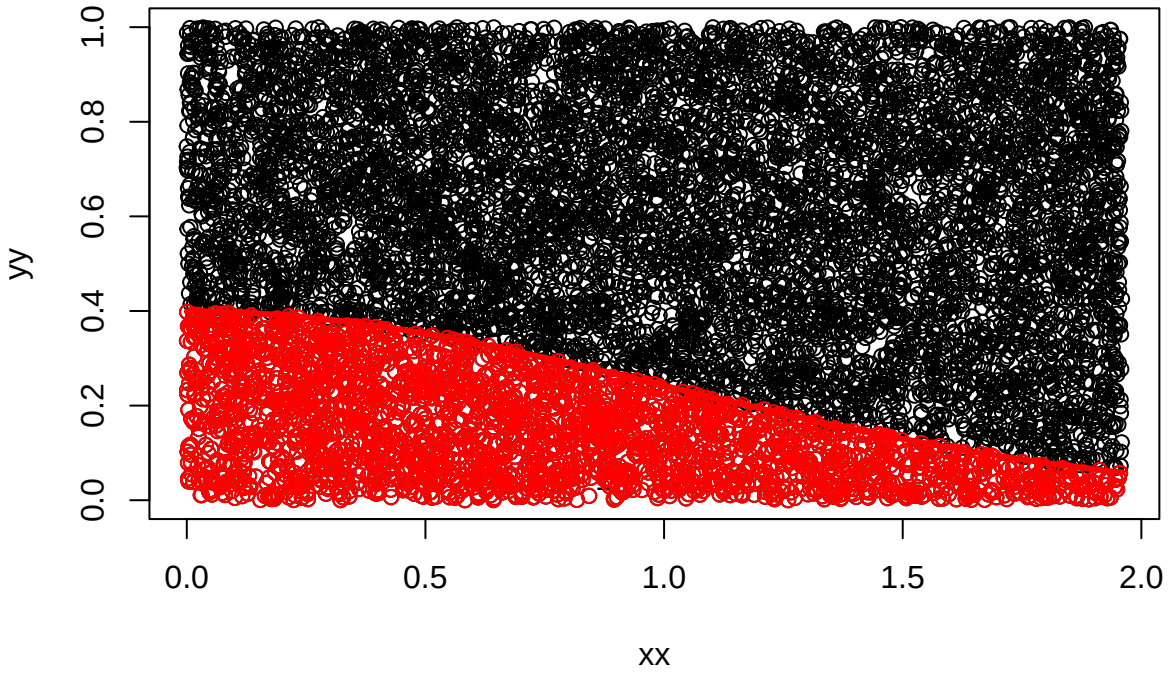


2번

```
xx<-runif(10000)
xx<-xx*1.96

yy<-runif(10000)

plot(xx,yy)

x<-seq(from=0, to=1.96, by=0.01)
y<-(1/sqrt(2*pi))*exp(-x^2/2)
lines(x,y,col='red',lwd=3)


test=function(xx,yy){
  yy < (1/sqrt(2*pi))*exp(-(xx)^2/2)
}

print(c(xx[1],yy[1]))
```

```
## [1] 0.87457479 0.04430315
```

```
text(xx[1],yy[1])

tst=c()

for(i in 1:10000) tst[i]=test(xx[i],yy[i])

points(xx[tst],yy[tst],col='red')
```




```
sum(tst)
```

```
## [1] 2531
```

```
# 2425/10000*1.96 (원래의 적분은 -1.96부터 1.96이니까 이 함수가 우함수인점을 인지하여 *
#답:0.9506  #우리가 이론적으로 아는 0.95에 근접한다
```

```
 #2-2
I=rnorm(1000)
t=rnorm(1000)
mean(I)
```

```
## [1] -0.02671691
```

```
A=0
for (i in 1:100) (I[i]-mean(I))
```

3번

type(a)

```
#ninesurv=0.5^n*0.95^(20-n)
#eightsurv=0.5^n*0.95^k*0.05*0.5^(20-n-k-1)
```

type(b)

```
recent_per=1
recent_glass=0
countsur=0
Start=while(recent_glass<21){
 if (rbinom(1,size=1,prob=0.5)==1){
    recent_per=recent_per+0
    recent_glass=recent_glass+1
  }else{
    recent_per=recent_per+1
    recent_glass=recent_glass+1
  }
if(recent_per<=8){
countsur=countsur+1
}
}
restart = function(){
recent_per=1
recent_glass=0
}

sim_once = function(){
  start()
  restart()
  return(countsur)
}
simrslt=c()
#for(i in 1000) simrslt[i]=sim_once()
simrslt
```

```
## NULL
```

##4번

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

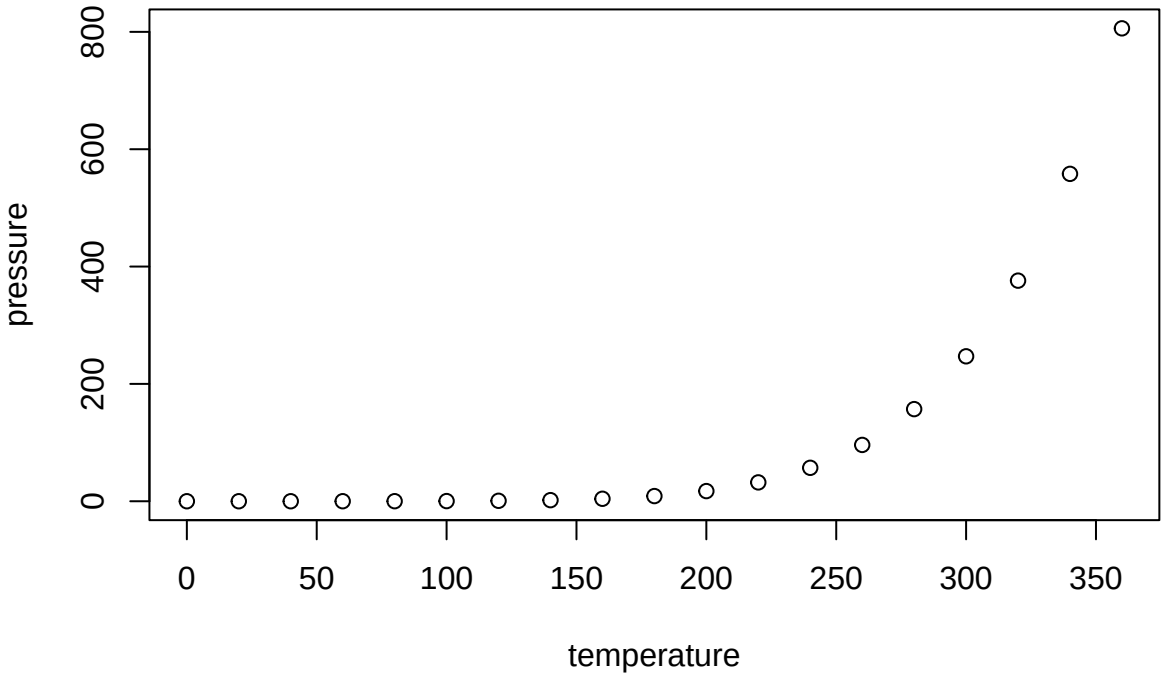
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist       
##  Min.   : 4.0   Min.   :  2.00  
##  1st Qu.:12.0   1st Qu.: 26.00  
##  Median :15.0   Median : 36.00  
##  Mean   :15.4   Mean   : 42.98  
##  3rd Qu.:19.0   3rd Qu.: 56.00  
##  Max.   :25.0   Max.   :120.00
```

Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.