Proyek Individual 2 - Kompstat (A)

Tiara Alamanda

14/01/2021

Soal 1: Hitunglah integral fungsi *f(x)=sin(x)^2* pd domain x selang [0,pi]

```
#Menghitung Integral secara 'langsung'
integrate(function(x)sin(x)^2, lower=0, upper=pi)
```

```
## 1.570796 with absolute error < 1.7e-14
```

```
#Menaksir Integral degan Monte Carlo
monte_int<-function(f, a, b, n=1e6){ #1e6 adlh 1jt=10^6
  x<-runif(n, min=a, max=b)
  return((b-a)*sum(f(x))/n)
}
monte_int(function(x)sin(x)^2, a=0, b=pi)
```

```
## [1] 1.570558
```

Soal 2: Memprediksi pergerakan Saham Aneka Tambang Tbk PT (ANTM) selama 100 hari kedepan (Minimal 1000 simulasi)

```
library(readr)
```

```
## Warning: package 'readr' was built under R version 4.0.3
```

```
ANTM <- read.csv("ANTM.JK.csv")
View(ANTM)
ANTM = ANTM[,-1] #yang digunakan hanya kolom tambahan yaitu kolom H "Return" dengan perhitungan Return=
#Mean hitung excel: 1+0.001227556 = 1.001227556
#SD hitung excel: 0.03100741

library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.0.3
```

```
##
## Attaching package: 'dplyr'
```

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

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

```
Return= (select(ANTM,7))
summary(Return)
```

```
##      Return
##  Min.   :-0.163720
##  1st Qu.:-0.014617
##  Median : 0.000000
##  Mean   : 0.001228
##  3rd Qu.: 0.013180
##  Max.   : 0.221835
##  NA's   :1
```

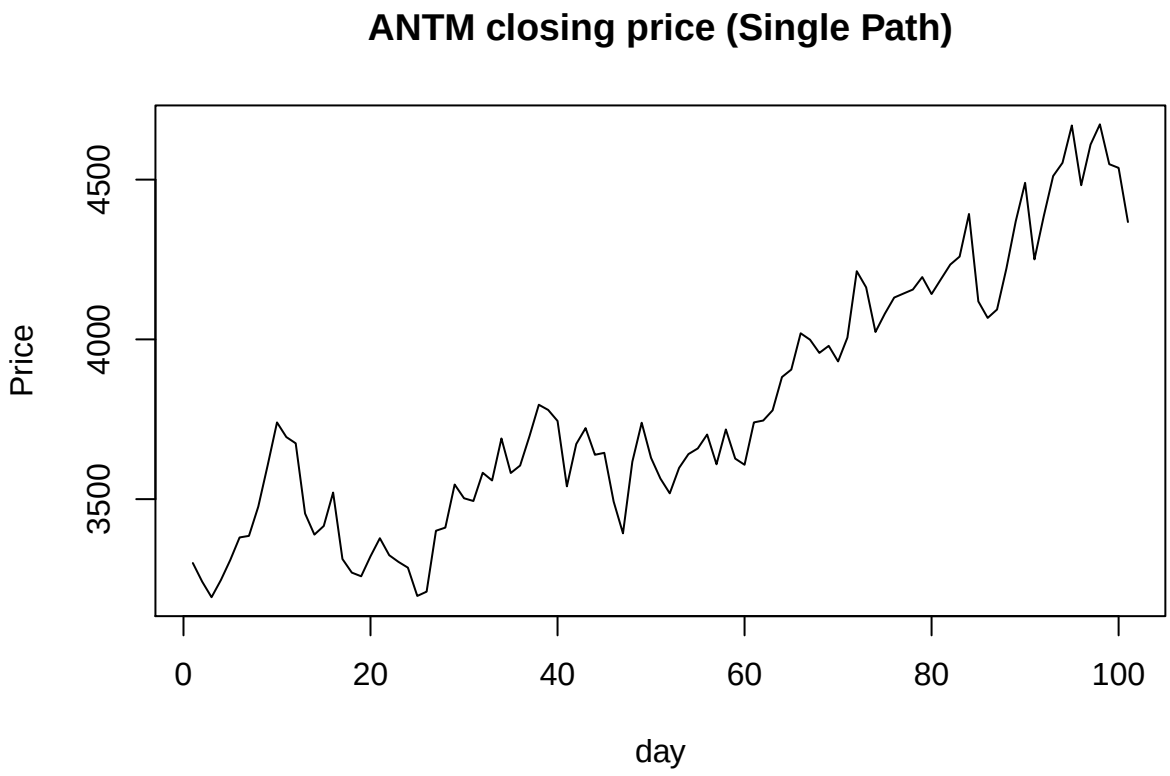
```
mean=colMeans(Return)
mean #Hasil R akan NA, maka digunakanlah Mean hasil hitung Excel
```

```
## Return
##     NA
```

```
sd=sapply(Return,sd)
sd #Hasil R akan NA, maka digunakanlah Mean hasil hitung Excel
```

```
## Return
##     NA
```

```
## Single Path
days <- 100
changes <- rnorm(days,mean=1.001227556,sd=0.03100741)
plot(cumprod(c(3300,changes)),type='l',ylab="Price",xlab="day", main="ANTM closing price (Single Path)"
```




```
## Simulasi 1000 path
runs <- 1000
#simulates future movements and returns the closing price on day 200
generate.path <- function(){
  days <- 100
  changes <- rnorm(100,mean=1.001227556,sd=0.03100741)
  sample.path <- cumprod(c(3300,changes))
  closing.price <- sample.path[days+1] #+1 because we add the opening price
  return(closing.price)
}

mc.closing <- replicate(runs,generate.path())
median(mc.closing) #Rp 3633.685
```

```
## [1] 3608.908
```

```
mean(mc.closing) #Rp 3784.257
```

```
## [1] 3724.676
```

```
quantile(mc.closing, 0.95) #Rp 6068.015 #batas atas diambil di 95%
```

```
##     95%
## 5943.81
```

```r
quantile(mc.closing, 0.05) #Rp 2184.885 #batas atas diambil di 5%
```

```
##       5%
## 2089.417
```

```r
## Simulasi 10000 path
runs <- 10000
#simulates future movements and returns the closing price on day 200
generate.path <- function(){
  days <- 100
  changes <- rnorm(100,mean=1.001227556,sd=0.03100741)
  sample.path <- cumprod(c(3300,changes))
  closing.price <- sample.path[days+1] #+1 because we add the opening price
  return(closing.price)
}

mc.closing <- replicate(runs,generate.path())
median(mc.closing) #Rp 3561.527
```

```
## [1] 3556.156
```

```r
mean(mc.closing) #Rp 3723.731
```

```
## [1] 3726.652
```

```r
quantile(mc.closing, 0.95) #Rp 5900.938 #batas atas diambil di 95%
```

```
##      95%
## 5910.514
```

```r
quantile(mc.closing, 0.05) #Rp 2140.94 #batas atas diambil di 5%
```

```
##       5%
## 2134.745
```