RBCmodel

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clear workspace and console

```
rm(list=ls())
cat("\f")
```

parameters: alpha = 1/3, theta = 0.03, delta = 0.06, phi = 0, rho = 0.85 and sigma = 1%

```
#Code for Q1 part B

#Define matrices
M <- matrix(c(0.851275,0.39795,0,0.85), 2, 2, byrow=T)
P <- matrix(c(0.04339933,1.9012,0.4783,0.5494,-0.434901,1.3518,-1.47875,6.632
5), 4, 2, byrow=T)
print(M)
```

```
##          [,1]    [,2]
## [1,] 0.851275 0.39795
## [2,] 0.000000 0.85000
```

```
print(P)
```

```
##             [,1]   [,2]
## [1,]  0.04339933 1.9012
## [2,]  0.47830000 0.5494
## [3,] -0.43490100 1.3518
## [4,] -1.47875000 6.6325
```

```
Minv <- solve(M)

#At t=0
kt <- 0
At <- 0
stateVec0 <- matrix(c(kt,At), 2, 1, byrow=T)
OutputVec0 <- P %*% stateVec0

#At t=1
residVec1 <- matrix(c(0,1), 2, 1, byrow=T)
##Solve system in the form aX = b
stateVec1 <- solve(Minv, stateVec0 + Minv%*%residVec1)
OutputVec0 <- P %*% stateVec0


#at t=2
residVec2 <- matrix(c(0,0), 2, 1, byrow=T)
stateVec2 <- solve(Minv, stateVec1 + Minv%*%residVec2)
OutputVec1 <- P %*% stateVec1

#Define time series of variables
ktseries <- c(stateVec0[1],stateVec1[1])
ktseries <- c(ktseries,stateVec2[1])
Atseries <- c(stateVec0[2],stateVec1[2])
Atseries <- c(Atseries,stateVec2[2])
ytseries <- c(OutputVec0[1],OutputVec0[1])
ytseries <- c(ytseries,OutputVec1[1])
ctseries <- c(OutputVec0[2],OutputVec0[2])
ctseries <- c(ctseries,OutputVec1[2])
ntseries <- c(OutputVec0[3],OutputVec0[3])
ntseries <- c(ntseries,OutputVec1[3])
itseries <- c(OutputVec0[4],OutputVec0[4])
itseries <- c(itseries,OutputVec1[4])
tseries <- 0
tseries <- c(tseries, 1)
tseries <- c(tseries, 2)

#Generate variables over time
t <- 3
while (t < 22) {
  residVec3 <- matrix(c(0,0), 2, 1, byrow=T)
  stateVec3 <- solve(Minv, stateVec2 + Minv%*%residVec3)
  OutputVec2 <- P %*% stateVec2
  ktseries <- c(ktseries,stateVec3[1])
  Atseries <- c(Atseries,stateVec3[2])
  ytseries <- c(ytseries,OutputVec2[1])
  ctseries <- c(ctseries,OutputVec2[2])
  ntseries <- c(ntseries,OutputVec2[3])
```

```
  itseries <- c(itseries,OutputVec2[4])
  stateVec2 <- stateVec3
  tseries <- c(tseries, t)
  t = t + 1
}


#Check length of series
print(length(tseries))
```

```
## [1] 22
```

```
print(length(ktseries))
```

```
## [1] 22
```

```
print(length(Atseries))
```

```
## [1] 22
```

```
print(length(ytseries))
```

```
## [1] 22
```

```
print(length(ctseries))
```

```
## [1] 22
```

```
print(length(ntseries))
```

```
## [1] 22
```

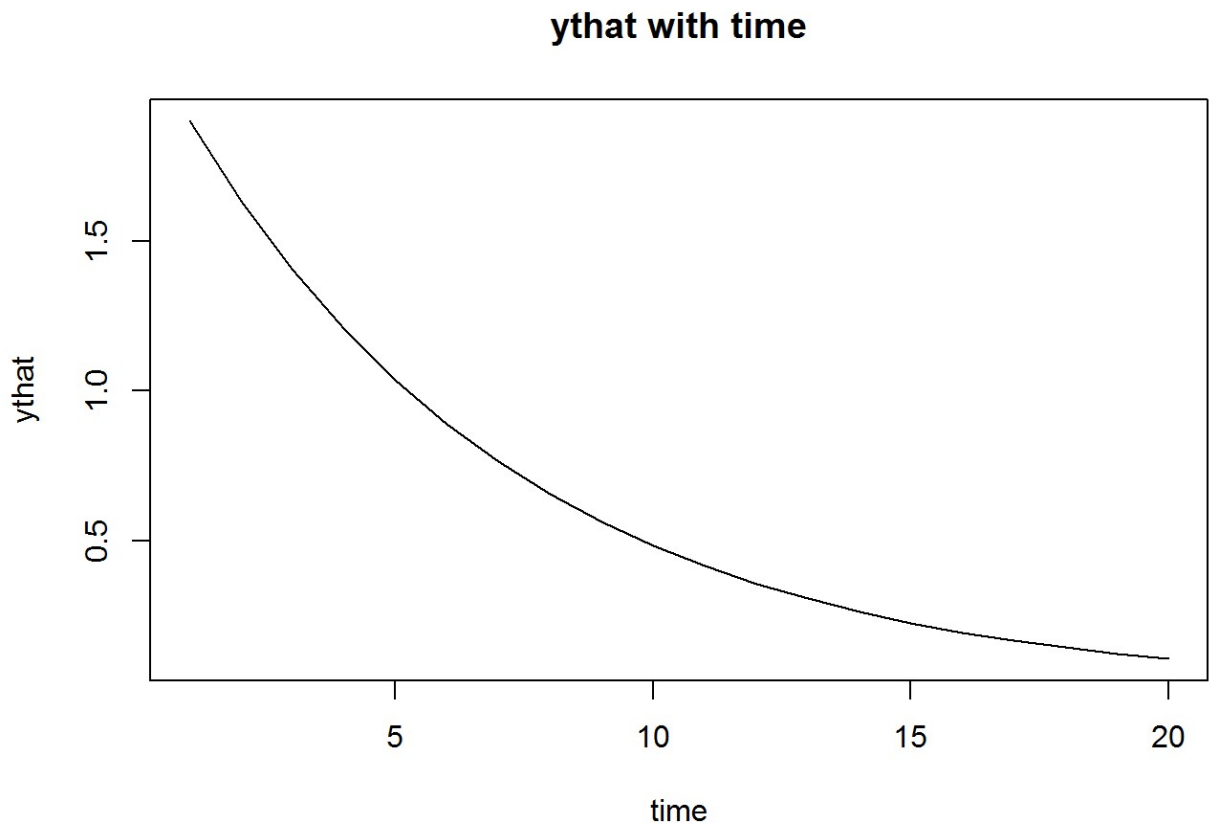
```
print(length(itseries))
```

```
## [1] 22
```

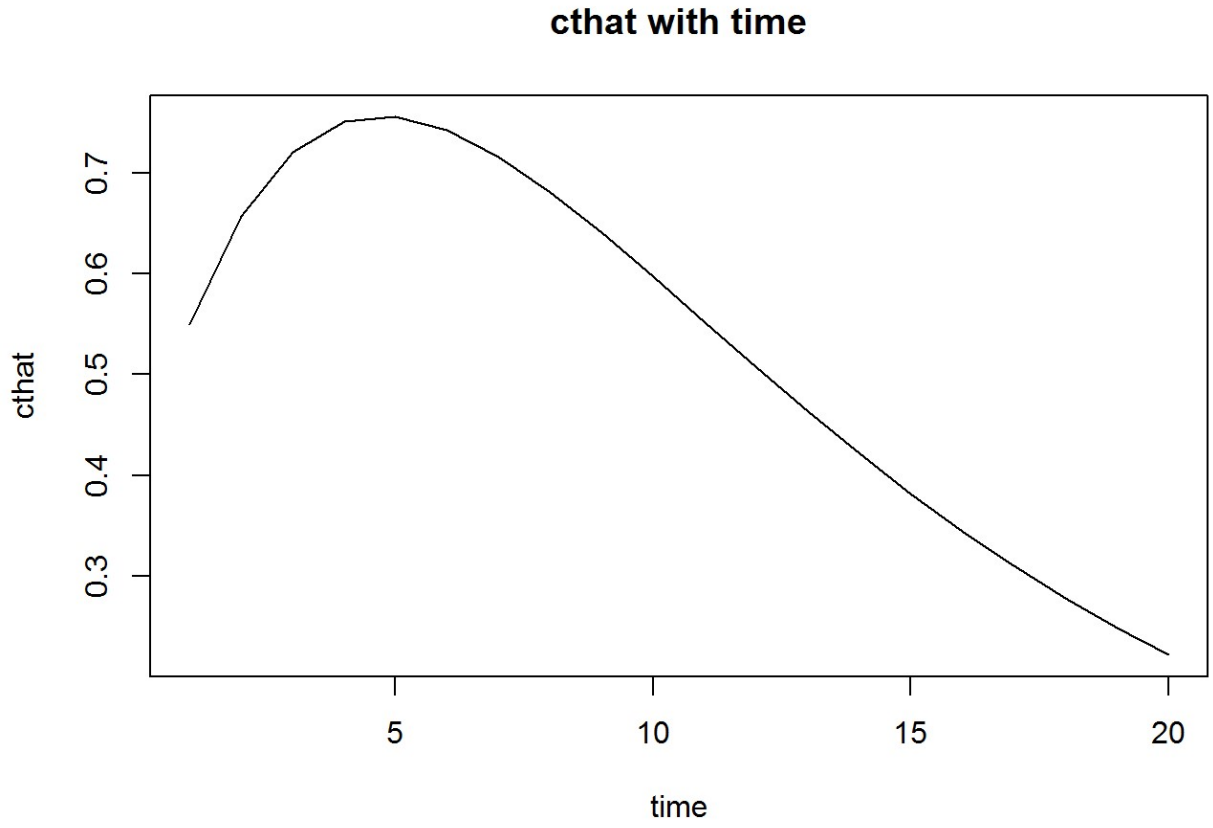
```
#Correction for t-1
Atseries <- Atseries[1:21]
ktseries <- ktseries[1:21]
ytseries <- ytseries[2:22]
ctseries <- ctseries[2:22]
ntseries <- ntseries[2:22]
itseries <- itseries[2:22]
tseries <- tseries[1:21]


#Printing a table
tbl <- matrix(c(tseries, ktseries, Atseries, ytseries, ctseries, ntseries, itse
ries),ncol=7,byrow=FALSE)
colnames(tbl) <- c("t", "kt^", "At^", "yt^", "ct^", "nt^", "it^")
print(tbl)
```

```
##         t       kt^        At^       yt^       ct^         nt^         it^
##   [1,]  0 0.0000000 0.00000000 0.0000000 0.0000000  0.00000000  0.00000000
##   [2,]  1 0.0000000 1.00000000 1.9012000 0.5494000  1.35180000  6.63250000
##   [3,]  2 0.3979500 0.85000000 1.6332908 0.6573295  0.97596115  5.04915644
##   [4,]  3 0.6770224 0.72250000 1.4029993 0.7207613  0.68223779  3.79083440
##   [5,]  4 0.8638511 0.61412500 1.2050650 0.7505803  0.45448446  2.79576424
##   [6,]  5 0.9797659 0.52200625 1.0349595 0.7554123  0.27954688  2.01337764
##   [7,]  6 1.0417826 0.44370531 0.8887852 0.7420563  0.14672855  1.40233947
##   [8,]  7 1.0634160 0.37714952 0.7631882 0.7158378  0.04735003  0.92891774
##   [9,]  8 1.0553461 0.32057709 0.6552825 0.6808971 -0.02561497  0.56563447
##  [10,]  9 1.0259634 0.27249053 0.5625851 0.6404246 -0.07783982  0.29015001
##  [11,] 10 0.9818146 0.23161695 0.4829602 0.5968523 -0.11389237  0.08434104
##  [12,] 11 0.9279662 0.19687440 0.4145707 0.5520090 -0.13743861 -0.06646053
##  [13,] 12 0.8683006 0.16734324 0.3558366 0.5072466 -0.15141020 -0.17409544
##  [14,] 13 0.8057568 0.14224176 0.3053993 0.4635411 -0.15814204 -0.24809446
##  [15,] 14 0.7425258 0.12090549 0.2620906 0.4215755 -0.15948515 -0.29610427
##  [16,] 15 0.6802080 0.10276967 0.2249063 0.3818051 -0.15689908 -0.32423768
##  [17,] 16 0.6199412 0.08735422 0.1929829 0.3445103 -0.15152762 -0.33736121
##  [18,] 17 0.5625031 0.07425109 0.1655784 0.3098388 -0.14426053 -0.33933108
##  [19,] 18 0.5083930 0.06311342 0.1420552 0.2778389 -0.13578391 -0.33318640
##  [20,] 19 0.4578983 0.05364641 0.1218650 0.2484861 -0.12662119 -0.32130723
##  [21,] 20 0.4111459 0.04559945 0.1045371 0.2217034 -0.11716644 -0.30554370
```

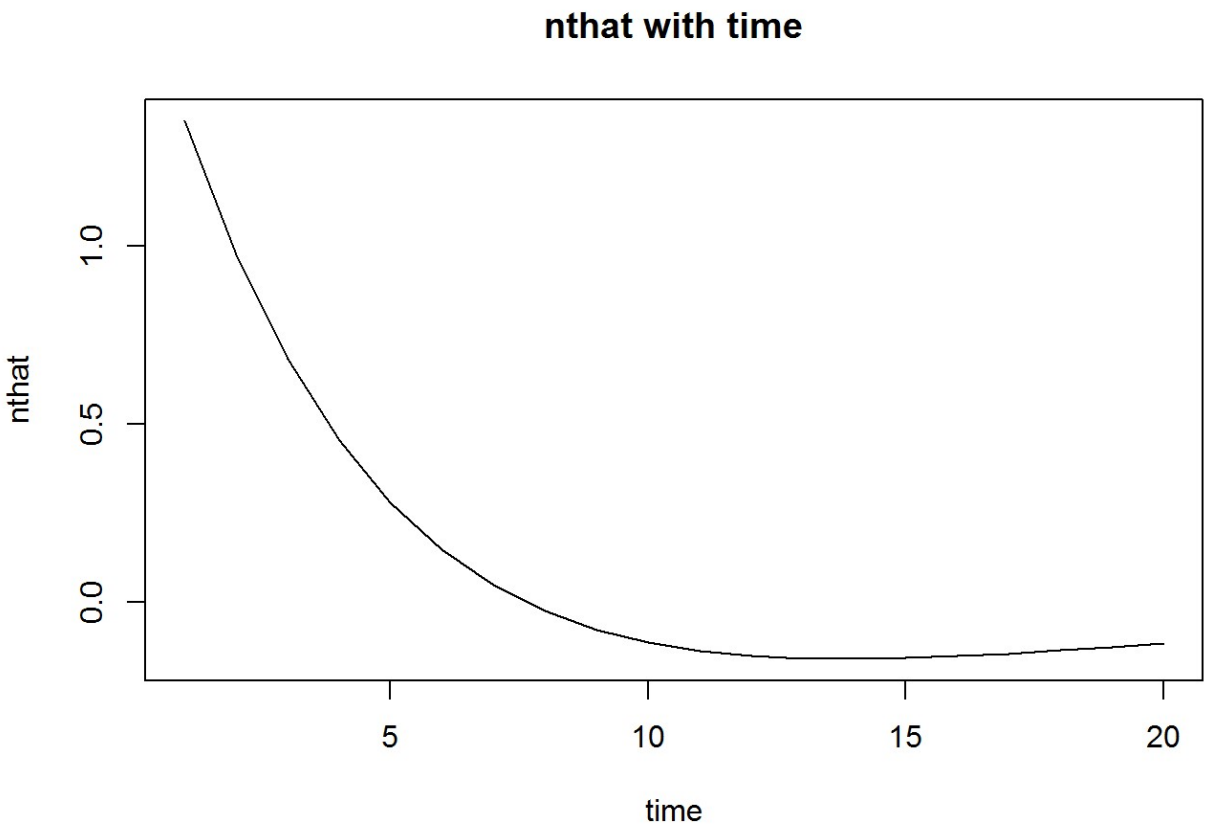
```
#Plots over time from t=1 to t=20
ythat <- ts(ytseries[2:21],frequency=1)
plot(ythat,xlab="time",ylab="ythat",main="ythat with time")
```



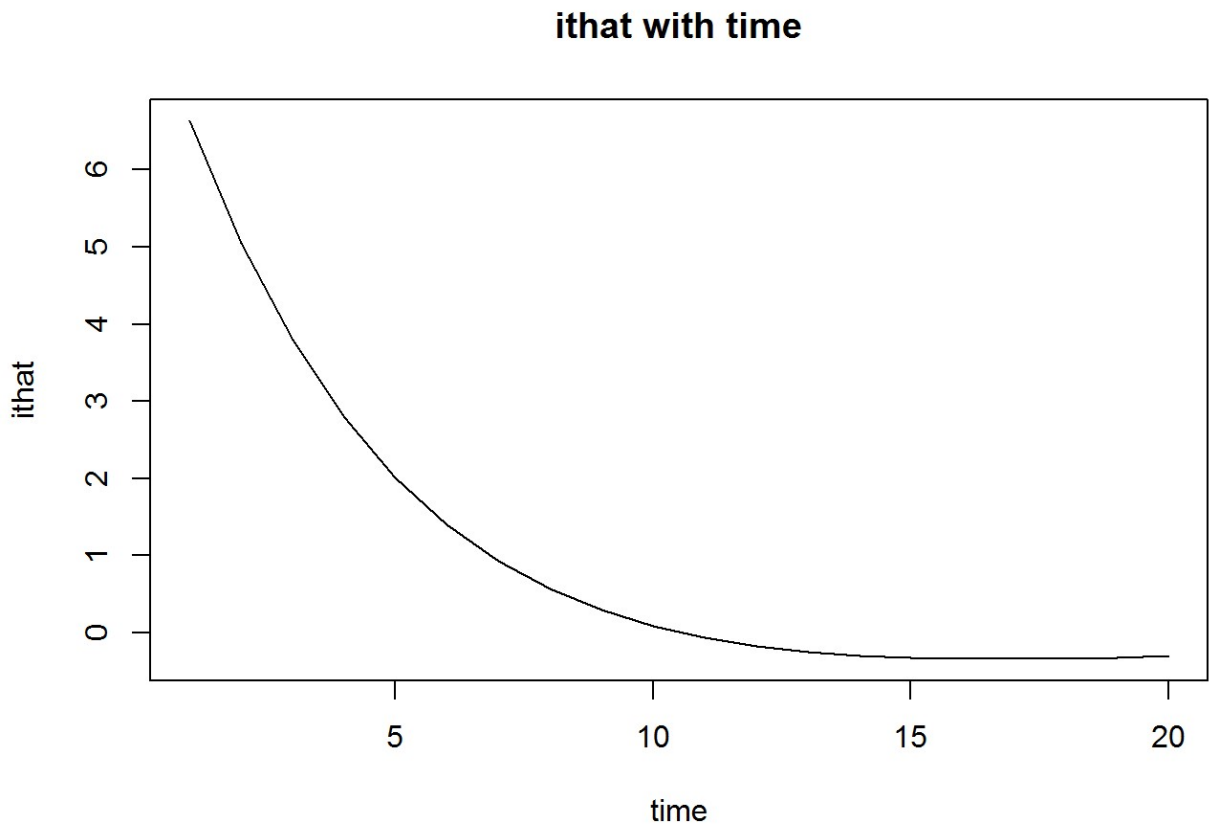

```
cthat <- ts(ctseries[2:21],frequency=1)
plot(cthat,xlab="time",ylab="cthat",main="cthat with time")
```




```
nthat <- ts(ntseries[2:21],frequency=1)
plot(nthat,xlab="time",ylab="nthat",main="nthat with time")
```




```
ithat <- ts(itseries[2:21],frequency=1)
plot(ithat,xlab="time",ylab="ithat",main="ithat with time")
```




```
#kthat <- ts(ktseries,frequency=1)
#plot(kthat,xlab="time",ylab="kthat",main="kthat with time")

#Athat <- ts(Atseries,frequency=1)
#plot(Athat,xlab="time",ylab="Athat",main="Athat with time")
```