Gazdasági Pénzügyi Modellek

Vizsga

Hallgató neve: Czikó Tivadar

Neptun kód: O2IXLB

Dátum: 2022.05.18

#0. feladat behelyesítem a neptun kódóm.

```
x="o2ixlb";#neptun kód
z=charToRaw(iconv(x, "latin1", "UTF-8"))
for (i in 1:6) v=paste("0x",z,sep="")
e=strtoi(v)
ax=e[1];ay=e[2];az=e[3];av=e[4];ss=sum(strtoi(v))+24
cat("ax=",ax,"\n")
cat("ay=",ay,"\n")
cat("az=",az,"\n")
cat("av=",av,"\n")
cat("ss=",ss,"\n")
ar=c( "FB","AAPL","AMZN","GOOG","NFLX","TSLA")
ai=ss-6*floor(ss/6)
ev=2021-(ss-10*floor(ss/10))
cat("ev=",ev,"\n")
cat("reszveny=",ar[ai+1],"\n")

## OUTPUT:
##       ev= 2015
##       reszveny= NFLX
```

#1. feladat: 1000 elemű minta reláció:

```
            set.seed(ss)
                  nx=1000
                  v=matrix(c(ax,abs(ax-ay),abs(ax-ay),ay),2)
                  w=chol(v)
                  z1=sqrt(-2*log(runif(nx)))*sin(runif(nx)*2*pi)
                  z2=sqrt(-2*log(runif(nx)))*cos(runif(nx)*2*pi)
                  zm=matrix(c(z1,z2),ncol=2)
```

zn=zm%*%w

#A) feladat:

plot(zn, main="ketdimenzios realizacio")

#Milyen eloszlasu lehet a fuggveny?

 # kovetkezonek hozza adtam egy package-t

#--- Please select a CRAN mirror for use in this session ---

#trying URL 'https://cran.rapporter.net/bin/windows/contrib/4.1/MASS_7.3-57.zip'

#Content type 'application/zip' length 1190770 bytes (1.1 MB)

#downloaded 1.1 MB

#package 'MASS' successfully unpacked and MD5 sums checked

#The downloaded binary packages are in

C:\Users\Diak\AppData\Local\Temp\RtmpiKFVEn\downloaded_packages

#

#A MASS package segitsegevel probaltam abrzolni gorbet es rajonni melyek eloszlas lehet

library(MASS)

#kovetkezo kodokat hasznaltam. Felteszem hogy normalis eloszlas

fitdistr(zn, densfun="normal")

#kovetkezo eredmenyt kaptam

#> fitdistr(zn, densfun="normal")

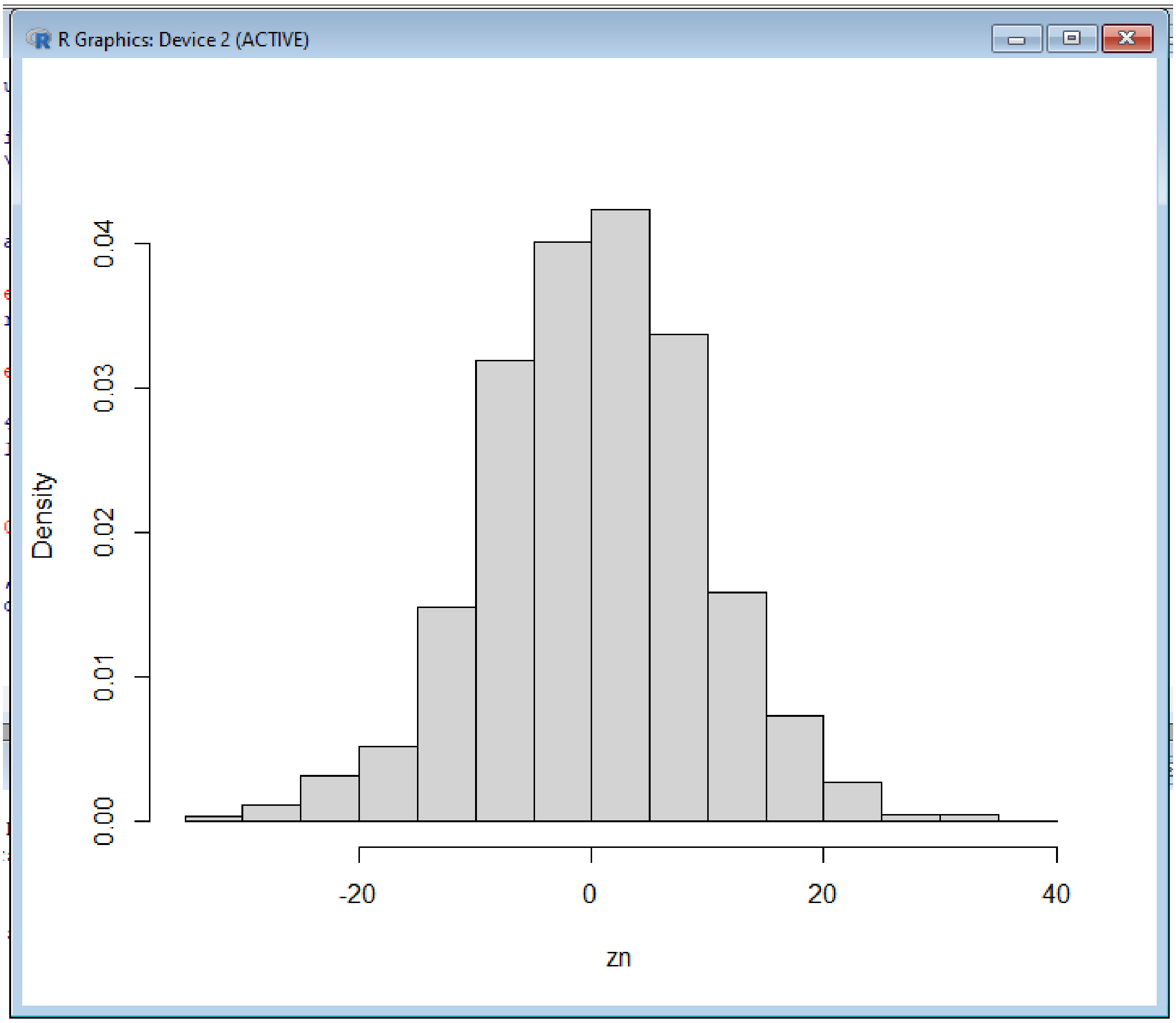
mean sd

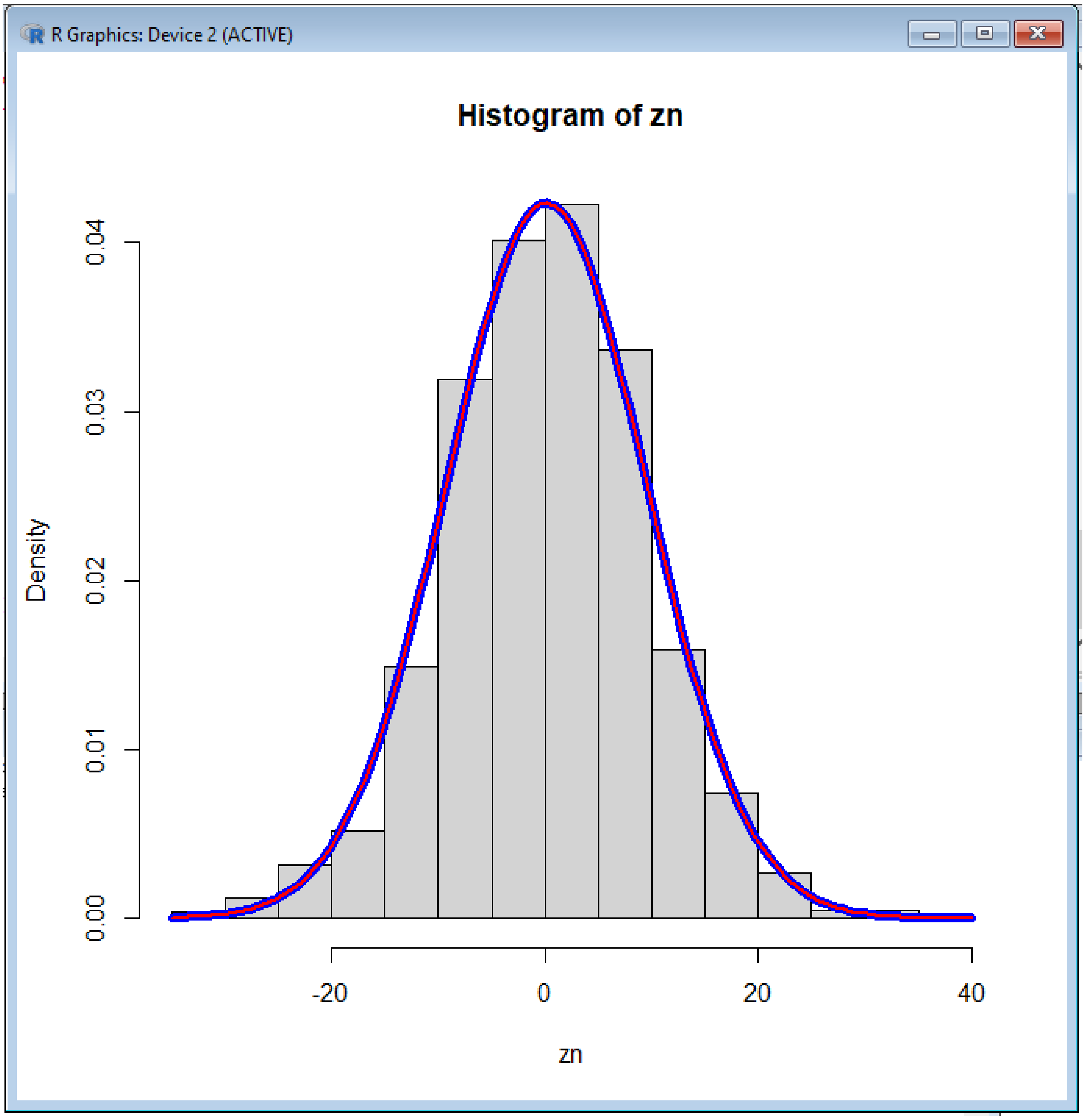
```
#  0.1343796   9.4230144
# (0.2107050) (0.1489909)
#
```

#Ez utan csinalok egy hisztogrammot es egy gorbet

```
fit <- fitdistr(zn, densfun="normal")
fit

hist(zn, pch=20, breaks=25, prob=TRUE, main="")
curve(dnorm(x, fit$estimate[1], fit$estimate[2]), col="red", lwd=2, add=T)

#megnezzuk likelyhooddal

log_likelihood <- function(params) { -sum(dnorm(zn, params[1], params[2], log=TRUE)) }
fit2 <- optim(c(0,1), log_likelihood)
fit2

# kovetkezo eredmenyt kaptam:
#
#$par
#[1] 0.1436455 9.4279092
#
#$value
#[1] 7324.189
#
#$counts
#function gradient
#     57       NA
#
#$convergence
#[1] 0
```

```
#

#$message

#NULL


## Ezutan a gorbet abrazoljuk

hist(zn, pch=20, breaks=25, prob=TRUE)

curve(dnorm(x, fit2$par[1],     fit2$par[2]),     col="blue", lwd=6, add=T) # optim fit

curve(dnorm(x, fit$estimate[1], fit$estimate[2]), col="red",  lwd=2, add=T) # fitdistr fit


print("A weibul eloszlasu")


#parameterek becsulese: Hozza adtam a moments package amivel a ferdeseget es a lapultagat tudom nezni

# plusz az elozo arbazolassal lehet latni a felso es also hatarit


library(moments)

skewness(zn)

kurtosis(zn)


#eredmenyek

#> skewness(zn)# lapultsag

#[1] -0.08648769 -0.02733868

#> kurtosis(zn)# ferdeseg

#[1] 3.088212 3.204510
```


R Graphics: Device 2 (ACTIVE)
Density
0.00
0.01
0.02
0.03
0.04
-20
0
20
40
zn



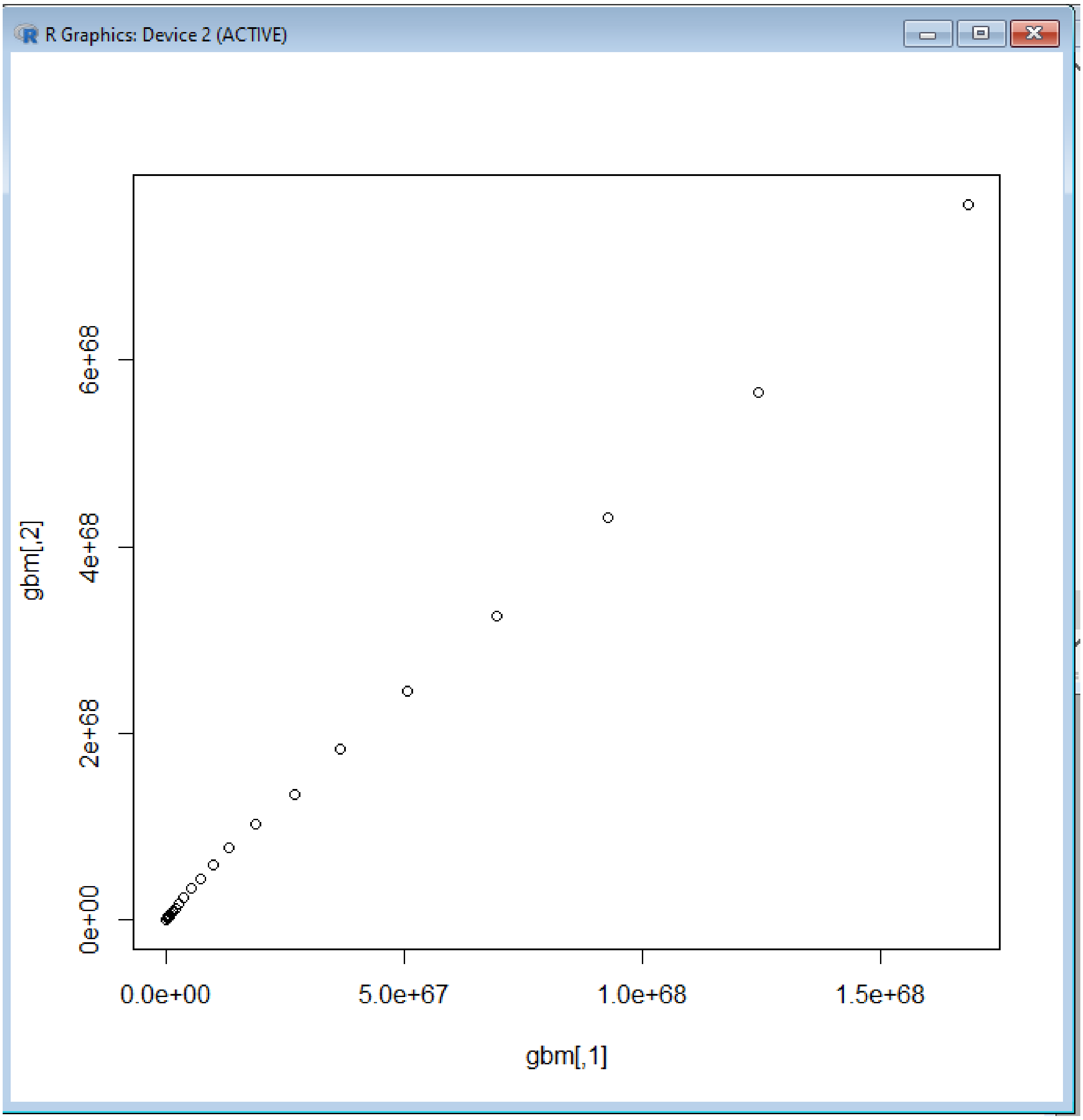
#2. Feladat

print("2. feladat")

plot(zn, main="ketdimenzios realizacio 2es feladat")

#3. feladat:

print("3, felaadat")



A 3. feladatot a kovetkezokeppen oldottam meg

set.seed(ss+17) **#setseed beallitasa**

nsim <- 50

t <- 500#intervallum

mu <- ax

sigma <- (ax+ay)/(ax+ay+az) **#varhato eretek**

S0 <- 500

gbm_vec <- function(nsim = 100, t = 25, mu = 0, sigma = 0.1, S0 = 100, dt = 1./365) {

epsilon <- matrix(rnorm(t*nsim), ncol = nsim, nrow = t)

```
gbm <- exp((mu - sigma * sigma / 2) * dt + sigma * epsilon * sqrt(dt))

gbm <- apply(rbind(rep(S0, nsim), gbm), 2, cumprod)

return(gbm)


}#GBM model

gbm <- gbm_vec(nsim, t, mu, sigma, S0)

summary(gbm)


plot(gbm)


##("EREDMENY:")

print("

      V1                V2                V3                V4                V5

 Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02

 1st Qu.:1.386e+19   1st Qu.:2.741e+19   1st Qu.:1.879e+19   1st Qu.:8.550e+18   1st Qu.:1.604e+19

 Median :2.908e+35   Median :8.483e+35   Median :1.759e+36   Median :2.359e+35   Median
:6.441e+35

 Mean   :1.273e+66   Mean   :6.111e+66   Mean   :1.100e+67   Mean   :6.551e+65   Mean   :7.542e+66

 3rd Qu.:9.258e+51   3rd Qu.:2.096e+52   3rd Qu.:5.282e+52   3rd Qu.:3.435e+51   3rd Qu.:3.327e+52

 Max.   :1.682e+68   Max.   :7.676e+68   Max.   :1.471e+69   Max.   :8.889e+67   Max.   :1.011e+69

      V6                V7                V8                V9               V10

 Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02

 1st Qu.:7.328e+18   1st Qu.:1.462e+19   1st Qu.:5.293e+18   1st Qu.:1.588e+19   1st Qu.:1.782e+19

 Median :1.317e+35   Median :5.524e+35   Median :1.997e+35   Median :3.930e+35   Median
:3.564e+35

 Mean   :5.324e+65   Mean   :4.705e+66   Mean   :5.342e+65   Mean   :4.666e+66   Mean   :7.168e+66

 3rd Qu.:2.420e+51   3rd Qu.:2.452e+52   3rd Qu.:3.636e+51   3rd Qu.:2.553e+52   3rd Qu.:1.580e+52

 Max.   :6.821e+67   Max.   :6.274e+68   Max.   :7.302e+67   Max.   :5.971e+68   Max.   :9.424e+68

     V11               V12               V13               V14               V15

 Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02

 1st Qu.:8.761e+18   1st Qu.:2.738e+19   1st Qu.:1.616e+19   1st Qu.:7.555e+18   1st Qu.:1.276e+19
```

Median :1.204e+35 Median :8.484e+35 Median :3.551e+35 Median :2.262e+35 Median :6.720e+35

Mean :1.044e+66 Mean :4.991e+66 Mean :3.932e+66 Mean :2.246e+66 Mean :6.042e+66

3rd Qu.:3.483e+51 3rd Qu.:2.251e+52 3rd Qu.:1.708e+52 3rd Qu.:1.142e+52 3rd Qu.:1.528e+52

Max. :1.330e+68 Max. :6.544e+68 Max. :5.245e+68 Max. :2.948e+68 Max. :8.351e+68

V16 V17 V18 V19 V20

Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02

1st Qu.:1.776e+19 1st Qu.:9.364e+18 1st Qu.:8.237e+18 1st Qu.:1.367e+19 1st Qu.:1.513e+19

Median :3.287e+35 Median :2.150e+35 Median :5.050e+35 Median :2.856e+35 Median :4.901e+35

Mean :3.409e+66 Mean :2.319e+66 Mean :5.480e+66 Mean :3.308e+66 Mean :3.677e+66

3rd Qu.:9.919e+51 3rd Qu.:8.805e+51 3rd Qu.:2.005e+52 3rd Qu.:9.986e+51 3rd Qu.:1.464e+52

Max. :4.584e+68 Max. :2.993e+68 Max. :6.912e+68 Max. :4.515e+68 Max. :4.890e+68

V21 V22 V23 V24 V25

Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02

1st Qu.:9.108e+18 1st Qu.:1.783e+19 1st Qu.:1.772e+19 1st Qu.:1.315e+19 1st Qu.:1.951e+19

Median :2.916e+35 Median :5.447e+35 Median :1.311e+36 Median :4.569e+35 Median :4.782e+35

Mean :2.143e+66 Mean :3.319e+66 Mean :1.300e+67 Mean :3.963e+66 Mean :2.563e+66

3rd Qu.:1.044e+52 3rd Qu.:1.537e+52 3rd Qu.:5.565e+52 3rd Qu.:1.306e+52 3rd Qu.:1.533e+52

Max. :2.631e+68 Max. :3.883e+68 Max. :1.731e+69 Max. :5.382e+68 Max. :3.307e+68

V26 V27 V28 V29 V30

Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02

1st Qu.:1.608e+19 1st Qu.:1.781e+19 1st Qu.:1.412e+19 1st Qu.:2.139e+19 1st Qu.:2.663e+19

Median :6.148e+35 Median :6.108e+35 Median :7.276e+35 Median :2.908e+35 Median :7.579e+35

Mean :3.753e+66 Mean :2.614e+66 Mean :4.727e+66 Mean :4.833e+66 Mean :2.213e+66

3rd Qu.:1.340e+52 3rd Qu.:1.558e+52 3rd Qu.:1.669e+52 3rd Qu.:1.216e+52 3rd Qu.:1.423e+52

Max. :4.800e+68 Max. :3.541e+68 Max. :6.317e+68 Max. :6.688e+68 Max. :2.886e+68

V31 V32 V33 V34 V35

Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02 Min. :5.000e+02

1st Qu.:2.974e+19 1st Qu.:2.761e+19 1st Qu.:1.789e+19 1st Qu.:1.747e+19 1st Qu.:1.202e+19

Median :8.574e+35   Median :6.152e+35   Median :6.252e+35   Median :4.694e+35   Median
:4.501e+35

Mean   :9.787e+66   Mean   :8.693e+66   Mean   :8.121e+66   Mean   :4.722e+66   Mean   :4.043e+66

3rd Qu.:2.855e+52   3rd Qu.:2.566e+52   3rd Qu.:2.896e+52   3rd Qu.:2.488e+52   3rd Qu.:1.438e+52

Max.   :1.242e+69   Max.   :1.202e+69   Max.   :1.020e+69   Max.   :6.247e+68   Max.   :5.408e+68

V36   V37   V38   V39   V40

Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02

1st Qu.:2.343e+19   1st Qu.:2.514e+19   1st Qu.:1.813e+19   1st Qu.:1.325e+19   1st Qu.:1.141e+19

Median :6.626e+35   Median :7.736e+35   Median :7.771e+35   Median :8.458e+35   Median
:2.696e+35

Mean   :4.785e+66   Mean   :1.014e+67   Mean   :8.040e+66   Mean   :8.649e+66   Mean   :1.548e+66

3rd Qu.:1.539e+52   3rd Qu.:2.854e+52   3rd Qu.:2.932e+52   3rd Qu.:2.744e+52   3rd Qu.:9.797e+51

Max.   :6.415e+68   Max.   :1.334e+69   Max.   :1.073e+69   Max.   :1.131e+69   Max.   :2.044e+68

V41   V42   V43   V44   V45

Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02

1st Qu.:1.192e+19   1st Qu.:9.600e+18   1st Qu.:1.813e+19   1st Qu.:2.712e+19   1st Qu.:2.991e+19

Median :5.075e+35   Median :2.398e+35   Median :2.979e+35   Median :9.639e+35   Median
:1.114e+36

Mean   :4.009e+66   Mean   :1.354e+66   Mean   :2.054e+66   Mean   :6.514e+66   Mean   :1.420e+67

3rd Qu.:2.455e+52   3rd Qu.:6.989e+51   3rd Qu.:9.946e+51   3rd Qu.:2.356e+52   3rd Qu.:3.747e+52

Max.   :5.149e+68   Max.   :1.817e+68   Max.   :2.627e+68   Max.   :8.026e+68   Max.   :1.823e+69

V46   V47   V48   V49   V50

Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02   Min.   :5.000e+02

1st Qu.:3.046e+19   1st Qu.:1.630e+19   1st Qu.:1.209e+19   1st Qu.:1.413e+19   1st Qu.:8.504e+18

Median :1.317e+36   Median :5.663e+35   Median :2.101e+35   Median :3.734e+35   Median
:2.786e+35

Mean   :9.489e+66   Mean   :1.381e+66   Mean   :2.056e+66   Mean   :2.143e+66   Mean   :1.067e+66

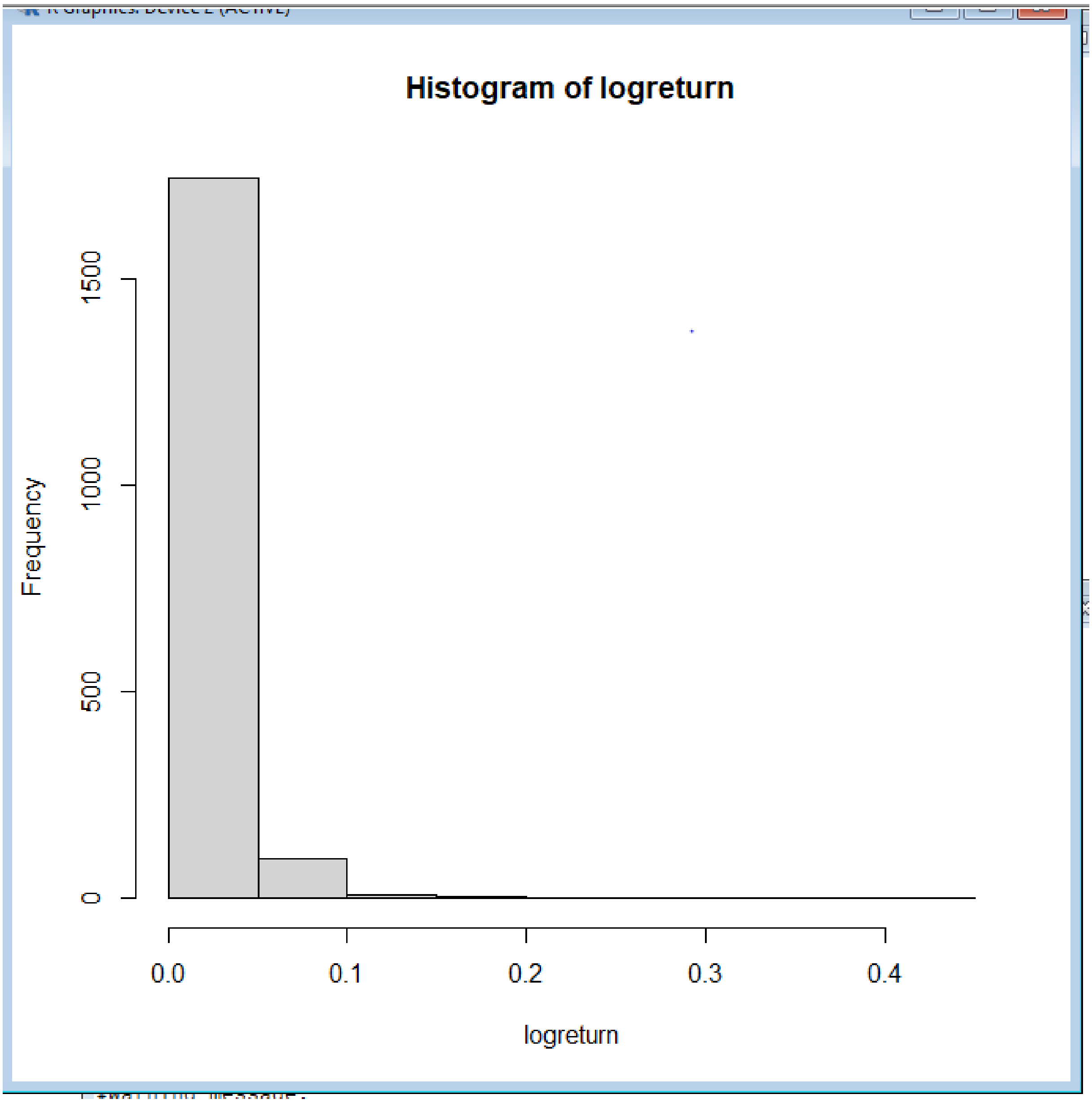
3rd Qu.:4.041e+52   3rd Qu.:8.717e+51   3rd Qu.:8.274e+51   3rd Qu.:1.190e+52   3rd Qu.:7.579e+51

Max.   :1.229e+69   Max.   :1.748e+68   Max.   :2.785e+68   Max.   :2.741e+68   Max.   :1.388e+68

> ")

#4-5. feladat:

```
print("4-5 feladat")
#https://finance.yahoo.com/quote/NFLX/history?p=NFLX
### 4-5. feladat

# ev= 2015
# reszveny= NFLX
reszveny=read.csv("D:/NFLX.csv")
x = reszveny$Close

logreturn = c()
for(n in 1:length(x)-1){
  logreturn[n] = abs(log(x[n+1]/x[n]))
}
chisq.test(logreturn)

#EREDMENY:
#> chisq.test(logreturn)
#
#       Chi-squared test for given probabilities
#
#data:  logreturn
#X-squared = 48.305, df = 1855, p-value = 1
#
#Warning message:
#In chisq.test(logreturn) : Chi-squared approximation may be incorrect

#Most abrazuljuk:


plot(logreturn, main="logreturn")
hist(logreturn)
```


Histogram of logreturn
Frequency
0
500
1000
1500
0.0
0.1
0.2
0.3
0.4
logreturn