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#Seminar 1 for RTF5930
rm(list=ls(all=TRUE))
setwd("C:\\Users\\xzhang\\R")

xdata<-read.csv(file="sp.vix.csv",header=T)
xdata <- data.frame(xdata)
plot(xdata[,2],typ='l',lty=1,col=4,xlab="",ylab="SP 500 Index",main="Time Series Plot of S&P 500")

# Plot time series with dates printed on the x-axis
xdata$Date <- as.Date(xdata[,1], format="%m/%d/%Y") # Adjust format if necessary
plot(xdata$Date, xdata[,2], type='l', lty=1, col=4, xlab="Date", ylab="S&P 500 Index", main="Time Series Plot of S&P 500", xaxt='n')
tem=pretty(xdata$Date, n=20)
axis(1, tem, format(tem,"%d-%m-%Y"))

# Calculate simple returns and plot the return series
sp<-xdata[,2] # 2nd column of xdata
n<-length(sp)
rt.sim<-(sp[2:n]-sp[1:(n-1)])/sp[1:(n-1)]*100 #element by element orporations
plot(xdata[2:n,1], rt.sim,typ='l', lty=1, col=4, xlab="", ylab="Percentage Returns", main="S&P 500 Daily returns", xaxt='n')
tem=pretty(xdata[2:n,1], n=20)
axis(1, tem, format(tem,"%d-%m-%Y"))

# Histogram
x<-rnorm(1000,0,1) #generate random numbers from N(0,1)
hist(x, breaks=16, col="lightblue", xlab="Observations",ylab="Frequency",main="Histogram of Normal",freq=FALSE)
# Histogram of S&P 500 returns
sp <- xdata[,2] # 2nd column of xdata
n <- length(sp)
rt.sim <- (sp[2:n]-sp[1:(n-1)])/sp[1:(n-1)]*100
hist(rt.sim, breaks=33, col="lightblue",xlab="Observations",ylab="Frequency",main="Histogram of S&P 500 returns", freq=FALSE)

#Box plot
x<-rnorm(1000,0,1) #generate random numbers from N(0,1)
boxplot(x,xlab="Observations",main="Box Plot of Normal",horizontal=TRUE)
#
sp <- xdata[,2] # 2nd column of xdata
n <- length(sp)
rt.sim <- (sp[2:n]-sp[1:(n-1)])/sp[1:(n-1)]*100
boxplot(rt.sim, col="lightblue",xlab="Observations",main="Box Plot of S&P 500 returns",
horizontal=TRUE)

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