# Assignment 11-Volatility of the S&P 500 Since 1991

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## MSDS 6306-Monday 6:30 p.m.

The following code demonstrates how to work with time series data by using closing prices of the S&P 500 from 1991-01-02 up to the most recent closing price (April 2, 2017). This example will measure and graph the volatility of the closing prices of the S&P 500 over time. It is important to measure volatility of stock prices to gauge the variation of them over time. This helps investors make informed decisions about how much risk there may be in purchasing particular stocks.

Load package 'tseries'

library(tseries)

## Warning: package 'tseries' was built under R version 3.3.3

Download the data of SP500 '^gspc'.

SNPdata <- get.hist.quote('^gspc',quote="Close")

## time series ends 2017-03-31

Calculate the log returns.

SNPret <-log(lag(SNPdata))-log(SNPdata)

Calculate volatility measure.

SNPvol <- sd(SNPret\*sqrt(250)\*100)

Define getVol function for volatility

getVol <- function(d, logrets) {  
 var = 0  
 lam = 0  
 varlist <- c()  
  
 for (r in logrets) {  
 lam = lam\*(1 - 1/d) + 1  
 var = (1 - 1/lam)\*var + (1/lam)\*r^2  
 varlist <- c(varlist, var)  
 }  
  
 sqrt(varlist)  
}

Calculate volatility over entire length of series for three different decay factors: 10 30. 100

volest <- getVol(10, SNPret)  
  
volest2 <- getVol(30, SNPret)  
  
volest3 <- getVol(100, SNPret)

Plot the results, overlaying the volatility curves on the data, just as was done in the S&P example.

plot(volest,type="l")  
  
lines(volest2, type="l", col="red")  
  
lines(volest3, type="l", col="blue")

