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%READ CSV FILE
%This creates a matrix without the headings, these are x(t) inputs
clear, clc
str = 'VIX';
fileID = fopen([str '.csv']);
C = textscan(fileID, '%s%f%f%f%f%f', 'HeaderLines', 1, 'Delimiter', ',');
fclose(fileID); %This grabs the dates and adjusted closing price

date = C{1,1}; %First cell contains dates
date_format = 'yyyy-mm-dd'; %used to convert to datenum
date = datenum(date, date_format);

%This creates a matrix without the headings, these are y(t) inputs
str2 = 'GSPC';
fileID = fopen([str2 '.csv']);
C2 = textscan(fileID, '%s%f%f%f%f%f', 'HeaderLines', 1, 'Delimiter', ',');
fclose(fileID); %This grabs the dates and adjusted closing price

date2 = C2{1,1}; %First cell contains dates
date2 = datenum(date2, date_format);

closing = C{1,2}; %Second cell contains closing values
closing2 = C2{1,2};

date = flipud(date); %reverse the order of date
closing = flipud(closing); %reverse the order of closing
date2 = flipud(date2); %reverse the order of date
closing2 = flipud(closing2); %reverse the order of closing

t1 = datenum('1995-01-04', date_format); %converts string date to serial date
%datestr(t1, date_format) %converts serial date to sting date

%find(date == t1) %locates indx for given serial date

t2 = datenum('2013-01-03', date_format); %converts string date to serial date
%datestr(t2, date_format) %converts serial date to sting date

ts1x = find(date == t1); %locates index for given serial date
ts2x = find(date == t2); %locates index for given serial date
ts1y = find(date2 == t1); %locates index for given serial date
ts2y = find(date2 == t2); %locates index for given serial date
%sometimes these yield errors because not all of the stocks are traded on
%the same dates

%By subtracting dates we can insure vectors of the same lenght, this might
%be a problem because not all stocks have the same number of trading days
deltat = ts2x - ts1x;
newdate = date(ts2x - deltat : ts2x); % Extract the ith through the jth elements for x
(t)
closingPx = closing(ts2x - deltat : ts2x); % Extract the ith through the jth elements

newdate2 = date2(ts2y - deltat : ts2y); % Extract the ith through the jth elements
closingPy = closing2(ts2y - deltat : ts2y); % Extract the ith through the jth elements

%Find variance by integrating over time period
varx = (1/deltat) * trapz(newdate, closingPx.^2);
vary = (1/deltat) * trapz(newdate2, closingPy.^2);

rhoxy = (1/sqrt(varx*vary)) * (1/(deltat)) * trapz(newdate2, closingPx.*closingPy) %this does
yield for the same x(t)

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The Correlation coefficient for GPSC and VIX is rhoxy =0.8974