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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%
% MONTES Virginie
% Due November 6
%
%%Problem 3:

clear all
close all
data = load('-ascii', 'NMprecip.txt');
        %variables are code, year, month, total precipitation

jan = data(:,3);
feb = data(:,4);
mar = data(:,5);
apr = data(:,6);
may = data(:,7);
jun = data(:,8);
jul = data(:,9);
aug = data(:,10);
sept = data(:,11);
oct = data(:,12);
nov = data(:,13);
dec = data(:,14);

n = length(jan);

avejan = mean(jan);           %each month average precipitation
avefeb = mean(feb);
avemar = mean(mar);
aveapr = mean(apr);
avemay = mean(may);
avejun = mean(jun);
avejul = mean(jul);
aveaug = mean(aug);
avesept = mean(sept);
aveoct = mean(oct);
avenov = mean(nov);
avedec = mean(dec);

seas = avejan + avefeb + avemar + aveapr + avemay + avejun + avejul + aveaug + ...
        avesept + aveoct + avenov + avedec;           %to remove seasonality we add all

yeartot1 = data(:,end);
n1 = length(yeartot1);
t1 = (1:n1)';

figure(1)
plot(t1, yeartot1) % plot before removing the seasonality
title('Precipitation data before removing the seasonality')

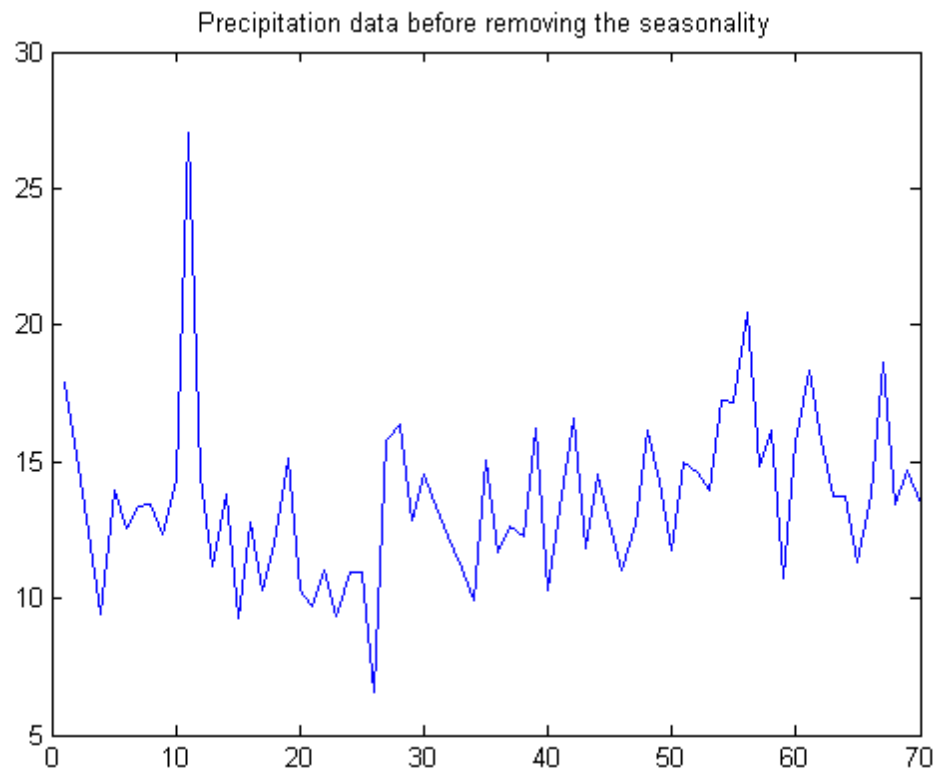
yeartot2 = yeartot1 - seas;
n2 = length(yeartot2);
t2 = (1:n2)';

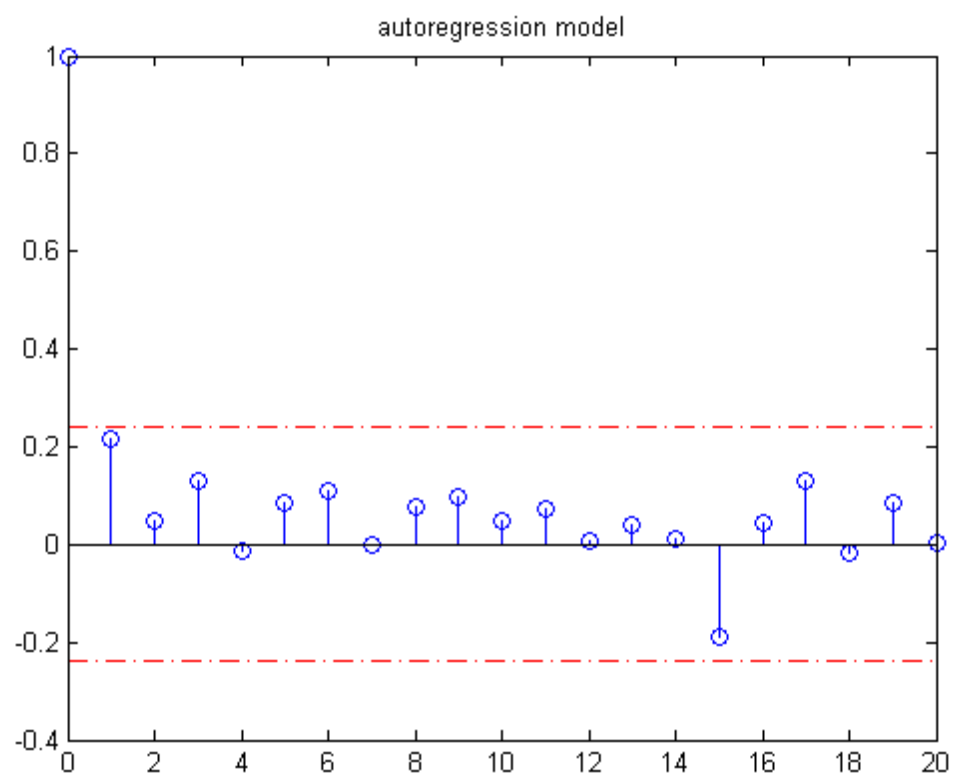
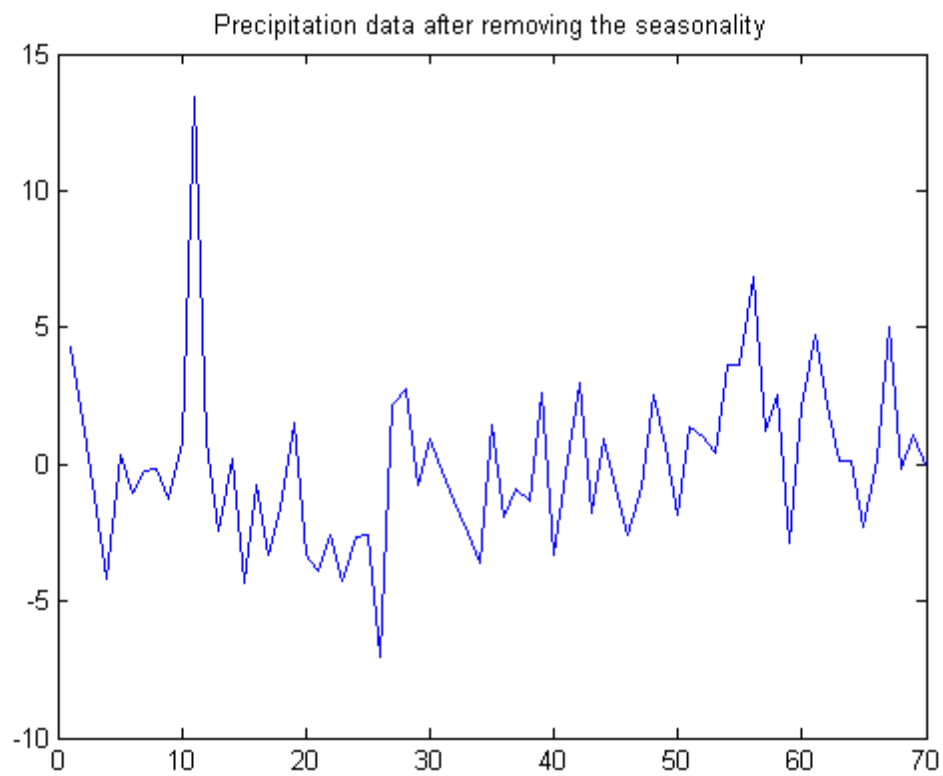
figure(2)
plot(t2, yeartot2) % plot after removing the seasonality
title('Precipitation data after removing the seasonality')

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% It seems to have an autocorrelated behavior in the de-seasoned
% precipitation values. So we will model the data with an autoregression
% equation

acf1 = makeacf(yeartot2,20);
title(['autoregression model']);
% We can see in the graph tha there is no correlation behavior in our data.
```





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