clear all

close all

clc

load X.mat

xdate=X{:,1};

xv=X{:,2};

xv = xv(~isnan(xv))

%%%visulaising given data

plot(1:1:length(xv),xv,'r')

xlabel('Time')

ylabel('Temperature')

title('Temperature variation over the years')

t=1:1:length(xdate);

y=xv;

yold=y

d\_poly=3;

d\_periodic=6;

T=365;

t=1:1:length(y)

[A,c]=lsfit\_poly\_periodic(t,y,d\_poly,d\_periodic,T)

% y = poly\_periodic(t,c,d\_poly,d\_periodic, T)

m=length(t);

y1=zeros(m,1);

c\_poly=c(1:d\_poly+1);

c\_periodic=c(d\_poly+2:end);

c\_poly=c\_poly'

for i=0:d\_poly

temp=t.^i;

y1=y1+temp'\*c\_poly(i+1)';

end

for i=1:1:d\_periodic

y1=y1+cos((2\*pi\*i/T)\*t)'\*c\_periodic(2\*i-1);

y1=y1+sin((2\*pi\*i/T)\*t)'\*c\_periodic(2\*i);

end

figure

plot(t,yold,'r')

hold on

plot(1:1:m,y1(1:m),'b\*')

xlabel('Time')

ylabel('Temperature')

title('Temperature variation over the years')

legend('Actual','Prediction')

%%%%Identifying resuide part

ynew=yold-y1 %y1 is the predicted value of trend+seasonality model

figure

plot(1:1:m,ynew,'r')

%%%performing stationality test in residue to identify noise

% %Adf test (null hypothesis is not stationary)

adf\_test=adftest(ynew)

%

% %kpss test (null hypothesis is stationary)

kpss\_test=kpsstest(ynew)

figure

parcorr(ynew)

figure

autocorr(ynew)

%

%local model

Mdl1=arima(2,0,1) %defining the model

md=estimate(Mdl1,ynew) % estimating parameters

ylocal = infer(md,ynew); %output vlaues

%

ylast = ynew-ylocal %residue noise

kp=kpsstest(ylast)

ad=adftest(ylast)

%

% % %ylast=simulate(md,m)

% % figure

% % % plot(t,ylast,'r')

% % % hold on

% % plot(1:1:m,ylast,'b\*')

%

%

% figure

% autocorr(ylast)

% %

% figure

% parcorr(ylast)

%

%

yfinal=y1+ylocal;

figure

plot(t,y,'r')

hold on

plot(1:1:m,yfinal,'b\*')

%

%