clear all

close all

clc

%cp\_data = load('data');

data = [175 0.910;

200 0.910;

225 0.911;

250 0.913;

275 0.915;

300 0.918;

325 0.923;

350 0.928;

375 0.934;

400 0.941;

450 0.956;

500 0.972;

550 0.988;

600 1.003;

650 1.017;

700 1.031;

750 1.043;

800 1.054;

850 1.065;

900 1.074;

950 1.082;

1000 1.090;

1050 1.097;

1100 1.103;

1150 1.109;

1200 1.115;

1250 1.120;

1300 1.125;

1350 1.130;

1400 1.134;

1500 1.143;

1600 1.151;

1700 1.158;

1800 1.166;

1900 1.173;

2000 1.181;

2100 1.188;

2200 1.195;

2300 1.202;

2400 1.209;

2500 1.216;

2600 1.223;

2700 1.230;

2800 1.236;

2900 1.243;

3000 1.249;

3500 1.276;

4000 1.299;

4500 1.316;

5000 1.328;

5500 1.337;

6000 1.344

];

%extracting temperature data (1st column) from the array data

%extracting specific heat(cp) data (2nd column) from the array data

specificHeat.temp=data(:,1);

specificHeat.cp=data(:,2);

display(specificHeat)

disp(specificHeat.temp)

disp(specificHeat.cp)

t1=table(specificHeat.temp,specificHeat.cp,'VariableNames',{'Temperature','cp'})

%curve fit

%assuming cp to be a linear function of temperature, cp= a\*T + b

%Using inbuilt function for curve fitting

co\_eff1 = polyfit(t1.Temperature,t1.cp,1);

predicted\_cp1 =polyval(co\_eff1,t1.Temperature);

co\_eff3 = polyfit(t1.Temperature,t1.cp,3);

predicted\_cp3 =polyval(co\_eff3,t1.Temperature);

co\_eff6 = polyfit(t1.Temperature,t1.cp,6);

predicted\_cp6 =polyval(co\_eff6,t1.Temperature);

%plotting Specific Heat(cp) against Temperature curve

figure(1)

plot(t1.Temperature,t1.cp,'linewidth',3)

hold on

plot(t1.Temperature,predicted\_cp1,'linewidth',3,'color','r')

xlabel('Temperature')

ylabel('Specific Heat[KJ/Kmol-K]')

legend('Original dataset','location','southeast')

title('Original Dataset')

figure(2)

plot(t1.Temperature,t1.cp,'linewidth',3)

hold on

plot(t1.Temperature,predicted\_cp3,'linewidth',3,'color','r')

xlabel('Temperature')

ylabel('Specific Heat[KJ/Kmol-K]')

legend('Original dataset','location','southeast')

title('Original Dataset')

figure(3)

plot(t1.Temperature,t1.cp,'linewidth',3)

hold on

plot(t1.Temperature,predicted\_cp6,'linewidth',3,'color','r')

xlabel('Temperature')

ylabel('Specific Heat[KJ/Kmol-K]')

legend('Original dataset','location','southeast')

title('Original Dataset')

sum=0;

x=t1.cp(:,end);

for i=1:length(x)

sum=sum+t1.cp(i,end);

end

mean=sum/length(x);

ssr=0;

for j=1:length(x)

ssr=ssr+(predicted\_cp1(j)-mean)^2;

end

sse=0;

for k=1:50

sse=sse+(t1.cp(k,end)-predicted\_cp1(k))^2;

end

sst=ssr+sse;

r=ssr/sst;

disp('R square=');

disp(r)

ssr3=0;

for j=1:length(x)

ssr3=ssr3+(predicted\_cp3(j)-mean)^2;

end

sse3=0;

for k=1:50

sse3=sse3+(t1.cp(k,end)-predicted\_cp3(k))^2;

end

sst3=ssr3+sse3;

r3=ssr3/sst3;

disp('R square3=');

disp(r3)

ssr6=0;

for j=1:length(x)

ssr6=ssr6+(predicted\_cp6(j)-mean)^2;

end

sse6=0;

for k=1:50

sse6=sse6+(t1.cp(k,end)-predicted\_cp6(k))^2;

end

sst6=ssr6+sse6;

r6=ssr6/sst6;

disp('R square6=');

disp(r6)

%result=runtests("SpecificHeat");