Jeffery Schons

**Cl vs. a curve fitting.**

**Program:**

clear, clc

% Jeffery Schons project 3 aero 261

tic

%read in the alpha, Cl

%alpha = x

%Cl = y

table=dlmread('alphavscl.txt',' ');

alphagiven=table(:,1);

Clgiven=table(:,2);

for angle=alphagiven(1)+1:alphagiven(7)+1

alpha=angle-1;

alphatable(angle)=alpha;

if angle<alphagiven(2)+2

[y] = Linear\_region(alpha,alphagiven(1),alphagiven(2),Clgiven(1),Clgiven(2));

Cl(angle)=y;

elseif angle<alphagiven(4)+2

[y] = quadratic\_region(alpha,alphagiven(2),alphagiven(3),alphagiven(4),Clgiven(2),Clgiven(3),Clgiven(4));

Cl(angle)=y;

elseif angle<alphagiven(6)+1

[y] = quadratic\_region(alpha,alphagiven(4),alphagiven(5),alphagiven(6),Clgiven(4),Clgiven(5),Clgiven(6));

Cl(angle)=y;

else

[y]= Linear\_region(alpha,alphagiven(6),alphagiven(7),Clgiven(6),Clgiven(7));

Cl(angle)=y;

end

end

alphaneg=-alphatable;

Clneg=-Cl;

Cltotal=[Clneg,Cl];

alphatotal=[alphaneg,alphatable];

figure(1)

plot(alphatotal, Cltotal)

title('alpha vs Cl')

xlabel('alpha')

ylabel('Cl')

toc

**Functions:**

function [y] = Linear\_region(x,x0,x1,y0,y1)

%calculates Linear region

y=(((y1-y0)/(x1-x0))\*(x-x0))+y0;

end

function [y] = quadratic\_region(x,x0,x1,x2,y0,y1,y2)

%calculates quadratic region

A=(y2/((x2-x0)\*(x2-x1)))+(y1/((x1-x0)\*(x1-x2)))+(y0/((x0-x1)\*(x0-x2)));

B=-((y2\*(x0+x1))/((x2-x0)\*(x2-x1)))-((y1\*(x0+x2))/((x1-x0)\*(x1-x2)))-((y0\*(x1+x2))/((x0-x1)\*(x0-x2)));

C=((y2\*x0\*x1)/((x2-x0)\*(x2-x1)))+((y1\*x0\*x2)/((x1-x0)\*(x1-x2)))+((y0\*x1\*x2)/((x0-x1)\*(x0-x2)));

y=((A)\*(x^2))+((B)\*x)+C;

end

**Output**

Elapsed time is 0.022091 seconds.

