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clear all;
close all;
clc
data=xlsread('Kerr_HW1.xlsx');
x=data(:,1);
y=data(:,2);
stand_data=std(y);
plot(x,y,'*');
p=polyfit(x,y,1);
fitted=p(1)*x+p(2);
hold on
plot(x,fitted,'--');
stand_fit=std(fitted);

%%
% SEM = std(x)/sqrt(length(x));           % Standard Error
ts = tinv([0.025 0.975],length(x)-1);    % T-Score
% CI = mean(x) + ts*SEM;                  % Confidence Intervals
mean_data=mean(x);

%
m=4;
poly=polyfit(x,y,m);
for i=1:length(y)
    s(i)=(x(i) - ((poly(1)*x(i)) + (poly(2)*x(i)^3) + (poly(3)*x(i)^2)
    + poly(4)*x(i) + poly(5)))^2;
end
s_inter=sum(s);
v=length(y)-(m+1);
sxy=sqrt(((s_inter))/v);
for i=1:length(x)
    x_minus(i)=(x(i)-mean_data)^2;
end
x_minus_mean=sum(x_minus);
for i=1:length(x)
    fit_pos(i)=((poly(1)*x(i)^4) + (poly(2)*x(i)^3) +
    (poly(3)*x(i)^2)...
    + poly(4)*x(i) + poly(5))+(ts(2)*sxy)*sqrt((1/length(x))...
    +(((x(i)-mean_data)^2)/x_minus_mean));

    fit_neg(i)=((poly(1)*x(i)^4) + (poly(2)*x(i)^3) +
    (poly(3)*x(i)^2)...
    + poly(4)*x(i) + poly(5))-(ts(2)*sxy)*sqrt((1/length(x))...
    +(((x(i)-mean_data)^2)/x_minus_mean));

    data_pos(i)=((poly(1)*x(i)^4) + (poly(2)*x(i)^3) +
    (poly(3)*x(i)^2)...
    + poly(4)*x(i) + poly(5))+(ts(2)*sxy)*sqrt(1+(1/length(x))...
    +(((x(i)-mean_data)^2)/x_minus_mean));

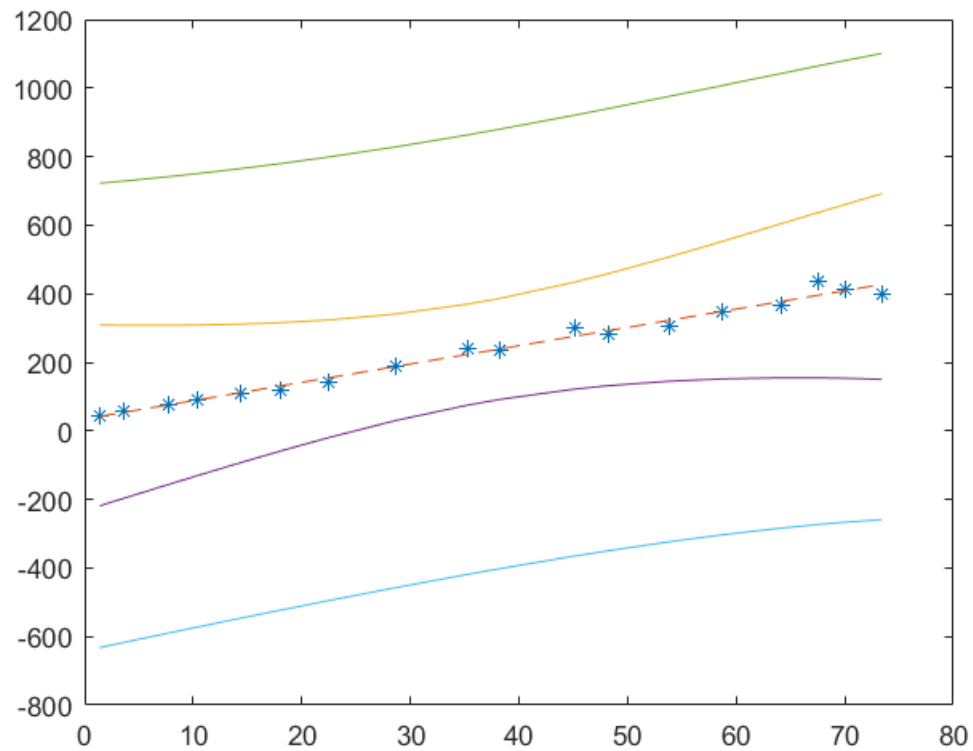
    data_neg(i)=((poly(1)*x(i)^4) + (poly(2)*x(i)^3) +
    (poly(3)*x(i)^2)...

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        + poly(4)*x(i) + poly(5))-(ts(2)*sxy)*sqrt(1+(1/length(x))...
        +(((x(i)-mean_data)^2)/x_minus_mean));
end
plot(x,fit_pos)
plot(x,fit_neg)
plot(x,data_pos)
plot(x,data_neg)

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