```
data = readtable('Al-0.5Mg.xlsx');
data.Properties.VariableNames = {'Strain','Strain Rate','T1','T2','T3','T4','T5','T6'}
```

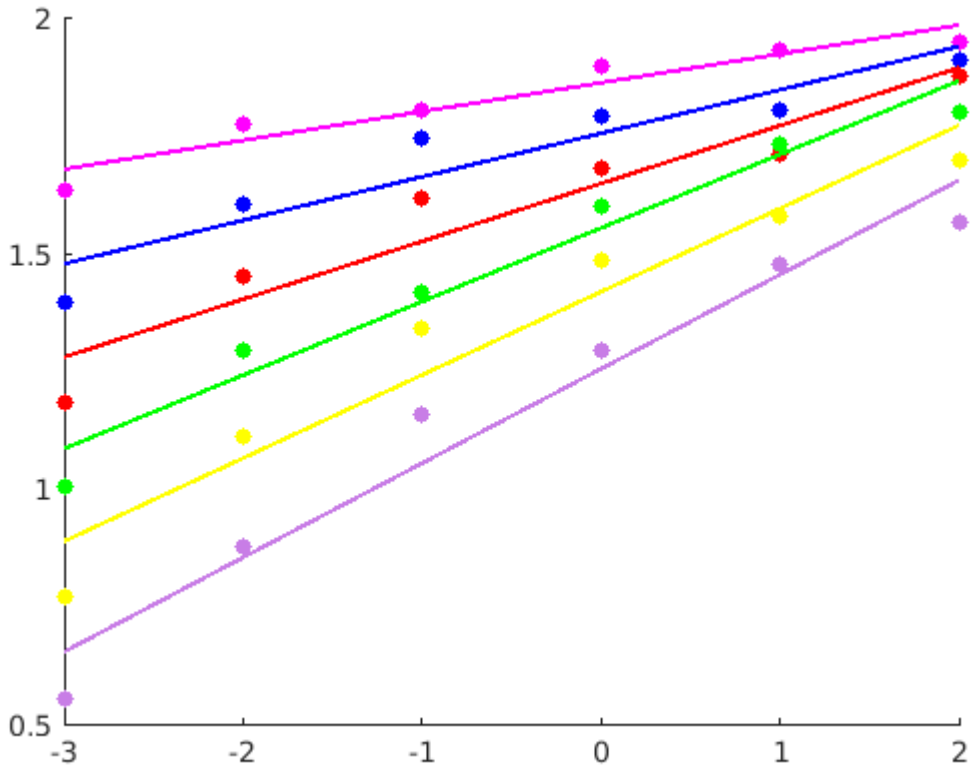
data = 31×8 table

	Strain	Strain Rate	T1	T2	T3	T4	T5	T6
1	NaN	NaN	300.0000	350.0000	400.0000	450.0000	500.0000	550.0000
2	0.1000	0.0010	39.2000	23.5000	14.3000	9.4000	5.9000	3.6000
3	0.1000	0.0100	53.9000	39.2000	26.4000	18.9000	12.6000	7.5000
4	0.1000	0.1000	53.5000	50.9000	39.0000	24.5000	21.3000	14.2000
5	0.1000	1.0000	65.1000	53.9000	42.2000	36.7000	28.5000	18.6000
6	0.1000	10.0000	66.6000	53.9000	43.8000	48.1000	34.7000	27.8000
7	0.1000	100.0000	71.0000	67.6000	63.1000	54.0000	44.0000	31.6000
8	0.2000	0.0010	42.1000	24.5000	15.0000	10.1000	5.9000	3.6000
9	0.2000	0.0100	56.8000	40.9000	27.8000	19.7000	13.0000	7.6000
10	0.2000	0.1000	58.8000	53.4000	40.9000	26.0000	21.7000	14.5000
11	0.2000	1.0000	73.0000	59.3000	45.8000	38.9000	30.0000	18.9000
12	0.2000	10.0000	77.4000	59.3000	48.1000	51.3000	36.7000	29.5000
13	0.2000	100.0000	81.3000	75.9000	71.4000	59.2000	48.1000	35.5000
14	0.3000	0.0010	43.3000	25.0000	15.4000	10.2000	5.9200	3.6000

⋮

```
data(1,:)=[];
```

```
datan= table2array(data);
% 0.1 strain
strain_1 = datan(13:18,2:end);
sr1 = strain_1(:,1);
strainlog = log10(sr1);
stress1 = strain_1(:,2:end);y = zeros(6,6);
stresslog = log10(stress1);
C = {'m','b','r','g','y',[.8 .5 .9]};
hold on
for r = 1:length(stress1)
    scatter(strainlog,stresslog(:,r),'filled','MarkerFaceColor',C{r})
    c= polyfit(log10(sr1),log10(stress1(:,r)),1);
    y(:,r) = polyval(c,log10(sr1));
    plot(log10(sr1),y(:,r),'LineWidth',1.5,'Color',C{r})
end
hold off
```




```
%slope or strain rate sensitivity
%slope or strain rate sensitivity
m= zeros(length(stress1),length(stress1));
for k =  1:length(stress1)
 for p = 1:length(stress1)
        c1= polyfit(log10(sr1),log10(stress1(:,k)),3);
        deriv = polyder(c1);
        m(p,k) = polyval(deriv,strainlog(p));
 end
end
```

```
e= (2*m./(m+1))*100;
T= 300:50:550;
%instability zone
e1= e/200;
slope= zeros(length(stress1),length(stress1));
for k =  1:length(stress1)
    for p =  1:length(stress1)
        c2= polyfit(log10(sr1),log10(e1(:,k)),3);
        deriv = polyder(c2);
        slope(p,k) = polyval(deriv,strainlog(p));

    end
end
```

```
iz = slope +m;
```

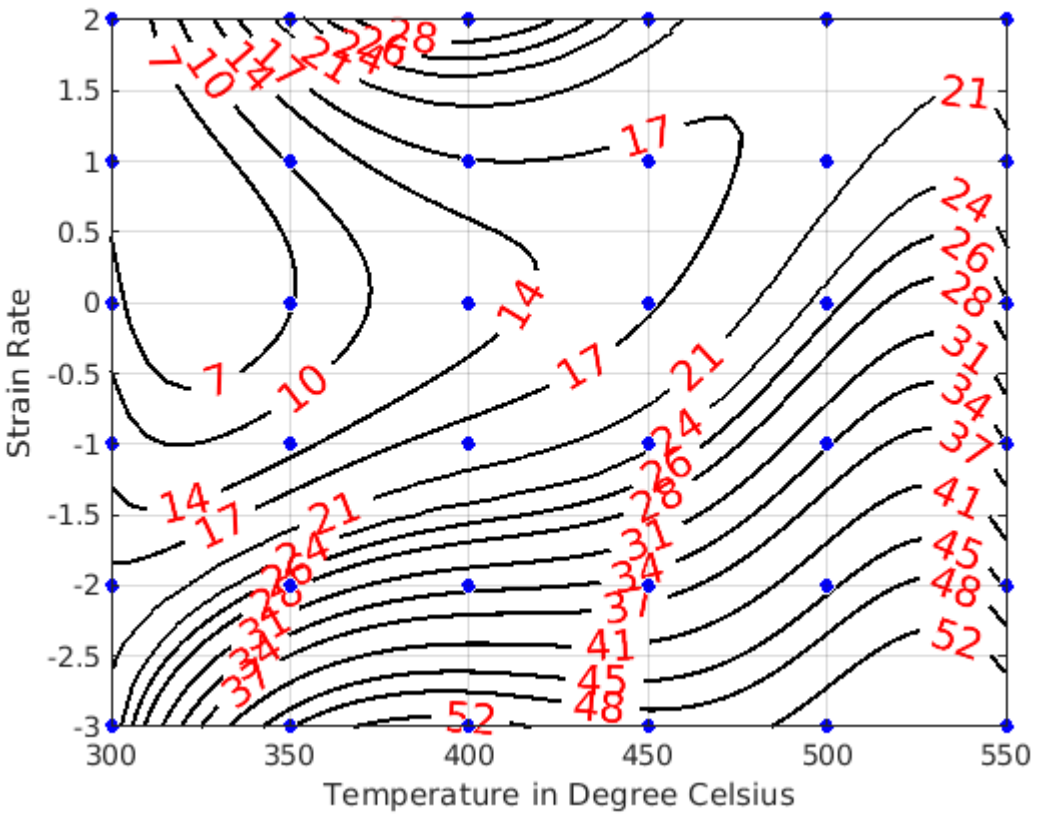
```
%% Fit: 'untitled fit 1'.
[xData, yData, zData] = prepareSurfaceData( T, strainlog, e );

% Set up fittype and options.
ft = fittype( 'poly54' );

% Fit model to data.
[fitresult, gof] = fit( [xData, yData], zData, ft, 'Normalize', 'on' );

% Make contour plot.
figure( 'Name', 'Power Dissipation' );
h = plot( fitresult, [xData, yData], zData, 'Style', 'Contour' );
% Label axes
xlabel( 'Temperature in Degree Celsius', 'Interpreter', 'none' );
ylabel( 'Strain Rate', 'Interpreter', 'none' );

grid on
clabel(h(1).ContourMatrix, h(1),'FontSize',15,'Color','Red');
set(h(1),'LineWidth',1.5,'Fill','off');
set(h(1),'LevelList',[3,7,10,14,17,21,24,26,28,31,34,37,41,45,48,52])
fig = gcf;
saveas(gcf,'pd0_5.jpg')
```



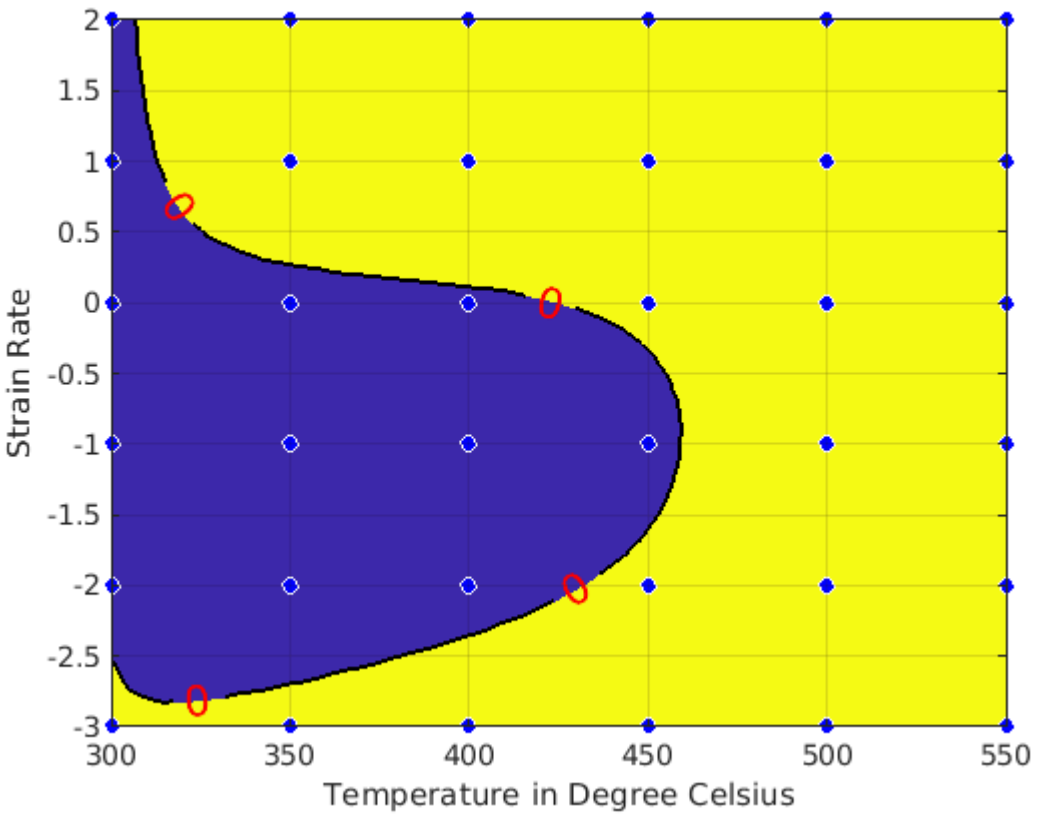
```
%% Fit: Instability map .
[xData, yData, zData] = prepareSurfaceData( T, strainlog, iz );

% Set up fittype and options.
opts = fitoptions( 'Method', 'LinearLeastSquares' );
opts.Normalize = 'on';
opts.Robust = 'LAR';

% Fit model to data.
[fitresult, gof] = fit( [xData, yData], zData, ft, opts );
```

```
Warning: Iteration limit reached for robust fitting.
```

```
% Make contour plot.
figure( 'Name', 'Instability Zones' );
w=plot( fitresult, [xData, yData], zData, 'Style', 'Contour' );
% Label axes
xlabel( 'Temperature in Degree Celsius', 'Interpreter', 'none' );
ylabel( 'Strain Rate', 'Interpreter', 'none' );
grid on
clabel(w(1).ContourMatrix, w(1),'FontSize',15,'Color','Red');
set(w(1),'LineWidth',1.5,'LevelStep',3);
fig = gcf;
saveas(gcf,'is0_5.jpg')
```




```
fig1 = imread('pd0_5.jpg');
```

```
fig2 = imread('is0_5.jpg');
op=imfuse(fig1,fig2);
imshow(op)
title('Processing Map')
```