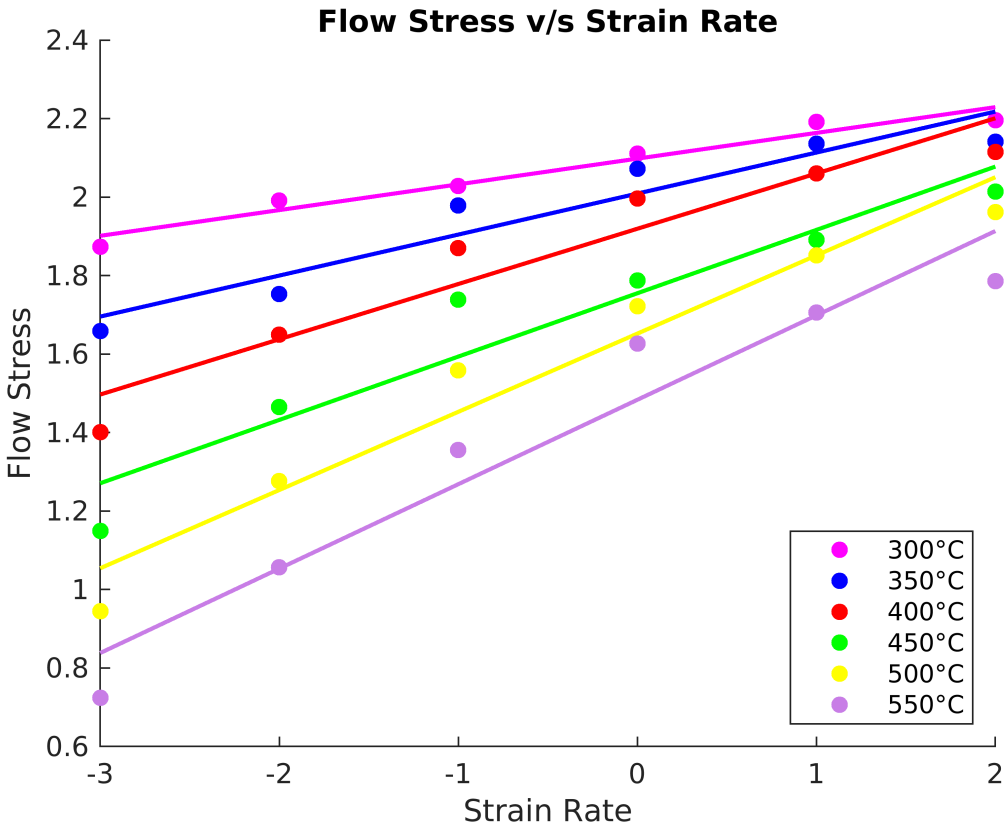
```
data = readtable('Al-1Mg.xlsx');
data.Properties.VariableNames = {'Strain','Strain Rate','T1','T2','T3','T4','T5','T6'}
```

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	75.3000	44.0000	24.0000	13.9000	8.6000	5.0000
3	0.1000	0.0100	87.1000	55.0000	44.0000	29.5000	18.6000	11.7000
4	0.1000	0.1000	99.6000	91.2000	73.9000	54.8000	36.0000	22.7000
5	0.1000	1.0000	115.3000	110.9000	95.4000	58.7000	53.4000	43.0000
6	0.1000	10.0000	130.2000	119.6000	105.8000	70.5000	68.6000	51.2000
7	0.1000	100.0000	138.1000	122.7000	118.0000	93.8000	84.3000	57.5000
8	0.2000	0.0010	74.5000	44.8000	24.0000	14.1000	8.8000	5.3000
9	0.2000	0.0100	93.4000	55.7000	44.6000	29.5000	18.6000	11.6000
10	0.2000	0.1000	102.8000	92.8000	73.3000	54.8000	36.2000	22.7000
11	0.2000	1.0000	123.2000	115.6000	96.8000	60.7000	52.9000	43.0000
12	0.2000	10.0000	145.1000	130.6000	112.6000	75.5000	70.5000	51.3000
13	0.2000	100.0000	147.5000	133.0000	126.0000	99.6000	89.7000	60.3000
14	0.3000	0.0010	74.7000	45.6000	25.2000	14.1000	8.8000	5.3000
15	0.3000	0.0100	98.1000	56.6000	44.6000	29.2000	18.9000	11.4000
16	0.3000	0.1000	106.7000	95.2000	74.2000	54.8000	36.2000	22.7000
17	0.3000	1.0000	129.0000	118.0000	99.2000	61.3000	52.7000	42.3000
18	0.3000	10.0000	155.4000	136.9000	115.0000	77.8000	71.0000	50.8000
19	0.3000	100.0000	157.0000	138.5000	130.3000	103.2000	91.6000	61.1000
20	0.4000	0.0010	76.1000	46.7000	25.2000	14.1000	8.8000	5.3200
21	0.4000	0.0100	103.6000	57.2000	45.2000	28.9000	18.9000	11.4000
22	0.4000	0.1000	109.8000	99.7000	75.1000	54.2000	36.2000	22.7000
23	0.4000	1.0000	135.0000	118.9000	99.8000	62.5000	52.2000	41.5000
24	0.4000	10.0000	160.8000	142.4000	117.3000	79.3000	72.3000	50.5000
25	0.4000	100.0000	164.8000	142.4000	131.4000	106.1000	90.6000	61.1000
26	0.5000	0.0010	76.7000	47.2000	25.2000	14.1000	8.8000	5.5000
27	0.5000	0.0100	109.1000	58.2000	45.7000	28.9000	18.1000	11.1000
28	0.5000	0.1000	113.0000	102.3000	76.3000	53.0000	36.2000	22.7000
29	0.5000	1.0000	141.2000	119.6000	100.3000	63.6000	50.9000	40.7000
30	0.5000	10.0000	166.8000	146.3000	118.0000	81.3000	74.0000	50.9000
31	0.5000	100.0000	172.6000	144.0000	130.3000	106.1000	87.7000	58.7000

```
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(r) =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
ylabel('Flow Stress');xlabel('Strain Rate');
title('Flow Stress v/s Strain Rate')
legend(Scatter,'300°C','350°C','400°C','450°C','500°C','550°C','Location','southeast');
hold off
```



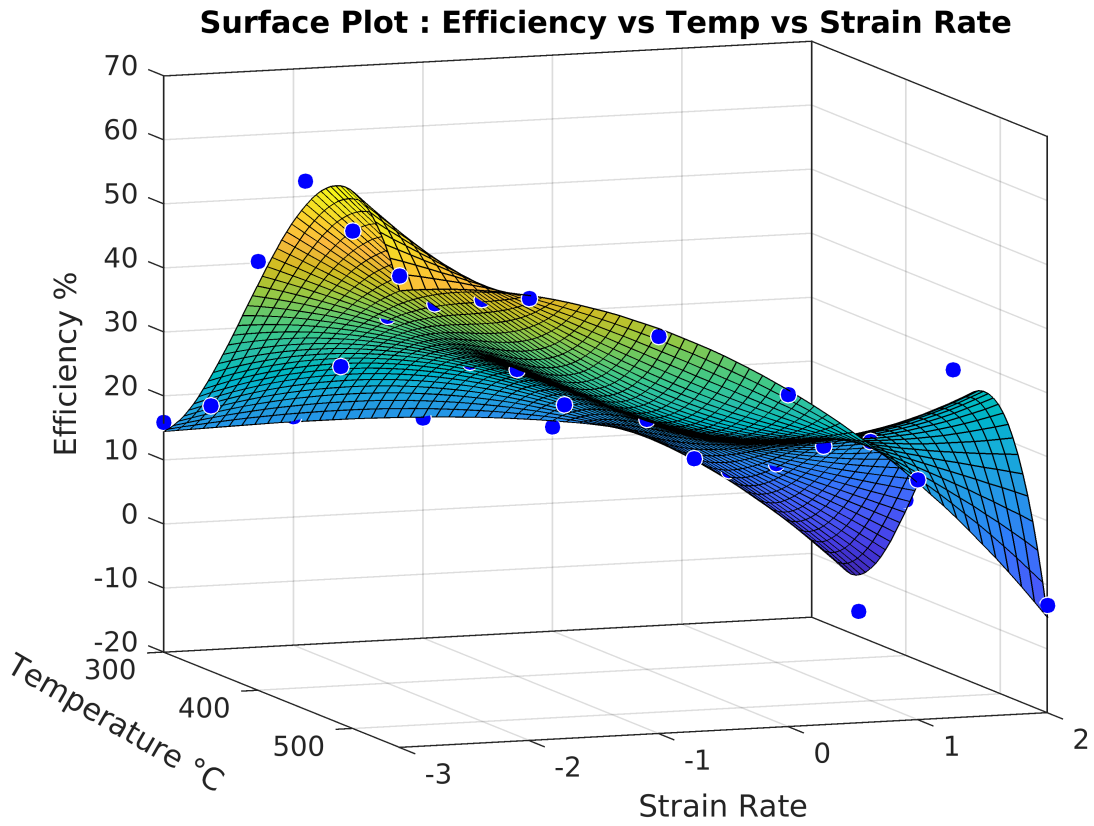

```
fprintf('Coded By: Mudit Vyas IIT INDORE')
```

```
Coded By: Mudit Vyas IIT INDORE
```

```
%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( 'poly35' );
% 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', 'Surface' );
% Label axes
xlabel( 'Temperature °C ', 'Interpreter', 'none' );
ylabel( 'Strain Rate', 'Interpreter', 'none' );
grid on
zlabel('Efficiency %')
view([70 10]);
set(get(gca,'xlabel'), 'Rotation',-30);
title('Surface Plot : Efficiency vs Temp vs Strain Rate');
```



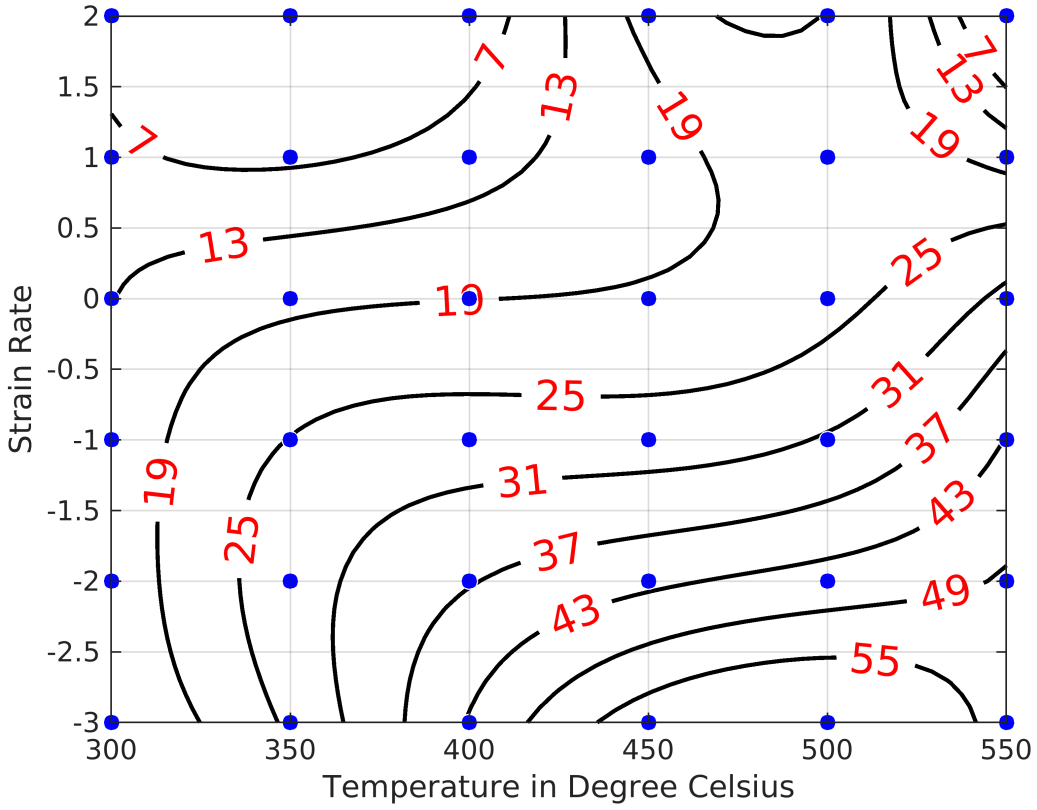

```
fprintf('Coded By: Mudit Vyas IIT INDORE')
```

```
Coded By: Mudit Vyas IIT INDORE
```

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

% Set up fittype and options.
ft = fittype( 'poly35' );
% 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',[7,13,19,25,31,37,43,49,55])

fig = gcf;
saveas(gcf,'pd0_5.jpg')
```




```
fprintf('Coded By: Mudit Vyas IIT INDORE')
```

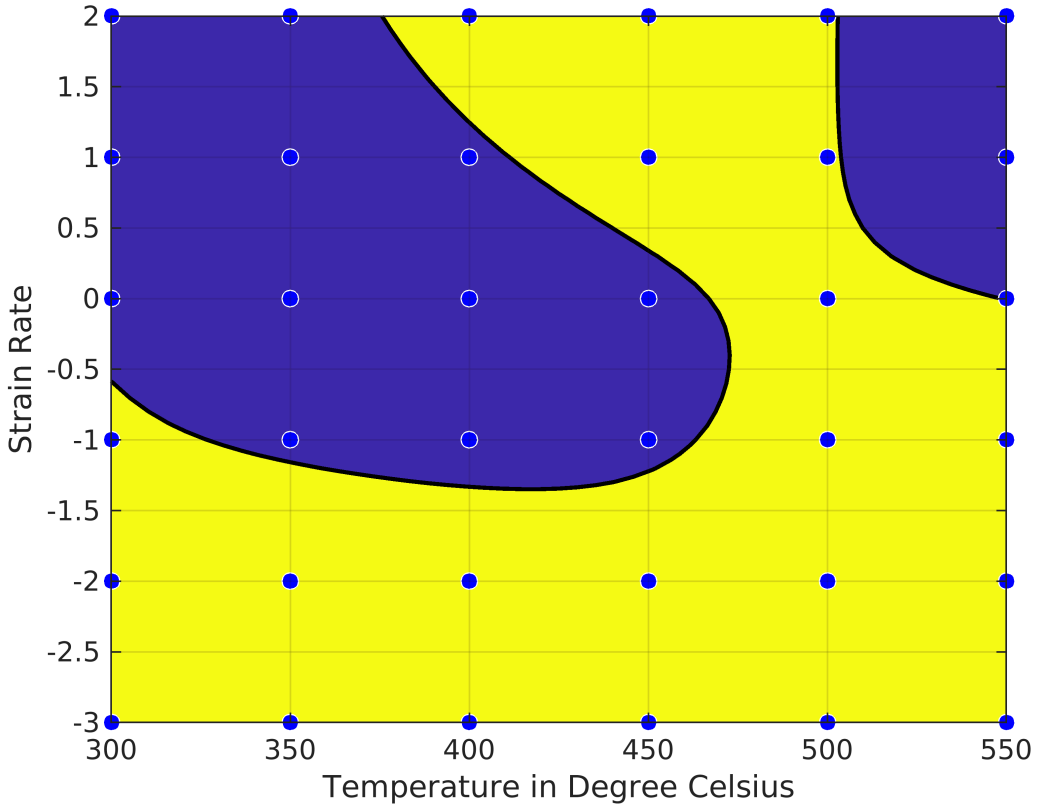
```
Coded By: Mudit Vyas IIT INDORE
```

```
%% Fit: 'untitled fit 2'.
[xData, yData, zData] = prepareSurfaceData( T, strainlog, iz );
```

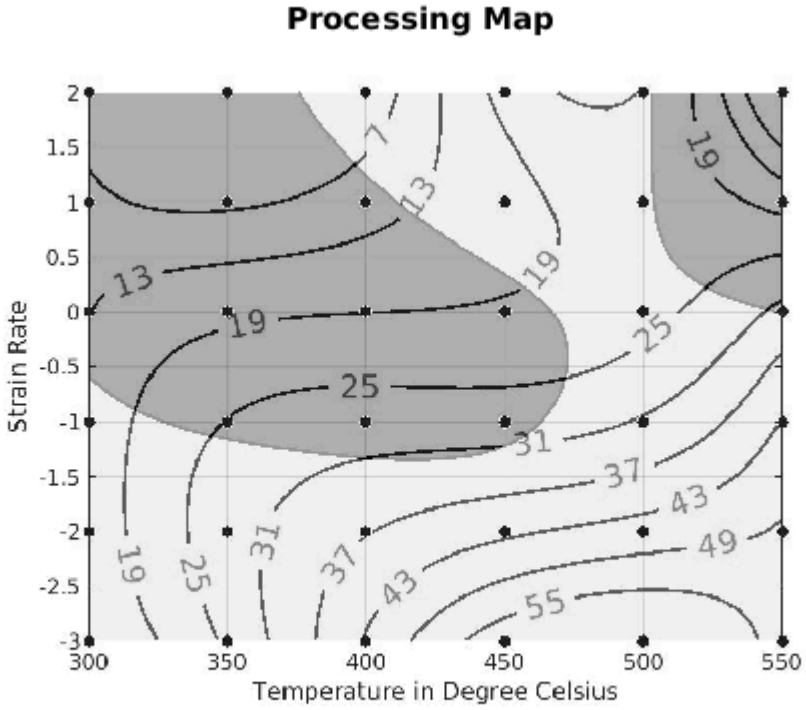
```
Warning: Using only the real component of complex data.
```

```
% Set up fittype and options.
ft = fittype( 'poly35' );
% Fit model to data.
[fitresult, gof] = fit( [xData, yData], zData, ft, 'Normalize', 'on' );
% Make contour plot.
figure( 'Name', 'untitled fit 2' );
w=plot( fitresult, [xData, yData], zData, 'Style', 'Contour' );
% Label axes
xlabel( 'Temperature in Degree Celsius', 'Interpreter', 'none' );

ylabel( 'Strain Rate', 'Interpreter', 'none' );
grid on
set(w(1),'LineWidth',1.5,'LevelStep',2);
fig = gcf;
saveas(gcf,'is0_5.jpg')
```




```
% BASIC IMAGE PROCESSING : SUPERIMPOSE
fig1 = imread('pd0_5.jpg');
fig2 = imread('is0_5.jpg');
fusionimage=imfuse(fig1,fig2,'falsecolor','Scaling','joint');
op=rgb2gray(fusionimage);
imshow(op);
title('Processing Map')
```


Processing Map
Strain Rate
Temperature in Degree Celsius
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
300
350
400
450
500
550
7
13
19
25
31
37
43
49
55