

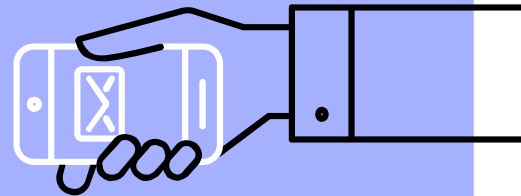
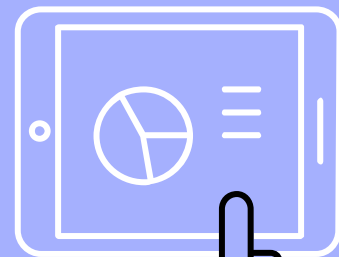


MATLAB Graphics Structure

Data Display



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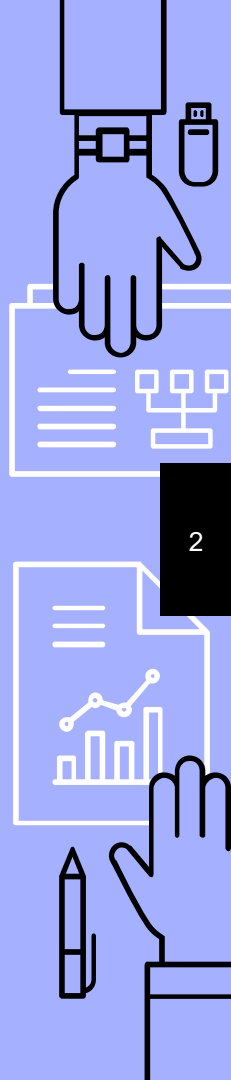


Contents

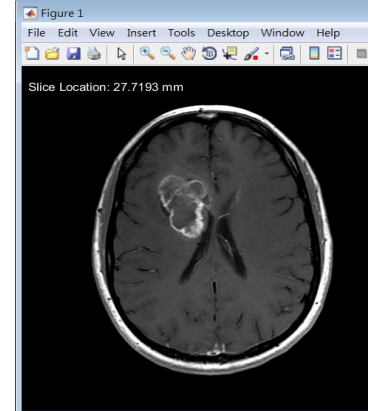
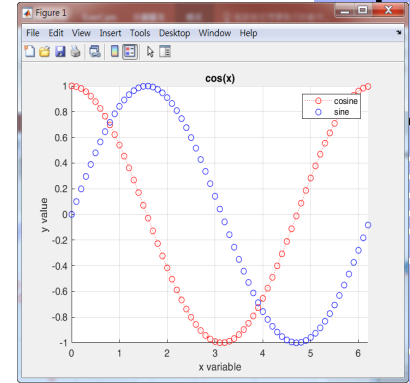
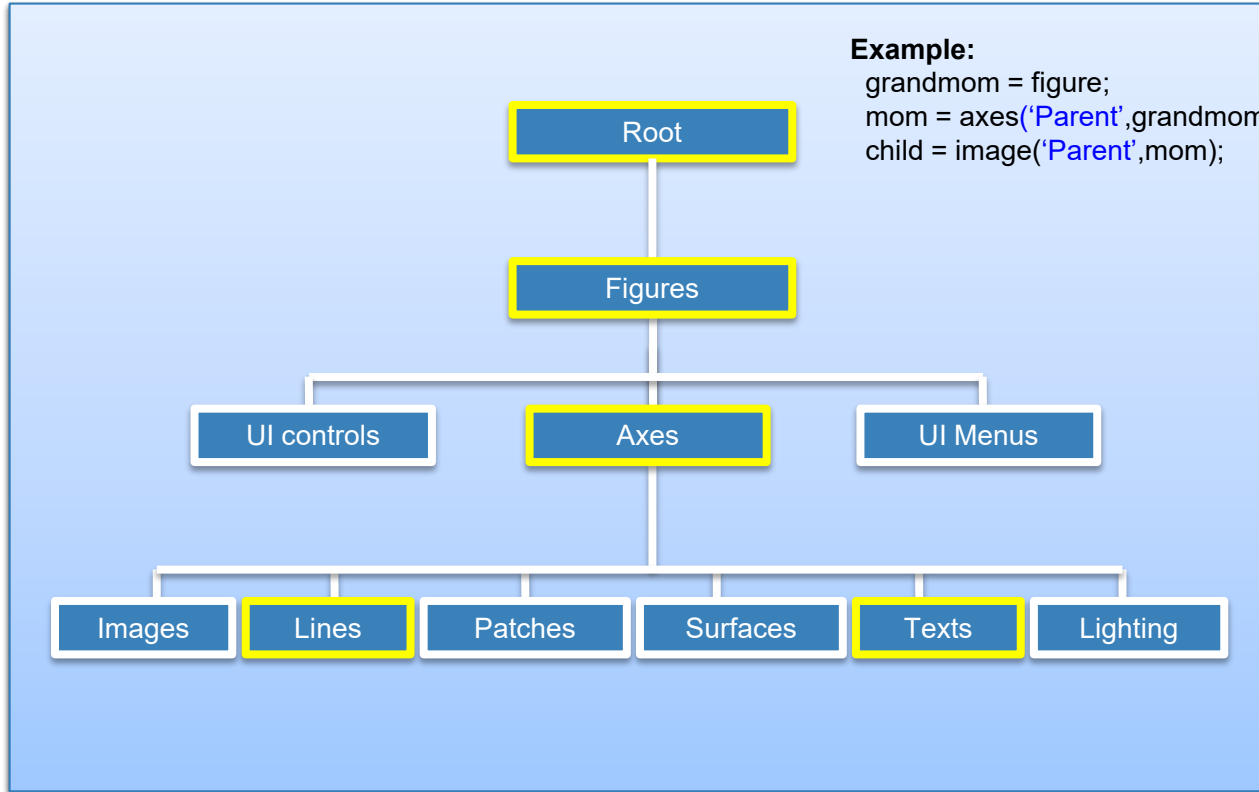
- ▶ Graphics structure and data display

Please download the handout and materials from (Week 11-1)

http://cflu.lab.nycu.edu.tw/CFLu_course_matlabimage.html



Hierarchical Relations of Objects



Plot Your First Line!

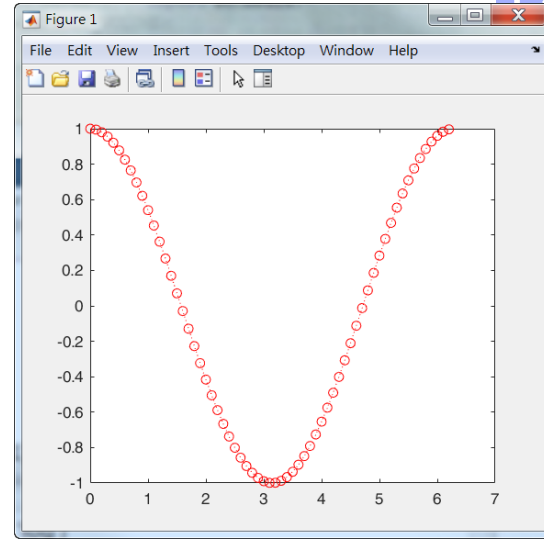
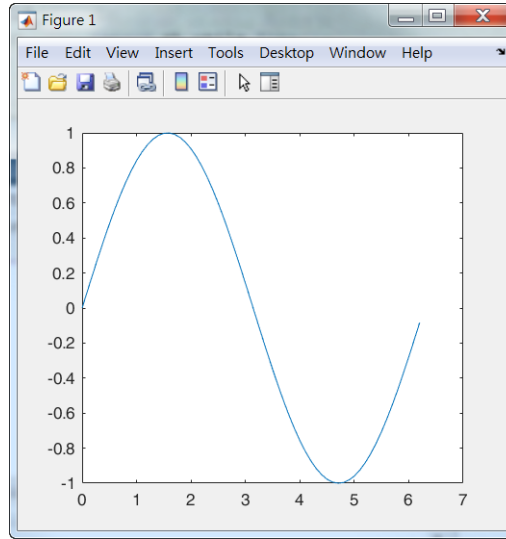
```
x=[0:0.1:2*pi];
```

```
figure,
```

```
plot(x,sin(x))
```

```
plot(x,cos(x),'ro:')
```

help plot



Plot Two Lines Together

```
x=[0:0.1:2*pi];
```

```
figure,
```

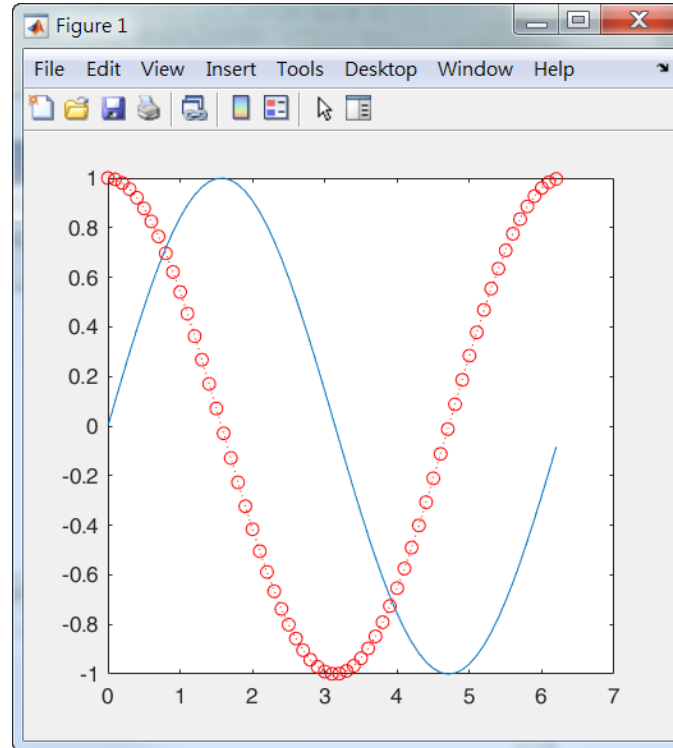
```
plot(x,sin(x))
```

```
hold on
```

```
plot(x,cos(x),'ro:')
```

HINT:

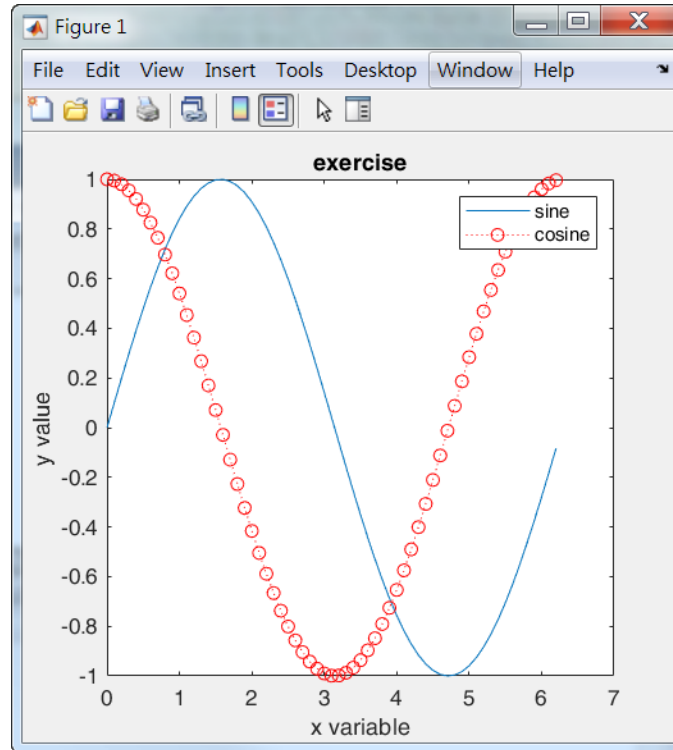
“hold on” allows subsequent graphing commands to add into the existing graph without resetting the figure.



Add Information to Your Plot

Following the last slide...

```
legend('sine','cosine')  
xlabel('x variable')  
ylabel('y value')  
title('exercise')
```

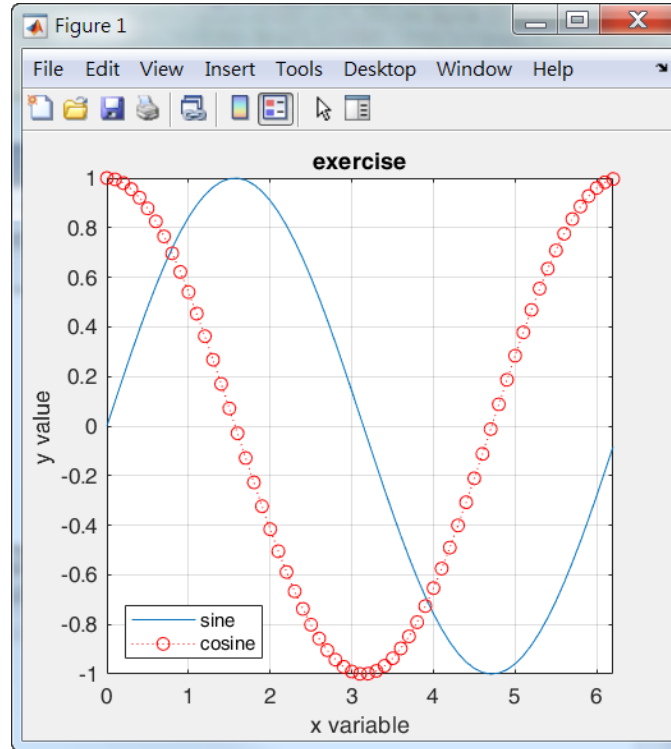


Control Axes Properties

Following the last slide...

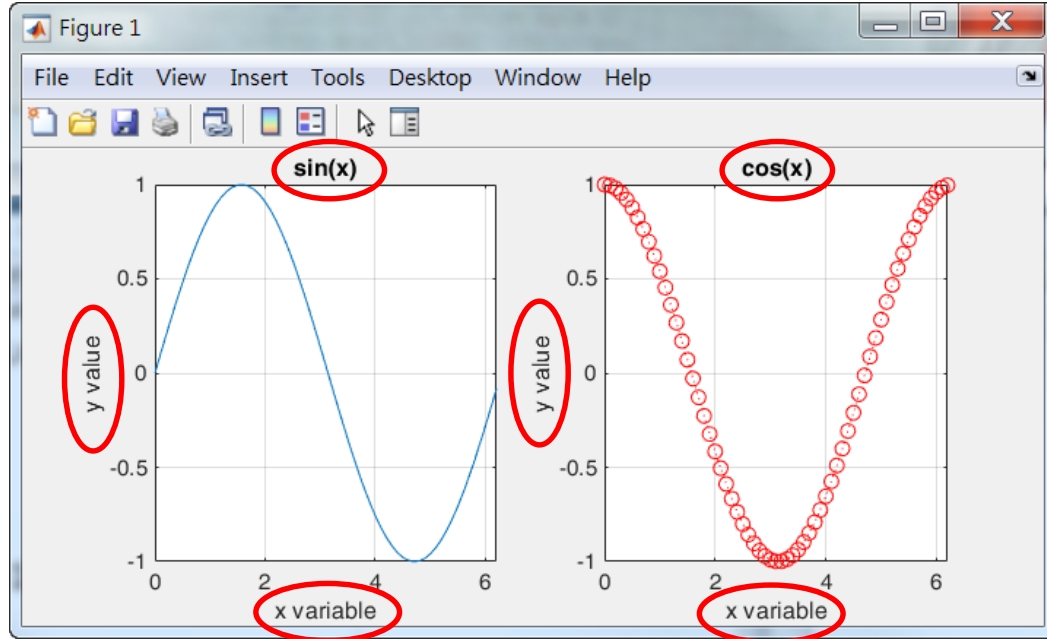
grid on,

axis([min(x) max(x) -1 1])



Plot Two Lines Separately

```
x=[0:0.1:2*pi];  
figure,  
subplot(1,2,1),  
plot(x,sin(x))  
subplot(1,2,2),  
plot(x,cos(x),'ro:')
```





Plot vs. Line

- ▶ Actually, **plot** is a kind of **line**!
- ▶ Understand the properties of **line** can help us to fully understand the usage of **plot**.

```
x=[0:0.1:2*pi];
```

```
figure,
```

```
plot(x,cos(x),'ro:')
```

```
figure,
```

```
line('xdata',x,'ydata',cos(x),'color','r','marker','o','linestyle',':');
```

Both commands print out the same results!!

Control Line Properties

<Commad Window>

set(line)

- ▶ Parent
- ▶ Xdata, Ydata, Zdata
- ▶ color
- ▶ Linestyle, Linewidth
- ▶ Marker, MarkerSize
- ▶ MarkerEdgeColor, MarkerFaceColor

```
Color
EraseMode: [ {normal} | background | xor | none ]
LineStyle: [ {-} | -- | : | - . | none ]
LineWidth
Marker: [ + | o | * | . | x | square | diamond | v | ^ | > | < | pentag
MarkerSize
MarkerEdgeColor: [ none | {auto} ] -or- a ColorSpec.
MarkerFaceColor: [ {none} | auto ] -or- a ColorSpec.
XData
YData
ZData

ButtonDownFcn: string -or- function handle -or- cell array
Children
Clipping: [ {on} | off ]
CreateFcn: string -or- function handle -or- cell array
DeleteFcn: string -or- function handle -or- cell array
BusyAction: [ {queue} | cancel ]
HandleVisibility: [ {on} | callback | off ]
HitTest: [ {on} | off ]
Interruptible: [ {on} | off ]
Parent
Selected: [ on | off ]
SelectionHighlight: [ {on} | off ]
Tag
UIContextMenu
UserData
Visible: [ {on} | off ]
```

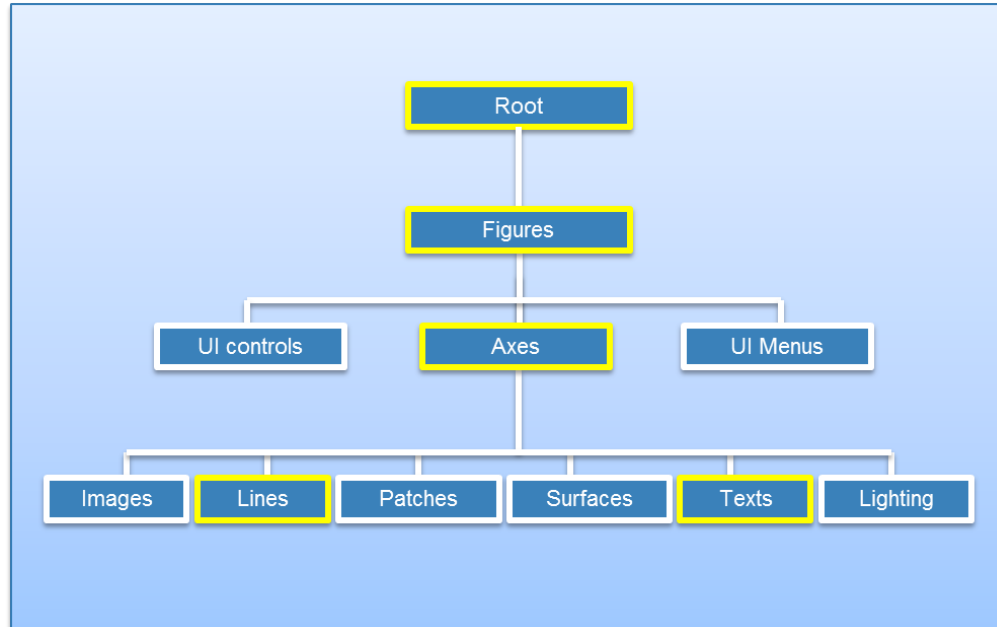
Control Line Properties: **handle**

▶ Please open MImaterials_L11_1\DemoLine.m

▶ `set(figure)`

▶ `set(axes)`

▶ `set(line)`

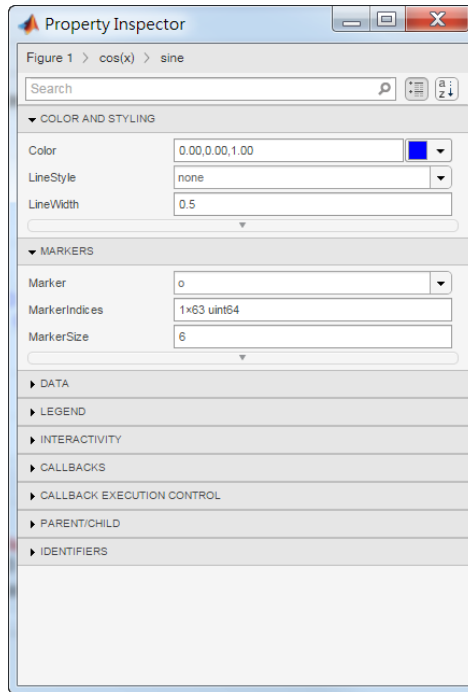


Learn the usage of set

```
5 - x=[0:0.1:2*pi];
6
7 - handle.fig1=figure;
8 - handle.axes1=axes('parent',handle.fig1);
9 - handle.line1=line('parent',handle.axes1);
10 - handle.line2=line('parent',handle.axes1);
11
12 - set(handle.line1,'xdata',x,'ydata',cos(x),'color','r','marker','o','linestyle',':');
13 - set(handle.line2,'xdata',x,'ydata',sin(x),'color','b','marker','o','linestyle','none');
14
15 - legend('cosine','sine')
16 - xlabel('x variable')
17 - ylabel('y value')
18 - title('cos(x)')
19 - grid on,
20 - axis([min(x) max(x) -1 1])
```

propedit

▶ Property editor



Property Inspector

Figure 1 > cos(x) > sine

Search

▼ COLOR AND STYLING

Color: 0.00,0.00,1.00

LineStyle: none

LineWidth: 0.5

▼ MARKERS

Marker: o

MarkerIndices: 1×63 uint64

MarkerSize: 6

▶ DATA

▶ LEGEND

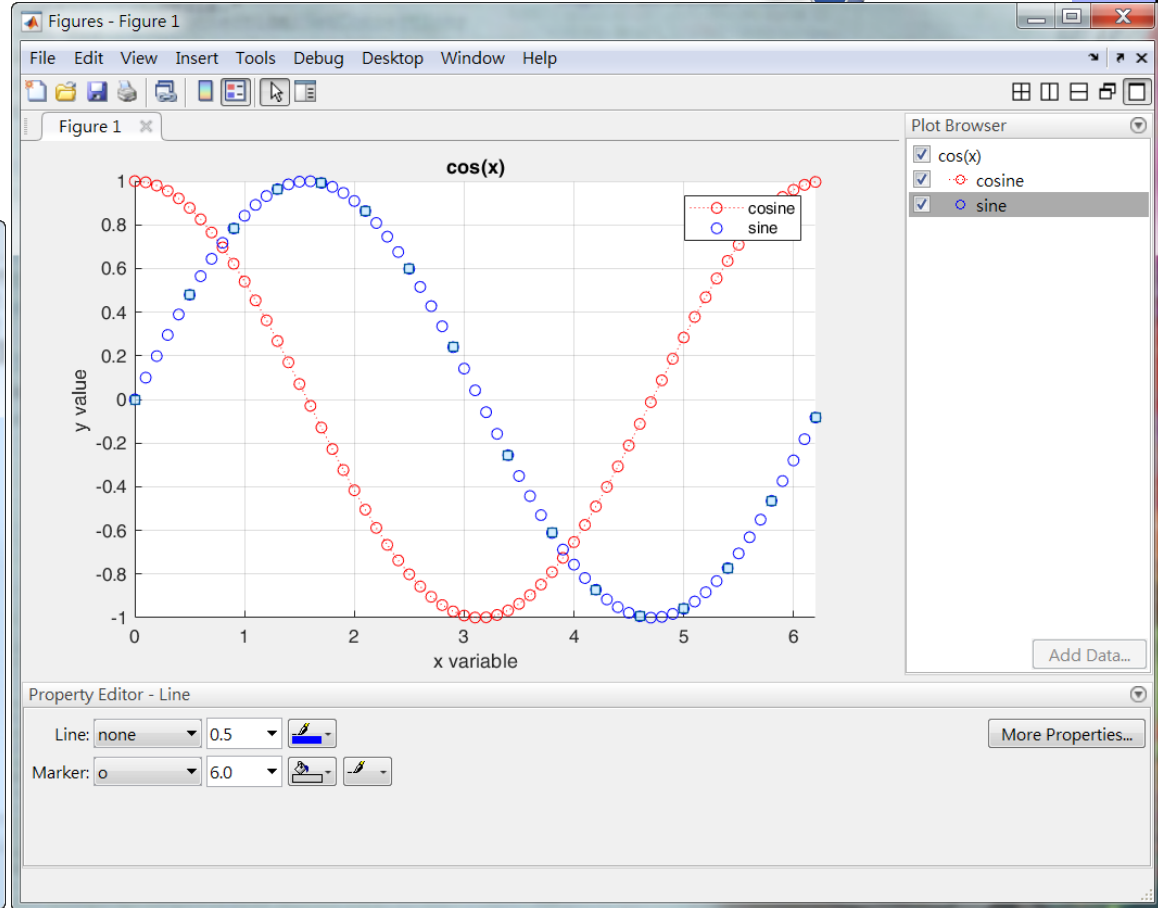
▶ INTERACTIVITY

▶ CALLBACKS

▶ CALLBACK EXECUTION CONTROL

▶ PARENT/CHILD

▶ IDENTIFIERS



Figures - Figure 1

File Edit View Insert Tools Debug Desktop Window Help

Figure 1

cos(x)

y value

x variable

Plot Browser

- cos(x)
- cosine
- sine

Property Editor - Line

Line: none 0.5

Marker: o 6.0

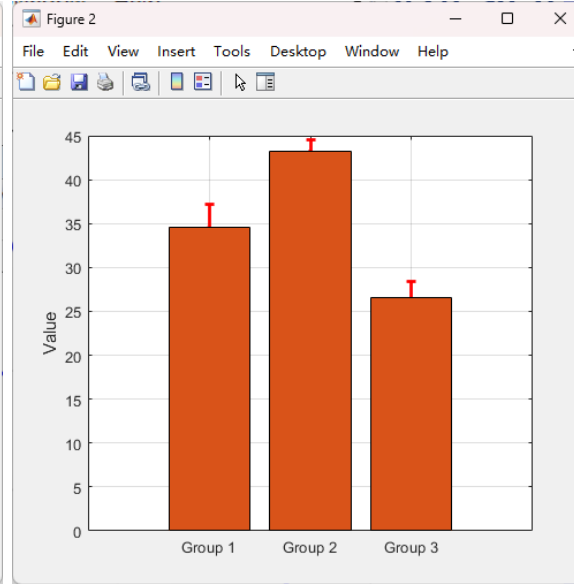
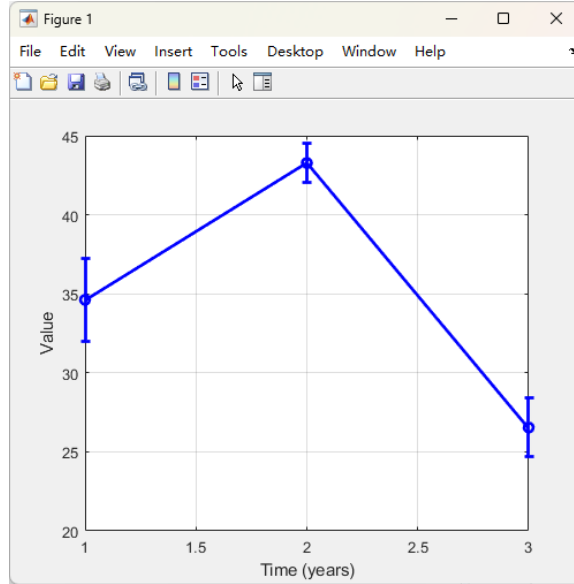
More Properties...

x variable	cosine (red circles)	sine (blue squares)
0	1.00	0.00
1	0.54	0.84
2	-0.42	0.91
3	-0.99	0.56
4	-0.76	-0.64
5	0.28	-0.96
6	0.96	-0.28

Data variation - errorbar

Useful function

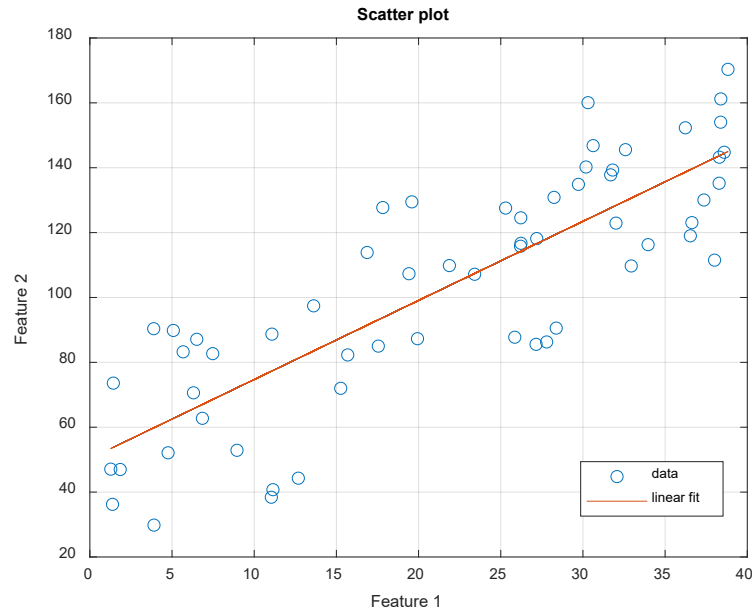
- ▶ errorbar
- ▶ bar

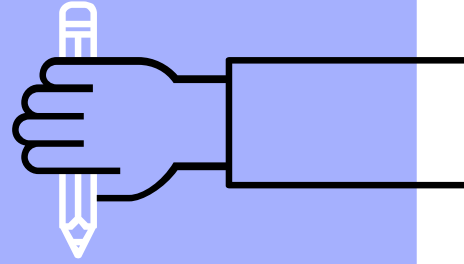


Please open and run `MImaterials_L11_1\DemoErrorBar.m`

Homework...

- ▶ Load ScatterData.mat
- ▶ Plot feature1 (x-axis) and feature2 (y-axis).
- ▶ Use `polyfit` and `polyval` to find the linear fit.
 - **Hint:** please set `N=1`
- ▶ Plot linear fit line.
- ▶ Give `xlabel`, `ylabel`, `title`, `grid`, and `legend`.





THE END

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