MA2252 Introduction to Computing

Lecture 10
Plotting

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Learning outcomes

At the end of lecture, students will be able to understand

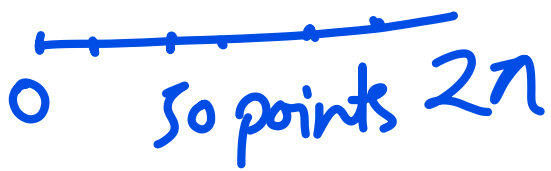
- Plotting 2D figures in MATLAB
- Basic formatting in plots

plot function

MATLAB's plot function can be used to create 2D plots.

Example: This script file creates a plot of y=sinx.

```
x=linspace(0,2*pi,50)
y=sin(x);
plot(x,y)
```



To save your figure, type savefig('filename') in the command window.

plot function (contd.)

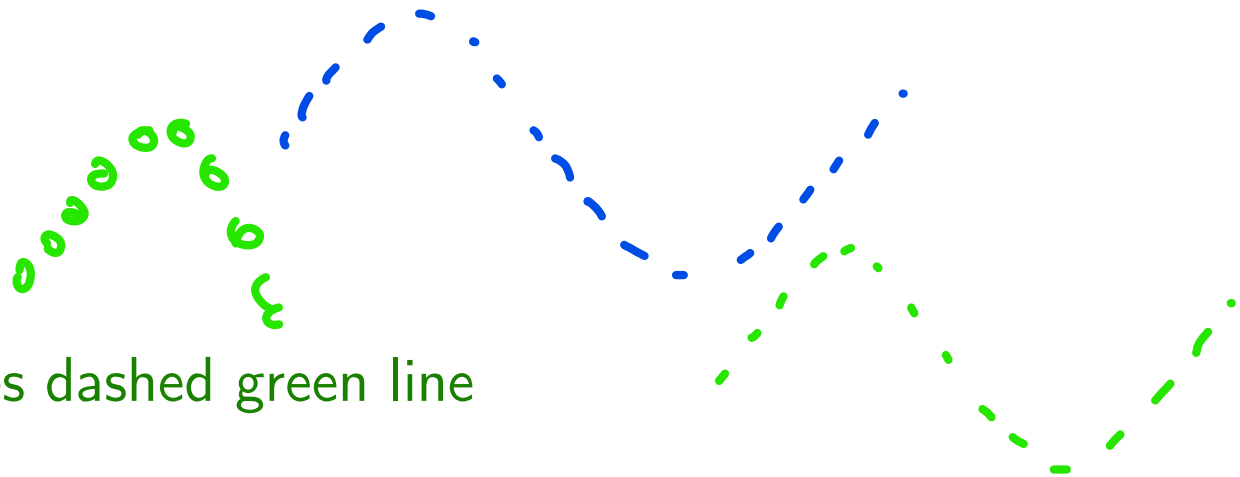
Demo

Line style, marker and color

plot(X,Y,LineSpec) creates the plot using the specified line style, marker, and color. Specify the relevant symbol as a string.

For list of colors, list of line styles and markers, refer book.

Example:

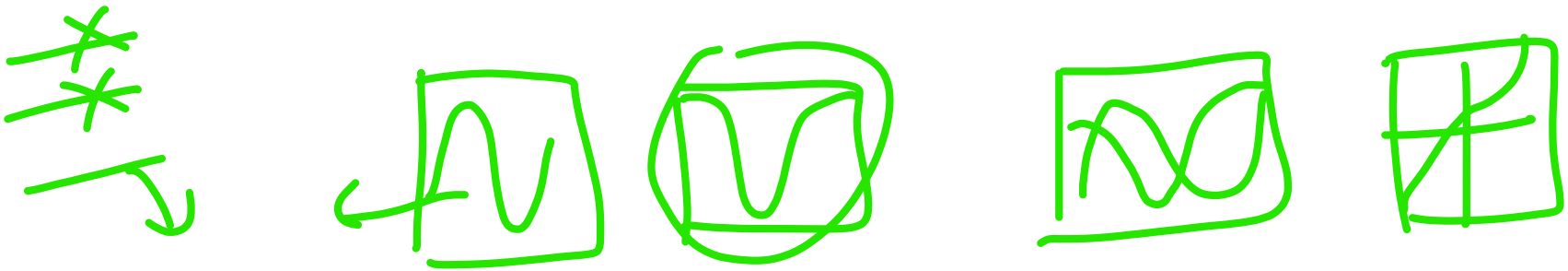


```
x=linspace(0,2*pi,50)
y=sin(x);
plot(x,y,'g- -')    %creates dashed green line
```

Line style, marker and color (contd.)

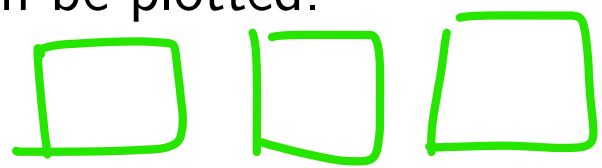
Demo

hold function



hold on

Retains the existing plot so that multiple plots can be plotted.



hold off

Sets the hold state to off and only the final plot will be plotted.

Note: By default, the hold state is off.

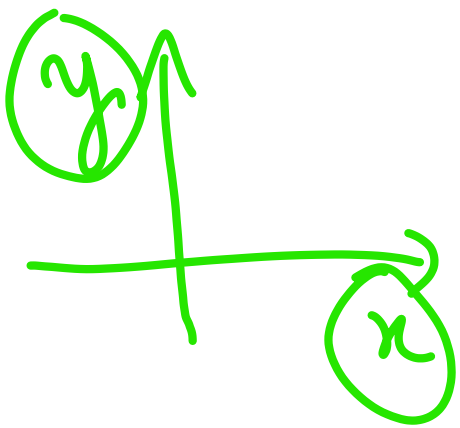
hold function (contd.)

Example:

```
x=linspace(0,2*pi,50);
hold on
plot(x,sin(x))
plot(x,cos(x))
hold off
```

Title, Axes labels and Legend

- title() function creates title of plot.
- xlabel() and ylabel() functions create labels for x and y axis respectively.
- legend(label1,label2,...) function creates labels for the plotted data.



Title, Axes labels and Legend (contd.)

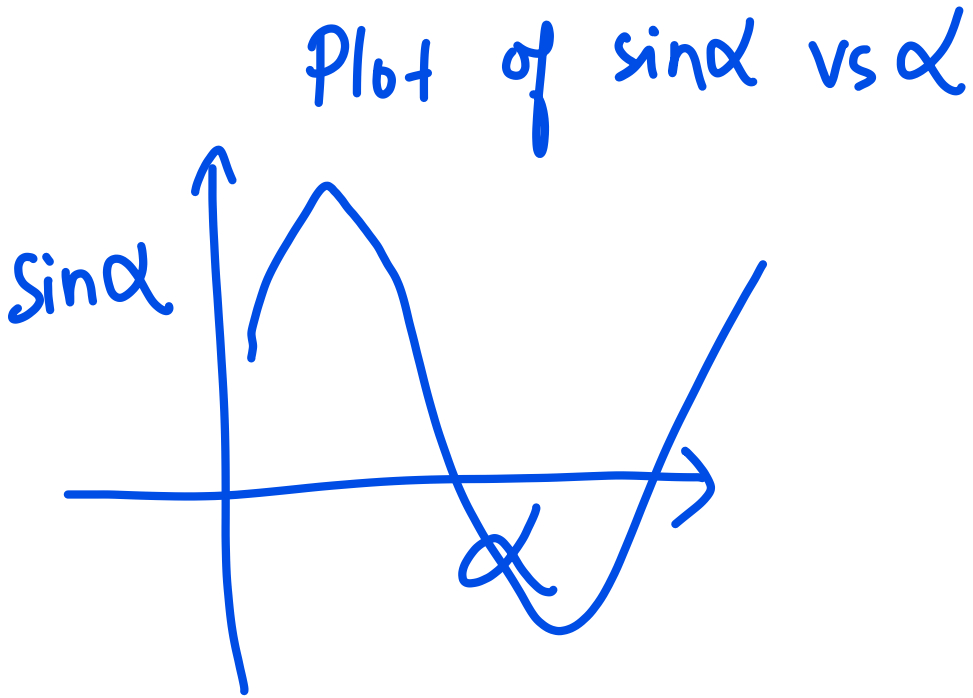
Example 1

```
x=linspace(0,2*pi,50);
hold on
plot(x,sin(x))
plot(x,cos(x))
title('Plot of sinx and cosx')
xlabel('x') ⟶ x
ylabel('y') ⟶ y
legend('sin(x)','cos(x)')
hold off
```

Title, Axes labels and Legend (contd.)

Example 2

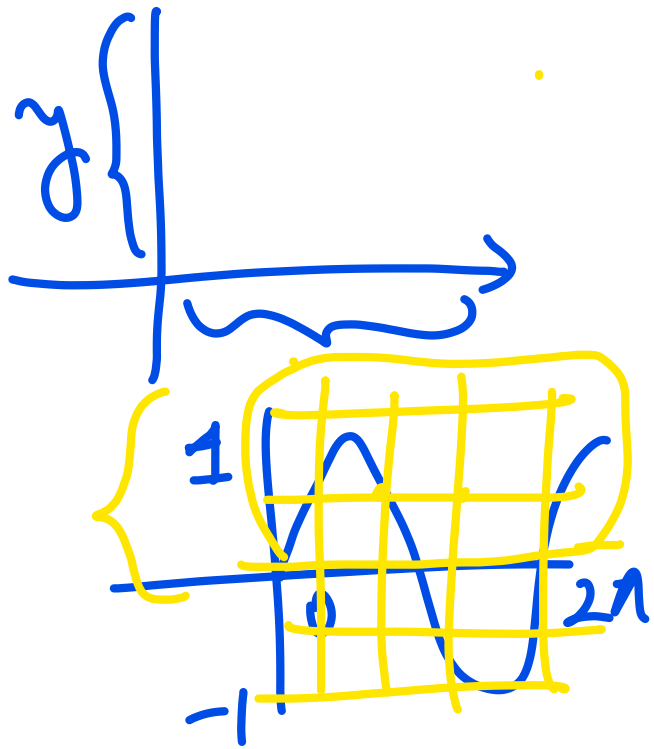
See lecture recording.



Setting axis and grid

axis([0 2π 0 1])

- axis(limits) function sets axis limits.
- 'grid on' creates a grid to the axis.
- 'grid off' removes the grid.



Here, limits takes the form of a vector [xmin xmax ymin ymax].

Setting axis and grid (contd.)

Example:

```
x=linspace(0,2*pi,50);
hold on
plot(x,sin(x))
plot(x,cos(x))
title('Plot of sinx and cosx')
xlabel('x')
ylabel('y')
legend('sin(x)','cos(x)')
axis([0 2*pi 0 1])
grid on
hold off
```

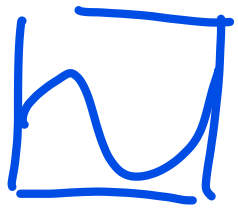
figure and close all commands

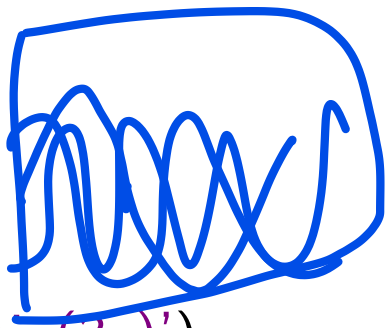
- figure command opens a new figure without overwriting the current figure.
- close all command closes all the figures.

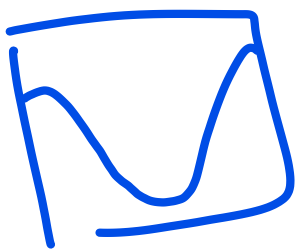
figure and close all commands (contd.)

Example:

```
close all
x=linspace(0,2*pi,50);
figure %opens Figure 1
plot(x,sin(x))
figure %opens Figure 2
%plotting graphs of sinx,sin2x and sin3x on same axes
hold on
plot(x,sin(x))
plot(x,sin(2*x))
plot(x,sin(3*x))
legend('sin(x)','sin(2x)','sin(3x)')
hold off
figure%opens Figure 3
plot(x,cos(x))
```







End of Lecture 10

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