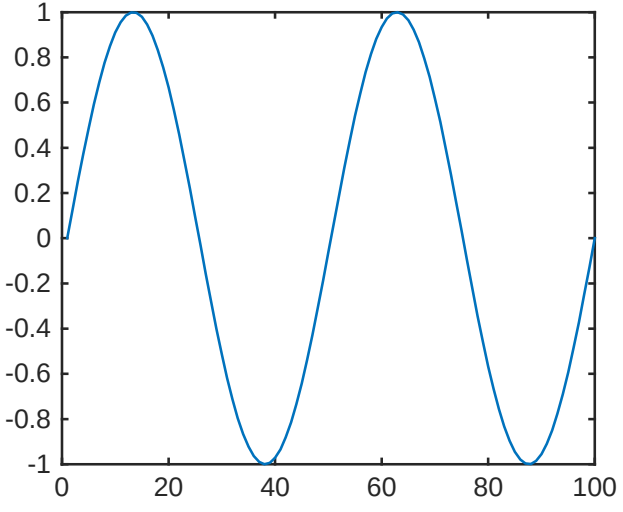
Basic Task: Plot The Signals

Plot the signal sin(x) between $0 \leq x \leq 4\pi$

- Create an x-array of 100 samples between 0 and 4π.
  - x=linspace(0,4*pi,100);
- Calculate sin(.) of the x-array
  - y=sin(x);
- Plot the y-array
  - plot(y)
  - plot(x,y)

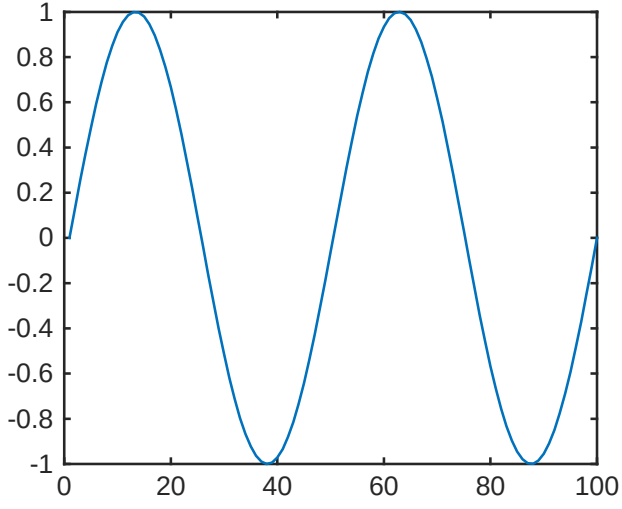


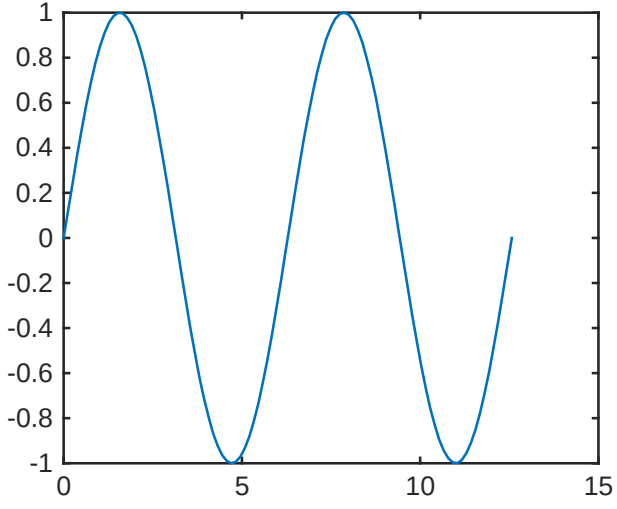
Display Facilities

- plot(.)

Example:
- x=linspace(0,4*pi,100);
- y=sin(x);
- plot(y)
- plot(x,y)

plot(y)





plot(x,y)

Plot the signal $e^{-x/3}\sin(x)$ between $0 \leq x \leq 4\pi$

- Create an x-array of 100 samples between 0 and 4π.
  - x=linspace(0,4*pi,100);
- Calculate sin(.) of the x-array
  - y=sin(x);
- Calculate $e^{-x/3}$ of the x-array
  - y1=exp(-x/3);
- Multiply the arrays y and y1

  - y2=y*y1;
  - y2=y.*y1;

Multiple Choice(single)

Points: 1

设置

- Which of the following statements will give the correct y2, which is the product of signals y and y1 ?

A y2=y*y1

B y2=y.*y1

C y2=y*y1′

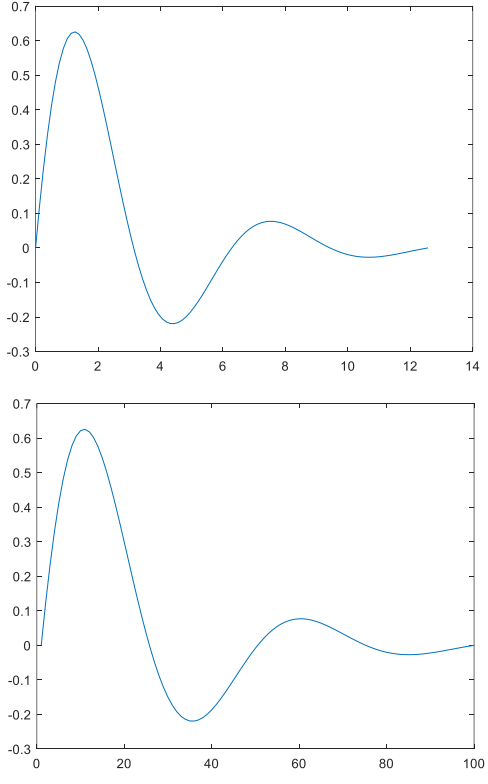
D y2=y′ *y1

```
x=linspace(0,4*pi,100);
y=sin(x);
y1=exp(-x/3);
```

提交

Plot the signal $e^{-x/3}\sin(x)$ between $0 \leq x \leq 4\pi$

- Multiply the arrays y and y1 correctly
  - y2=y.*y1;
- Plot the y2 array
  - plot (y2)
  - plot (x,y2)



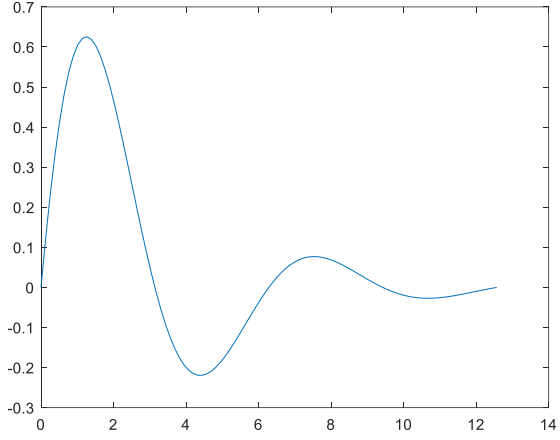
Multiple Choice(single) Points: 1

Setting

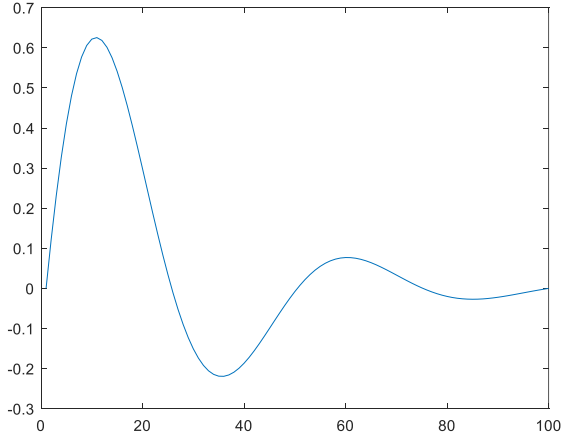
Which figure is the result of following commands

```
x=linspace(0,4*pi,100);
y=sin(x);
y1=exp(-x/3);
y2 = y.*y1;
plot(x, y2);
```

A



B

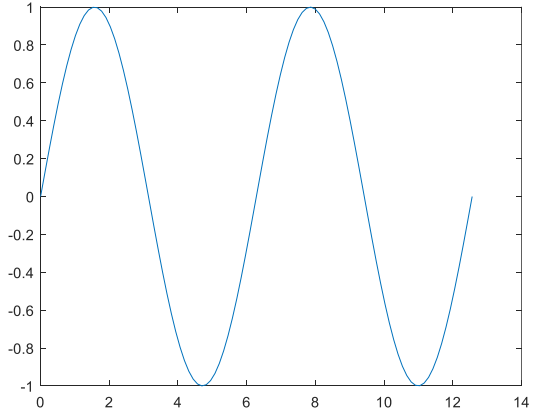


Submit

Display Facilities

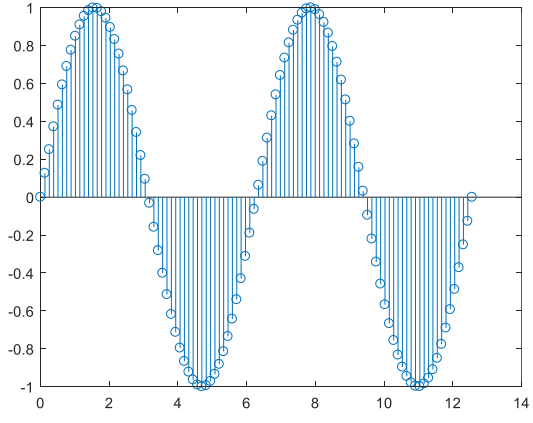
- plot(.)

Example:
- x=linspace(0,4*pi,100);
- y=sin(x);
- figure; plot(x,y)



- stem(.) （用于绘制离散数据图）

Example:
- stem(y2)
- figure; stem(x,y)



- bar(.) （绘制条形图）

Display Facilities

- title(.)

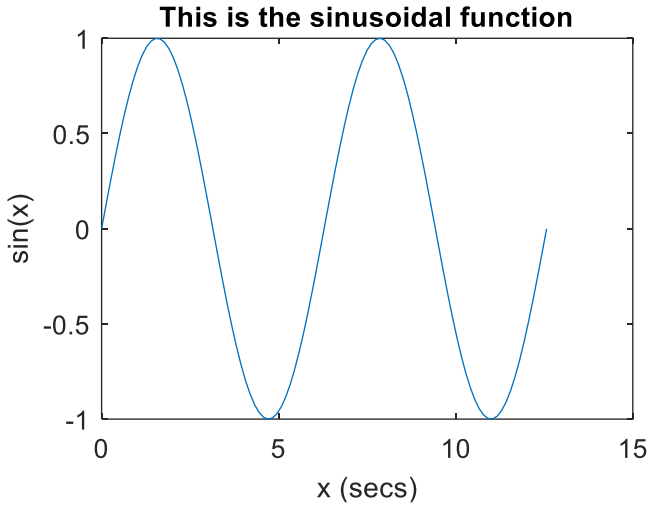
```
title('This is the sinusoidal function')
```

- xlabel(.)

```
xlabel('x (secs) ')
```

- ylabel(.)

```
ylabel('sin(x) ')
```



Display Facilities

- Plot with various line types, plot symbols and colors
  - E.g., >> plot(x, y, 'r--o')

b	blue	.	point	-	solid
g	green	o	circle	:	dotted
r	red	x	x-mark	-.	dashdot
c	cyan	+	plus	--	dashed
m	magenta	*	star	(none)	no line
y	yellow	s	square		
k	black	d	diamond		
w	white	v	triangle (down)		
		^	triangle (up)		
		<	triangle (left)		
		>	triangle (right)		
		p	pentagram		
		h	hexagram		

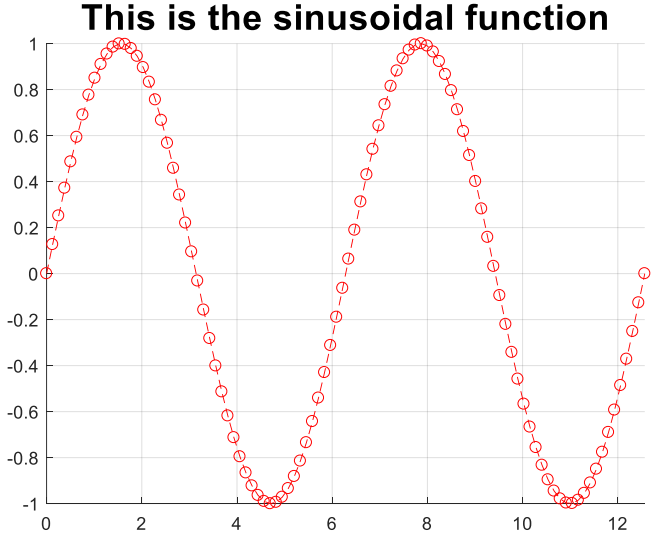
Colors

Symbols

Line type

Display Facilities

- plot(x, y, 'r--o')
- title('This is the sinusoidal function','fontsize',20)
- grid on
- box off
- axis([0 4*pi ylim])



Display Facilities

- Drawing properties (see more in Matlab help)
  - Line style, line width, line color, symbol, etc.

    ```
    >> plot(x, y, 'rx--', 'linewidth',2)
    ```

  - Font, fontsize

    ```
    >> title('Example 1', 'fontsize', 18)
    ```

  - Grid on
  - Box off
  - Axis

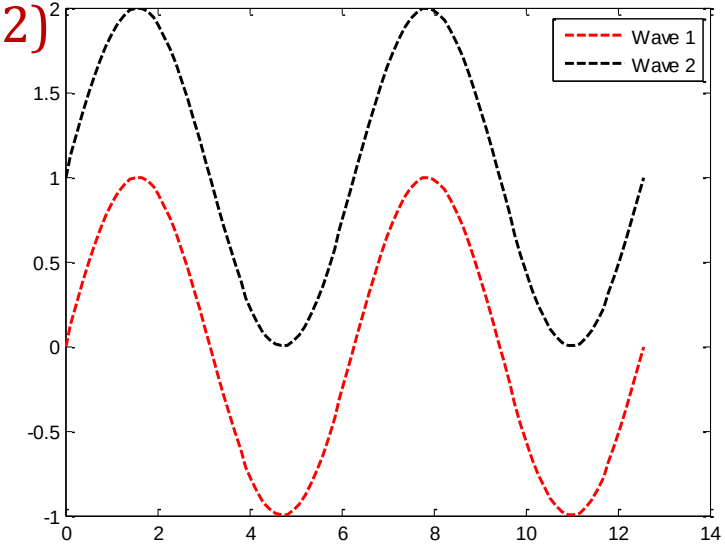
    ```
    >> axis([0 1 -1 1])
    >> axis([xlim -1 1])
    ```

Display Facilities

- More figures
  - figure
  - figure(111)
  - figure('Name', 'this is the NAME');
  - figure('position', [50 50 800 550])
- More plots in one panel
  - Hold on (hold off)

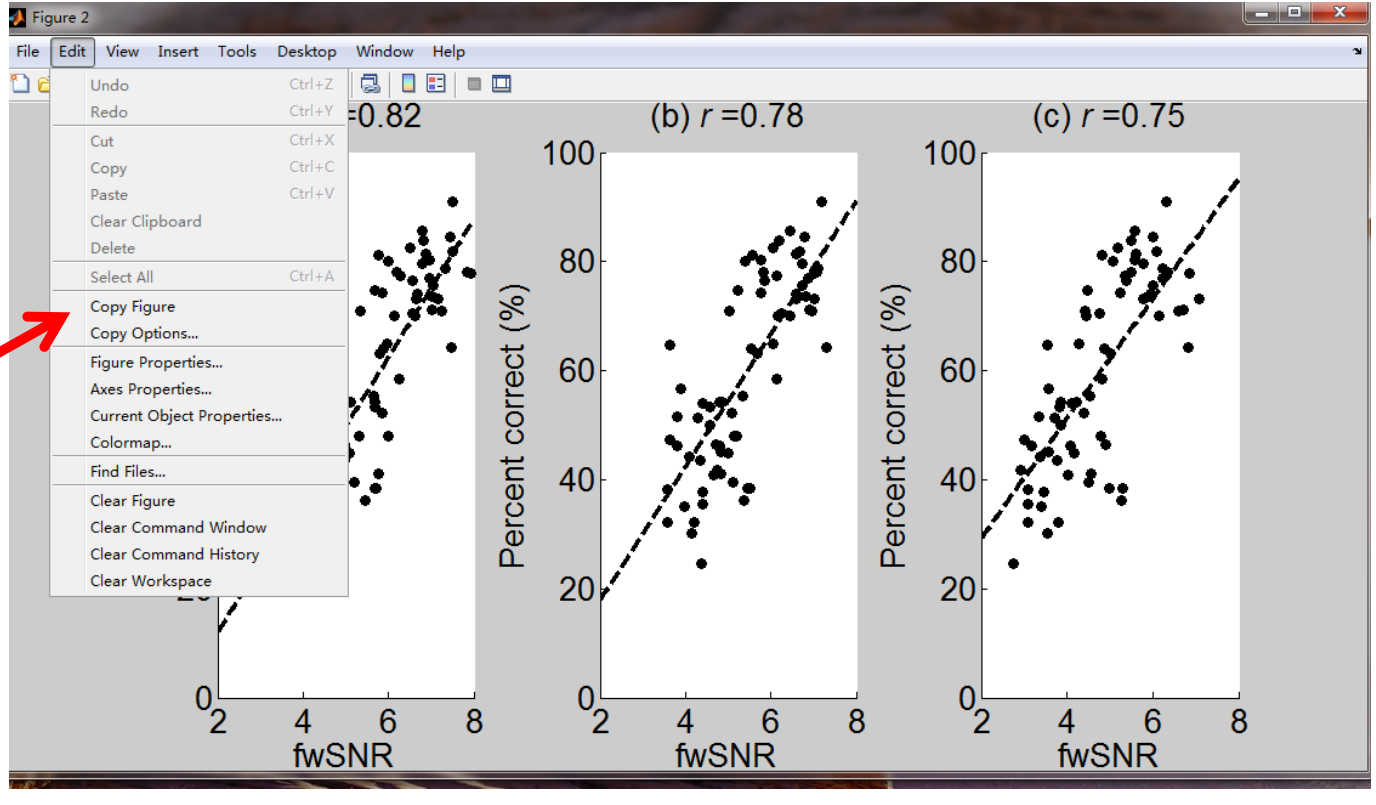
Display Facilities

- Legend
  - figure(1)
  - plot(x, y, 'r--', 'linewidth',2)
  - hold on, plot(x, y+1, 'k--', 'linewidth',2)
  - legend('wave 1', 'wave 2')



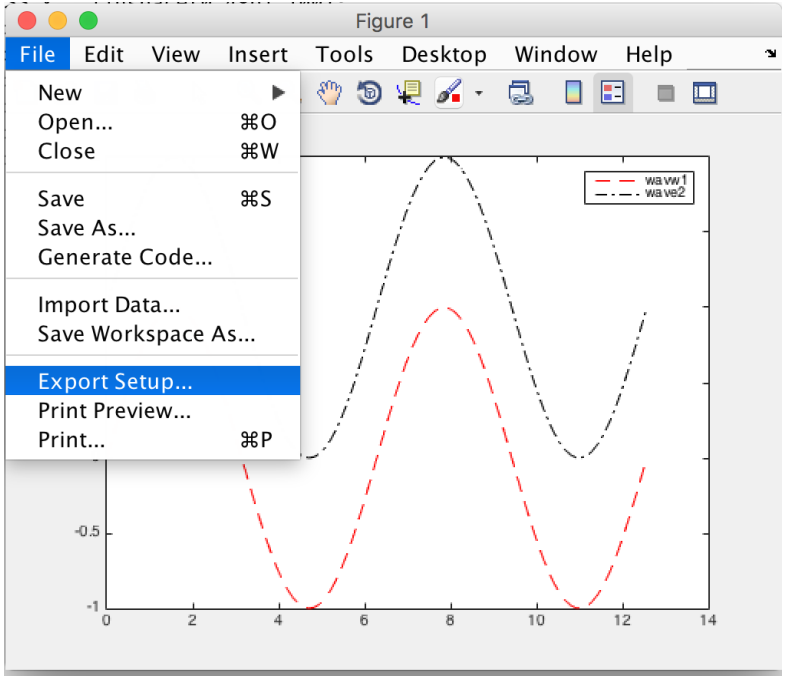
Display Facilities

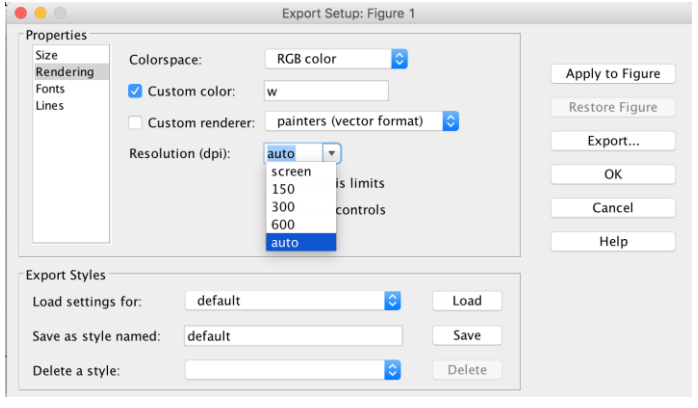
- Copy Matlab Figure



Display Facilities

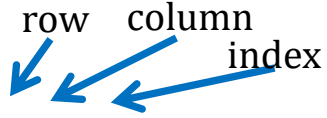
- Export Matlab Figure



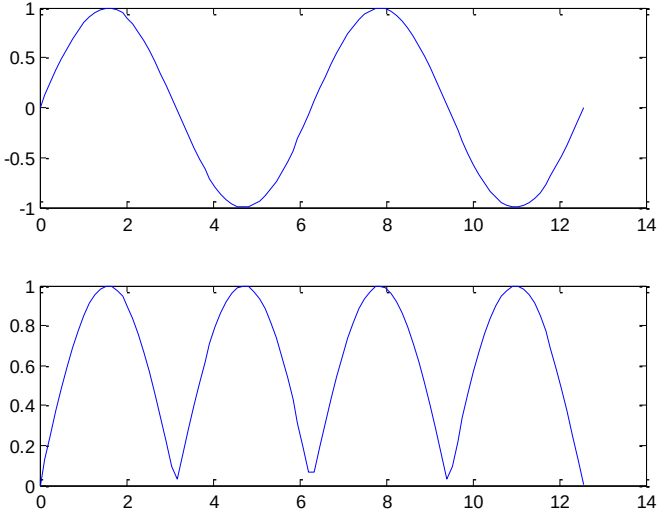


Display Facilities

- Subplot
  - subplot(2,3,1)



  - figure(1)
  - subplot(2,1,1),plot(x,y)
  - subplot(2,1,2),plot(x,abs(y))



Some useful function

- length(.), size(.)
- abs(.)
- sum(.), mean(.), std(.)
- diff(.) （差分）

Final tip: use help!

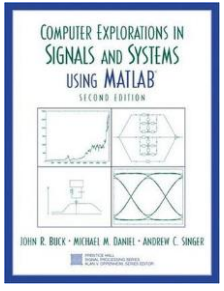
```
>> help mean
>> help plot

>> doc mean
>> doc plot
```

To Start with Matlab

- Work through the built-in tutorial in Matlab: “Getting Started”
- A summary of university-authored MATLAB tutorials in http://www.mathworks.com/academia/student_center/tutorials/launchpad.html
- The error messages you may encounter when running commands could be a big help.

Lab Assignment 1

- 1.4 & 1.5, practice tutorial 1.1 first.



- Submit your report + codes onto Blackboard system before 10:00 am. September 30th (4th week)

Any questions?