TP. 5 Graphisme (Gestion des fenêtres graphiques, plot)

1. draw the graph of a function:

To plot the graph of a function y as a function of x, with x and y being vectors of the same dimension, we use the plot(x,y)

2. Improve the readability of a figure:

ÿ the plot command can take a third input parameter which is a 3-character string **plot(x,y,'cst')** with **'c'** denoting the line color, **'s'** the point symbol and **'t'** the line style. The different possibilities for these parameters can be seen by typing **help plot.** It is not mandatory to specify all three characters.

ÿ **grid on** puts the grid on the graph drawn by plot. **grid off** clears the grid.
ÿ **title ('the title')** allows you to give a title to the figure.
ÿ **xlabel** and **ylabel** write text along the corresponding axis.
ÿ **text(x,y,'text to display')** writes a text at the coordinates of point x,y of the graph.
ÿ **gtext('text to display')** gives a cursor that we bring to the place where we want to place the text. This one is written when you click the mouse. ÿ **axis([xmin,xmax,ymin,ymax])** imposes the scales in x and y. is executed after the plot command.
ÿ **axis('square')** presents the graph in a square instead of the usual rectangle.
ÿ **legend** allows you to associate a legend with each curve in the figure.

3. plotting several graphs:

3.1 Graphics window management (figure management)

To plot multiple graphs in separate graphics windows, you can type: **figure(n)** before the **plot command,** where **n** represents the graphics window number (the figure number).

ÿ **close** closes the current figure
ÿ **close(n)** closes figure number n.
ÿ **close all** closes all open figures
ÿ **clf** clears the current figure (leaving it open).
ÿ **print** allows you to save the figure of a graphics window in a file in various image formats.

3.2 Displaying multiple curves on the same figure

3.2.1 Displaying multiple curves in a single dial of the figure

There are two ways to represent two curves on the same dial of the figure:

a) By putting several pairs (abscissa, ordinate) in the same **plot** command

Example : x=0:0.01:2*pi ;
y1=sin(x) ; y2=sin(2*x) ;
plot(x,y1,x,y2)

b) Using the " hold " command. The **hold on** command holds the contents of the graphics window so that a new curve can be superimposed on the same window. The **hold off** command releases the window.

3.2.2 Displaying multiple curves in multiple quadrants of the figure:

t is possible to divide the figure into several quadrants in which different curves can be placed using the command **Subplot(n,m,k),** with **n :** number of lines, **m :** number of columns and **k :** used to specify in which quadrant (sub-window) the display should be carried out. The quadrants are numbered from left to right and from top to bottom.

4. Creating 3-D Plots

Mesh Plot

The `mesh` function creates a wireframe mesh. By default, the color of the mesh is proportional to the surface height.

example

```
z = peaks(25);

figure
mesh(z)
```

Surface Plot

The `surf` function is used to create a 3-D surface plot.

```
surf(z)
```

Surface Plot (with Shading)

The `surfl` function creates a surface plot with colormap-based lighting. For smoother color transitions, use a colormap with linear intensity variation such as `pink`.

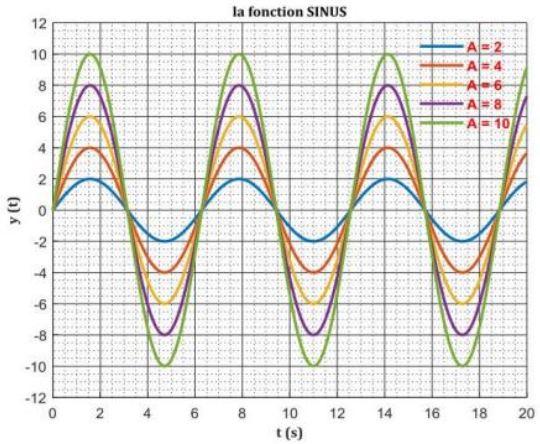
example

```
surfl(z)
colormap(pink)    % change color map
shading interp    % interpolate colors across lines
```

Symbol	Color	Symbol	Line Style	Symbol	Marker
k	Black	−	Solid	+	Plus sign
r	Red	−−	Dashed	o	Circle
b	Blue	:	Dotted	∗	Asterisk
g	Green	−.	Dash-dot	.	Point
c	Cyan	none	No line	×	Cross
m	Magenta			*s*	Square
y	Yellow			*d*	Diamond

Exercise 1

Write a program that can present the evolution of a sinusoidal signal over time as a function of the amplitude



Exercise.2

Using Matlab's graphical features, Plot the following curves (Use plot then fplot):

1. The sin(x) function in the interval [−π, π] with a step of π 100/5.

2. The cos(x) function in the interval [−π, π] with a step of π/ 5

3. The cos(x)+1 function in the interval [−π, π] with a step of π.

For each graph:

– create the grid

– Create the titles on the graph.

– standardize the size of the axes.

Resuming with the following color and style options:

1. Dotted red line with circles.

2. Solid black line with crosses.

Exercise.3

Given the three functions:

1. f(x) = cos(x).

2. g(x) = $\sin(x^2)$.

3. t(x) = log(x + 2π).

Plot in the same graph f(x), g(x) and t(x) in the interval [−π, π] with a step of π/5. Using the graphical convention:

1. For f(x) magenta dotted.

2. For g(x) green with stars.

3. For t(x) black with left triangles.