Scilab: Graphics

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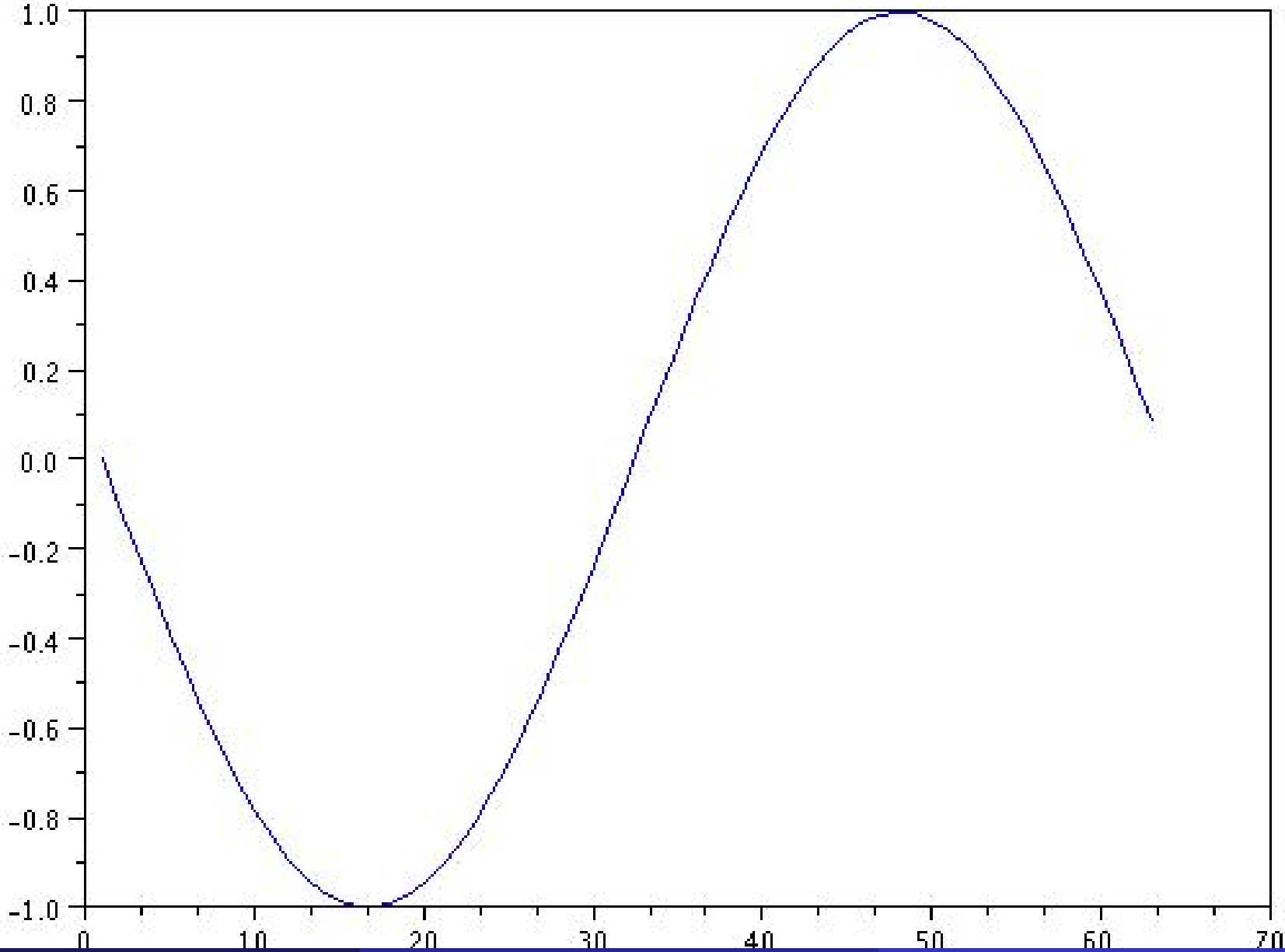
Ploting simple data.

```
1
2-->x=linspace(12,34,10);
3-->y=linspace(-.1,2,10);
4-->plot2d(x,y,style=-1)
```

Let us start with simple graphics command

```
1 -->t=-%pi:0.1:%pi;
2
3-->size(t)
4 ans  =
5
6    1.    63.
7
8-->plot(sin(t))
```

t is a vector given. We check size of the vector with `size|` command.


1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0
10
20
30
40
50
60
70

Try some known graphs:

- $\cos(x)$
- x^2
- $\exp(x)$

$$y = 3x + x \sin x$$

```
1
2>deff('[y]=f2(x)','y=3*x+x.*sin(x)')
3-->x=1:.5:100;
4-->y=f2(x);
5-->plot(x,y)
6
```

$$y = 3x + x \sin x$$

```
1 -->deff('[y]=f2(x)','y=3*x+x.*sin(x)')
2 -->x=1:.5:100;
3 -->fplot2d(x,f2)
4
```

```
1   -->function [y]=f(x)
2 >y=x*abs(x)/(1+x^2);
3 >endfunction
```

Try with **Help**:

- plot2d(x,y)

Try with **Help**:

- plot2d(x,y)
- fplot2d(x,f)

Try with **Help**:

- plot2d(x,y)
- fplot2d(x,f)
- subplot : Multiple graphs

Try with **Help**:

- plot2d(x,y)
- fplot2d(x,f)
- subplot : Multiple graphs
- xgrid :

Try with **Help**:

- plot2d(x,y)
- fplot2d(x,f)
- subplot : Multiple graphs
- xgrid :
- xtitle :

Try with **Help**:

- plot2d(x,y)
- fplot2d(x,f)
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- xclear : Clears one or more windows

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- plot2d(x,y)
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- xclear : Clears one or more windows
- clf() : Clears the grpahic window

Try with **Help**:

- plot2d(x,y)
- fplot2d(x,f)
- subplot : Multiple graphs
- xgrid :
- xtitle :
- xclear : Clears one or more windows
- clf() : Clears the grpahic window
- xbasc: Clears graphic window and erase recorded graphics

- Choice of good interval for the graph is imporatant.

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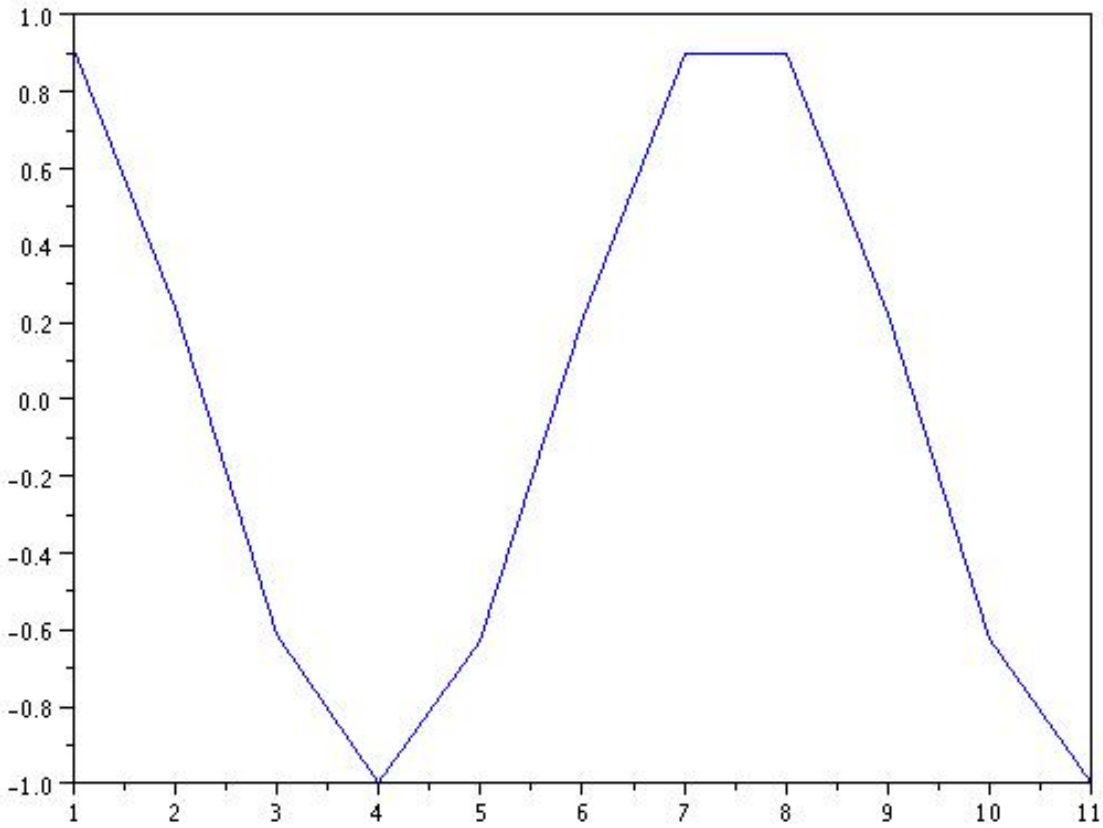
- Smoothness of the graph changes with number of points cosdiered in the given interval. Always check size of the vector you are using for plotting.



- Also check for zeros of the function and make sure that you want to include it in the interval or exclude it.

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- Before drawing check what you have asked to draw.

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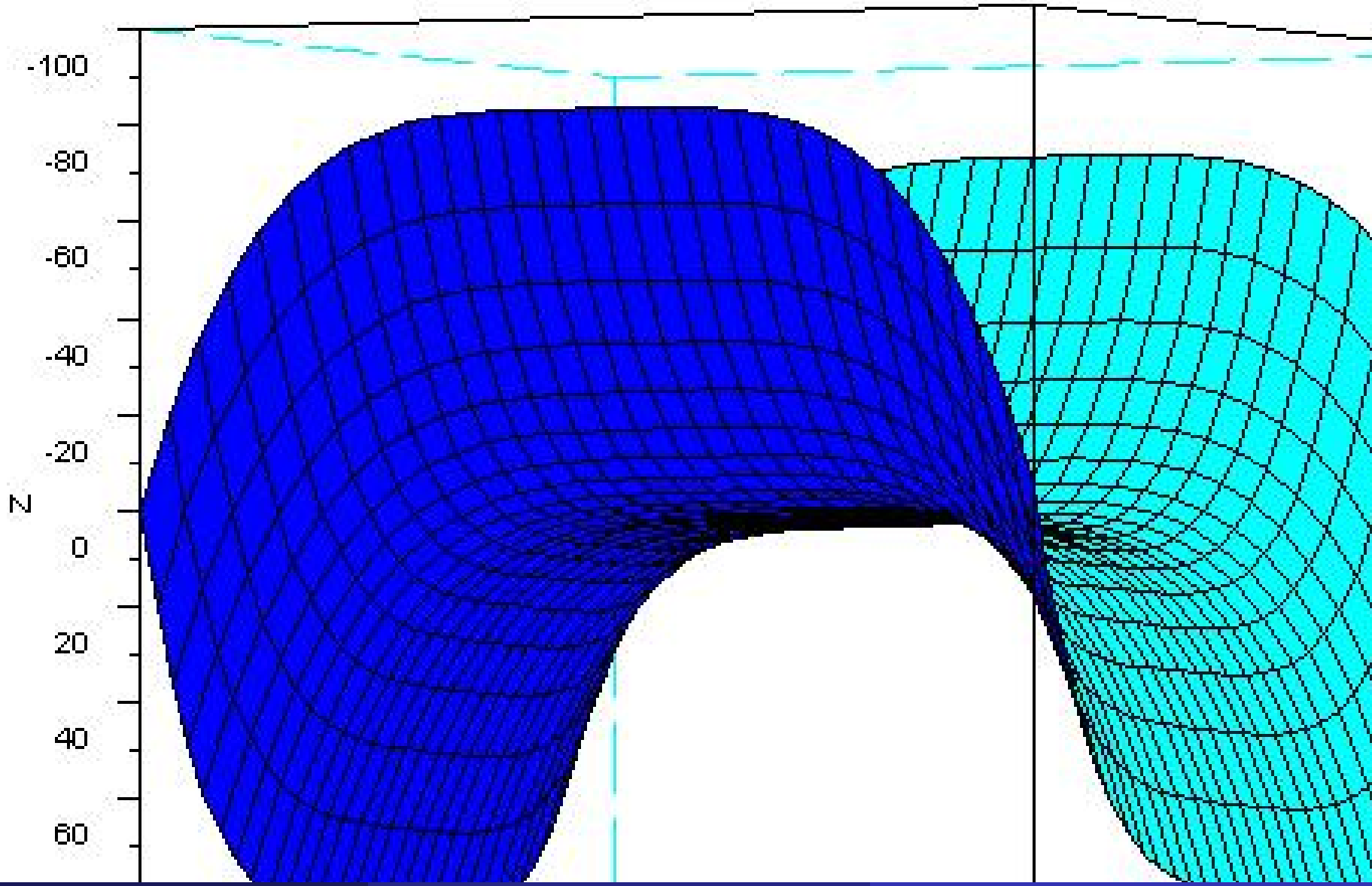
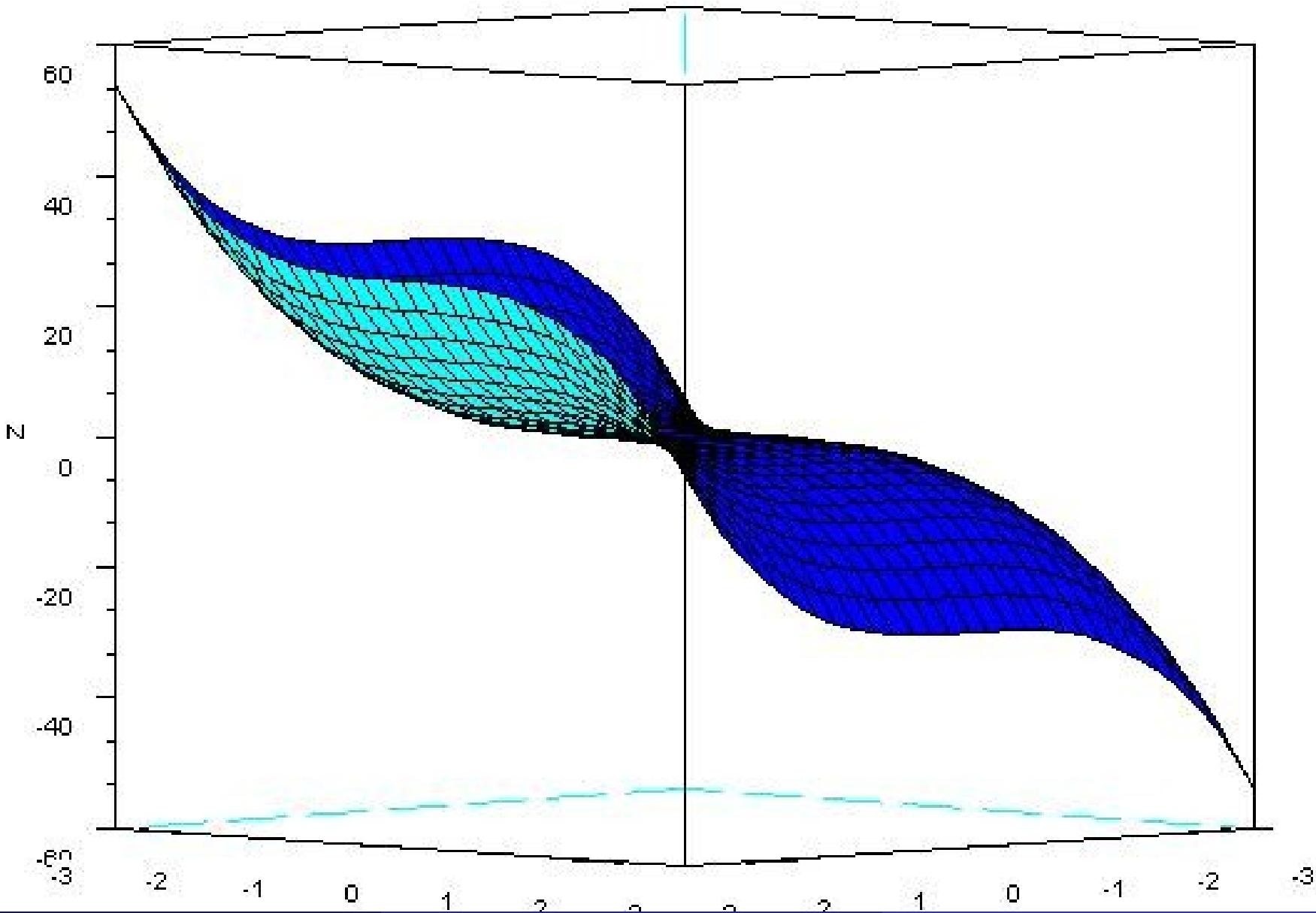
- Before drawing check what you have asked to draw.
- You will be happy to see the figure which you already thought.

To obtain 3-D figure for the equation $z = x^4 - y^4$.
Note that command **fplot3d** has arguments as x, y and the function f.

```
1  -->deff('z=f(x,y)','z=x^4-y^4')
2
3  -->x=-3:0.2:3 ;y=x ;
4
5  -->clf() ;fplot3d(x,y,f)
6
```

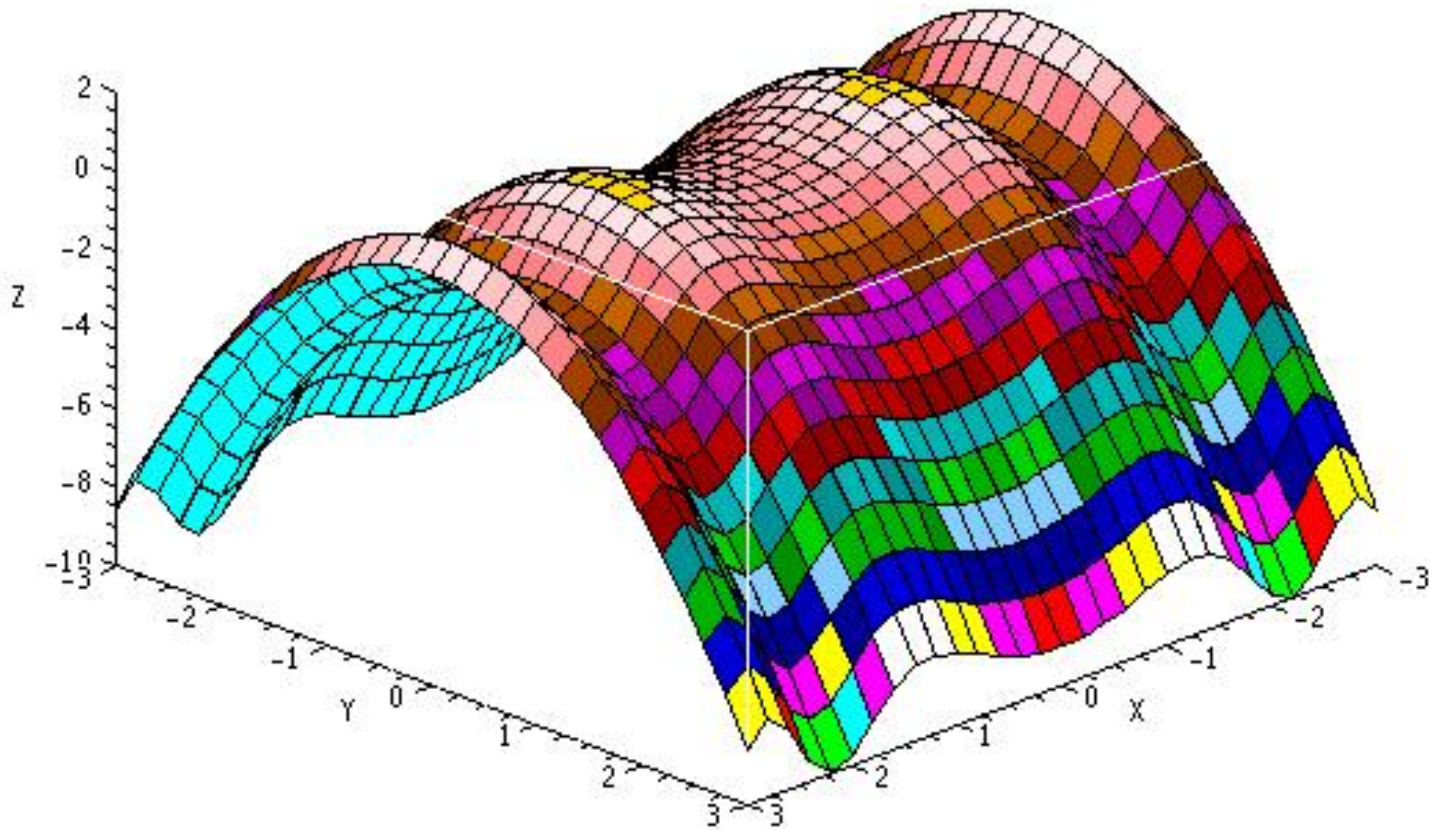

-100
-80
-60
-40
-20
N
0
20
40
60

```
1 -->deff('z=f(x,y)','z=x^3-y^3')
2
3-->x=-3:0.2:3 ;y=x ;
4
5-->clf() ;fplot3d(x,y,f)
```


60
40
20
0
-20
-40
-60
N
-3
-2
-1
0
1
2
3
2
1
0
-1
-2
-3

$$z = \sin(x^2) - y^2$$

```
1 ->deff('z=f(x,y)','z=sin(x^2)-y^2')
2
3
4 ->x=-3:0.2:3 ;y=x ;
5
6 ->clf() ;fplot3d1(x,y,f)
```


Z
2
0
-2
-4
-6
-8
-10
Y
-3
-2
-1
0
1
2
3
X
3
2
1
0
-1
-2
-3

We can label X-axis, Y-axis and assign title for the graph:

```
1   -->xlabel('X');
2
3  -->ylabel(' Y-axis');
4
5  -->xtitle(' Graph of sin(x)');
6  -->plot(sin(x))
```

We want to compare some graphs. With same set of points. In that case, we can have more than one graph at a time.

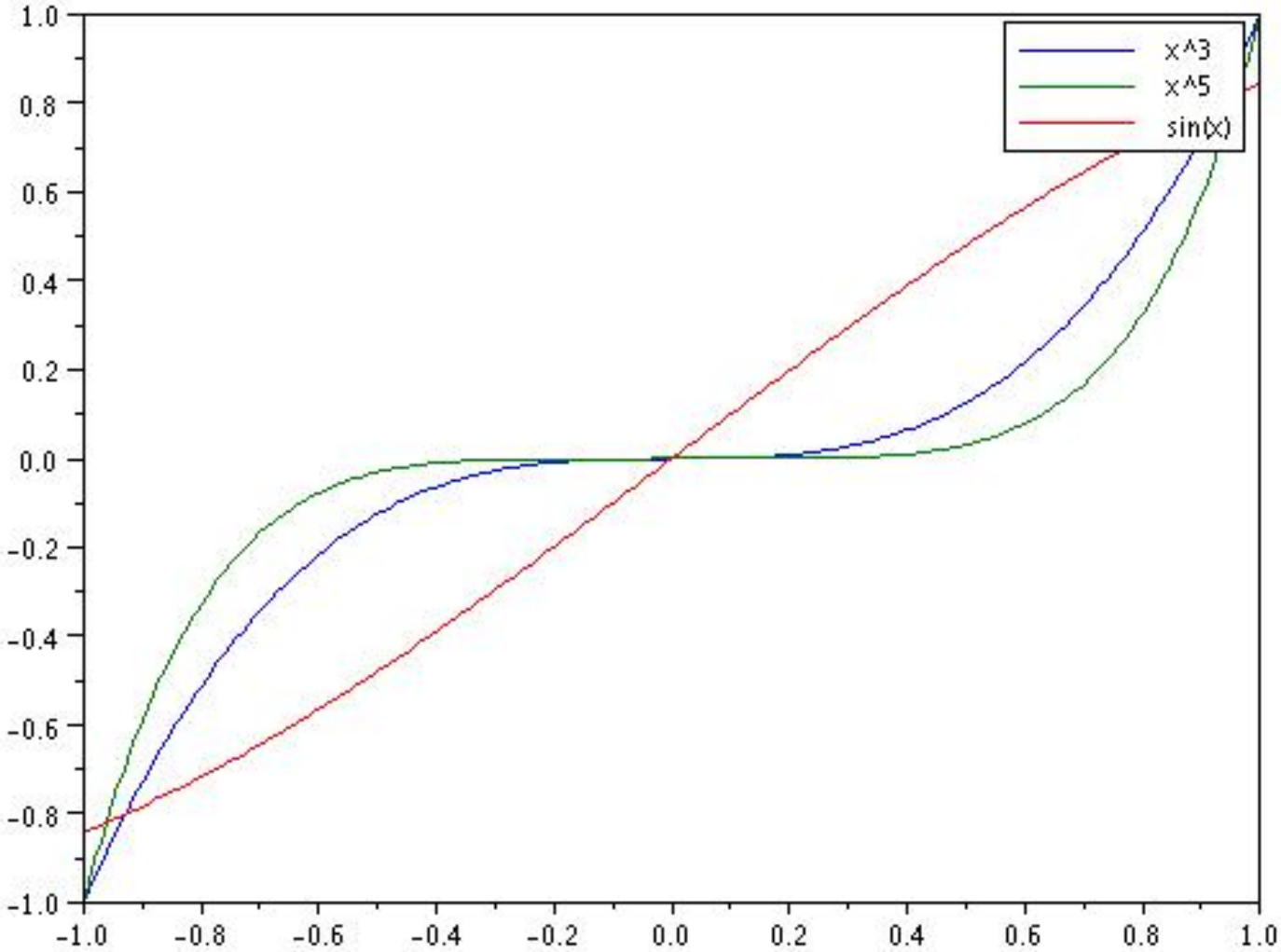
```
1 >> x=-2:.01:2
2 >> y=x.^3
3  >> z=x.^5
4  >> w= sin(x)
5  >> plot(x,y,x,z,x,w)
```

Observe the ooccurrence of x for each of the function in the plot command.

Though, there are different colours for each graph, since there are more than one graph in one graph window. We would like to know which graphs goes to which function.
for that 'legend' command can be used.

```
1 >> legend('x^3','x^5','sin(x)')
```

Will put colour marks with the function name.


x^3
x^5
sin(x)
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
1.0

```
1  -->subplot(2,2,2)
2
3 -->plot2d(x,sin(x),[2])
4
5 -->subplot(2,2,3)
6
7 -->plot2d2(x,sin(x),[3])
8
9 -->subplot(2,2,4)
10
11 -->plot2d3(x,sin(x),[4])
```

`contour` draws level curves of the given surface. It compute max and min for the surface. Then divide open interval (min, max) into number of level curves we asked for. Accordingly it draws the contour.

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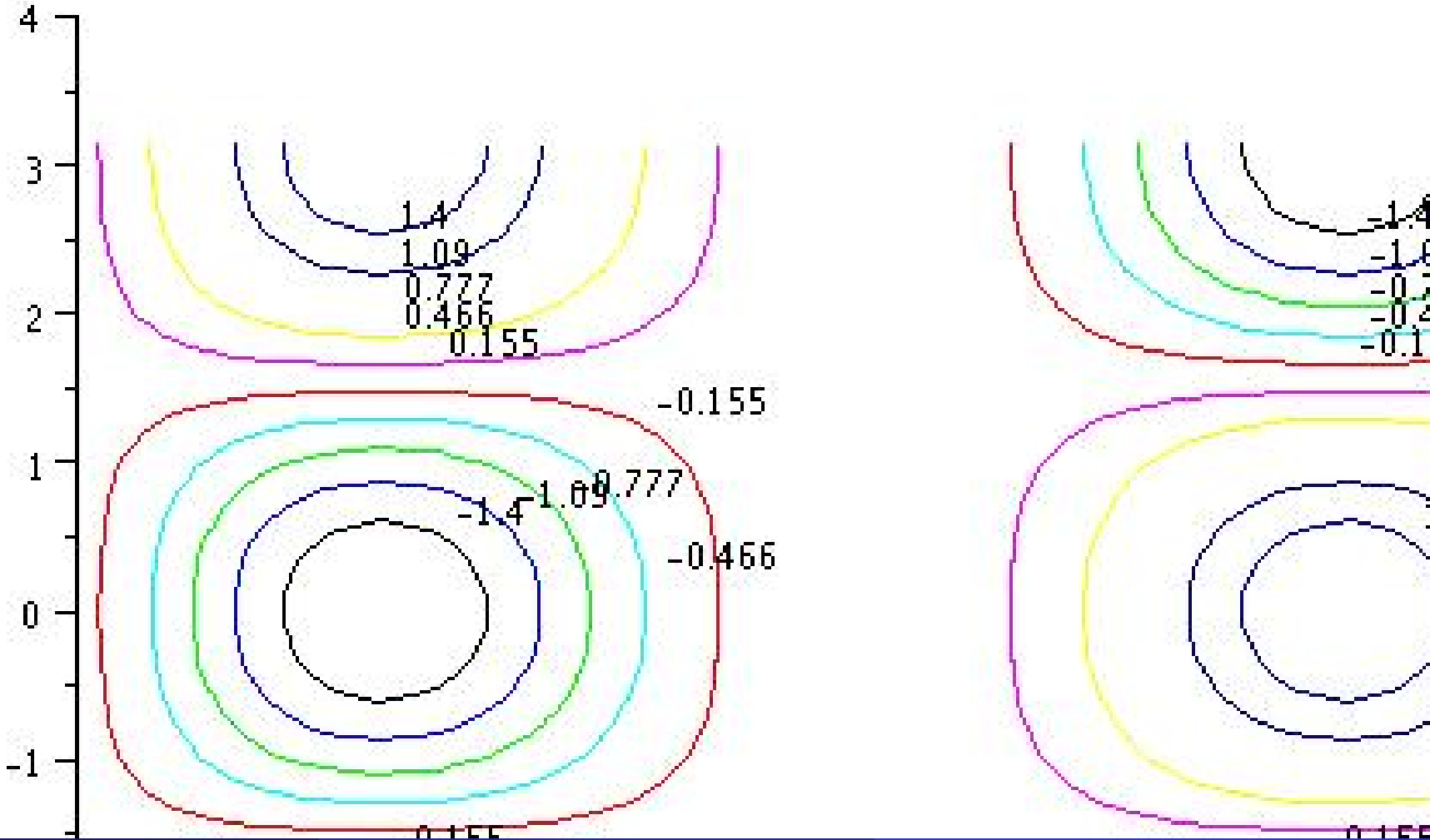
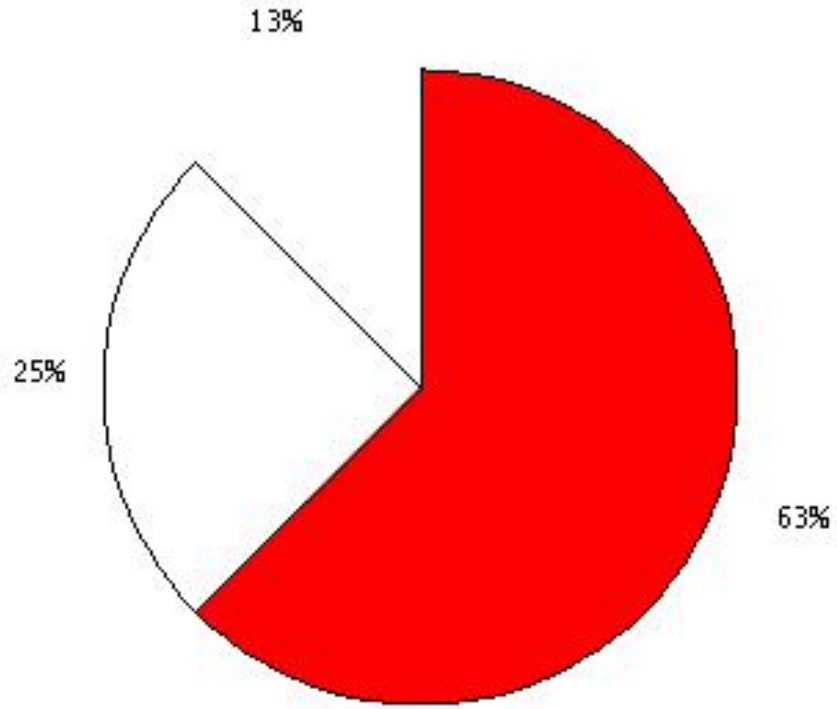
```
1 deff('z=f(x,y)','z=x.*sin(x)+y.*cos(y)')
2  x=-3: .1: 3; y=x;
3 feval(x,y,f)
4
5  contour(x,y,f,5)
```

Another contour



Pie graph



```
1
2 pie([1, 2, 5])
```

since 1+2+5=8, we will see a circle divided in to 8 parts, out of which 1, 2 and 5 parts are denoted by different colours.

From graphics window of scilab, choose option form file menu 'export'.

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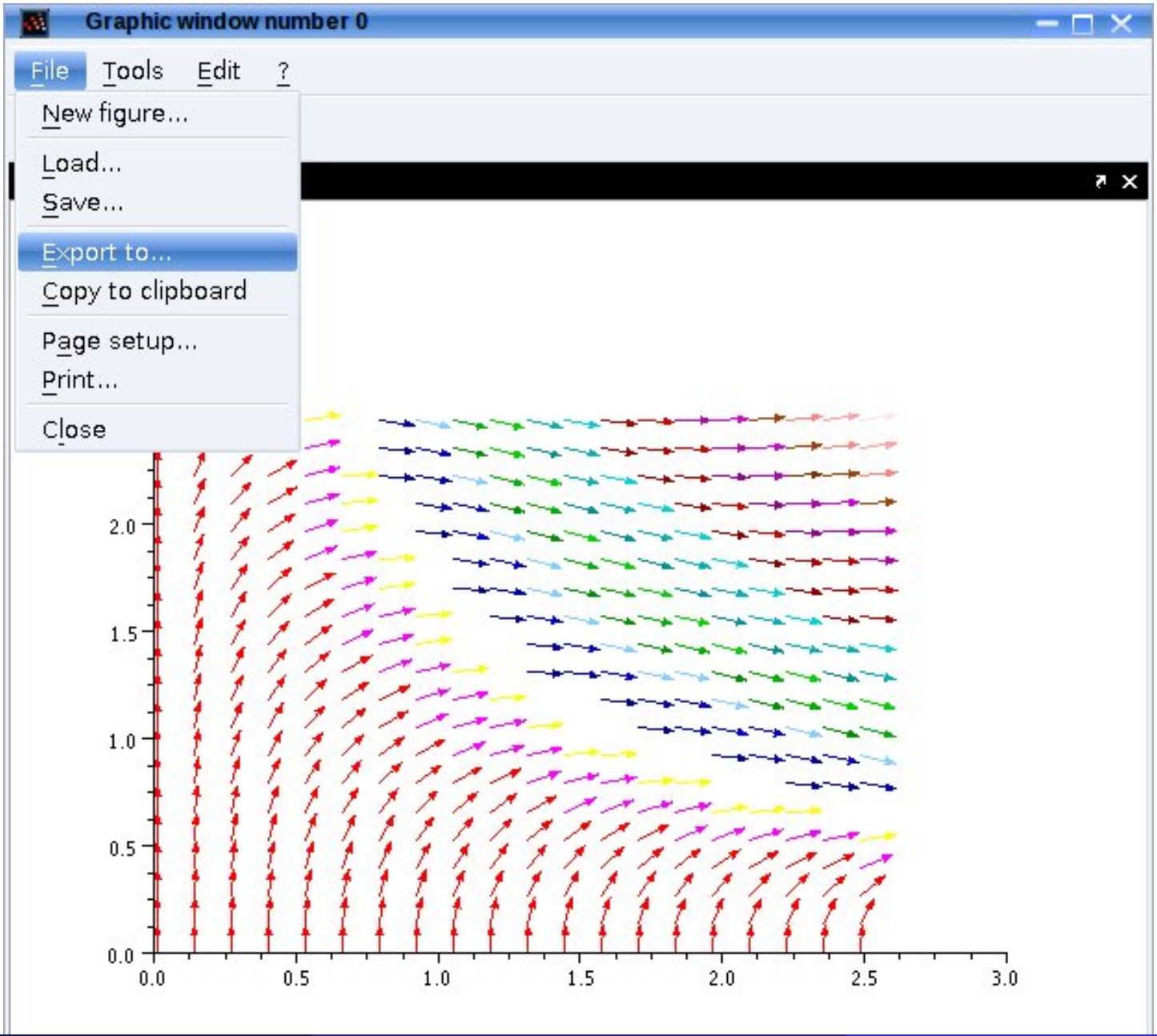

In LaTeX use command

```
1 \includegraphics{filename.jpg}
```

Make sure the path of the figure file given correctly. Use `pdflatex` to convert TeX file to pdf.
Make sure that you have include graphics package in the preamble (before `\begin{document}`) of your TeX file.
`\usepackage{graphicx}`