

Statistics and Computer Application

PLOTTING PACKAGES - XMGRACE and GNUPLOT

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 - Curve Fitting
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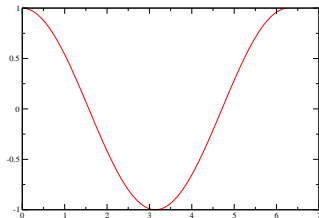
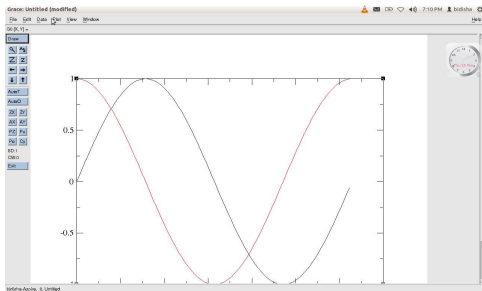
Xmgrace

⇒ Xmgrace can only plot 2-D graphs.

⇒ Can plot only if there is an existing data file ending with ".dat" or ".txt"

⇒ Steps for plotting with Xmgrace

- Open a terminal
- Type 'xmgrace *<filename.dat>*'
- If there are more than 2 columns then type 'xmgrace -block *<filename.dat>* -bxy 1:2'
- To plot more type 'xmgrace -block *<filename.dat>* -bxy 1:2 -bxy 1:3'
- To save go to 'File' and select on 'Save As', write the name of plot. Plot is saved as '.agr' format
- To cover to '.ps' file goto 'File' and select 'Print'
- For 'Help' menu type 'xmgrace -help'



Gnuplot

- Better features than Xmgrace
- Can plot 2-D as well as 3-D.
- Can be used for both Windows and Linux operating systems.

Getting Started

Open terminal and type 'gnuplot'

The screenshot displays a Linux desktop environment with several windows open. The primary window is a terminal titled "Gnuplot (window id : 0)". The terminal shows the following text:

```
bidisha@bidisha-Aspire:~/marsen/
bidisha@bidisha-Aspire:~/marsen$ gnuplot

G N U P L O T
Version 4.4 patchlevel 3
last modified March 2011
System: Linux 3.0.0-16-generic

Copyright (C) 1986-1993, 1998, 2004, 2007-2010
Thomas Williams, Colin Kelley and many others

gnuplot home:      http://www.gnuplot.info
faq, bugs, etc:   type "help seeking-assistance"
immediate help:   type "help"
plot window:      hit "h"

Terminal type set to 'wxt'
gnuplot> plot sin(x)

(gnuplot:10371): Gtk-WARNING **: Unable to locate theme engine
pixmap",
gnuplot> 
```

Below the terminal window, a smaller window titled "Gnuplot (window id : 0)" displays a plot of the sine function, $\sin(x)$. The plot shows a red sine wave oscillating between -1 and 1 on the y-axis, with x-axis values ranging from -10 to 10. The plot is labeled "sin(x)" in the top right corner.

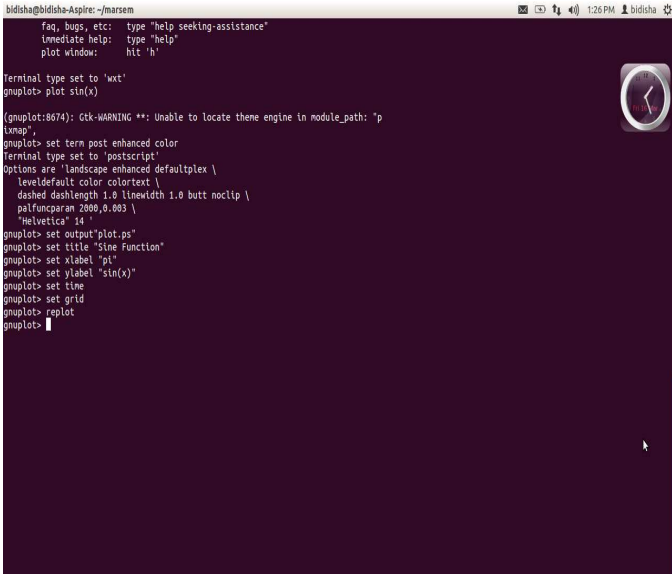
In the background, a terminal window shows the command `xmgrace -block $\angle filename.dat \rangle$ -by 1:2' filename.dat \rangle$ -by 1:2 -by 1:3' , write the name of plot. Plot is saved as '.agr' format at 'Print'`. A system clock in the top right corner shows the time as 7:36 PM on Thursday, May 14.

Saving Plots

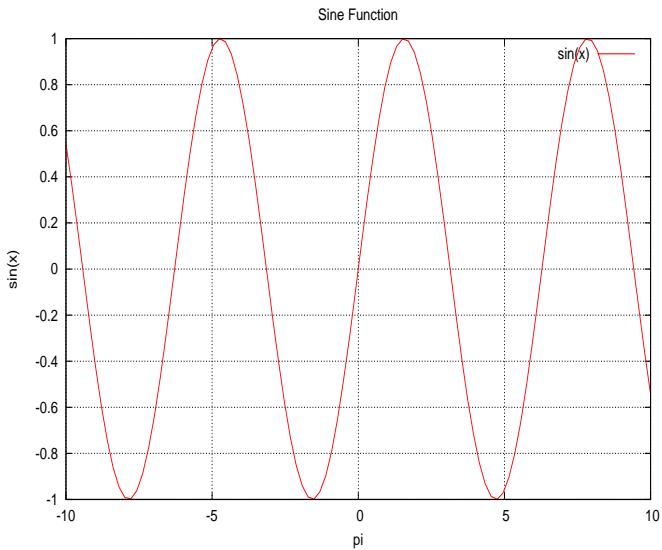
```
bidisha@bidisha-Aspire: ~/marssem
faq, bugs, etc: type "help seeking-assistance"
immediate help: type "help"
plot window: hit 'h'

Terminal type set to 'wxt'
gnuplot> plot sin(x)

(gnuplot:8674): Gtk-WARNING **: Unable to locate theme engine in module_path: "p
ixmap",
gnuplot> set term post enhanced color
Terminal type set to 'postscript'
Options are 'landscape enhanced defaultplex \
  leveldefault color colortext \
  dashed dashlength 1.0 linewidth 1.0 butt noclip \
  palfuncparan 2000,0.003 \
  "Helvetica" 14 '
gnuplot> set output "plot.ps"
gnuplot> set title "Sine Function"
gnuplot> set xlabel "pi"
gnuplot> set ylabel "sin(x)"
gnuplot> set time
gnuplot> set grid
gnuplot> replot
gnuplot> |
```

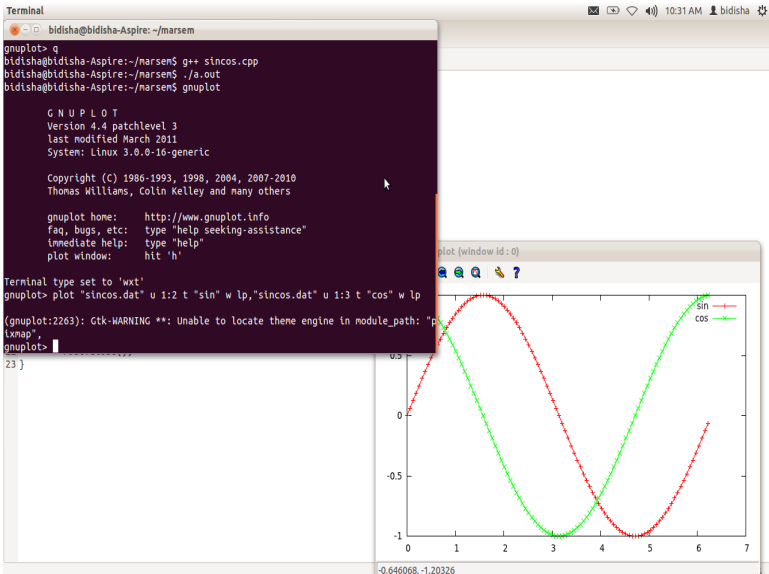


Saving Plots



Fri Mar 16 13:26:11 2012

Plotting from data file



```
Terminal
bidisha@bidisha-Aspire: ~/marsen
gnuplot> q
bidisha@bidisha-Aspire:~/marsen$ g++ sincos.cpp
bidisha@bidisha-Aspire:~/marsen$ ./a.out
bidisha@bidisha-Aspire:~/marsen$ gnuplot

  G N U P L O T
  Version 4.4 patchlevel 3
  last modified March 2011
  System: Linux 3.0.0-16-generic

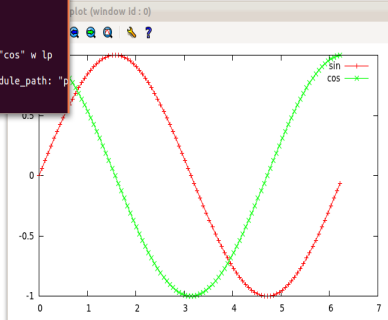
  Copyright (C) 1986-1993, 1998, 2004, 2007-2010
  Thomas Williams, Colin Kelley and many others

  gnuplot home:      http://www.gnuplot.info
  faq, bugs, etc:   type "help seeking-assistance"
  immediate help:   type "help"
  plot window:      hit 'h'

Terminal type set to 'wxt'
gnuplot> plot "sincos.dat" u 1:2 t "sin" w lp,"sincos.dat" u 1:3 t "cos" w lp

(gnuplot:2263): Gtk-WARNING **: Unable to locate theme engine in module_path: "p
lxmap",
gnuplot>
23 }
```

plot (window id: 0)



x	sin(x)	cos(x)
0	0.000	1.000
1	0.841	0.471
2	0.909	-0.416
3	0.143	-0.989
4	-0.761	-0.646
5	-0.961	0.637
6	-0.277	0.961
7	0.754	0.657

Curve Fitting

Curve Fitting

Gnuplot (window id: 0)

```
Terminal type set to 'wxt'
gnuplot> plot "sincos.dat" u 1:2 w lp
```

```
(gnuplot:8041): Gtk-WARNING **: Unable to locate theme engine in module_path: "p
```

```
txmap",
gnuplot> f2(x)=a2*sin(x)
```

```
gnuplot> a2=0.99
```

```
gnuplot> fit f2(x) 'pro1.txt' u 1:2 via a2
```

```
Iteration 0
```

```
WSSR      : 0.00250003      delta(WSSR)/WSSR   : 0
delta(WSSR): 0             limit for stopping  : 1e-05
lambda    : 0.707107
```

```
initial set of free parameter values
```

```
a2        = 0.99
```

```
/
```

```
Iteration 1
```

```
WSSR      : 9.61335e-07      delta(WSSR)/WSSR   : -2599.58
delta(WSSR): -0.00249907    limit for stopping  : 1e-05
lambda    : 0.0707107
```

```
resultant parameter values
```

```
a2        = 0.999804
```

```
/
```

```
Iteration 2
```

```
WSSR      : 1.53644e-10      delta(WSSR)/WSSR   : -6255.91
delta(WSSR): -9.61181e-07    limit for stopping  : 1e-05
lambda    : 0.00707107
```

```
resultant parameter values
```

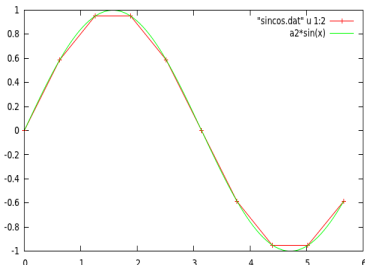
```
a2        = 1
```

```
/
```

```
Iteration 3
```

```
WSSR      : 1.53605e-10      delta(WSSR)/WSSR   : -0.000250199
delta(WSSR): -3.84319e-14    limit for stopping  : 1e-05
```

Gnuplot (window id: 0)



[1.1, 2.000 0.00, -1.16704]



Multiplots

Multiplots

Gnuplot (window id : 0)

```

bidisha@bidisha-Aspire: ~/marsem
G N U P L O T
Version 4.4 patchlevel 3
last modified March 2011
System: Linux 3.0.0-16-generic

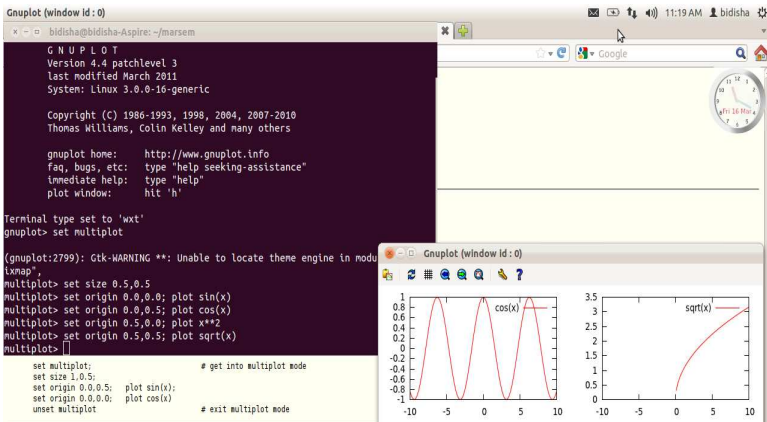
Copyright (C) 1986-1993, 1998, 2004, 2007-2010
Thomas Williams, Colin Kelley and many others

gnuplot home:      http://www.gnuplot.info
faq, bugs, etc:   type "help seeking-assistance"
immediate help:   type "help"
plot window:      hit 'h'

Terminal type set to 'wxt'
gnuplot> set multiplot

(gnuplot:2799): Gtk-WARNING **: Unable to locate theme engine in module
"ixmap",
multiplot> set size 0.5,0.5
multiplot> set origin 0.0,0.0; plot sin(x)
multiplot> set origin 0.0,0.5; plot cos(x)
multiplot> set origin 0.5,0.0; plot x**2
multiplot> set origin 0.5,0.5; plot sqrt(x)
multiplot> 
set multiplot;                # get into multiplot mode
set size 1.0,5;
set origin 0.0,0.5;  plot sin(x);
set origin 0.0,0.0;  plot cos(x)
unset multiplot            # exit multiplot mode

```



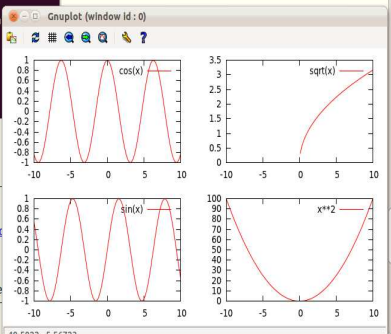
10. GNUPLOT DEMO FILES AND THE GNUPLOT FAQ

Most of Gnuplot's current features are illustrated in one or more of the [Gnuplot demo files](#). To start Gnuplot from the resulting demo directory, and type

```
load "all.dem"
```

The Gnuplot feature you are looking for will probably be illustrated in one of the

11. HARD-COPY (PLOTTING ON PAPER)



3-D Plots

3-D Plots

Gnuplot (window id : 0)

```

bidisha@bidisha-Aspire: ~/marsen
gnuplot> q
bidisha@bidisha-Aspire:~/marsen$ convert data.png data.ps
bidisha@bidisha-Aspire:~/marsen$ gnuplot

  G N U P L O T
  Version 4.4 patchlevel 3
  last modified March 2011
  System: Linux 3.0.0-16-generic

  Copyright (C) 1986-1993, 1998, 2004, 2007-2010
  Thomas Williams, Colin Kelley and many others

  gnuplot home:      http://www.gnuplot.info
  faq, bugs, etc:   type "help seeking-assistance"
  immediate help:    type "help"
  plot window:      hit 'h'

Terminal type set to 'wxt'
gnuplot> splot "pro1.txt" u 1:2:3 w p

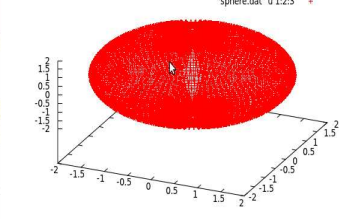
(gnuplot:9301): Gtk-WARNING **: Unable to locate theme engine in module
: "pixmap",
gnuplot> splot "sphere.dat" u 1:2:3 w p
gnuplot>

```

contourmap.ps
gnu1.ps
pro1.txt

Gnuplot (window id : 0)

"sphere.dat" u 1:2:3



view: 52.0000, 24.0000 scale: 1.00000, 1.00000

Log and Messages Output Konsole

[DVtoPS] Done!

[PStoPDF] seminar19.ps => seminar19.pdf (

[PStoPDF] Done!

More with 3-D

More with 3-D

Gnuplot (window id : 0)

```

bidisha@bidisha-Aspire: ~/marsen$ convert sphere.png sphere1.ps
bidisha@bidisha-Aspire:~/marsen$ gnuplot

G N U P L O T
Version 4.4 patchlevel 3
last modified March 2011
System: Linux 3.0.0-16-generic

Copyright (C) 1986-1993, 1998, 2004, 2007-2010
Thomas Williams, Colin Kelley and many others

gnuplot home:    http://www.gnuplot.info
faq, bugs, etc:  type "help seeking-assistance"
immediate help:  type "help"
plot window:     hit "h"

Terminal type set to 'wxt'
gnuplot> set pm3d
gnuplot> set contour
gnuplot> splot sin(x)/x+cos(y)/y

(gnuplot:10347): Gtk-WARNING **: Unable to locate theme engine in mod
h: "pixmap",
gnuplot>

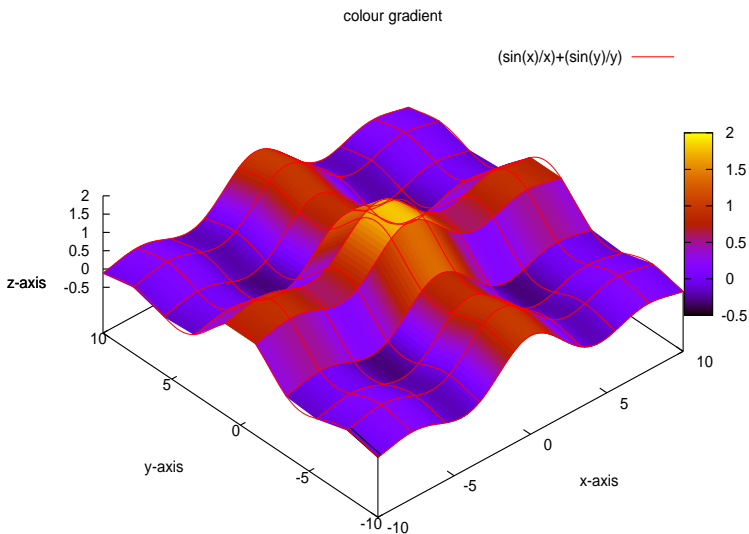
```

contourmap.ps
gnu1.ps

Gnuplot (window id : 0)

view: 64.0000, 67.0000 scale: 1.00000, 1.00000

Line: 114 Col: 41 INS LINE



Conclusion

- Gnuplot has many other features
- Gnuplot gives good quality 2-D plots
- Its a free software like xmgrace.
- But Gnuplot can not output symbolic equations and formula
- Other features of xmgrace will come up soon

THANK YOU