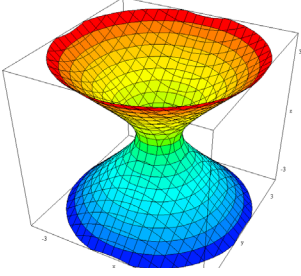
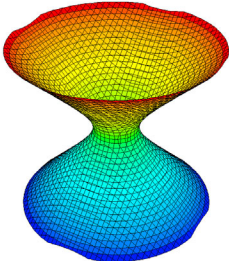
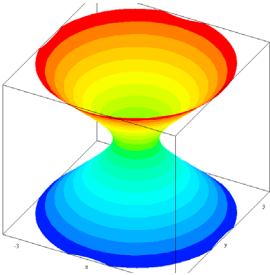
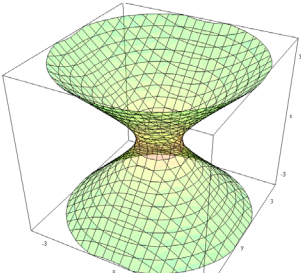


DPGraph Tutorial

DPGraph is a 3D graphing program written by David Parker (hence the DP). It is very small (131 KB) yet very powerful.

The full list of options can be found under the help menu. Here is a list of some common ones. They are all accessed by *graph3d.option := value*. For brevity's sake, only the *option := value* part is shown below.

<p>Defaults box := true mesh := true resolution := 21 perspective := true transparency := 0 color := byheight</p>	<p>The equation of the image graphed is $z^2 = x^2 + y^2 - 0.5$</p>	
 <p>box := false resolution := 41</p>	 <p>mesh := false perspective := false</p>	 <p>transparency := 3/4 color := bysteepness</p>

Other options you might use include the following (Defaults are in capitals):

- graph3d.view (STANDARD, top, side, front, or textbook)
- graph3d.background (black, gray, WHITE, brown, red, yellow, green, cyan, blue, or magenta)
- graph3d.color (BYHEIGHT, bysteepness, black,gray, white, brown, red, yellow, green, cyan, blue, magenta, or an expression depending on x, y, z, or time)

You can include variables (a, b, c, or d) in your equation that allow you to manipulate the graphic without having to change the equation. For example,

$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ is an ellipsoid, but you can control the x, y, and z intercepts by using a scrollbar and changing a, b, and c.

Constants that are recognized include pi and e.

Variables are x, y, and z (implicit graphing); r and theta (polar coordinates); rho and phi (spherical coordinates); u and v (parametric graphs); a, b, c, and d for scrollbars; and time (animating graphs). Each variable has a .minimum and a .maximum value that allow you to configure the domain of the variable. Example x.minimum := -3. The window settings are -3 ... 3, the other defaults are in the help.

You can use the arrow keys to rotate the graph to the view you want. Home resets to the default position. Pg Up and Pg Dn are zooms.

Symbols include =, <, >, <=, >=, & (intersection), := (assignment), +, -, *, /, ^, and !. You can include parentheses and enter absolute values as |x| or abs(x).

Most of the standard functions are available. See the help for a list.

The most important command you'll use is the graph3d() command. It has to be last and it contains the equation you want to graph.

```
graph3d( x^2/a^2 + y^2/b^2 + z^2/c^2 = 1)
```

You can graph multiple equations simultaneously but you have to enclose them in parentheses.

```
graph3d( ( x=3 , y=2 , z=1 ) )
```

Here are the most common errors.

1. leaving out asterisks for multiplication; Use 3*x, not 3x
2. leaving out equals signs or inequality signs;
3. leaving out the parentheses for lists;
4. trying to use equalities in intersections (DPGraph can only intersect inequalities, i.e. regions of space);
5. putting a space inside the two-character symbols :=, >=, or <=;
6. using the parametric variables u or v in implicit graphs; and
7. using the implicit variables x, y, z, r, theta, rho, or phi in parametric graphs.