

Visualization

Visualization updates in Maple 2016 include colorscheme options and many new visualizations for Statistics, Data Analysis, and Thermophysical Data. The default orientation for 3-D plots has also be updated.

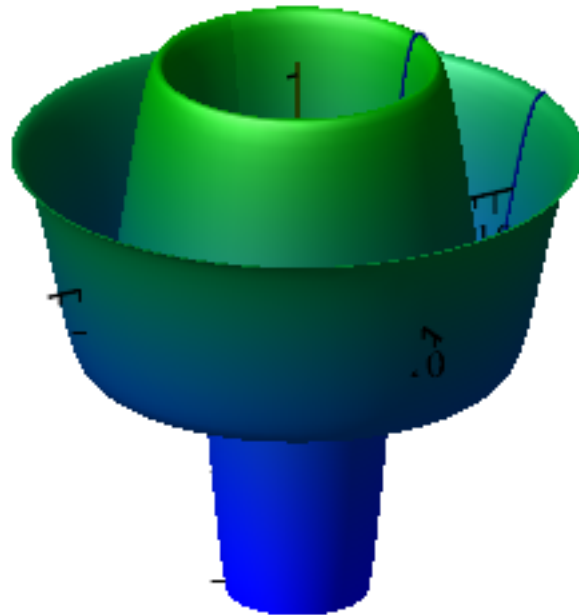
▼ Color Schemes

The [colorscheme](#) option for plots offers new functionality in Maple 2016.

▼ Availability

The [colorscheme](#) option is now supported by most visualization commands in Maple, including [plots:-display](#).

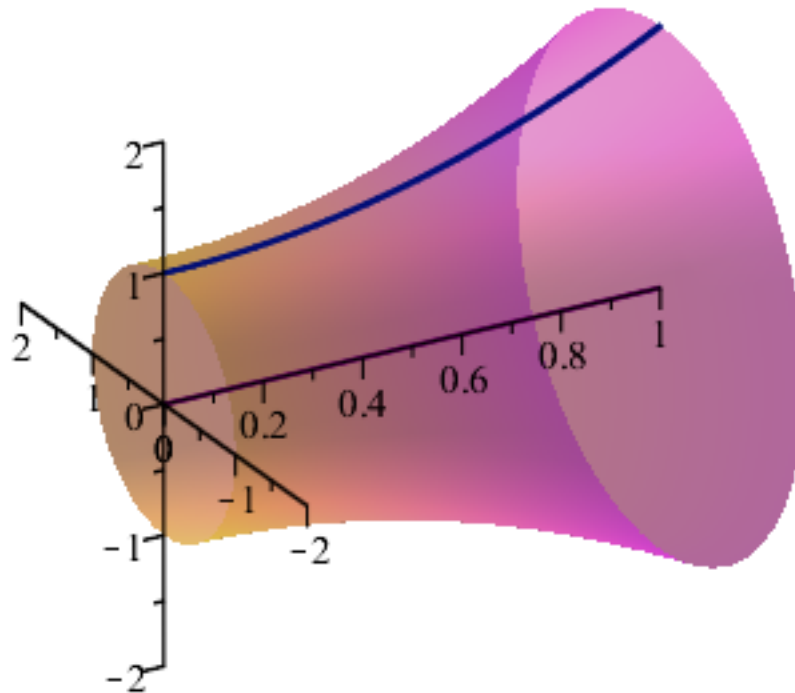
```
Student:-Calculus1:-SurfaceOfRevolution  $\left( \frac{\cos(x)}{x}, \pi..4\pi, output = plot, axis = vertical, \right.$   
surfaceoptions = [colorscheme = ["Blue", "Green"], caption = ""]
```



▼ Additions to Gradient Schemes

New "**xgradient**" and "**ygradient**" schemes have been added, to allow gradients in the x and y directions, as well as the default z direction.

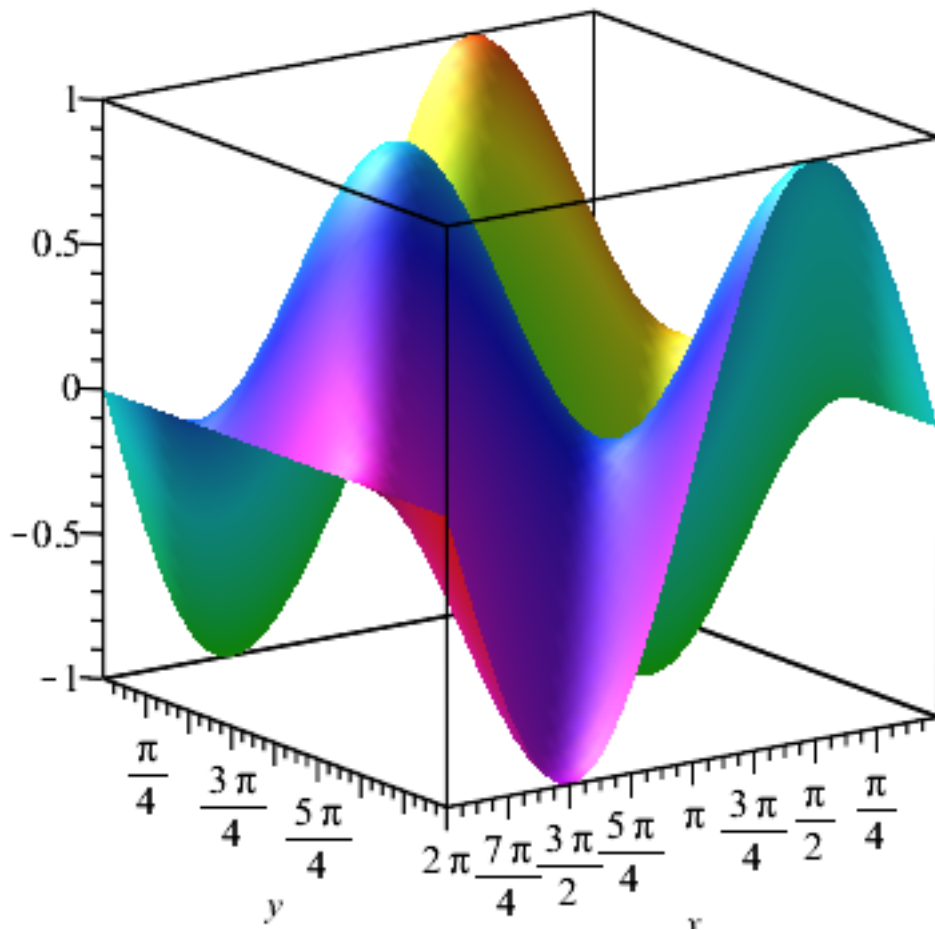
Student-Calculus1:-VolumeOfRevolution($x^2 + 1$, $x = 0 .. 1$, $output = plot$, $volumeoptions = [transparency = 0.5, colorscheme = ["xgradient", ["Orange", "Magenta"]]], caption = ""$)



▼ Coloring with Functions of Coordinate Values

New "zcoloring" and "xyzcoloring" schemes allow you to color 3-D surfaces using functions of the x , y , and z values of your plot.

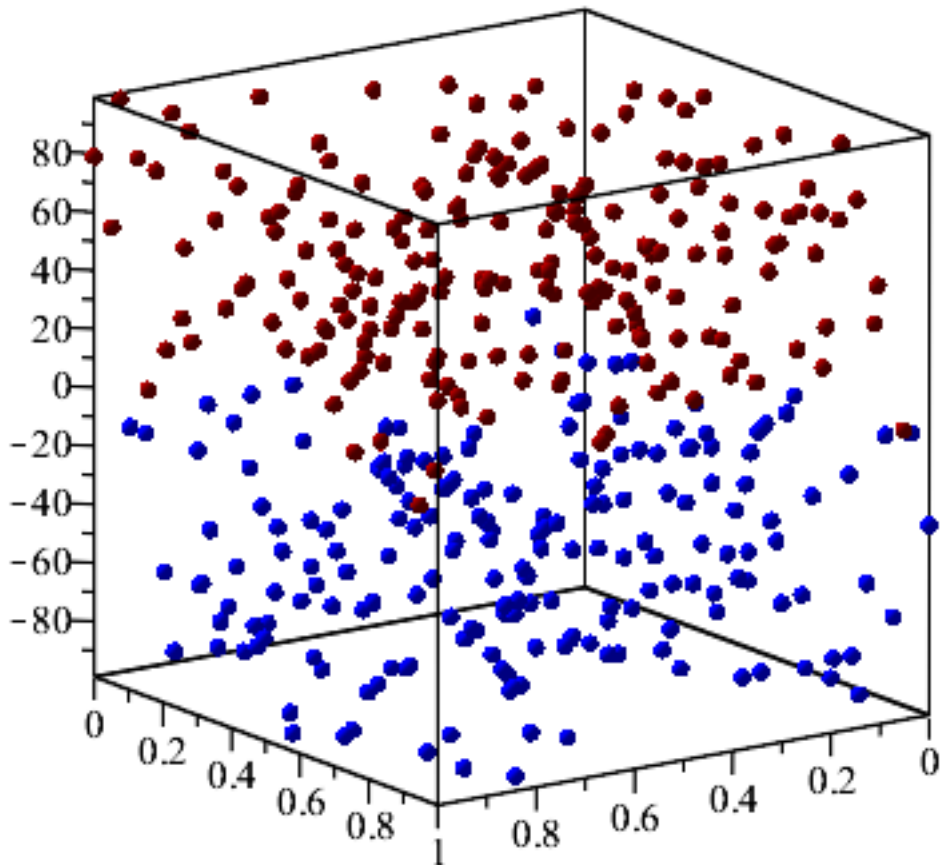
```
plot3d(sin(x) cos(y), x=0..2 pi, y=0..2 pi, colorscheme=["xyzcoloring", (x, y, z) -> x + y - z^2], style=surface)
```



▼ Partitioning the Data by Value

The new "valuesplit" color scheme allows you to partition the data and assign colors based on associated values or ranges of values.

```
dataplot(LinearAlgebra:-RandomMatrix(20),surface,style = point, colorscheme = ["valuesplit", [
    -infinity .. -1 = "Blue", 0 .. infinity = "DarkRed" ]], symbol = solidcircle, symbolsize = 15)
```

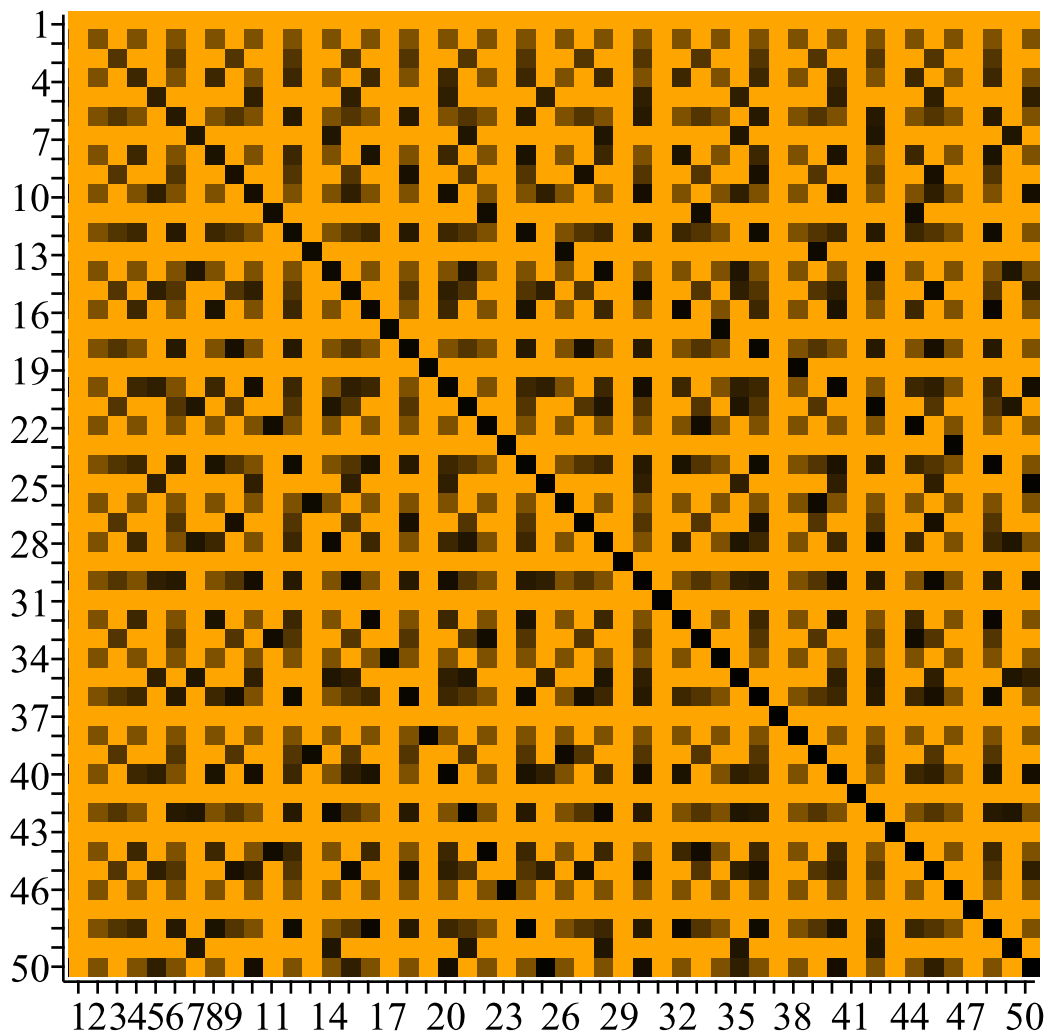


▼ Statistics Visualizations

There are several new visualizations in [Statistics](#) for Maple 2016 including [GridPlot](#), [Biplot](#), [ScreePlot](#), and [heat maps](#), a means of visualizing tabular data using a color spectrum to quickly gain insight into variation within the data.

The following command builds a matrix M for which the $M_{i,j}$ entry is the reciprocal of the greatest common divisor.

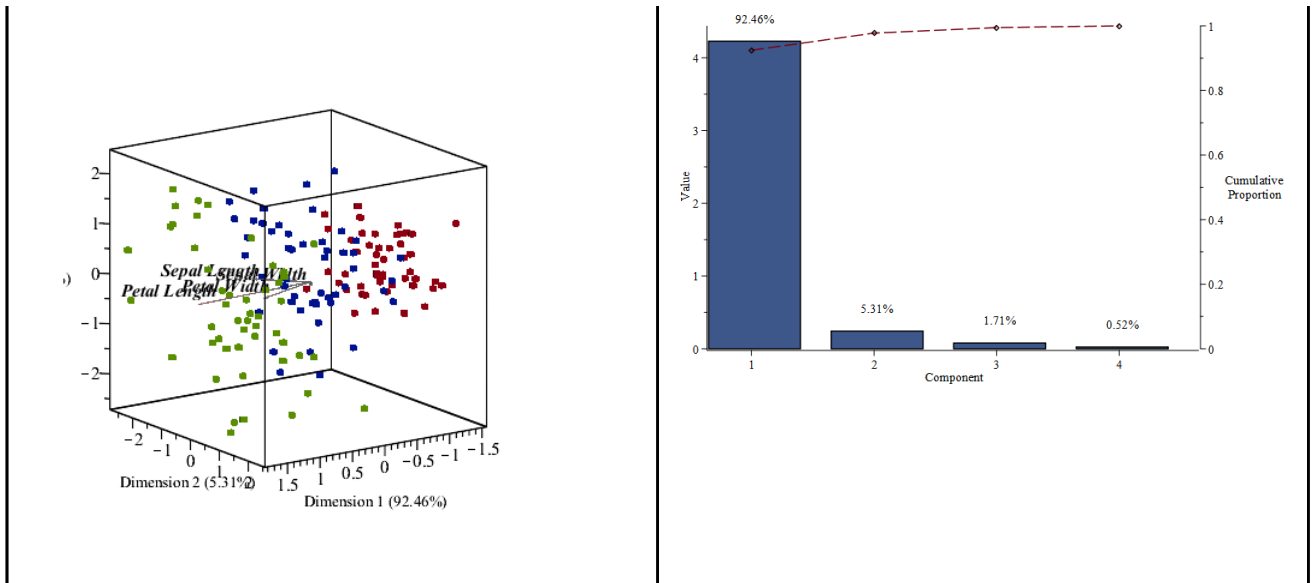
```
Statistics:-HeatMap(Matrix(50,  $\frac{1}{igcd}$ ), color = "Black".."Orange")
```



There are also two new plots that relate to Principal Component Analysis:

```
data := Import(FileTools:-JoinPath(["datasets", "iris.csv"], base = datadir)) :
```

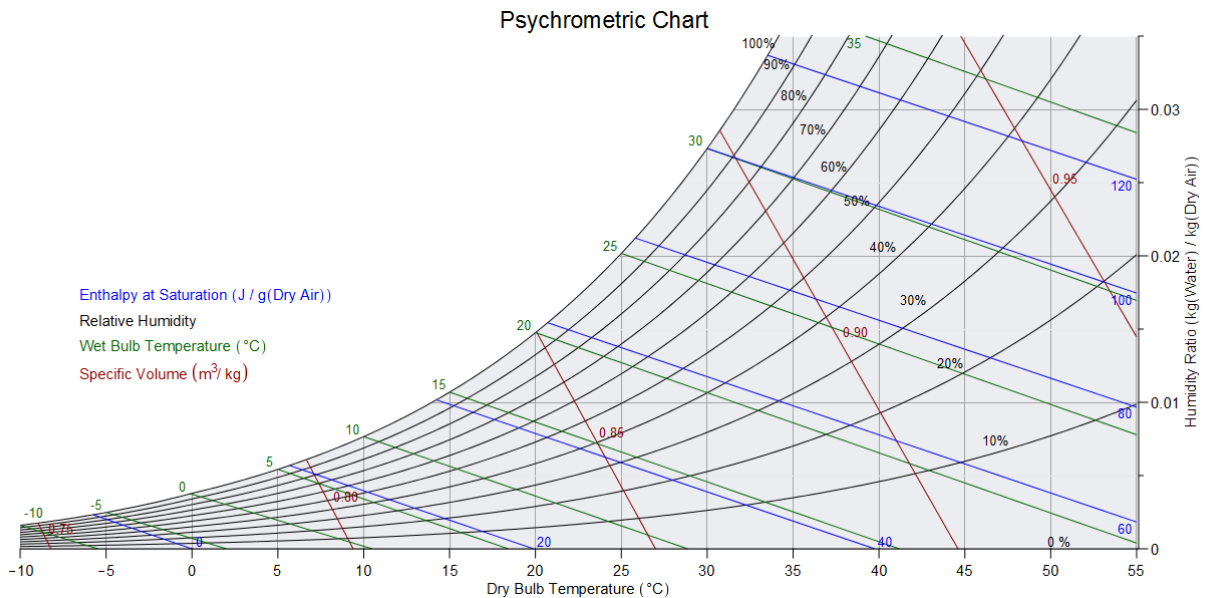
Biplot	ScreePlot
<pre>Statistics:-Biplot(data[[`Sepal Length`, `Sepal Width`, `Petal Length`, `Petal Width`]], dimension = 3, points = [colorscheme = ["valuesplit", data[Species]], lightmodel = none)</pre>	<pre>Statistics:-ScreePlot(data[[`Sepal Length`, `Sepal Width`, `Petal Length`, `Petal Width`]])</pre>



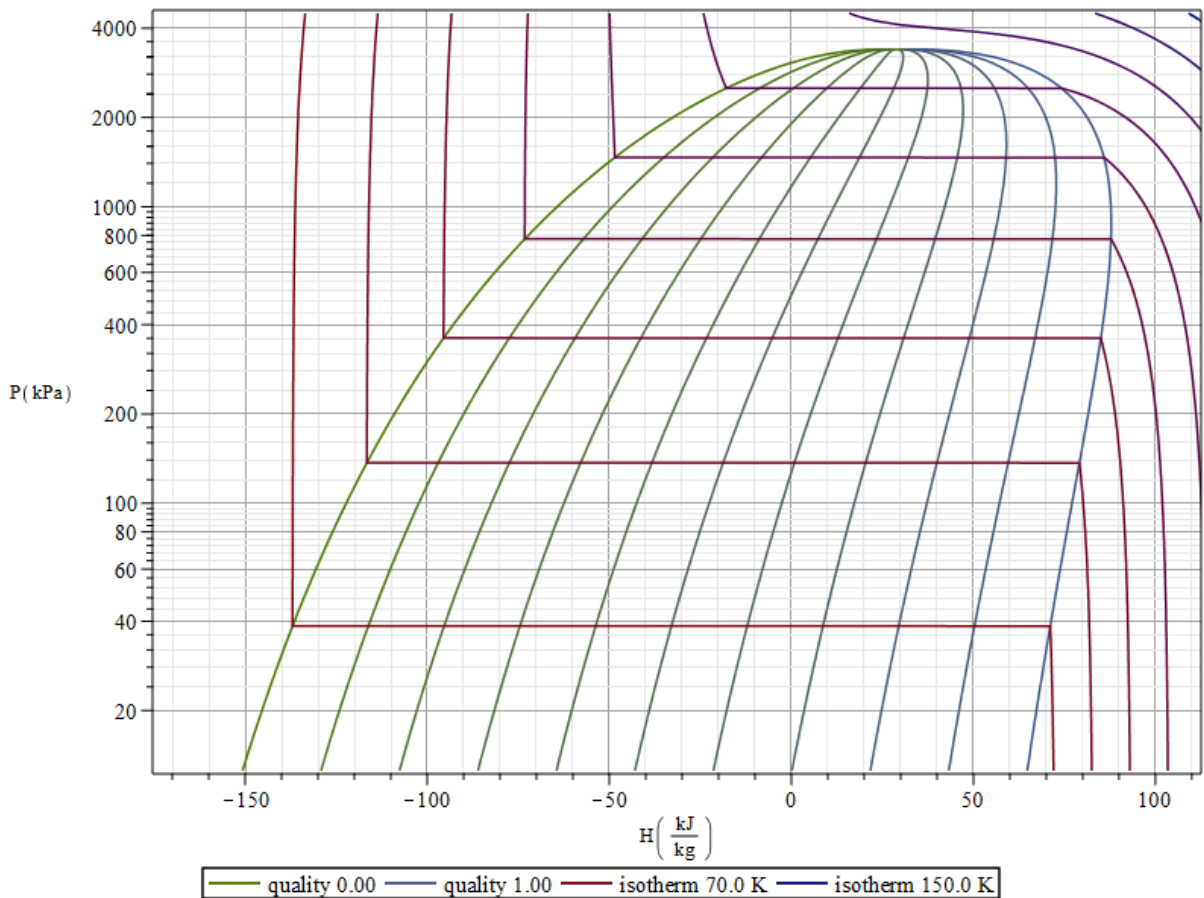
▼ Psychrometric Charts and Pressure-Temperature-Enthalpy Charts

As a part of the new [ThermophysicalData](#) package, Maple 2016 now generates [psychrometric charts](#) for humid air, and [pressure-enthalpy-temperature](#) charts for a range of fluids.

ThermophysicalData:-PsychrometricChart(pressure = 101325)

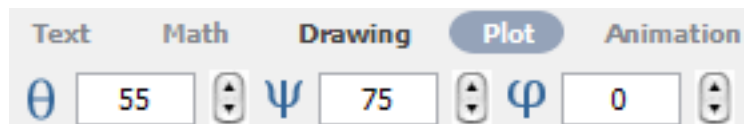


ThermophysicalData:-PHTChart("nitrogen")

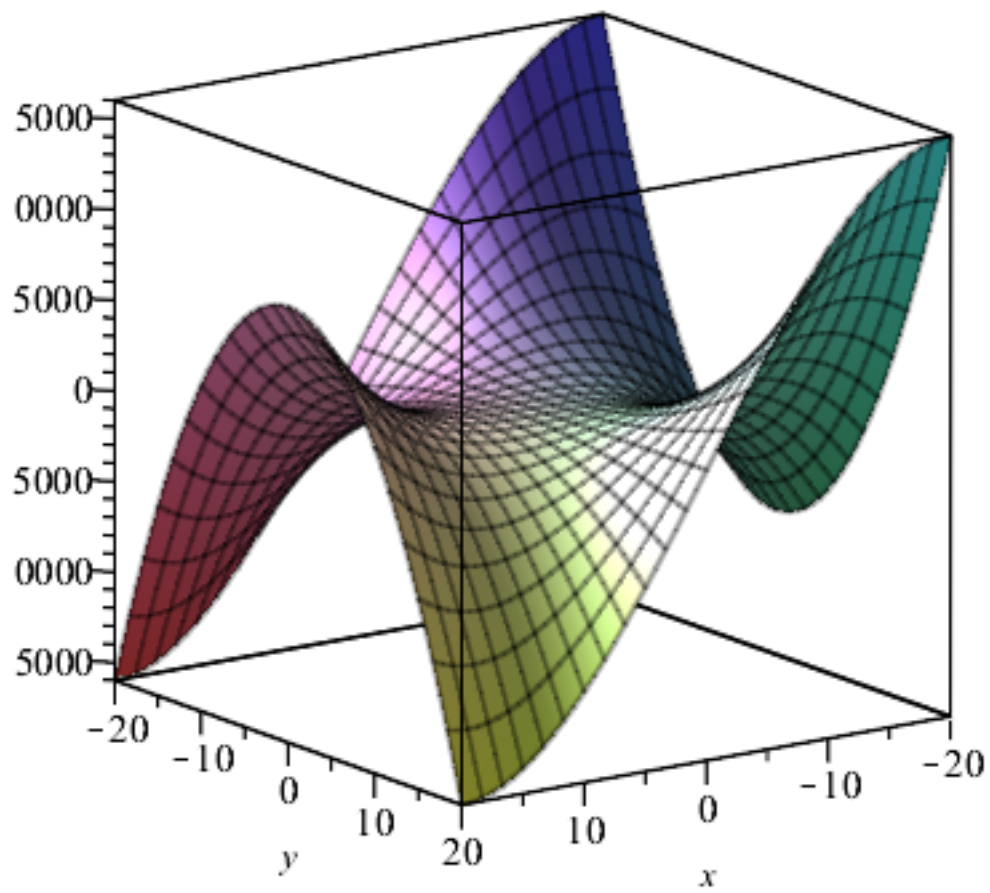


▼ 3-D Plot Orientation

Three dimensional plots have a new default orientation, **[55, 75, 0]**. You can change the orientation of a plot using the **orientation** option or the plot toolbar.



`plot3d(x3 - 3xy2, x = -20..20, y = -20..20)`



`plot3d(x e-x2 - y2, x = -2..2, y = -2..2, color = x)`

