Introduction to *Mathematica*: Plot Options

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The **Plot** command contains many options. The following is a description of some of the more useful ones. These options apply to the entire picture that is created. If you want to change only the actual curve being plotted, see the PlotStyle.nb notebook.

```
Options[Plot]
```

$$\left\{\text{AspectRatio} \to \frac{1}{\text{GoldenRatio}}, \text{Axes} \to \text{Automatic}, \text{AxesLabel} \to \text{None},\right.$$
$$\text{AxesOrigin} \to \text{Automatic}, \text{AxesStyle} \to \text{Automatic}, \text{Background} \to \text{Automatic},$$
$$\text{ColorOutput} \to \text{Automatic}, \text{Compiled} \to \text{True}, \text{DefaultColor} \to \text{Automatic},$$
$$\text{Epilog} \to \{\}, \text{Frame} \to \text{False}, \text{FrameLabel} \to \text{None}, \text{FrameStyle} \to \text{Automatic},$$
$$\text{FrameTicks} \to \text{Automatic}, \text{GridLines} \to \text{None}, \text{ImageSize} \to \text{Automatic},$$
$$\text{MaxBend} \to 10., \text{PlotDivision} \to 30., \text{PlotLabel} \to \text{None}, \text{PlotPoints} \to 25,$$
$$\text{PlotRange} \to \text{Automatic}, \text{PlotRegion} \to \text{Automatic}, \text{PlotStyle} \to \text{Automatic},$$
$$\text{Prolog} \to \{\}, \text{RotateLabel} \to \text{True}, \text{Ticks} \to \text{Automatic},$$
$$\text{DefaultFont} :\to \$\text{DefaultFont}, \text{DisplayFunction} :\to \$\text{DisplayFunction},$$
$$\left.\text{FormatType} :\to \$\text{FormatType}, \text{TextStyle} :\to \$\text{TextStyle}\right\}$$

The **AspectRatio** option specifies the ratio of height to width of graph. The default value is $\frac{1}{\text{GoldenRatio}} \approx 3{:}5$. To make a circle appear as a circle, use **AspectRatio->Automatic**. Example: **AspectRatio->1/10**.

The **Axes** option turns axes on or off. Examples: **Axes->False**, or **Axes->{True,False}**

The **AxesLabel** option labels the axes. Example: **AxesLabel->{"Time","Temperature"}**

The **AxesOrigin** option specifies where the axes cross. Example: **AxesOrigin->{3,4}**

The **AxesStyle** option will change the appearance of the axes. This can be specified for all axes or for each axis separately. Examples: **AxesStyle->{Thickness[0.01],RGBColor[0,0,1]}** or **AxesStyle->{{Thickness[0.01],RGBColor[0,0,1]},{Thickness[0.03],RGBColor[1,0,0]}}**

The **Background** option specifies the background color of a graph. Example: **Background->RGBColor[0,0.9,0.7]**

The **DefaultColor** option is normally set to Automatic. It chooses a color that will contrast with the background color.

The **DefaultFont** option sets the fonts for the entire graph. Example: **DefaultFont->"HELVETICA"**

The **DisplayFunction** option tells whether to hide or display the graph. The default is to display the graph. To hide the graph, us **DisplayFunction->Identity**. To show the graph, use **DisplayFunction->$DisplayFunction.**

The **FormatType** option specifies if equations in the title should be written in traditional, text or standard form. Example: compare **Plot[Sin[x]^2, {x, 0, 2 Pi}, PlotLabel->Sin[x]^2, FormatType -> TraditionalForm]** and **FormatType -> StandardForm]**

The **Frame** option can be set to either True or False. It draws a box around the graph. Example: **Frame->True**

The **FrameLabel** option creates label for the four sides of the frame. Example: **FrameLabel->{"One",Two","Three","Four"}**

The **FrameStyle** option is like the **AxesStyle** option but for the frame. You can specify four separate styles for the four sides. Example: **FrameStyle->{{RGBColor[1,0,0]},{RGBColor[0,1,0]},{RGBColor[0,0,1]},{RGB**

```
Color[
        0,0,0]}}
```

The **FrameTicks** option puts tick marks on the frame. Example: **FrameTicks->{Automatic,{1},Automatic,{2,4}}**

The **Gridlines** option puts a grid on the graph. It can be set for **None**, **Automatic**, or you can set your own. Example: **Gridlines->Automatic**

The **ImageSize** option specifies the width of the image in points (72 points per inch.) For a 5 inch wide picture, use **ImageSize->360**

The **PlotLabel** commnd creates a label for the top of the graph. The formatting of the label is done with the **StyleForm** command. For example look at the following

```
Plot[x^2,{x,-2,2},
PlotLabel→StyleForm["When Pigs Fly",FontFamily→"Times",FontSlant→"Italic",
     FontSize→18,FontColor→Hue[1]]]
```

The **PlotRange** option specifies the minimum and maximum *y* values for a graph. Example: **PlotRange->{1,5}**

The **PlotRegion** option specifies a portion of the image area to be used for a graph. For example, if you set up a 5 inch wide picture, using **PlotRegion->{{0,0.5},{0,0.5}}** will put you graph in the lower left quarter of the picture.

The **PlotStyle** option specifies characteristics for the actual curve(s) rather than the entire picture. This includes thing like the color or the thickness of the curve. For more details, see the PlotStyle worksheet.

The **RotateLabel** option specifies if the label for the vertical axis should be vertical. The default value is **RotateLabel->True**.

The **TextStyle** option specifies all the characteristics of the font. Example: Put the following inside of a **Plot** statement: **TextStyle->{FontFamily→"Times",FontSlant→"Italic",FontSize→18,FontColor→Hue[1]}**

The **Text** options allows you to place text in graphs.The **Ticks** options is like the **FrameTicks** option but applied to the axes instead of the frame.

The other options **ColorOutput**, **Compiled**, **DefaultFont,Epilog**, **MaxBend**, **PlotDivision**, **PlotPoints**, **Prolog** will not be needed except in special cases. See the *Mathematica* Help files for more information