Mathematica Dos and Don'ts: Graphics

Version 2.4: February 2, 2000

DO be sure all options to *Mathematica*'s plot commands come *after* the iterator in the argument list to the command, as

```
Plot[ f[x], {x, xmin, xmax, xstep}, PlotRange->All];
```

DO check that the function you intend to plot is *entirely numerical except for the independent variable*. When in doubt, execute the function just before you execute the plot command. For example, the safest way to plot a function $f(x)$ for $-1 \leq x \leq 1$, is to enter the function (in its general form), as `f[x]`, then the plot command, e.g.,`Plot[ f(x), {x, -1, +1}]`.

DO label all axes, including units in your axis labels.

DO enclose all labels—axis labels, plot labels, frame labels—in double quote marks, as `Axes->{"x","y"}`. [Only if you enclose symbols in double quote marks does *Mathematica* know they're *strings* (literal sequences of characters).]

DON'T forget to eliminate explicit units (such as `Meter` or `Second`) from functions you intend to plot; either divide out our set them equal to 1 using a replacement rule, as `Meter->1`.

DO wrap arguments to plot commands in `Evaluate` whenever the argument contains a *Mathematica* command (such as `Table`), condition(s) (i.e.,`/;`), or replacement rules (`->` or `:>`). If you're plotting a complicated function, you can also use `Evaluate` to force *Mathematica* to generate analytic forms for the arguments *before* it starts plugging in numbers to generate the plot.

DO use a semicolon after plot commands to eliminate the word `-Graphics-` from your output.

DO use different line types, varying the thickness, graylevel, and dashing, to distinguish different curves on the same graph. Here are some suggested line types:

thickLine	Thickness[0.015]
longDashLine	Dashing[0.05,0.03]
mediumDashLine	Dashing[0.03]
shortDashLine	Dashing[0.01]
lightGrayLine	GrayLevel[0.7]
grayLine	GrayLevel[0.5]
darkGrayLine	GrayLevel[0.3]

To use these, first define them in your `BookKeeping` section, e.g., `thickLine = Thickness[0.015]`. Then use the defined line types in `PlotStyle` options to your graphics commands. For example, to plot two curves on the same graph with the first curve a solid, thick line and the second a gray long-dashed line, use the setting

```
\PlotStyle->{ {thickLine}, {grayLine, longDashLine}}
```

DO load `Graphics‘Master‘` at the beginning of any notebook in which you plan to use any of graphics commands other than *Mathematica*'s built-in commands: `Needs["Graphics‘Master‘"]`

DO use the option `AspectRatio -> Automatic` whenever you want to ensure that *Mathematica* will use the same scale on the x and y axes of your (2–D) plot. *Mathematica*'s default `AspectRatio` deforms angles and curves (e.g., circles). (Note that `AspectRatio->Automatic` is the default setting for `PolarPlot` and `ImplicitPlot`.)