

## A Meta-Introduction to SM

SM, sometimes referred to as supermongo, is a program for making plots. It has a substantial amount of internal power for manipulating data vectors and doing mathematics, so while it's not an equivalent of Python or Matlab, you can do quite sophisticated processing of your input data before plotting them. For point-and-line plots, which constitute the great majority of figures that appear in science articles, SM is extremely good for making publication quality plots at reasonably low effort. However, its capabilities for making fancy color image plots, pseudo-3d plots, etc. are more limited.

Python has its own plotting package, matplotlib. By default, Python does not produce publication quality plots — the axis labels are too small and sometimes incomprehensible, and space on the plot is sometimes poorly managed. However, if you are doing your computations in Python, there is obvious advantage to doing your plots in the same language and maybe even in the same programs. Thus, you can either figure out how to get Python to make publication quality plots (I haven't done this myself, but I haven't put a lot of time into it), or you can write out results from your Python programs and plot them with sm.

sm is installed on the Astronomy Department computers, and you should be able to start it just by typing sm at the command prompt. If not, try /usr/local/pkg/bin/sm. I expect it is available on the Physics Department computers, but I don't know. We do have a site license, so if you want to get it installed on your laptop you can consult David Will.

sm can be used interactively, but it can also be run from a shell script, or using macros. I tend to do a little bit of playing around interactively but then write and edit scripts to run it. One can also define macro sets and load them in. Macros and scripts are a powerful way of reusing work from previous plots you have made and allowing you to work at a high level without repeating low level implementations.

The A8824 web page has pointers to a tutorial that is the best introduction to how sm works. It also has copies of my environment and default macro files. If you install these as instructed, then you will have a useful set of tools to draw on for making good plots.

Some of our assignments will have lots of things to plot. For most assignments, I will provide you via the web page the sm scripts that I use for my own solutions. Using these may save you a significant amount of time and allow you to focus more of your attention on the computation and statistics instead of the plotting. You will also learn some useful things about what sm can do and get examples that you can copy for your own work. However, it's entirely your choice whether you use my sm scripts or do your own plots, with either sm or Python. My scripts do rely on the macros available from the web page.

Start with the sm tutorial.