Making plots in Matlab look nice

1 Introduction

By default, Matlab plots look rather boring. Go ahead, try this one.

```matlab
x = linspace (-1,1,50);
y = x.^2;
plot(x,y);
xlabel('This is my x label');
ylabel('This is my y label');
title('Really boring plot :-\');
```

*Yawn* The biggest problem is...most everything is too small. And the default blue gets a bit old after a while.

2 Colors and Line Thickness

Sometimes you’ll want a color that’s not one of the defaults. It’s very easy to use any RGB color code to create any color you want. you’ll want to use the ’Color’ option in your plot statement. Right after color, include a vector with the RGB color values of whatever color you want. For example `plot(x,y,’Color’,1/255*[148 0 211])` will produce a very nice shade of purple. You can easily find RGB color codes for various colors online. One thing to remember, Matlab accepts RGB values between 0 and 1, the codes you’ll find online go from 0 to 255, so you’ll want to scale everything you find by 1/255.

While purple is very nice, the line is still a bit thin. the ’LineWidth’ option will allow you to change the thickness of the plot. 1 is default, in this case 2 looks pretty good. `plot(x,y,’Color’,1/255*[148 0 211],’LineWidth’,2)`

3 Axis Font

The default axis font size is too small. We’re going to use `set` to do this. `set` is a built in function that sets properties for graphics objects. The code we want is `set(gca,’FontSize’,14)`. You can put this code immediately after the plot statement, or if you used `figure`, right after that. 14 looks good here, but you can play with it to get things looking just right for whatever plot you’re making. `gca` means get current axis, which `set` then uses to increase the font size. Notice how all of the font on the plot changed to 14 pt, not just the axes. That’s OK, we’re going to change the rest next.

4 Axis Labels and Title

The axis labels should be a bit larger than the axis font, and the title should be a bit larger than the axis labels. For each of these, use the ’FontSize’ option for xlabel/ylabel and title. For example, replace your `xlabel` command with `xlabel(’This is my x label’,’FontSize’,16)`. Again, I thought 16 looked good here, but play around with it.
The title works the same way, only it should probably be a little larger. Something like: title('Much Better!! :-D', 'FontSize', 18)

After all that fiddling, our code isn't that much more complicated...

```matlab
x = linspace(-1,1,50); y = x.^2; plot(x,y,'Color',1/255*[148 0 211],'LineWidth',2); set(gca,'FontSize',14); xlabel('This is my x label','FontSize',16); ylabel('This is my y label','FontSize',16); title('Much Better!! :-D','FontSize',18);
```

And the results are much more pleasing!

5 Using \LaTeX\ symbols

Maybe you know what latex is (no, not that latex...it's like: lay tech), but you probably don't. It's what I'm typing this handout in right now! (Albus, my cat is very excited about latex, but he's very strange. He almost woke up from his nap to come help me type this). Anyway, latex symbols are very easy to use in matlab! Say you want to have something like \( \sin(\theta) \) in your plot title. All you'd have to do is type in `title('sin(\theta)')` and you'd get a nice little \( \theta \) symbol! This works in the xlabel and ylabel commands as well:

```matlab
x = linspace(0,2*pi,100); y = sin(x); plot(x,y,'Color',1/255*[0 205 0],'LineWidth',2); axis([0 2*pi -1 1]); title('sin(\theta)','FontSize',18); xlabel('\theta','FontSize',16);
```

Here I left the axis font the default, because I felt like it.

Latex greek letters are all the same... then whatever it is. So, \( \pi \) is \( \pi \), \( \xi \) is \( \xi \). If you wanted \( \cos(\omega t + \delta) \), just type `cos(\omega t + \delta)`. If you want capital letter, just capitalize it! So, \( \Pi \) is \( \Pi \). Easy as \( \pi \)!

6 Saving Figures

When saving figures, NEVER use jpg. They look terrible—pixelated with lots of compression artifacts. PNGs are alright, they don't have any of the compression artifacts, but they're still pixelated. Your best bet is to use .eps when you save figures. Sometimes eps files are a pain, but they look the best. There's neither pixilation nor compression artifacts. They scale very nicely, so as you resize the fonts and curves stay smooth.