MATLAB Quick Reference Guide – 2D Plots (Part 1)

Basic Plot Example

Plot sin(x) using 100 points on the domain $0 \leq x \leq 2\pi$

```
x = linspace(0,2*pi,100);
y = sin(x);
plot(x,y,'b-');      % plots a blue line
```

Axis Labels and Title

```
xlabel('x')
ylabel('y')
title('Graph of y vs. x')
```

Plot Options - Marker and Line Styles

```
plot(x,y,'b-')      % plots a blue line
```

Replace `'-'` with the following to change the plot style:

```
'o'  = circle       '-'  = solid line
'+'  = plus         ':'  = dotted line
's'  = square       '—'  = dashed line
'*'  = star         '-.' = dash-dot line
'x'  = x
'd'  = diamond
```

Plot Options - Colors

Replace `'b'` in the above example, with the following to change the color:

```
'r'  = red          'c'  = cyan
'g'  = green        'm'  = magenta
'b'  = blue         'y'  = yellow
'k'  = black        'w'  = white
```

Plot Options - Custom Colors

The color is set by specifying the red R, blue B and green G values, each defined on [0,1]:

```
plot(x,y,'o','Color', [R G B])
```

This example uses dark green circle markers `'o'`:

```
plot(x,y,'o','Color', [0 0.2 0])
```

Plot Options - Line or Marker Thickness

The following code draws a thicker line:

```
plot(x,y,'b-','LineWidth', 2)
```

Thinner line:

```
plot(x,y,'b-','LineWidth', 0.5)
```

Plot Options - Filled Markers

The following draws filled-in circular blue markers:

```
plot(x,y,'bo','MarkerFaceColor', 'b')
```

Shade Under Curve

Fill under curve with red

```
area(x,y,'FaceColor','r')
```

Fill under curve with pink

```
area(x,y,'FaceColor',[1,.8,.8])
```

Axis Limits

Sets the limits along the x and y axes:

```
xlim([xmin xmax])
ylim([ymin ymax])
```

Custom Tick Mark Spacing

Label tick marks from `xmin` to `xmax` in steps `dx` along the x axis. Similar for y axis.

```
xticks(xmin:dx:xmax)
yticks(ymin:dy:ymax)
```

Annotations

Displays text `'hello'` at position (x0,y0) on plot:

```
text(x0, y0, 'hello');
```

Multiple Curves on a Plot

Use `'hold on'` after first plot to prevent subsequent plots from overwriting it:

```
plot(x1,y1)
hold on
plot(x2,y2)
plot(x3,y3)
```

Subplots

The `subplot(ny,nx,n)` command creates a grid of `nx` plot rows and `ny` plot columns and makes the n^{th} plot active. The following creates space for 6 subplots (3 rows, 2 columns) and selects the top right subplot:

```
subplot(3,2,2)
```

Equal Axis Scaling

Set the scaling to be the same for each axis.

```
axis equal
```

Error Bars

To draw error bars given by `yerr` along the y axis, replace the `plot(x,y,'bo')` command with:

```
errorbar(x,y,yerr,'bo')
```

To draw horizontal error bars given by `xerr` use:

```
errorbar(x,y,xerr,'horizontal','bo')
```

Legend

This example plots two curves and displays a legend, labeling the curves "curve 1" and "curve2".

```
plot(x1,y1)
hold on
plot(x2,y2)
legend('curve 1', 'curve 2')
```