MATLAB Plotting & Functions

Corbyn Mellinger

June 11 2021

Xu Group Meeting

Basic Plotting Functions

Function name	Description	Syntax	Example plot	
Plot	Linear 2d plot	Plot(x,y)		
Semilogx (semiology)	Logarithmic x (y) axis plot	Semilogx(x,y)		
loglog	Double-log plot			
plot3	3d plot	Plot3(x,y,z)		
mesh	3d mesh plot (only edge color)			
surf	3d surface plot (only face color)			

Main Figure Editing Pathways

function g=gca (gets current *axes*) : allows for editing/manipulation of data within a window (e.g. plotted function, axis labels, legend, etc.)

function g=gcf (gets current *figure*) : environment in which the data will be displayed (i.e. contains the information within gca)

Multi-tiled plots

tiledlayout(m,n) generates m x n grid in window

nexttile(i) selects the i^{th} tile for manipulation

nexttile(i,[l,w]) generates the i^{th} tile to take up l-by-w vertical, horizontal tiles

Some Useful Properties within gca

g.{PROPERTY}	What it Does	
Children	Lists all data sets in current axes	
Box	Full box around plot (‘on’ , ‘off’) (default : ‘off’)	
FontName, FontSize, FontWeight	Controls axis font, size, and boldness (defaults are ‘Helvetica’, 12, ‘normal’)	
LineWidth	Axes lines (default : 0.5)	
Title	Control plot title (e.g. g.Title.String=‘Title here’)	

”gca” arguments

Font

- **FontName — Font name**
  supported font name | `'FixedWidth'`
- **FontWeight — Character thickness**
  `'normal'` (default) | `'bold'`
- **FontSize — Font size**
  scalar numeric value
- **FontSizeMode — Selection mode for font size**
  `'auto'` (default) | `'manual'`
- **FontAngle — Character slant**
  `'normal'` (default) | `'italic'`
- **LabelFontSizeMultiplier — Scale factor for label font size**
  `1.1` (default) | numeric value greater than 0
- **TitleFontSizeMultiplier — Scale factor for title font size**
  `1.1` (default) | numeric value greater than 0
- **TitleFontWeight — Title character thickness**
  `'bold'` (default) | `'normal'`
- **SubtitleFontWeight — Subtitle character thickness**
  `'normal'` (default) | `'bold'`
- **FontUnits — Font size units**
  `'points'` (default) | `'inches'` | `'centimeters'` | `'normalized'` | `'pixels'`
- **FontSmoothing — Font smoothing**
  `'on'` (default) | on/off logical value

Ticks

- **XTick, YTick, ZTick — Tick values**
  `[]` (default) | vector of increasing values
- **XTickMode, YTickMode, ZTickMode — Selection mode for tick values**
  `'auto'` (default) | `'manual'`
- **XTickLabel, YTickLabel, ZTickLabel — Tick labels**
  `''` (default) | cell array of character vectors | string array | categorical array
- **XTickLabelMode, YTickLabelMode, ZTickLabelMode — Selection mode for tick labels**
  `'auto'` (default) | `'manual'`
- **TickLabelInterpreter — Tick label interpreter**
  `'tex'` (default) | `'latex'` | `'none'`
- **XTickLabelRotation, YTickLabelRotation, ZTickLabelRotation — Tick label rotation**
  `0` (default) | numeric value in degrees
- **XMinorTick, YMinorTick, ZMinorTick — Minor tick marks**
  on/off logical value
- **TickDir — Tick mark direction**
  `'in'` (default) | `'out'` | `'both'`
- **TickDirMode — Selection mode for TickDir**
  `'auto'` (default) | `'manual'`
- **TickLength — Tick mark length**
  `[0.01 0.025]` (default) | two-element vector

Rulers

- **XLim, YLim, ZLim — Minimum and maximum axis limits**
  `[0 1]` (default) | two-element vector of the form `[min max]`
- **XLimMode, YLimMode, ZLimMode — Selection mode for axis limits**
  `'auto'` (default) | `'manual'`
- **XLimitMethod, YLimitMethod, ZLimitMethod — Axis limit selection method**
  `'tickaligned'` (default) | `'tight'` | `'padded'`
- **XAxis, YAxis, ZAxis — Axis ruler**
  ruler object
- **XAxisLocation — x-axis location**
  `'bottom'` (default) | `'top'` | `'origin'`
- **YAxisLocation — y-axis location**
  `'left'` (default) | `'right'` | `'origin'`
- **XColor, YColor, ZColor — Color of axis line, tick values, and labels**
  `[0.15 0.15 0.15]` (default) | RGB triplet | hexadecimal color code | `'r'` | `'g'` | `'b'` | ...
- **XColorMode — Property for setting x-axis grid color**
  `'auto'` (default) | `'manual'`
- **YColorMode — Property for setting y-axis grid color**
  `'auto'` (default) | `'manual'`
- **ZColorMode — Property for setting z-axis grid color**
  `'auto'` (default) | `'manual'`
- **XDir — x-axis direction**
  `'normal'` (default) | `'reverse'`
- **YDir — y-axis direction**
  `'normal'` (default) | `'reverse'`
- **ZDir — z-axis direction**
  `'normal'` (default) | `'reverse'`
- **XScale, YScale, ZScale — Scale of values along axis**
  `'linear'` (default) | `'log'`

Add. plot Arguments

`'Color'` — Line color
`[0 0.4470 0.7410]` (default) | RGB triplet | hexadecimal color code | `'r'` | `'g'` | `'b'` | ...

`'LineStyle'` — Line style
`'-'` (default) | `'--'` | `':'` | `'-.'` | `'none'`

`'LineWidth'` — Line width
`0.5` (default) | positive value

`'Marker'` — Marker symbol
`'none'` (default) | `'o'` | `'+'` | `'*'` | `'.'` | ...

`'MarkerIndices'` — Indices of data points at which to display markers
`1:length(YData)` (default) | vector of positive integers | scalar positive integer

`'MarkerEdgeColor'` — Marker outline color
`'auto'` (default) | RGB triplet | hexadecimal color code | `'r'` | `'g'` | `'b'` | ...

`'MarkerFaceColor'` — Marker fill color
`'none'` (default) | `'auto'` | RGB triplet | hexadecimal color code | `'r'` | `'g'` | `'b'` | ...

`'MarkerSize'` — Marker size
6 (default) | positive value

`'DatetimeTickFormat'` — Format for `datetime` tick labels
character vector | string

`'DurationTickFormat'` — Format for `duration` tick labels
character vector | string

Line Style	Description
`-`	Solid line
`--`	Dashed line
`:`	Dotted line
`-.`	Dash-dot line

Marker	Description
`'o'`	Circle
`'+'`	Plus sign
`'*'`	Asterisk
`'.'`	Point
`'x'`	Cross
`'_'`	Horizontal line
`'|'`	Vertical line
`'s'`	Square
`'d'`	Diamond
`'^'`	Upward-pointing triangle
`'v'`	Downward-pointing triangle
`'>'`	Right-pointing triangle
`'<'`	Left-pointing triangle
`'p'`	Pentagram
`'h'`	Hexagram

Color	Description
y	yellow
m	magenta
c	cyan
r	red
g	green
b	blue
w	white
k	black