Statistics and Simple Plots



Outline

- Announcements:
- Homework II: due Today. by 5, by e-mailStatistics
- Simple plots

Statistics

Descriptive

- summarize properties of data
- Comparative
 - compare data sets
 - test hypotheses

Descriptive Stats

- Most common descriptive stats are in "datafun" toolbox
 - mean, median, min/max, std
 - vectorized, operate on columns
 - Ex: x & y are column vectors with data
 - m=mean([x,y])
 - m(1)=mean of x, m(2)=mean of y

Descriptive Stats

- The descriptive stats functions don't like nans
 - mean([nan;x]) returns NaN
- The statistics toolbox has nanmean, nanmin, nanstd,etc. that ignore nans
 Simple to write your own versions

Basic Comparative Stats

- Curve fitting with polyfit
- Correlation coefficient (r) with corrcoef

"Advanced" Comparative Stats

- Statistics toolbox has functions for
 - regress--like polyfit, but get stats (p, R2)ANOVA

Summary of Matlab Stats

- Matlab has basic stats built-in
- Can expand with the stats toolbox
- Most statistical tests are easy to program
 - Can program Matlab to deal with your data!
 - look for vector-products!

Simple plots

- Plot 1D functions (2D data) with plot
 - plot(x,y) plots (x,y) with a blue line
 - plot(y) is plot([1:length(y)],y)
 - plot(x,[y1,y2,y3]) plots (x,yX) each in a different color

Customizing plot

- plot(x,y,'r') is a red line
- plot(x,y,'o') plots circles rather than lines
- plot(x,y,'yp') plots yellow pentagrams
- Type help plot to get more options

Specialized 1D graphics

- bar--bar chart
- pie--pie chart
- polar--polar coordintes
- semilogy, semilogx, loglog--plotting with log-scales

2D basics

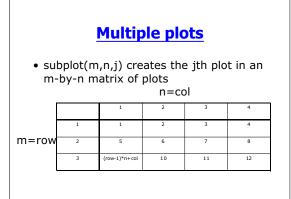
- Assume data Z is on a regular grid defined by X and Y
- pcolor, imagesc, contour plot in 2D
- surf, mesh plot in 3D (perspective)

2D basics

- 2D graphics use colors to represent data
- Color of z is defined by a colormap and caxis
- several built-in colormaps--help graph3d

Generic graphics functions

- xlabel, ylabel, title label your plots
- hold on--allows multiple plots on same axes
- clf clears the figure window
- axis([xmin,xmax,ymin,ymax]) controls axis properties





Axes & Figures

- Matlab plots into figures
 - figure(n) makes n the current figure or creates a figure numbered n
- Figures contain axes
 - If no axes exist in current figure, then any graphics call will create one
 - Can explicitly create with subplot or axes

Printing figures

- print will send gcf to printer (or use GUI)
- print -depsc fname.eps will save graphics in EPS format
- print -djpeg fname.jpg will save into JPG format