

Lec06 IAM550 D. Cramer 9/12/2019 simple sort, advanced plotting

Sorting

- Often, you'll need to sort a list of values
- Thousands of possible algorithms of varying efficiency and different applications
 - Comparison sorts: sort by comparing two values in list
- Bubble sort
 - Very inefficient, but easy to code (test your knowledge of conditionals and loops!)
 - For each value, loop through later values and swap when out-of-order
 - Example: Make a vector of $\exp(\sin^4)$. Sort to find quartiles. Explain quartiles.
- Quicksort (<https://en.wikipedia.org/wiki/Quicksort>)
 - Usually efficient (MATLAB's **sort** command uses this)
 - MATLAB **sort**: `a_sorted = sort(a)`
 - “Divide and Conquer” - requires recursion

Advanced plotting:

- Line properties:
 - <https://www.mathworks.com/help/matlab/ref/matlab.graphics.chart.primitive.line-properties.html>
 - plot syntax: `plot(x,y[,s][,prop1,prop1 value...])`
 - s: line color/marker/style string specification (can combine as in 'r^-')
 - line markers - s is 'o', '+', '^', etc.
 - line color - s is 'r', 'g', 'b', etc.
 - line type - s is '-', '--', ':', etc.
 - properties: 'MarkerSize', 'LineWidth', etc.
- Axis labels (xlabel, ylabel, title)
 - <https://www.mathworks.com/help/matlab/ref/xlabel.html>, etc.
 - `xlabel(text[,prop1,prop1 value...])`
 - multi-line text: {'Line 1', 'Line 2', ...}
 - Annotations and greek characters:
 - https://www.mathworks.com/help/matlab/creating_plots/greek-letters-and-special-characters-in-graph-text.html
- Axes properties
 - axis: set axis ranges (`axis([xmin, xmax, ymin, ymax])`)
 - gca - current axes object
 - <https://www.mathworks.com/help/matlab/ref/matlab.graphics.axis.axes-properties.html>
 - two ways to access (set() or 'dot' notation)
 - `set(gca,'LineWidth',20)` or `ax=gca; ax.LineWidth=20`

- other properties: 'TickLength', etc.
- semilogx, semilogy, loglog
- grid on
- Multiple lines - 'hold on' - or in same plot command (i.e., plot(x1,y1,s,x2,y2...))
 - legend[(label1,...labelN[,prop1,prop1value...])]
 - properties: 'Location' ('NorthEast', etc.), 'Orientation' ('horizontal')
 - can use 'DisplayName' property in plot command to set labels
- Multiple sub plots
 - subplot(nrows, ncols, currentposition)
- Example with looping