



UNIVERSITY OF
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CPSC 531: System Modeling and Simulation

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- There are many “tricks of the trade” used in data analysis and results presentation
- A few will be mentioned here:
 - statistical analysis
 - multi-variate analysis
 - ANOVA
 - tabular presentation of results
 - graphical presentation of results

- “Math and stats are your friends!!!” CW
- There are lots of “standard” techniques from mathematics, probability, and statistics that are of immense value in performance evaluation work:
 - confidence intervals, null hypotheses, F-tests, T-tests, linear regression, non-linear regression, least-squares fit, maximum likelihood estimation (MLE), correlation, time series analysis, transforms, Q-Q plots, EM...
 - working knowledge of commonly-observed statistical distributions

- For in-depth and really messy data analysis, there are multi-variate techniques that can be immensely helpful
- In many cases, good data visualization tools will tell you a lot (e.g., plotting graphs), but in other cases you might try things like:
 - multi-variate regression: find out which parameters are relevant or not for curve fitting
 - ANOVA: analysis of variance can show the parameters with greatest impact on results

- Graphs and tables are the two most common ways of illustrating and/or summarizing data
 - graphs can show you the trends
 - tables provide the details
- There are good ways and bad ways to do each of these
- Again, it is a bit of an “art”, but there are lots of good tips and guidelines as well

- Decide if a table is really needed; if so, should it be part of main paper, or just an appendix?
- Choose formatting software with which you are familiar; easy to import data, export tables
- Table caption goes at the top
- Clearly delineate rows and columns (lines)
- Logically organize rows and columns
- Report results to several significant digits (consistently)
- Be consistent in formatting wherever possible



- Choose a good software package, preferably one with which you are familiar, and one for which it is easy to import data, export graphs
- Title at top; caption below (informative)
- Labels on each axis, including units
- Logical step sizes along axes (1's, 10's, 100's...)
- Make sure choice of scale is clear for each axis (linear, log-linear, log-log)
- Graph should start from origin (zero) unless there is a compelling reason not to do so

- Make judicious choice of type of plot
 - scatter plot, line graph, bar chart, histogram
- Make judicious choice of line types
 - solid, dashed, dotted, lines and points, colours
- If multiple lines on a plot, then use a key, which should be well-placed and informative
- If graph is “well-behaved”, then organize the key to match the order of lines on the graph (try it!)
- Be consistent from one graph to the next wherever possible (size, scale, key, colours)



- There are many “tricks of the trade” used in data analysis and presentation
- A few have been mentioned here
- Effective data analysis and presentation is important in an effective performance evaluation study
- Not always easy to do, but it is worth it!