Engineering Problem Solving with Computers: Matlab

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Outline for Session

- About me
- Course overview
- Matlab Primer

Intro

- Jake Blanchard, Professor, Engineering Physics
- PhD in Nuclear Engineering, UCLA, 1988
- Research: fusion technology, solid mechanics, nuclear batteries for MEMS, laser effects in metals
- Born and raised in Southern California
- married with two kids (11 and 9 yrs)

Student Introductions

Surveys

- Live Meeting familiarity
- Matlab familiarity
- Other programming tools
- Access to Matlab now?
- What would you like to do with Matlab?

Goal of EPSC

- Students who have completed this course should have a broad understanding of:
  - Matlab Fundamentals
  - Solution techniques for several equation types
  - Level of difficulty for various problem types
- No assumption of prior Matlab experience
- Slow me down if I go too fast (or speed me up if I'm too slow)

Resources

- **The Matlab Primer, 6th edition**, Sigmon, K. and Davis, T.A., CRC Press, 2002.

- **Basics of Matlab and Beyond**, Knight, A., CRC Press, 2000.

- **Getting Started with Matlab 5: A Quick Introduction for Scientists and Engineers**. Pratap, R., Oxford University Press, 1998.

- **Introduction to Matlab for Engineers and Scientists**, Etter, D.M., Prentice Hall, 1995.

- **MatLab 5 for Engineers, 2nd Edition**, Biran, A. & Breiner, M., Prentice Hall, 1999.

- **MatLab for Engineering Applications**, Palm, W.J., McGraw-Hill, 1998.

Resources

- Not much in Safari
- Several in Books24x7
- Do you have access to other collections?

Course Outline

- Intro to Matlab
- Functions
- Problem Solving I
- Problem Solving II
- Signal Processing
- Differential Equations
- Monte Carlo Analysis
- Toolboxes
- Signal Processing
- Comparison to VBA

Numerical Topics

- Root-Finding
- Quadrature
- Linear Systems
- Curve-Fitting
- Optimization
- FFTs and Transforms
- Ordinary Differential Equations

Web Site for Course

- Moodle site

  http://epdonline.engr.wisc.edu/course/

- What's on the site:
  - ppt slides
  - Example script files
  - Background (Word/pdf docs)
  - Forums for posting questions

Walkthrough of Web Site

My Approach

- 2 50 minute sessions with break in between
- For Each Topic:
  - Cover fundamentals
  - Show Matlab implementation
  - Show examples
  - Give problems for you to solve in class
  - Share my solution to practice problems
  - Offer "homework" problems for outside practice

Best Approach for Learning Matlab

- Attempt problems during sessions
- Ask if you need assistance
  - Chat in Live Meeting
  - Question tool in Live Meeting
- Try homework problems or find similar problems of interest (between sessions)
- Ask me offline if you need help with these problems
- We learn by doing!
- Consider printing slides for taking notes
- Try to review slides before class
- Feel free to ask me to cover other topics

Etiquette

- Ask questions any time (more is better)
- Please try to give name before you speak (so I can learn voices)

Running Matlab with Our License

- We have made a Matlab license server available for your use

- It is up to you whether you use your license or yours

- To use ours (full doc on web site):
  - variable name: MLM_LICENSE_FILE
  - variable value: 1348@license-2.cae.wisc.edu
  - variable name: LM_PROJECT
  - variable value: EPSC

Any Questions or Comments?