Engineering Problem Solving with Computers: Matlab

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Outline for Session

- About me
- Course overview
- Matlab Primer
• 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

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?