Introduction to MATLAB

Natasha S. Sharma, Ph.D.

What is MATLAB?

- Matlab stands for MATrix LABoratory.
- It is a software package for numerical computations and data visualization. It is a high level language.
- Advantages:
  - Based on the built-in functions.
  - Ease in solving certain kinds of problems: for plotting 2D and 3D.
  - Has a vast toolboxes for numerically solving problems from engineering and sciences.
  - Since matlab is open-source, MATLAB users (from Ph.D. researchers in the engineering and sciences after support the official MATLAB functionality) have over the years created many libraries to solve lots of different mathematical problems.
- Basic building blocks: Matrices.
  All the entities are matrices in MATLAB!
  For example: The number 20 is a matrix of dimension 1×1.

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    1. Several in-built functions.
    2. User-friendly data visualization tools for plotting 2D and 3D.
    3. Plethora of toolboxes to numerically solve problems from engineering and sciences.
    4. User can write their own MATLAB scripts (bunch of commands to be implemented whenever the script is called) or MATLAB functions (a function that can be repeatedly called for different input arguments).
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- How to plot functions in MATLAB using `plot`.

- Look at the different formats of representing numbers including hexadecimal and binary.

- We present a constrained and unconstrained minimization problem and list the steps to be followed to solve them using the toolbox.

Suggested Reading: Example 2.1.1 on Pages 36-37 of the textbook and Appendix D.

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Goals of this lecture

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