MA2252 Introduction to Computing

Lecture 3: Variables and Arrays

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Learning outcomes

- Creating variables and assigning values
- Basic understanding of arrays and their types
- Creating some basic arrays

Variables

- Variables in MATLAB are used to store data e.g. a number or a word.
- Variable names examples: x, y, z, t_1, t_2, omega, etc.
- Variable names can contain letters, numbers or underscore.

Note: Variable name must start with a letter.

It's a good idea copenson on in your problems

Variable assignment

• The assignment operator '=' is used to store a value to a variable.

• Examples:

$$x=5$$

name='Sharad'

• The assigned variables are stored in workspace.

Useful tips:

- semicolon suppresses the variable assignment output in command window.
- 'clear all' deletes all variables in workspace.
- 'clc' clears text in command window.

The assignment operator '=' in MATLAB is different from equality sign '=' in Mathematics.

Try this!

$$x=2;$$

$$y=x+1;$$

Arrays

$$B = \begin{bmatrix} 1 & 0 & 2 & 3 & 5 \end{bmatrix}$$
 $A = \begin{bmatrix} 1 & 2 \\ 5 & 1 \end{bmatrix}_{2\times 2} \rightarrow 2\times 2$
array

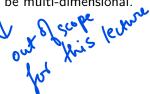
'Matrices' in Mathematics are 'Arrays' in MATLAB.

Wing Hila ?

• Arrays are used to store and organise data.

Y (311)

• Arrays in MATLAB can be multi-dimensional.



Some array types

• Double array: stores numbers

• Char array: stores alphanumeric characters

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Double array

Double array is a very useful array for mathematicians and engineers.

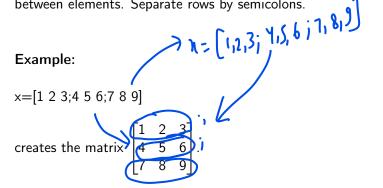
Examples:

•
$$x=[2 \ 4 \ 5]$$
• $y=\begin{bmatrix} 3 \\ 5 \\ 12 \end{bmatrix}$
• $z=\begin{bmatrix} 1 & 2 & 8 \\ 5 & 10 & 11 \\ 3 & 4 & 9 \end{bmatrix}$

Array creation

Basic method to create an array

Put elements of array inside square brackets with a comma or space between elements. Separate rows by semicolons.



Linearly-spaced 1D array (row vector) can be created by using

• colon operator (:)

linspace function

The command initial value: increment: final value spacing

• creates an array with elements starting for specified increment:

• Example:

3:2:14 creates the array

Using linspace function: linspace(a,b,n)
$$b = 0$$
 $a = 1$ $a =$

- creates an array with equally-spaced specified number of elements n starting at initial value a and ending at final value b.
- Example: $| \frac{1}{4} \frac{1}{4} \frac{1}{5} | \frac{10}{10}$ linspace(1,2,11) creates the array $| \frac{1}{5} \frac{1$

$$\frac{2-1}{(1-1)} = \frac{1}{10} = 0.1$$

<u>Array</u> creation (contd.)

To check your understanding of colon operator and linspace, let's do a mentimeter poll.

Please go to the link https://www.menti.com/alnd6z1jfk4g provided in chat

or

visit https://www.menti.com and enter the code 67866952

End of Lecture 3

Please provide your feedback • here