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.

Variable assignment

- The assignment operator '=' is used to store a value to a variable.
- **Examples:**

  x=5

  omega=1.2

  name='Sharad'

- The assigned variables are stored in workspace.

Variable assignment (contd.)

Demo

Variable assignment (contd.)

Useful tips:

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

Variable assignment (contd.)

Demo

Variable assignment (contd.)

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

Try this!

```
x=2;

y=5;

y=x+1;
```

Arrays

- 'Matrices' in Mathematics are 'Arrays' in MATLAB.
- Arrays are used to store and organise data.
- Arrays in MATLAB can be multi-dimensional.

Some array types

- **Double array:** stores numbers
- **Char array:** stores alphanumeric characters

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.

Example:

x=[1 2 3;4 5 6;7 8 9]

creates the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$.

Array creation (contd.)

Demo

Array creation (contd.)

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

- colon operator (:)
- linspace function

Array creation (contd.)

Using colon operator:

The command initial value : increment : final value

- creates an array with elements starting from initial value with specified increment until or equal to final value.
- **Example:**

  3:2:14 creates the array

  [3 5 7 9 11 13]

Array creation (contd.)

Demo

Array creation (contd.)

Using linspace function:

linspace(a,b,n)

- creates an array with equally-spaced **specified number of elements** n starting at initial value a and ending at final value b.
- **Example:**

  linspace(1,2,11) creates the array

  [1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2] containing 11 elements.

Array creation (contd.)

Demo

Array 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