**MATLAB TUTORIAL (DEC, 2022)**

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**PART ONE**

**1. MATLAB Graphical Interface**

* Command Window
* Current folder
* Workplace
* Tabs (Home, Plot, App)

**2. Some common MATLAB operations**

* Variables
* Whos, clear all, clc

**3. Handling Variables**

* Size of a variable
* Character and String
* Indexing variable (Non zero based)
* Logical
* Creating scripts
* Usage of Column

**4. Math with Matlab**

* Basic math (Addition, subtraction, multiplication, division)
* Elementwise
* GCD, LCM, Random numbers
* Trigonometric function
* Set (Intersect, union, difference)
* Statistics (Column wise & Row wise)
* Random number (Rand, randperm)
* Cross & Dot product
* Logic operation (OR, AND, NOT)
* Sign and Absolute
* Number conversion
* Discretize data

**5. Matrices**

* Unique element
* Membership of element
* Shifting matrix element
* Determinant, Inverse matrix
* Relations
* Commonly used matrix (zeros, ones, magic)
* Sorting matrix
* Concatenate
* Find non-zero elements
* Frequency of value

**6. Advanced math Function**

* Symbolic (sym/syms)
* Differentiation and Integration
* Solving equations

**7. Interacting with MATLAB**

* I/O command
* Plotting (2D & 3D)
* More plot option (Figure, Subplot)
* Bar graph
* Hold on keyword
* Interactive brush tool
* Two y-axes
* Animated line
* Existence of file/directory
* Dir (regular expression)

**8. Importing data**

* Csv and Dlm method
* Spreadsheet link
* Calling MatLab func from Excel

**9. Matlab Programming**

* If-else statement
* For loop
* Nested loop
* While loop
* Break, Continue, Switch statement

**10. Functions**

* Function input
* Local and global variable
* Multiple function output
* Return statement

**PART TWO**

**1. Cell data type**

* Cell creation, display and plot
* Cell indexing
* Nested cell
* Cell concatenation

**2. Tables**

* Create table
* Concatenate table
* Select and Reorder table
* Sorting
* Read and write
* Export Summary (evalc, fopen, fclose)
* Add and delete column & row
* Time table
* Add and deleting column
* Concatenate (synchronizing)
* Indexing based on row (timerange)
* Dealing with missing data

**3. Struct**

* Create struct
* Retrieve struct data
* Concatenate & storing
* Map container
* Concatenate map

**4. Data Conversion**

* Convert other data to cell
* Convert from cell to other data
* Other data type to table
* Table to other data