



BASICS OF MATLAB

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WHAT IS MATLAB?

- MATrix LABoratory
- Language for mathematical computing and visualization of data
- A tool data can also be used as a programming language
- Open architecture
- Case sensitive
- MATLAB works with matrices everything is a matrix (from text to large cell arrays and structure arrays)



MATLAB HAS

- Over 600 mathematical, statistical and engineering functions
- More than 36 specialized development toolboxes
- Object Oriented capabilities
- GUI development tools
- Debugging tools
- Link in C++, Java and Fortran



MATLAB ENVIRONMENT

- Command Window
- Command History
- Workspace
- MATLAB Editor



BASIC COMMANDS

- 'who' and 'whos'
- size
- 'lookfor ...'
- 'help ...'
- 'clear' 'clear ...' 'clc'
- 'save filename'
- 'load filename'



VECTORS / MATRICES

- All vector / matrix indexes start with 1 (not 0)
- Indexing matrices
- Matrix operations
 - Addition
 - Subtraction
 - Multiplication
 - Element by element multiplication
 - Element by element division
 - Determinant of a matrix
 - Transpose of a matrix
 - Inverse of a matrix



TYPE OF .M FILES IN MATLAB

- Scripts

- Includes commands

- Function

- Includes function definitions
 - **OUT = function_name(INPUT);**
- Name of the function and the name of the file should be the same.



CONDITIONAL STATEMENT

```
if num1 > num2
    out = 'greater'
elseif num1 < num2
    out = 'smaller'
else
    out = 'equal'
end
```

Comparison is '==' not '='
Other comparison operators

>= greater than or equal

<= less than or equal

~= if different from



LOGICAL OPERATORS

- **AND, OR and NOT** operators :

- $\&$ = AND
- $|$ = OR
- \sim = NOT

- 'find' command

- $x = [4 \ 2 \ 5 \ 7]$
- $\text{find}(x > 5)$



LOOPS

FOR i = 1:N,

$Q(i) = Q(i) + 1;$

END

Try to avoid loops as much as possible...

WHILE E > 0,

 fprintf(E-1);

 E = E-1;

END



- Thank you for listening 😊
- Questions ?

