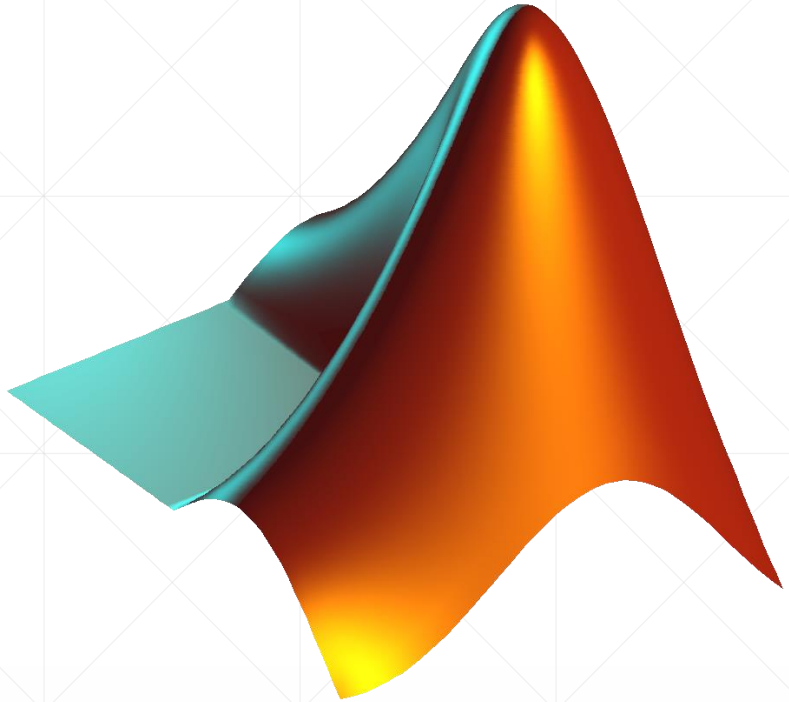


MATLAB

sh

Lesson 1

outline

- Introduction
- Variables
- Who and whos
- clc and clear
- Math operations
- Rounding
- Comment
- Inpute and disp

Introduction

- MATLAB acronym for MATRIX LABORATORY
- MATLAB was written in its first version by Cleve Molar in the 1970s.
- MATLAB integrates computation, visualization and programing.

Introduction

- Matlab Applications
  - Computation
  - Programming
  - Simulation
  - Plotting and data representation
  - Engineering graphs
  - Data analysis

MATLAB Interface

VARIABLES

WHO AND WHOS

clc and clear

Math operations

+,-,/,x , ^ , $\sqrt{\ }$, e^x , π, and | |

Logarithm
Trigonometric functions
imaginary

Rounding

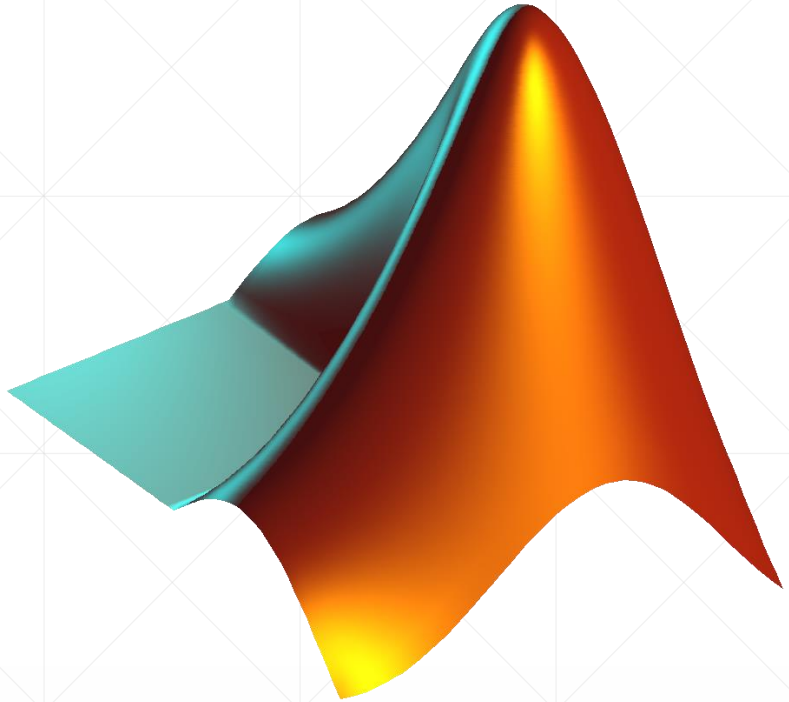
fix , floor , ceil and round

Comment

input and disp

Next lesson’s Outline

- vector
- Max, min, sum, mean, length, rand
- Matrix
- Matrix :addition ,subtraction , multiplication and division
- multiplication and division element by element
- Matrix: ones, zeros, eye, diagonal, inverse and repmat.
- Matrix :size, length ,number of elements, transpose, random, determinant and triangle (upper and lower)



MATLAB

sh

Lesson 2

Outline

- vector
- Max, min, sum, mean, length, rand
- Matrix
- Matrix :addition ,subtraction , multiplication and division
- multiplication and division element by element
- Matrix: ones, zeros, eye, diagonal, inverse and repmat
- Matrix :size, length ,number of elements, transpose, random, determinant and triangle (upper and lower)

VECTOR

[ ], : , Linspace

Max, min, sum, mean, length, rand, sort

Matrix

addition, subtraction, multiplication and division

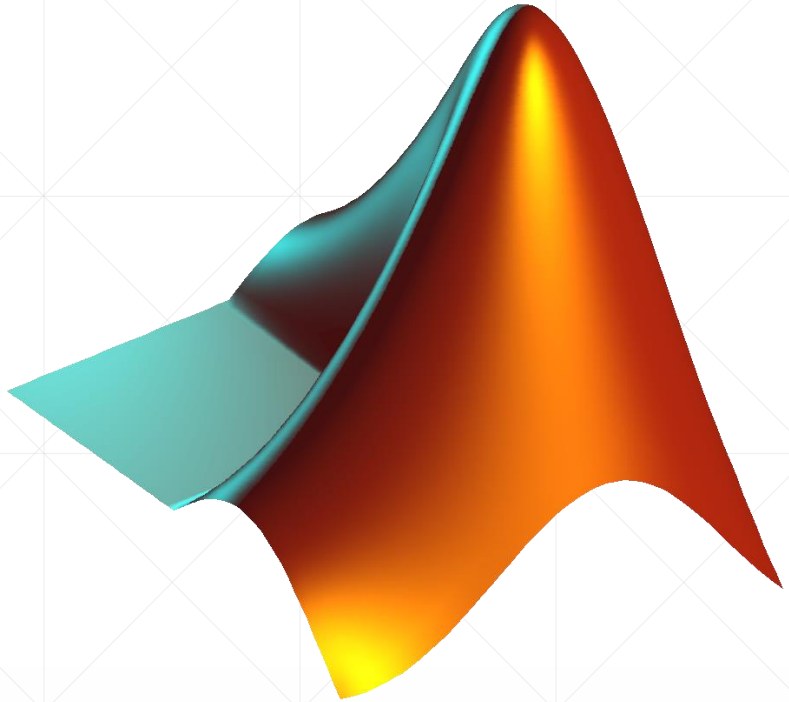
Element by element

ones, zeros, eye, diagonal, inverse and repmat

size, length ,number of elements, transpose, random, determinant and triangle

Next lesson’s Outline

- If end
- If else end
- If elseif
- Switch case otherwise end



MATLAB

sh

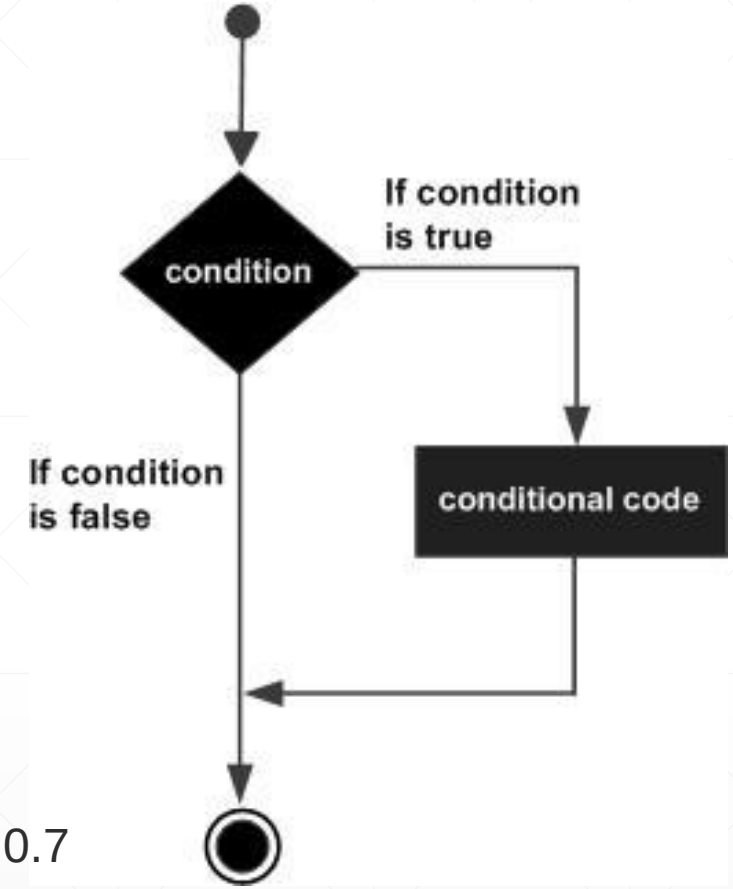
Lesson 3

Outline

- If end
- If else end
- If elseif
- Switch case otherwise end

If end

```
if expression
    % statement(s) will execute if the Boolean
    expression is true
    statements
end
```



1- determine if a value is nonzero
2-the student passes the course when he attends more than 0.7
And obtain more than 40 in the final exam

Relation operator	MATLAB	Logic operator	MATLAB
Less than	<	AND (ele)	&
Greater than	>	OR (ele)	|
Less than or equal	<=	NOT	~
Greater than or equal	>=	AND CONDITION	&&
equal	==	OR CONDITION	||
inequality	~=		

- If else end
- If elseif

```
if expression
    statements
else
    statements
end
```

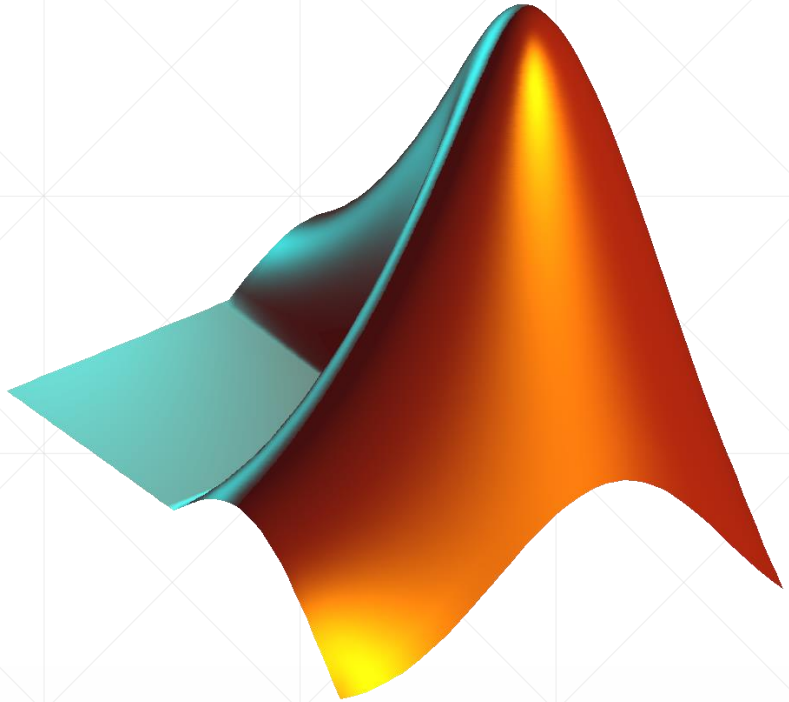
```
if expression
    statements
elseif expression
    statements
else
    statements
end
```

- Switch case otherwise end

```
switch switch_expression
   case case_expression
      statements
   case case_expression
      statements ...
   otherwise
      statements
end
```

Next lesson’s Outline

- For
- Nested loops
- While end
- Function
- structure



MATLAB

sh

Lesson 4

Outline

- For
- Nested loops
- While end
- Function
- structure

For end

```
for variable = start number :step : last number
    statements
end
```

Nested loops

```
for variable = start number 1:step1 : last number1
    statements 1
    for variable = start number 1:step1 : last number1
        statements 1
     end
end
```

While end

```
while condition TRUE
    statements
end
```

function

```
Function  [out1 ,….,outn] = myfun(inp1 ,… ,inpn)
    Statements1
    Statements2
end
```

structure

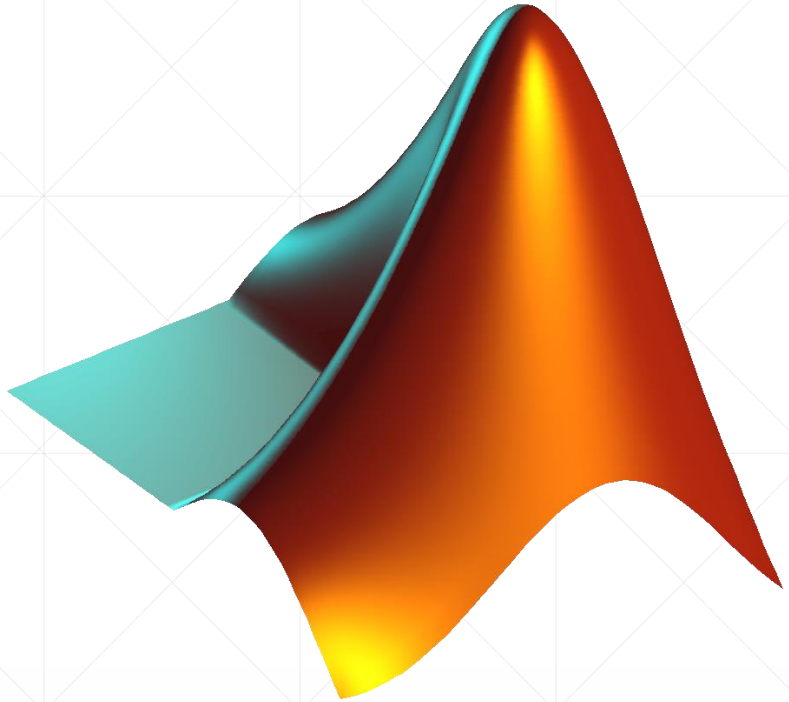
Structure_name = struct(‘name 1’,value 2 ,’name 2’,value 2 ,….,’name n’, value n)

Struct_name . Name1 =value1

Struct_name . Name2 =value2

Next Lesson’s Outline

- Ploting
- Algebraic solutions
- Graphical user interface



MATLAB

sh

Lesson 5

Outline

- Ploting
- Algebraic solutions
- Graphical user interface

symbol	color	sym	marker	sym	Line style
b	Blue	.	Point	-	Solid line
r	Red	O	Circle	:	Dotted line
g	Green	*	Asterisk	-.	Dash dot line
c	Cyan	+	Plus	--	Dash line
m	Magneta	X	Cross		
b	Black	S	Square		
y	Yellow	D	Diamond		
w	White	^	triangle		

ploting

- Algebraic solutions

```
Syms a b c x
equ = a*x^2 + b*x + c == 0;
solx = solve(equ, x)
```

Graphical user interface