2. Lab 2

Script files, data and variable types

R First, see in the lectures' part of the Laboratory manual (polycopié des TPs), the counterpart chapter of this Lab.

2

1. Do the basic calculations given in listings 2.1–2.7, and check that you get the correct answers.

Listing 2.1: Usage of the whos command

```
>> b = 3
b =
3
>> a = 2
a =
2
>> c = a*b
c =
6
>> info3 = a+5
info3 =
7
>> whos
Nom           Taille            Bytes  Classe

a              1x1                 8  double
b              1x1                 8  double
c              1x1                 8  double
info3          1x1                 8  double
```

Listing 2.2: Create a row vector

```
>> x = [1 2 3]
x =
```

```
1    2    3
```

Listing 2.3: Create a column vector

```
>> y = [4; 5; 6]
y =
4
5
6
```

Listing 2.4: The transpose operator

```
>> x'
ans =
1
2
3

>> y'
ans =
4    5    6
```

Listing 2.5: Creating vectors using a range of values

```
>> z = 8:1:10
z =
8    9    10

>> v = linspace(0,10,5)
v =
0    2.5000    5.0000    7.5000    10.0000
```

Listing 2.6: The dot operator.

```
>> clear
>> a = [2 3; 5 1]
a =
2    3
5    1
>> b = [4 7; 9 6]
b =
4    7
9    6
>> a*b
ans =
35         32
29         41
>> a.*b
ans =
8    21
45          6
>> c = [1 2 3 4]
c =
1    2    3    4
>> a*c
??? Error using ==> mtimes
Inner matrix dimensions must agree.
>> a.*c
??? Error using ==> mtimes
Matrix dimensions must agree.
```

Listing 2.7: Accessing the elements of a matrix

```

>> w = [1 2 3 4; 5 6 7 8; 9 10 11 12]
w =
1    2    3    4
5    6    7    8
9   10   11   12

>> size(w)
ans =
3    4

>> w(1,1)
```

```
ans =
1

>> w(3,1)
ans =
9

>> w(3,:)
ans =
9    10    11    12

>> w(2,4) = 13
w =
1    2    3    4
5    6    7   13
9   10   11   12

>> v = w(1:2,2:3)
v =
2    3
6    7

>> z = w([2,3],[2,4])
z =
6   13
10   12

```

2. This part guides you through all necessary the steps for developing a Matlab program (a script file).

   (a) Create a new script file by clicking on the *New M-File* icon in the Matlab window toolbar, shown in figure 2.1. This launches Matlab editor with a blank *script file*.
   (b) Insert the following code in this blank script file :

surf_circ.m

```
radius=2;                    %
surface=pi*power(rayon,2);   %
diameter=2*radius;           %
circumference=pi*diameter; %                .
```

   (c) Save the script file as `surf_circ.m`.
   (d) Try to understand the proposed program : it is a script that calculates the area and circumference of a circle from its radius.
   (e) Run your program by typing `surf_circ` at the command prompt >>, to get a result.
   (f) Describe the action performed at each line of the program using a comment.
   (g) Can Matlab know the value of the constant `pi` ? What is this value ?
   (h) In your opinion, what does the `power(radius,2)` instruction correspond to ?. Can you replace it with another equivalent instruction ?.
   (i) Give your explanations and answers in a form of comments in your program ?.
   (j) You will try again with a radius $\frac{\sqrt{pi}}{2}$.
3. Write a program that calculates the area of a triangle whose dimensions are : `Height=2.25 cm` and `Base=5.5 cm` ?.
4. Briefly explain, in your own words, what the following program does

no_title.m.

```

   a = input('Enter an integer number a: ');
```

```
3   b = input('Enter an integer number b: ');
4   if a < b
5           fprintf('a is the smaller of the two numbers\n');
6   elseif a == b
7           fprintf('a and b are equal\n');
8   else
9           fprintf('a is the larger of the two numbers\n');
10  end
```

Type the script, then run it several times with different values for a and b to confirm that it works as expected. In particular, choose combinations (a,b) so that all three branches of the `if` statement are tested.

■

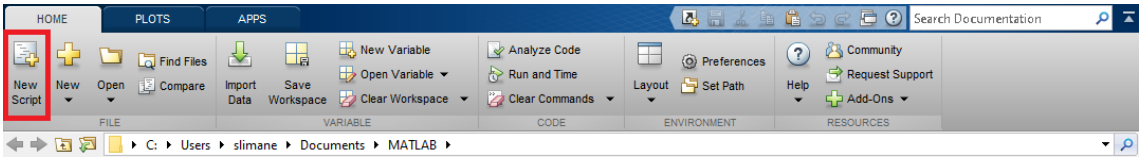

FIGURE 2.1 – The *New M-File* icon on the toolbar in the Matlab window.