



2.1 Variables

MATLAB and Octave for beginners

MER Simone Deparis

MATLAB and Octave for beginners



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EPFL

Variables and initialisation

Terminal Octave ou MATLAB

```
>> a = -3.4  
a =  
-3.4000  
>> b = [-3.1 ; 4.9]  
b =  
-3.1000  
4.9000  
>> c = [-2 4.67]  
c =  
-2.0000 4.6700  
>> d = [ 2 3 0 ; -4 5 6]  
d =  
2 3 0  
-4 5 6
```

- It is not necessary to declare a variable. Its type and size is allocated automatically
- The semi-column or a new line represent a line separator
- Comma or space represent a column separator



MATLAB and Octave for beginners

Now that our environment is ready, we can start working with Octave or MATLAB. First we must find our objects that we call variables. It can be numbers, vectors, matrices and later we will see something else. But first we must choose a name for these variables in order to define them. It is not necessary to declare a variable. Its size and type are set automatically. So for example: If you want to set the variable at minus 3.4 I can simply type 'a' equal to minus 3.4 and MATLAB or Octave recognizes it. I can simply define common vectors. For example I want to use 'b' equal to bracket minus 3.1 semicolon 4.9 and then I close the brackets and here I have defined a vector 'b' which is a common vector one by two. I can also define row vectors. Like for example: 'c' equal to a row vector minus 24.67 then I use to use the brackets and instead of using semicolons I have to just put a space then I can close the brackets again and here is my new variable. With the same principle, we can also define matrices of an arbitrary size. For example If you want to have a matrix 'd' equal to 2 3 and 0 in the first line and then in the second line minus 4 5 6 I have to put semicolons between the two lines but the same principle applies as before.

Notes

Summary



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- It is not necessary to declare a variable. Its type and size is allocated automatically
- The semi-column or a new line represent a line separator
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MATLAB and Octave for beginners

so space is separate colons and semicolon separate rows.

Notes

Summary



1m 52s

Variable names

Terminal Octave ou MATLAB

```
octave:11> a = 3;
octave:12> a
a = 3
octave:13> 3a = 2
parse error:

syntax error

>>> 3a = 2
^

octave:13> a3 = 5;
octave:14> a + a3
ans = 8
octave:15> █
```

- Variable names must start with a letter
- The number of characters in the name must be less than 63 (= namelengthmax)
- The names are CASE SENSITIVE, upper and lower letters are different

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when you write the program you need variables. These variable stores values vectors, matrices so you need to name those variables. Before we have seen that we can say 'a' equal to 3 and then I put a semicolons that the variables doesn't show up but it is there so so if I type again 'a' then I can record a the value. Now there are rules to name variables that is important to give a proper name to a variable a name that you can recognize but the, you don't have the freedom that you want. For example: you cannot name a variable starting with a number, so if I say 3a equal to 2 for example then there is a an error Octave and MATLAB don't like that so very important you start with the name but I can say a3 equal to 5 and then there is no error. I have 'a' I can do 'a' plus a3 and get a result.

Notes

Summary



2m 00s

Variable names

Terminal Octave ou MATLAB

```
octave:12> a
a = 3
octave:13> 3a = 2
parse error:

    syntax error

>>> 3a = 2
    ^

octave:13> a3 = 5;
octave:14> a + a3
ans = 8
octave:15> area = 2.3;
octave:16> AREA
error: 'AREA' undefined near line 1 column 1
octave:16> AREA = 4.56;
octave:17> namelengthmax
ans = 63
octave:18> █
```

- Variable names must start with a letter
- The number of characters in the name must be less than 63 (= `namelengthmax`)
- The names are CASE SENSITIVE, upper and lower letters are different

MATLAB and Octave for beginners

good Now these are very simple variables but you can have a name, which is area equal to 2.3 and so I have now variable which is area but what if I type area uppercase right These doesn't exist because area uppercase an area, lowercase are two different variables but of course I can define now an area another area which is 4.56 and so now I have two different variables, with two different numbers stored in that okay so names are case sensitive you have also to know that there is a maximum length to the name of the variable and this you can recover with a with the name `namelengthmax` `namelength` and then I type the tab so that Octave completes the name by itself and then I see that is 63.

Notes

Summary



3m 05s

Variable names

Terminal Octave ou MATLAB

```
>> sin(3)

ans =

    0.1411

>> sin(3) = 2

sin =

    0    0    2

>> sin(3)

ans =

    2

>> clear sin
>> sin(3)

ans =

    0.1411

fx >>
```

- Avoid using names already used for build-in functions or variables
- Some names are RESERVED WORDS and can not be used (for, end, ...)



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In your choice you have to be careful because there are variables that are already predefined and they are building functions of variables so for example sine is function and if they sine of 3 times pi. pi is also a built in variable It's the value of pi and then sine is 3 times pi gives you almost here but if you take sine of 3, then you get 0.1411 Now what If you mistakenly type sine of 3 equal to 2 then Octave defines a new variable sin which has size 1 times 3 and whose the last entry is 2. now when you calculate it again sine of 3 you get 2 instead of 0.1411 If you want to recover the old variable or may be function, you have to clean the variable seems. so clean clear sin and then it takes sine of 3 you get gain the original variable.

Notes

Summary



Variable names

Terminal Octave ou MATLAB

```
>> sin(3)

ans =

    0.1411

>> sin(3) = 2

sin =

    0    0    2

>> sin(3)

ans =

    2

>> clear sin
>> sin(3)

ans =

    0.1411

fx >>
```

- Avoid using names already used for build-in functions or variables
- Some names are RESERVED WORDS and can not be used (for, end, ...)

MATLAB and Octave for beginners

so you have to be careful with them with these variables. There are also words which are reserved we will see later what these are but for example we have 4 and functions and many others.

Notes

Summary



5m 27s

Formatting screen output

Terminal Octave ou MATLAB

format may be used to affect the spacing variables as follows:

format COMPACT Suppresses extra line-feed
format LOOSE Puts the extra line-feed

Example:

```
format short, pi, single(pi)
displays both double and single pi with
format long, pi, single(pi)
displays pi as 3.141592653589793 and sir
```

```
format, intmax('uint64'), realmax
shows these values as 184467440737095516
format hex, intmax('uint64'), realmax
shows them as ffffffffffffffff and 7feff
The HEX display corresponds to the inter
and is not the same as the hexadecimal r
language.
```

See also [disp](#), [display](#), [isnumeric](#), [isfl](#)

Reference page in Help browser
[doc format](#)

fx >>

- **format** changes the screen output formatting, not the variable itself
- Cf **help format**
long, long e, long g,
short, short e, long g, ...

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I just spoke about pi. pi is the most known number is 3, 14 16 or what it is here, we see a short number of digits. so If I type format long then I get more digit. so try now get with pi and I see many digit this still the an approximation but it's much better then the one before. In any case the value of the variable didn't change this does, it's just the format, that we changed We can also change to another format for example: format long 'e' and then pi again and I see that I still get the same amount digits but then there is also times 10 to the 0. so this e+ 0 0 means 10 to the 0. So if I multiply pi by 10 or by 100 then I get 31415 time 10 to the second so this is the scientific format. There are other formats. just type help format and you get many other ways of formatting your output.

Notes

Summary



5m 44s