

Matlab/Simulink for beginners

Getting start with Matlab:

- how to use the “current folder”, “workspace” and “command window”:

<https://www.youtube.com/watch?v=agUQxT0rnXY>

My advice: use Layout -> Three column

Matlab customatization: Preferences

- how to make a script: <https://www.youtube.com/watch?v=8K9NITJJlmQ>

You can run you script with the “run” button or with the F5 button.

It is usual to start a script with:

close all

clear all

clc (delete command window)

If there are problems with the running script ctrl+c can stop it.

With “;” at the end of the lines, the script does not use the command window, and the script will run faster.

You can comment anywhere after a “%” – green font colour is the comment.

With “%%” you can make new sections in the script.

The script editor help you to find the errors on the right side of the window (yellow sign means smaller error, red line means important mistakes).

- How to make vectors:

[v1 v2 v3 v4 ...]

Or:

[v1; v2; v3; v4; ...]

- How to make a matrix:

[1 2 3; 4 5 6;...]

- Matlab help is always our friend! How can we use it?

For example if you want help for the “plot” command:

help plot – gives a short summary

doc plot – gives detailed information in a new window

- Useful commands for matrix operations:

ones, zeros, flipud, fliplr, rotate, eye, eig...

- The typical cycles also can be used in Matlab (for, while, if, else, elseif...):

```
for i=1:10
    commands...
end
```

- Making vectors:

```
linspace(1,10,5)
```

- Very important – using the plot command

plot(x,y) – x and y should be vectors with the same length for making one curve.

Other useful additional commands:

```
title('The title of the figure')
```

```
xlabel('Name of the x axis')
```

```
ylabel('Name of the y axis')
```

```
axis([xmin, xmax, ymin, ymax])
```

```
grid
```

```
legend
```

```
plot(x,y,'-') or with '+' or with ':' – line type setting
```

```
plot(x,y,'r') or with 'g' – line colour setting
```

There are many other setting properties!

Making more than one curve on a figure:

```
plot(x1,y1,x2,y2,...)
```

If you don't want to delete the previous curve with a new plot command:

```
hold on
```

If you want to delete it/them:

```
hold off
```

If you want to have more than one figure in one window:

```
subplot(2,2,1) – two rows, two columns, plotting on the first place
```

If you want to make a few figures in different windows:

```
figure(1)
```

```
plot...
```

If you want to put the figure into MS Word:

```
Edit -> Copy figure
```

Getting start with Simulink:

- Making a simple model: <https://www.youtube.com/watch?v=iOmqqewj5XI>
- Setting the solver: Simulation -> Model configuration parameters -> Additional parameters -> Relative tolerance
The basically given $1e-3$ usually too big!
- There are many toolboxes in the Simulink library. Usually the “Simulink” library is used, but you can find many other ones like “Automated driving system toolbox”, “Control system toolbox” or “Powertrain blockset”.
- Simulink also uses the workspace. Typically the parameters are generated with a script and Simulink just has the names of these parameters.
- How to make subsystems: <https://www.youtube.com/watch?v=EXMjPPyC-gA>

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