

# Lab report

## what to write, how to write?

*Some elements about what should be included in a lab report*

### 1 What (selecting the content)

The precise content depends on the lab assignment, but there are some common elements:

#### 1.1 Experiments (computer-based or hardware based)

##### 1.1.1 Experiment purpose

Clearly express **why** an experiment is conducted. In particular, what is the expected outcome ?

##### 1.1.2 Experiment parameters

For each experiment, there should be enough details for the reader to **reproduce** the experiment from the text. Therefore, the **experimental parameters** should be precisely given.

##### 1.1.3 Experiment results

Outcomes of experiments should be described precisely. It can be expressed with a value (or a table of values), or a curve, or both.

Once expressed, the results should be also **commented/discussed** (“numbers don't speak by themselves”):

- are the results in line with the expected results?
- are the results consistent with an underlying theory (analytical formula, theorem...)?

Do not forget to describe first the most obvious aspects (ex: “the voltage is mostly sinusoidal”), and only after the finer details (ex. continued: “but there are some harmonics”)

### 2 How (tips on clean formatting)

#### 2.1 Front page

The front page should include:

- the title of the lab assignment and the date (of the last session if more than one)
- the name of the writer(s) of the report, and the group number (if any)
- the name of the supervisor(s)

## 2.2 Numbers

Numerical results have a **unit** (W, V, A...)

The number of digits should be consistent with the underlying precision of the measurement.

	Unit is missing	Too many digits	Fine
Example	P = 10.2 	P = 10.2681 kW	P = 10.2 kW

## 2.3 Figures

First, figures should be **readable at their printed size** (which differs from the size on screen!).  
[Protip] Never export a fullscreen figure plot window, it will look tiny on paper.

**Label & legend:** x and y axes should have a name and unit (ex: “time (ms)”). If several lines are plotted, they should have a legend.

**Referencing:** All figures should be numbered and this number used as a reference in the text (replace “on the figure below” by “on figure 4”). [Protip] This numbering should preferably be automatic rather than manual (like section numbers).

**Commenting:** figures should be commented like any results (cf. §1.1.3) because “curves don't speak by themselves”. Also, figures can present complex data, so the main text should say what the reader is supposed to look at, in what order.

### 2.3.1 Proper export of figures

Screenshots are quick but dirty: avoid them! Use the proper export tool to generate a clean file:

- PNG image for Word/LibreOffice reports (JPEG creates dirty artifacts)
- PDF or PNG for LaTeX

In Matlab: `print(gcf, 'graph.png', '-dpng', '-r300')` (see doc `print` and my dedicated document “Clean export of Matlab plots” for details)

In Simulink:

- ideally use a “To Workspace” block to make a clean plot with a Matlab script (time consuming)
- if time is limited, you can use Simulink Scope, but **change the default set of colors**: white background instead of black. And again don't forget labels and legend.

## 2.4 External resources

If your report includes external resources (images, diagrams), the **source** (e.g. the URL) should be clearly given.

Additionally, if the report is meant to be published (outside the class), you should check that the redistribution of those resources is allowed (e.g. it's fine if covered by a Creative Commons License, not fine if covered by the “all rights reserved” copyright notice).