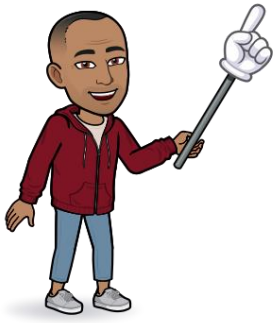
WRITING A REPORT

1

General guidelines

2

Guidelines for the report



Basic rules :

- Use the template (word or latex)
- Respect the suggested balance (number of pages/section)
  - Abstract (1/2 page)
  - Introduction (1-2 pages)
  - State-of-the-art (3-4 pages)
  - Work plan (2-3 pages)
  - Tentative schedule (1 page)
  - List of references (1-2 pages)
- Total number of pages 10-12

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Guidelines for the report

Other important rules

- The list of references should contain only the papers you are referring to in the text (no 'floating' reference)
- Plagiarism is forbidden, if you copy a sentence or paragraph from a source, cite it, and put it between brackets “”
- Every figure/table should be numbered, and correctly referenced to in the text
- If a figure/illustration is copied from a source, you have to cite it
- Footnotes are not common in our field, prefer links to references at the end of the document

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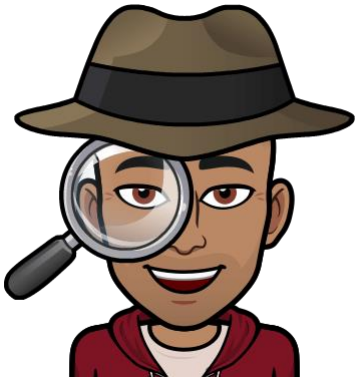
General advises



- Make a scenario before starting to write : what is the message you want to convey ?
- Use concise writing, avoid repetitions, go straight to the point
- Check English grammar and spelling, or have it checked by a native speaker
- Use illustrations in order to be more striking and attract visual attention of the reader

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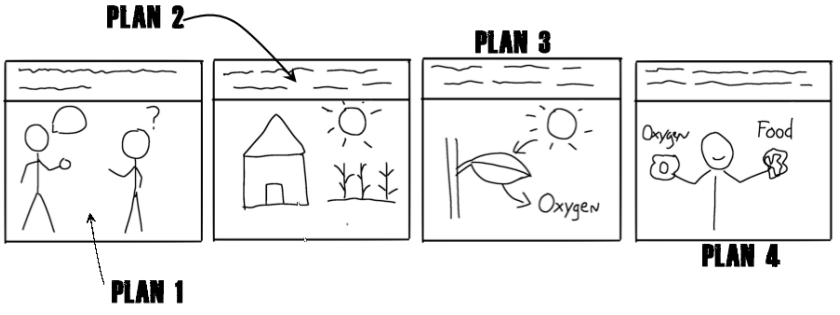
Making a scenario

Structure your report and check that :

- the parts are in the right order
- transitions are coherent
- everything you want to talk about is there
- your final message is clear



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Referencing

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Referencing example

Analytical expressions of these optimal parameters can be derived when the main structure is represented by a single degree-of-freedom (dof) system. The first author to derive such analytical expressions was probable Den Hartog [1] in 1956. He found the analytical expressions of the optimal stiffness and damping of a TMD

[from Soubeyroux et al, 2018]

References

[1] JP Den Hartog. *Mechanical vibrations*. McGraw-Hill Book Company, 1956. Book

[2] G.B. Warburton. Optimum absorber parameters for various combinations of response and excitation parameters. *Earthquake Engng and Struct. Dynamics*, 10, 381–401, 1982.
Volume Pages Year Journal papers

[13] B. Möller, M. Beer, and M. Liebscher, "Fuzzy analysis as alternative to stochastic methods: Theoretical aspects," in *Proc. Fourth German LS-DYNA Forum*, vol. 5, 2005.
Conference papers

→ When available, prefer book/journal paper to conference papers

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Referencing example : the doi

The doi is a unique identifier for each publication, the link allows to access directly the website of the publisher

Example :

[33] F. Levassort, P. Maréchal, P. Boy, O. Acher, Toward more efficient matching layers for piezoelectric transducers, Proc. – IEEE Ultrason. Symp. (1) (2009) 2762–2765, http://dx.doi.org/10.1109/ULTSYM.2009.5442015.

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Figures/Tables and referencing

We first consider the equations of motion of the host structure without TMD with a force applied at the position and in the direction of the TMD (Figure 3).

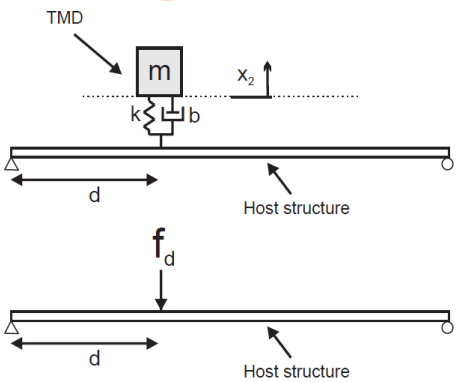

Figure 3: TMD attached to a continuous system, and host structure without TMD with force applied at the position and in the direction of the TMD

Importance of caption (should be explicit)

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The power of illustrations

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The power of illustrations : example

- The building is assumed to be excited by the wind. This causes vibrations which can be measured with dedicated sensors such as accelerometers or strain sensors.
- Our aim is to use the measured data from these sensors in real-time to be able to monitor the structure, i.e. to detect the appearance of damage and possibly locate where the damage has occurred.
- This is an important tool to aid for the maintenance of the building

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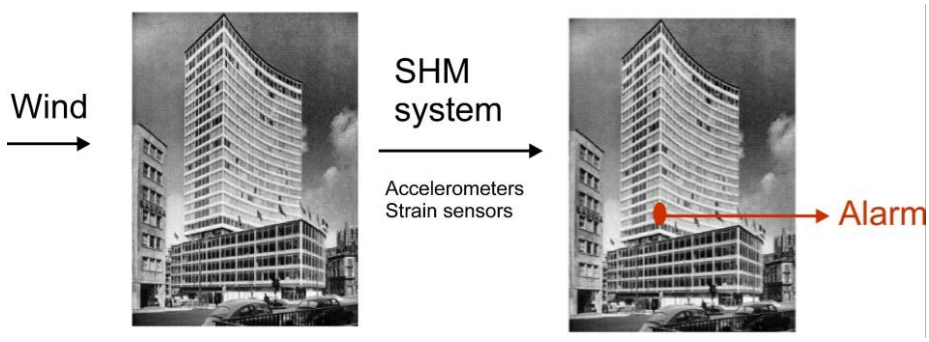
The power of illustrations : example



- In a report : support your text description with visual representations
- In a presentation : replace as much as possible text with visual support, and use oral expression to replace text

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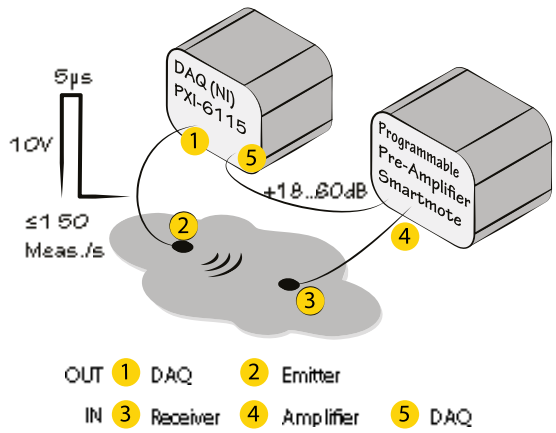
Illustrations : the skeleton of your report/presentation

« A picture is worth a thousand words »



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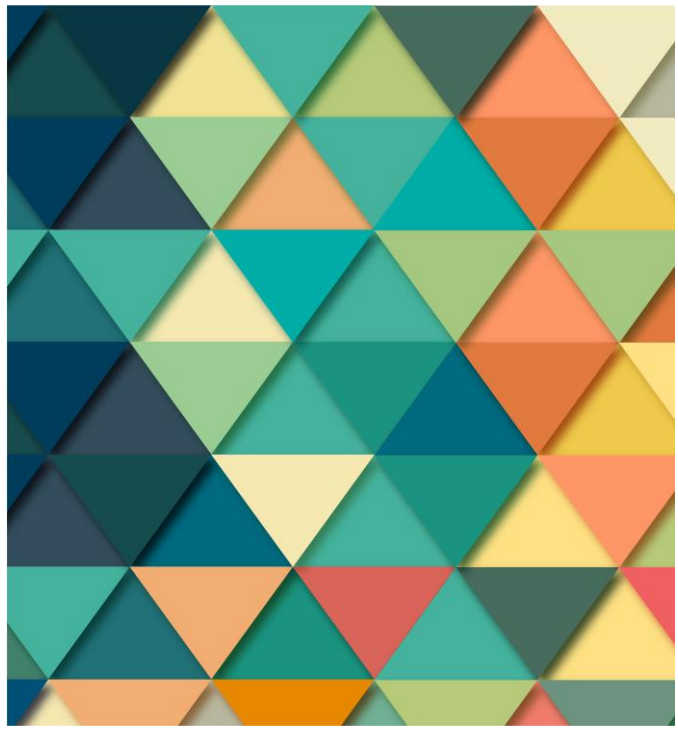
Vectorial vs pixel graphics



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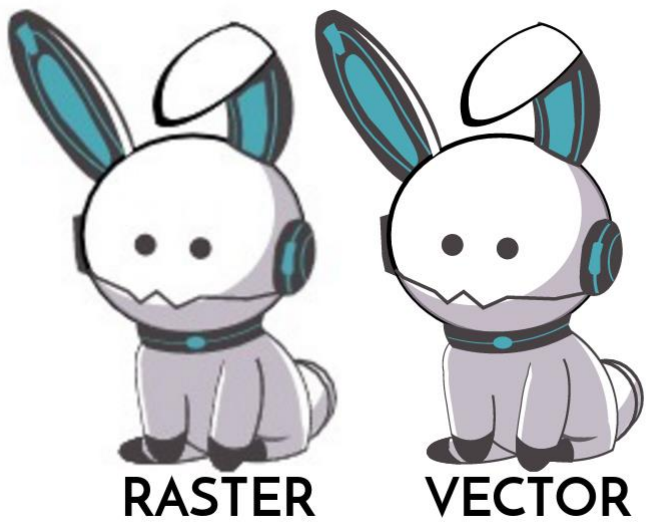
Vector vs pixel images



VECTOR	RASTER
FORMED BY VARIOUS SHAPES	COMPRISED OF PIXELS
SCALABLE	LOSES QUALITY WHEN SCALED
CAN CONVERT TO RASTER	CAN'T CONVERT TO VECTOR
SVG, CGM, EPS, XML	BMP, JPG, GIF, PNG

[https://vectr.com/tutorials/what-are-vector-graphics/]

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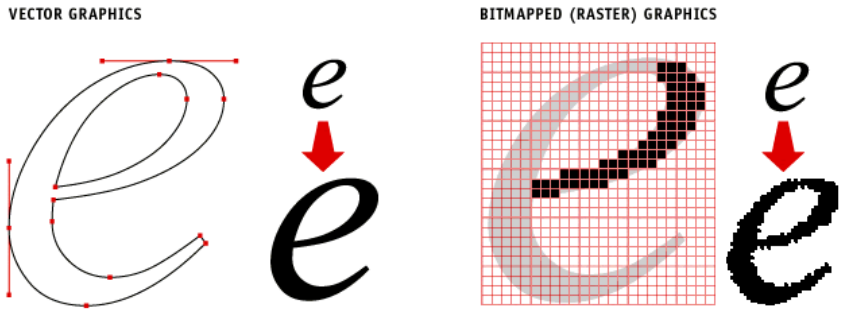
Vector vs pixel images



[https://sites.google.com/site/btxprojectcomputergraphics/raster-vector-resolution]

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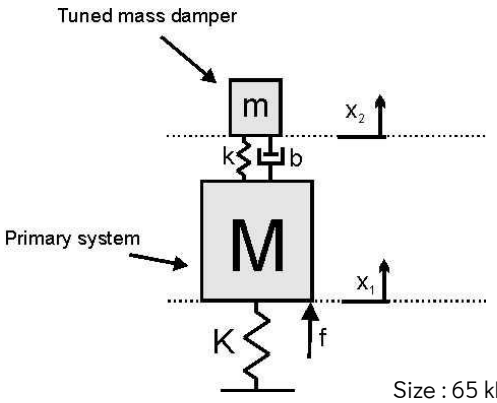
Vector vs pixel images

Pixel image : jpg, png, gif, tiff, ...
(Photoshop, Gimp, Paint, ...)

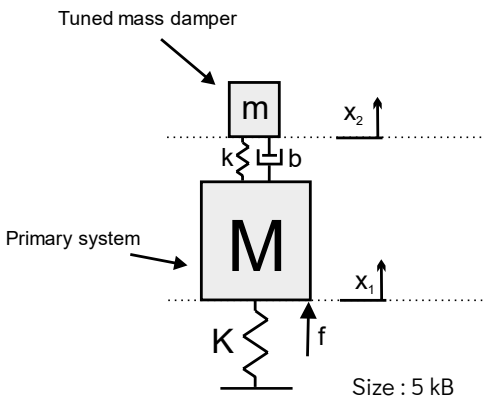
Vector graphic : eps, pdf, svg, ai, cdr, ...
(Adobe Illustrator, CorelDraw, InkScape)

JPG 100 dpi



Size : 65 kB

SVG



Size : 5 kB

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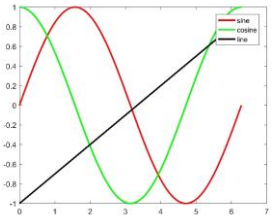
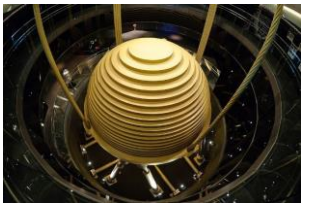
When to use vector or pixel graphics

Vector graphics :



- For schematics, simple drawings made of geometric figures, points, lines, arrows, etc.
- Main advantages : Small size of file, can be easily modified (change color, add element, etc ...)

Pixel graphics :



- Whenever you have pictures (cameras only work with pixels)
- Main advantages : Compatibility with most softwares

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Software compatibility

Most modern presentation/reporting software can handle both vectorial and pixel based illustrations

- Latex historically is vector based but can handle pixel figures
- Word and Powerpoint are historically pixel based but recent versions can handle SVG.
- Web pages use mainly pixel based images

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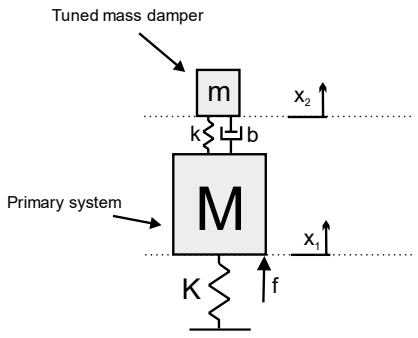
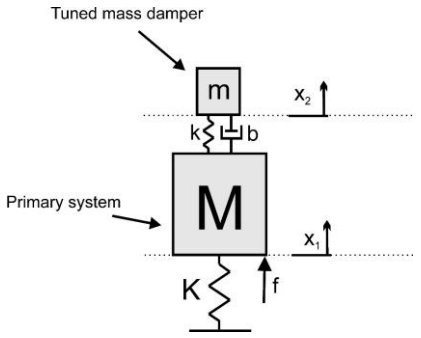
Conversion to high quality pixel graphics

When software does not handle vector graphics (i.e. for webpages), or if image is too complex (finite element mesh with a lot of elements), export vectorial representation to high-quality pixel format (>600 dpi).



SVG Size : 5 kB



JPG 1200 dpi Size : 551 kB

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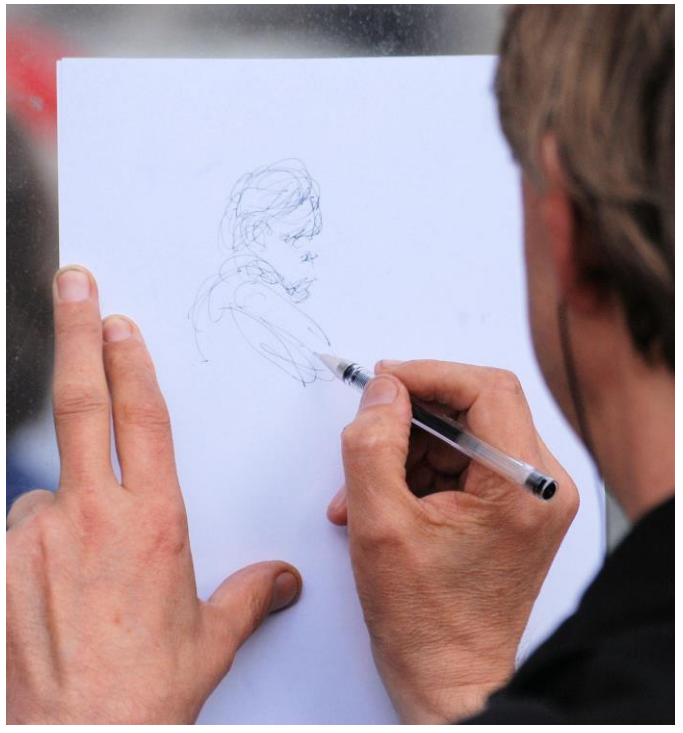
Make your own illustrations



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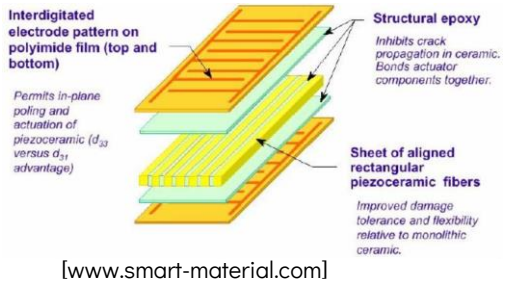
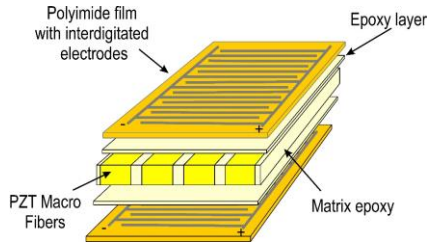
Avoid using illustrations from webpages/articles



[www.smart-material.com]

- Bad resolution
- Not optimal for your report



(with CorelDraw)

Spend some time to make your own illustrations

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Tell your story with illustrations

Strain gauges are installed on the building. The building is mainly subjected to wind oriented in the X-Direction of the tower. Our goal is to detect and locate damage directly from the sensors response, without any knowledge of the model of the structure.

We have recorded signals on the full set of transducers at two different instants. There are in total 83 strain gauges, one at each level of the building

The first strain gauge is at the bottom of the building. The first set of measurements corresponds to the healthy case while we suspect that a damage has occurred for the second set of signals.

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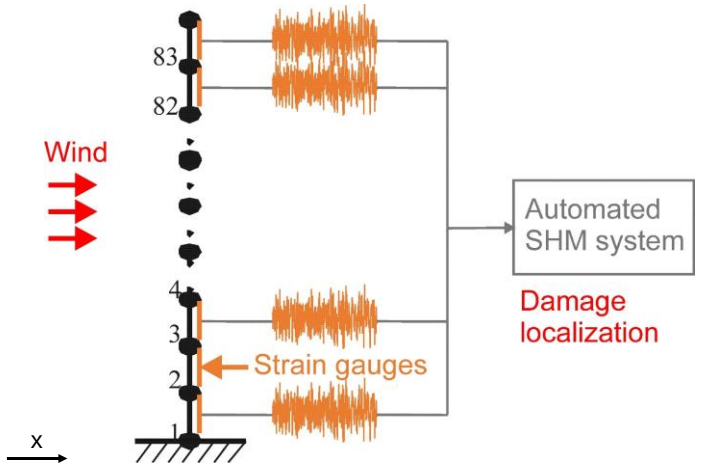
Tell your story with illustrations



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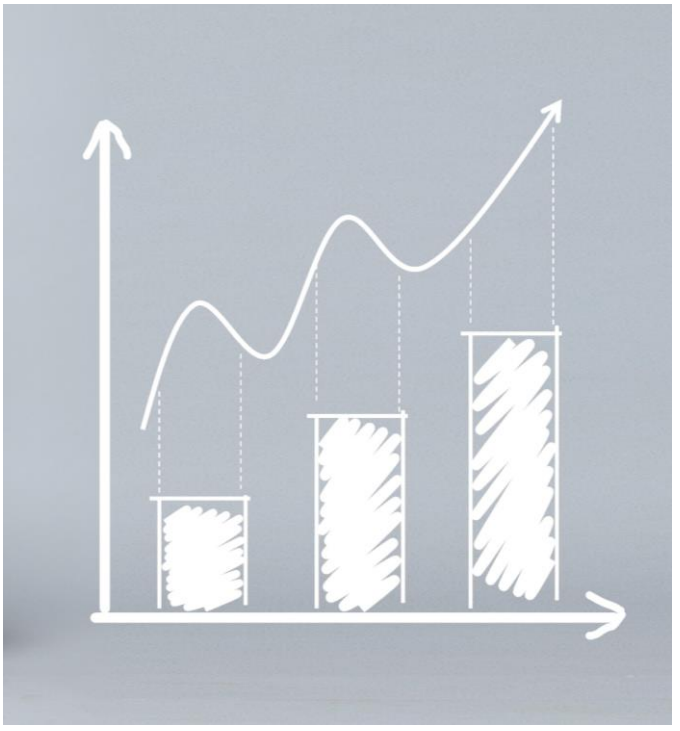
About graphs



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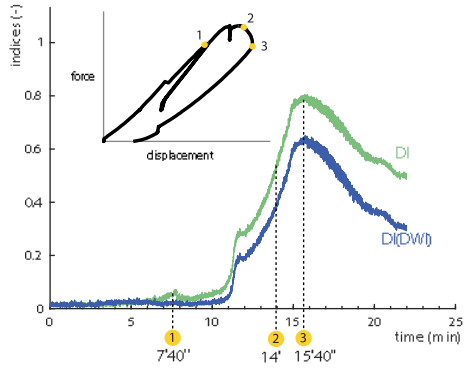
Basics of graphs

- Choose the right type of graph
- Pay attention to axes labels and units
- Improve readability of the graph : highlight information

(stay away from default graphs in Matlab, Excel, ...)



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Basics of graphs

Choosing the right graph

Jean-luc Doumont

https://www.youtube.com/watch?v=6lm4wJ1qm0w

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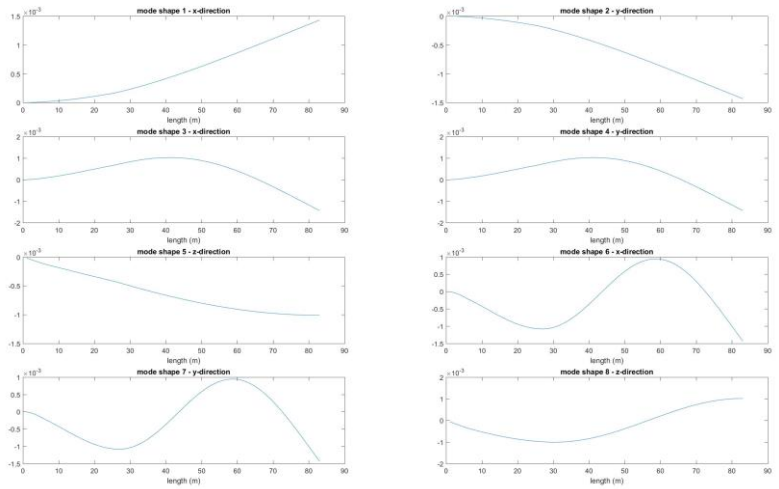
Example : representing modeshapes of a cantilever beam

Initial Matlab Figures



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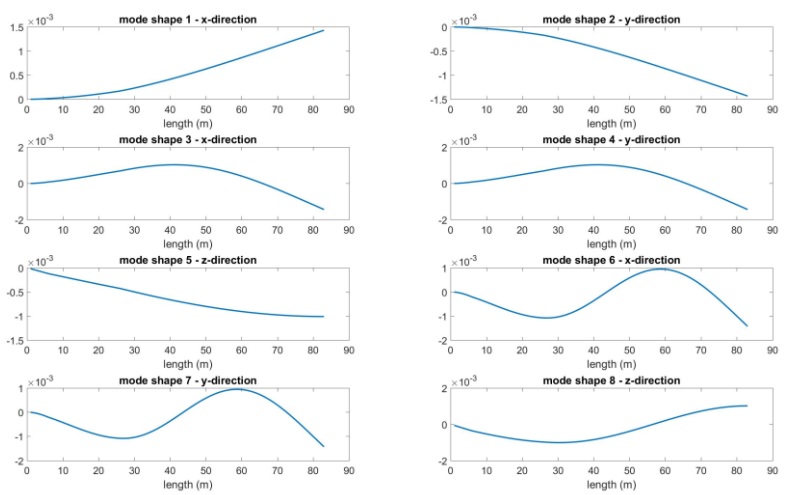
Example : representing modeshapes of a cantilever beam

Increase line width, font size



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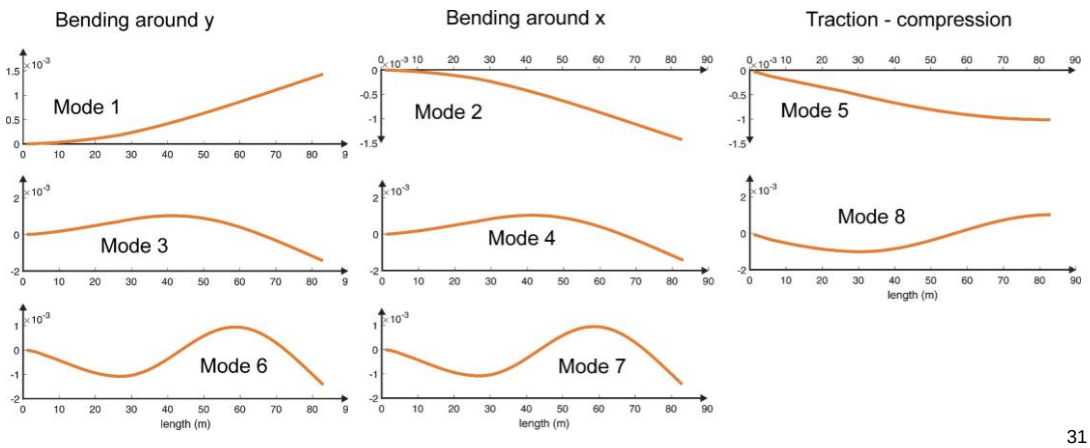
Example : representing modeshapes of a cantilever beam

- Reorganize
- Change axis style -> Engineering style
- Change line color



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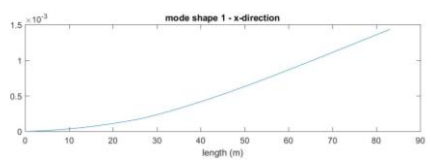
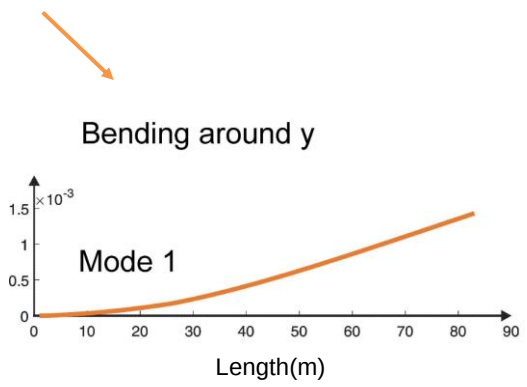
Stay away from default graphs in Matlab/Excel





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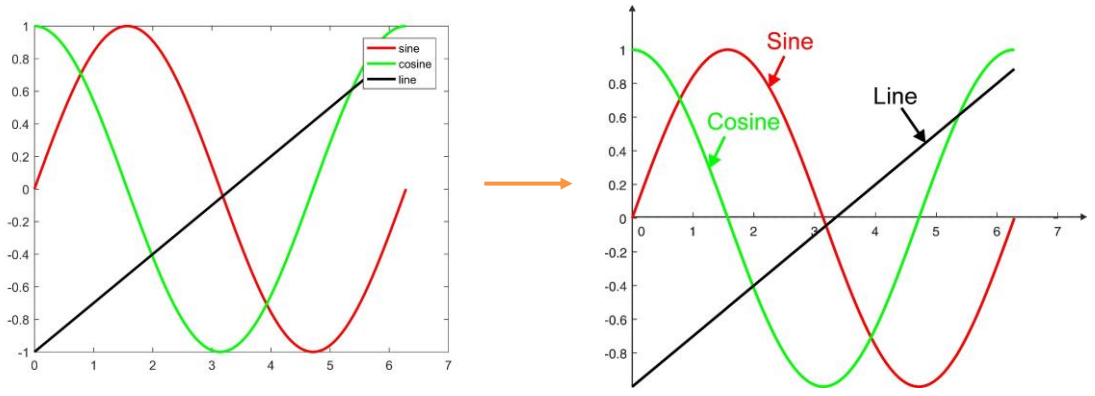
Graphs and legends

You may consider putting legend into the Graph (use arrows)



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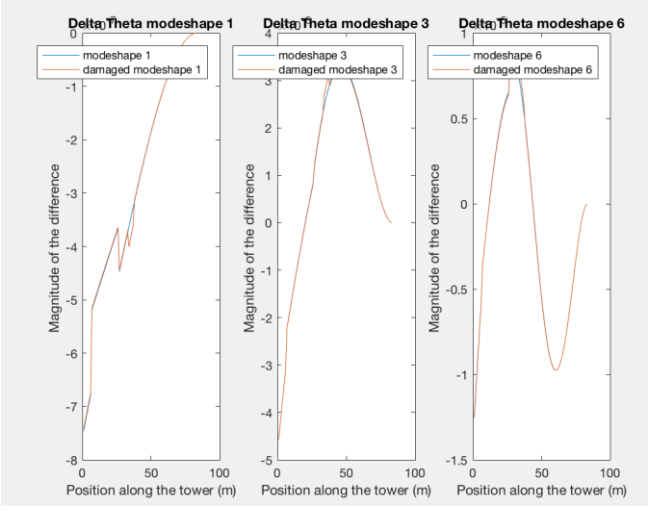
Graphs and legends

Example of a bad use of legend



[from student presentations]

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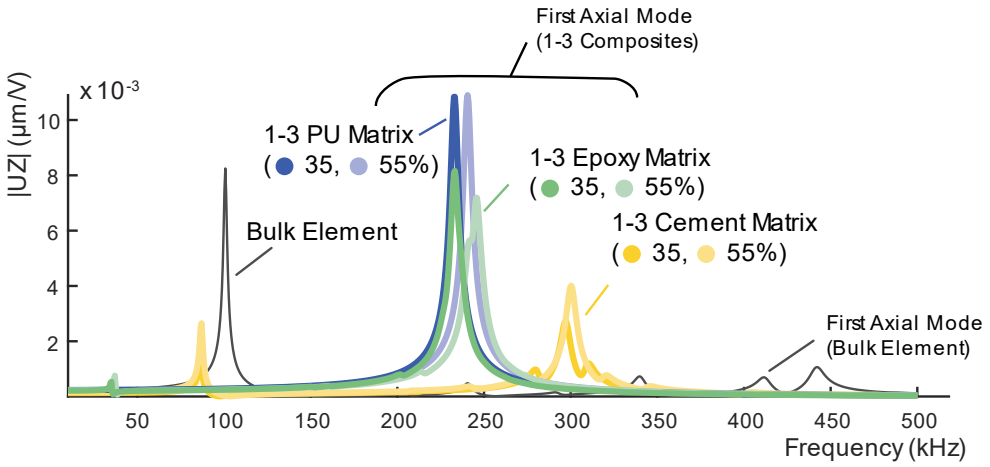
Highlight information in the graph

Tell your story in the graph



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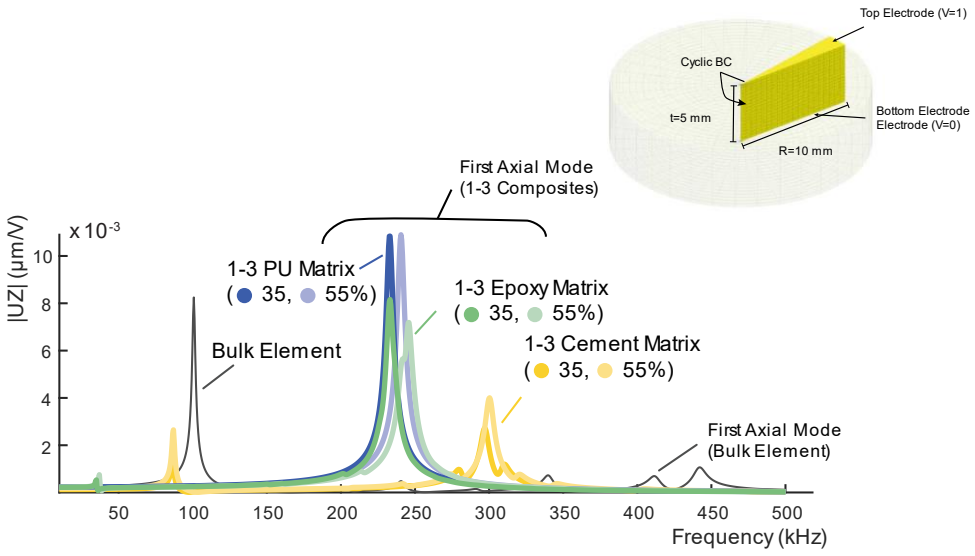
Combine graphs and illustrations



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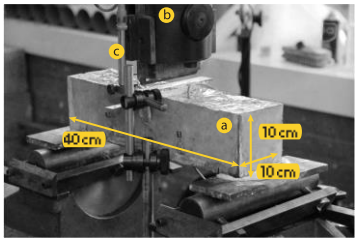
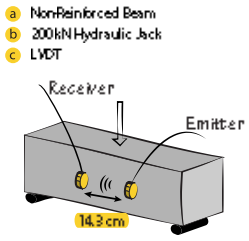
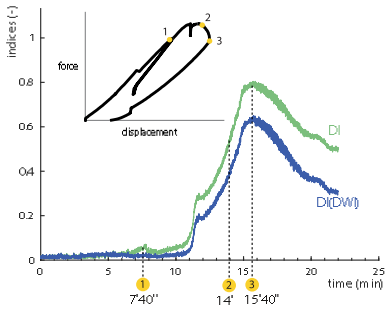
Combine graphs and illustrations





Is all the important information present to explain the graph ?



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Pictures

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Basics of picture handeling

Cropping

Adjusting brightness and levels (saturation)

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More advanced features

Getting rid of the background

Recomposing

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Background

When possible pay attention to the background

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Background

Or improve it ....

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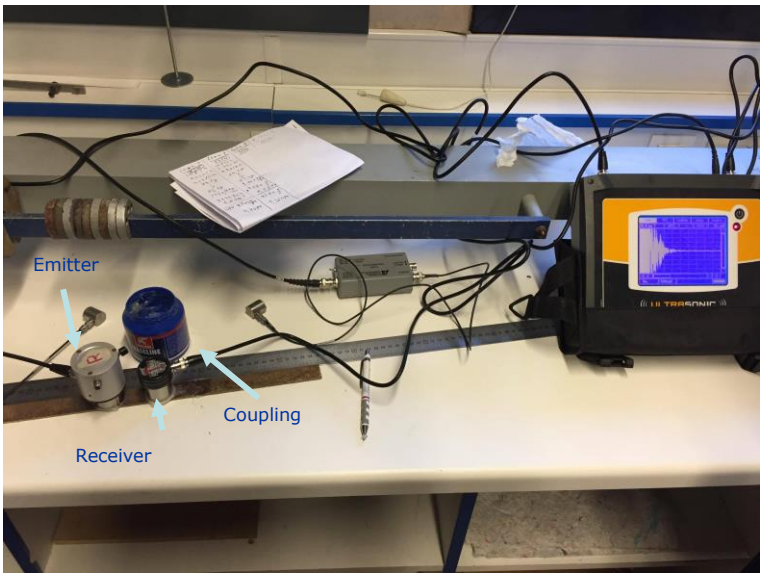
Add information on your pictures



And clean up before taking the picture !

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[from student presentations]

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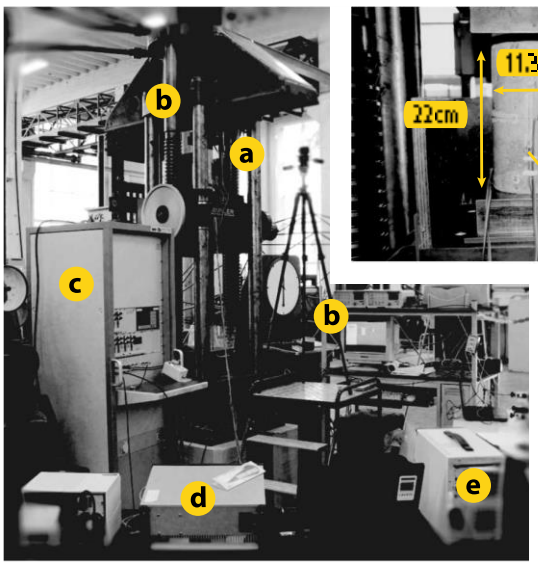
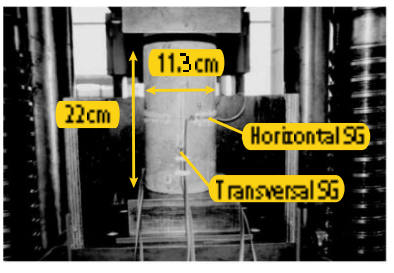
Add information on your pictures





- a Cylinder
- b 200kN Hydraulic Jack
- c Digicon controller
- d US monitoring system
- e Force-Strain DAQ

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Summary

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To keep in mind when writing a report

Draft a scenario → Write paragraphs according to scenario → Add efficient illustrations (information)

Check :

- references (not floating), plagiarism
- graph axis, labels, units
- grammar, spelling

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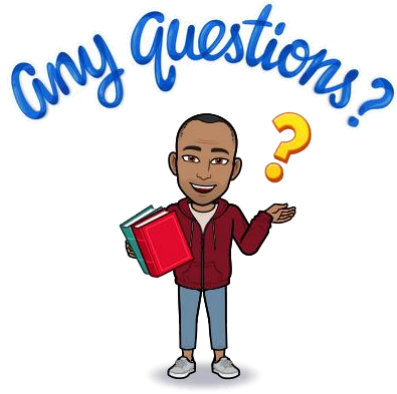

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