Universiteit Utrecht

Faculteit Bètawetenschappen

Your title

Bachelor Thesis

Your name

Natuur- en Sterrenkunde // Wiskunde (en Toepassingen)

Supervisors:

Dr. First Supervisor
First supervisor's Institute

Prof. Dr. Second Supervisor
Second supervisor's Institute

Your Date

Abstract

This is a summary of what's happening here. Basically nothing, as this is a template. We do however give nice tips on different topics, which you should state in an abstract, but we're going to refer to the contents (see the next page) as we're a bit lazy. This is the place you would normally place your abstract. Search in the requirements for your thesis or online for what your supervisor/readers will expect in an abstract.

Contents

The first text of the subfile.

1 First section

Like you can see, everything here is perfectly copied into the master file.

Subfiles are pasted right below each other, without any page-break. However, subfile 2 starts with a ‘newpage’, so we still see a page-break here.

2 Theorems and proofs

2.1 Not my theorem

Theorem 2.1.1 (Mine)**.** *The unit sphere is not compact in l^2.*

Proof. The sequence $(1,0,0,0,...),(0,1,0,0,...),(0,0,1,0,...),...$ does not have a converging subsequence so it is not sequentially compact hence not compact. □

Theorem 2.1.2. *This is a shorter theorem.*

Proof. Look at the source code. □

Theorem 2.1.3. *Adding a [title] is not necessary.*

Proof. Proof by lack of contradicition. □

Lemma 2.1.4. *This lemma keeps the same numbering as the theorems.*

Proof. Proof by picture: look at the number. □

Lemma 2.1.5. *The proof of this lemma will come later, refer to it using the label given in the source code.*

2.2 More numbering

Lemma 2.2.1. *We now see that the 2^{nd} number increased but the last number went back to 1.*

Proof.

Claim 1. The 2^{nd} number increased.
We use a claim here, using the '\clm' command.

Claim 2. The last number went back to one.

□

Theorem 2.2.2. *This Theorem is very important!*

Proof. Although the equation

$$\boxed{E = mc^2}$$

is very important, this Theorem is even more important because it has a bigger box and more space around it! □

Remark 2.2.3. Whenever we make a claim in a proof, the claim counter starts back at one.

Proof. Proof by picture:

Claim 1. Here we see a one.

□

Claim 1. This is a maintext claim. Now the next claim after this will start with a two.

Remark 2.2.4. As a test, we do a proof with claim:

Proof. Proof by picture:

Claim 2. Here we see a two.

□

Remark 2.2.5. The effect only works for one proof:

Proof. Proof by picture:

Claim 1. Here we see a one.

□

We did not prove the earlier lemma yet, so let's do that now.

Proof of lemma 2.1.5. Here be the proof of thy lemma. □

3 A sample section with many citations

3.1 Here I refer to some stuff

Please look at the bibfile (bibfile.bib) as well, and look in the preamble for the citation styles and how to make it work correctly for this template (if you want, of course you are free to use your favorite citation style).
Here I first cite an inbook [1]. I can also cite in a different matter[1], e.g. Eston [1]. I will now cite an master thesis [2], and even though the citation command is the same, the style might change (depending on your cite settings). Just look at all these mad citations referring to a booklet [3] and its author [3], a conference [4] and an article [5]. You can do even more that this!

3.2 Here I refer to some other stuff

For in a collection [6] you can refer to a manual [7] or a book [8] or a thesis written by a PhD student [9] or a master student [2] and if that is not enough for you, then you can even cite some miscellaneous stuff [10]. A technical report on something irrelevant [11] can also be cited, just like the proceeding for citations [12] and if you are still unpublished [13] you can even refer to that stuff.
Finally I refer multiple things at once: like this [9, 10] or this [4, 6, 11] or, if you are introducing many new refs at once, like this [1–4] . As a final thing, I refer to the previous section, section 2.
Also remark that the autocite (which will change to what it thinks is best) [14] and footcite[2] commands exist.

And if you really want to show everything? Use "\fullcite":
Peter Adams, Hugh Adamsson, and Gary Elliot Macklemore. "The title of the work". In: *The name of the journal* 4.2 (July 1993). An optional note, pp. 201–213

4 Tips & Tricks

If at a later time you run into some difficulties then we have some tips for you:

- The IBA has some very nice blogs in wich some usefull things are explained. You can find these blogs here or by clicking this link: `https://iba.a-eskwadraat.nl/`[3]. There are blogs about pictures and their placement, defining your own commands and tikz.
- See the next section (or the IBA blogs) to read how **pictures** are placed in LaTeX and what you can do if jou want to force it to be at a certain place.
- If you happend to need **pictures with a lot of boxes or arrows**, then tikz can be very usefull for you.
- For **diagrams** one uses the tikz-cd (tikz Commutative Diagrams) package.

[1] Disclaimer: this only works for certain citing styles, see the preamble.
[2] 14.
[3] Unless this is printed, in which case you should stop trying right now

- You have probably heard of the **label command** and probably used it a lot for equations and pictures, but you can also use it for sections! See also the next section.
- If you want to **define text like commands for the math environment** then DeclareMathOperator is the command for you. You already know this structure from the sine and cosine commands, but you can also use this for things like $\arg(z)$ for a complex number inside the math environment. This command makes sure that 'arg' will be written straight and not in *itallic*. Check the code comment if you want to see how it works. The first argument is the command that you will type inside your math environment and the second command is the word you want to use like log or sin etc.
- We have already loaded the hyperref package for you. Hyperref won't do anything on paper, but is incredibly useful in your pdf, as it allows you to **click any reference** to immediately jump to the referred place. It is good practice to label every main section (\label{sec:tipstricks}) so you can refer to them. Note this only applies on sources from your bibliography.
- Use can use the listings package to **display code**, in your appendix for instance. Listings actually uses code files as input and displays them nicely. Listings isn't loaded in this file, but you can find and uncomment it in the preamble.tex file.
- Do you run into some **symbol** that you don't know the LaTeXcode for? You probably used it before and your browser remembers, but you can draw the symbol into `detexify.kirelabs.org/`.
- Google is your best friend, be kind to it, and it will be kind to you. Stackexchange is full of questions about how to do a spicific thing in LaTeX.

5 Figures and labels

You probably want to include some figures in your thesis, either to illustrate an abstract idea or to present graphs or other results you obtained with your data.
In this section we give some code (see the source code below) you can use and adapt this yourself. We do this in the figure environment (needs graphicx package).
First we give a refresher:

h	here	Place figure ABOUT here in the text.
t	top	Place figure on the top of the page.
b	bottom	Place figure at the bottom of the page.
p	page	Place figure on a seperate page for figures.
!		You can put this command after one of the above to override the intern parameters for finding a good position.
H	HERE	Place figure exactly HERE in the document. Looks a lot like the h! command.

Table 1: Reference table for figure placing.

In square brackets we have letters indicating where to put the figure, see 1. It does not matter in which order you use h, p, t, b or !, LaTeX uses the following order:

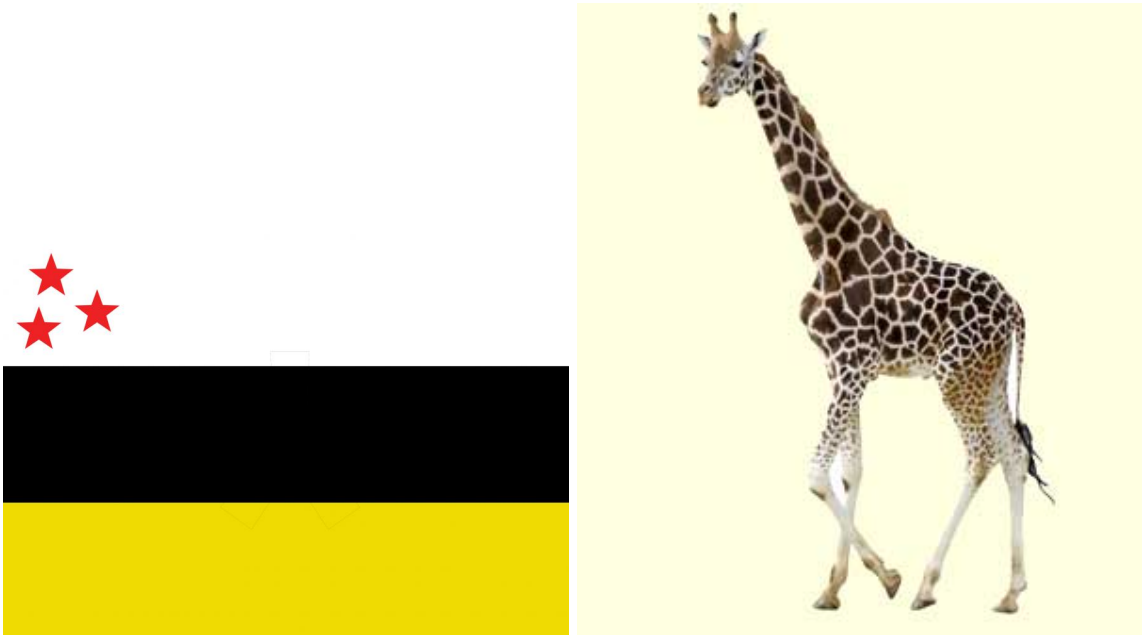
- Looks whether there is an h. If there is, it tries to place the figure immediately.
- If that did not work and there is a t, tries to place figure at the top of the page.
- Then it tries the b for the bottom of the page.
- If it still did not work yet, the figure is placed on hold, to be placed when/where you start on a new page. For example, you could use the command \clearpage.

You can refer to figures in advance, since Figure 3 is on page 6, note your labelname is your own to choose and does not show up in the pdf, however, you might want to stick to some logic and for example take into account what it is you are refering to, eg use fig, tab, sec if you label a figure, table or section (see table 2 on page 7). It makes more sense refering to table 1 instead of simply refering to 1 or 5 since there may exist a section, table and figure of that number. Try what the command \autoref can do for you in this regard!
Also note you can number figures continuously (the first picture in your document 1, second 2, etc.), or per section (then you get the third figure in section 2 labeled as 2.3). See the preamble (around lines 100) for this (it also works for equations).

Figure 1: My plot

Figure 2: This is an African animal

Figure 3: We can even rotate pictures



(a) colours (b) giraffe

Figure 4: two figures next to each other, left colours, right a giraffe

We can also make subfigures, here we have figures 4a and 4b inside figure 4
And you might want to make a ...

List of Figures

Note subfigures are not included in this list!
You can also make a ...

List of Tables

eq:	equation
fig:	figure
tab:	table
chap:	chapter
sec:	section
subsec:	subsection
itm:	enumerated list item
app:	appendix subsection

Table 2: Some conventions in labeling

A First appendix

Appendix A test.
If you want the next appendix to start on a new page, use \newpage or \clearpage.

B Second appendix

Appendix B works as well, as you can see. Note that using the appendix commando causes your sections to be lettered instead of being numbered. This is nice, unless you need more then 26 appendices; but if you need 26 appendices you have probably grown out of this template.

Some people prefer it if the pages for the appendices are numbered in Roman capitals instead; if you (or your supervisors) think so as well, move the 'backmatter' command in the thesis-file to the line above the 'appendix' command.

References

[1] Peter Eston. “The title of the work”. In: 3rd ed. Vol. 4. 5. An optional note. The address of the publisher: The name of the publisher, July 1993. Chap. 8, pp. 201–213.

[2] Peter Harwood. “The title of the work”. An optional note. MA thesis. The address of the publisher: The school where the thesis was written, July 1993.

[3] Peter Caxton. *The title of the work*. How it was published. An optional note. The address of the publisher, July 1993.

[4] Peter Draper. “The title of the work”. In: *The title of the book*. Ed. by The editor. Vol. 4. 5. An optional note. The organization. The address of the publisher: The publisher, July 1993, p. 213.

[5] Peter Adams, Hugh Adamsson, and Gary Elliot Macklemore. “The title of the work”. In: *The name of the journal* 4.2 (July 1993). An optional note, pp. 201–213.

[6] Peter Farindon. “The title of the work”. In: *The title of the book*. Ed. by The editor. 3rd ed. Vol. 4. 5. An optional note. The address of the publisher: The name of the publisher, July 1993. Chap. 8, pp. 201–213.

[7] Peter Gainsford. *The title of the work*. 3rd ed. An optional note. The organization. The address of the publisher, July 1993.

[8] Peter Babington. *The title of the work*. 3rd ed. Vol. 4. 10. An optional note. The address: The name of the publisher, July 1993. ISBN: 3257227892.

[9] Peter Joslin. “The title of the work”. An optional note. PhD thesis. The address of the publisher: The school where the thesis was written, July 1993.

[10] Peter Isley. *The title of the work*. How it was published. An optional note. July 1993.

[11] Peter Lambert. *The title of the work*. Tech. rep. 2. An optional note. The address of the publisher: The institution that published, July 1993.

[12] Peter Kidwelly, ed. *The title of the work*. Vol. 4. 5. An optional note. The organization. The address of the publisher: The name of the publisher, July 1993.

[13] Peter Marcheford. “The title of the work”. An optional note. July 1993.

[14] Peter Nigel, ed. *The title of the work*. An optional note. July 1993.