

Master Thesis

Thesis Title
Occupying More than One Line:
An Algorithmic Approach

submitted by

John Q. Public

submitted

October 25, 2022

Supervisor / Advisor

Prof. Dr. Meinard Müller

Reviewers

Prof. Dr. Meinard Müller
Prof. Dr. Max Mustermann

Erklärung

Hiermit versichere ich an Eides statt, dass ich die vorliegende Arbeit selbstständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus anderen Quellen oder indirekt übernommenen Daten und Konzepte sind unter Angabe der Quelle gekennzeichnet. Die Arbeit wurde bisher weder im In- noch im Ausland in gleicher oder ähnlicher Form in einem Verfahren zur Erlangung eines akademischen Grades vorgelegt.

Erlangen, October 25, 2022

John Q. Public

Acknowledgements

Optionally, I would like to express my gratitude to a crowd of people who supported me in the time of writing my thesis.

Abstract

Contents

Erklärung	i
Acknowledgements	iii
Abstract	v
1 Introduction	3
1.1 Thesis Organization	3
<hr/>	
I Title of this Part Being Longer than One Line	5
<hr/>	
2 Theoretic Foundations	7
2.1 Math Equations	7
2.2 Citations	8
2.3 Tables	8
2.4 Figures	8
2.5 Theorem-like Constructs	9
3 Practical Experiments	11
3.1 Small Experiment	11
3.2 Large Experiment	11
<hr/>	
4 Conclusions	13
A Source Code	15
Bibliography	17

Chapter 1

Introduction

Generally speaking, the introduction chapter should introduce the topic of the thesis and motivate the importance of it. Moreover, the introduction should give an outline of the thesis and point out the contributions of this work.

You can logically group the chapters of the thesis by using so-called parts. An example of how to insert a part-page containing a teaser-image is included in this template. Typically, you will have an introductory chapter that gives a broad overview. Then, the first part of the thesis might start after the introduction.

1.1 Thesis Organization

You can setup some layout options and elementary data in `thesis_config.tex`:

- the title of your thesis: `\myTitle{TITLE OF YOUR THESIS}`
- your name: `\myName{John Public}`
- your professor: `\myProf{Prof. Dr. Max Mustermann}`
- your second professor: `\myOtherProf{Prof. Dr. Max Mustermann}`
- your supervisor: `\mySupervisor{Prof. Dr. Max Mustermann }`
- your submission date: `\myTime{\today}`

Part I

Title of this Part
Being Longer than One Line



Chapter 2

Theoretic Foundations

Each chapter should start with a small summary discussing the content and the relation of the sections. In this chapter, we elaborate on the theoretical background, foundations and concepts that are being used in the thesis. In particular, we focus on latex construct that are typically used in thesis documents. Section 2.1 illustrates the usage of math equations. Then, in Section 2.2, some examples are given on how to cite literature. In Section 2.3, ...

When using labels, please avoid collisions in the label names.

2.1 Math Equations

You may want to display math equations in three distinct styles: inline, numbered or non-numbered display. These three styles are used in the following paragraph along with labeling, aligning and referencing equations.

A little anecdote tells that Johann Carl Friedrich Gauß was able to compute the sum of numbers in the set $\{i \in \mathbb{N} \mid i \leq N\}$ in a very short amount of time at the age of nine. Apparently, he was able to observe that if N is even, then the numbers in the sum can be reordered and grouped so that

$$\begin{aligned} \sum_{i=1}^N i &= 1 + 2 + \dots + N \\ &= (1 + N) + (2 + N - 1) + \dots + \left(\frac{N}{2} + \frac{N}{2} + 1\right) \end{aligned} \tag{2.1}$$

$$= \frac{N \cdot (N + 1)}{2} \tag{2.2}$$

If N is even, then the reordering Equation (2.1) simply builds $N/2$ summands with value $N + 1$,

Non-English or Math	Frequency	Comments
\emptyset	1 in 1,000	For Swedish names
π	1 in 5	Common in math
$\$$	4 in 5	Used in business
Ψ_1^2	1 in 40,000	Unexplained usage

Table 2.1. Frequency of Special Characters. Note that this table does not contain any vertical lines which makes the table look more tidy.

resulting to Equation (2.2). This Equation also holds for odd N and a similar argument holds in this case.

2.2 Citations

In a thesis one might want to cite interesting and relevant books [6, 5, 3], scientific papers [4, 2], or websites [1].

2.3 Tables

Because tables cannot, (well, at least not easily) be split across pages, the best placement for them is typically the top of the page nearest their initial cite. To ensure this proper “floating” placement of tables, use the environment *table* to enclose the table’s contents and the table caption. The contents of the table itself must go in the *tabular* environment, to be aligned properly in rows and columns, with the desired horizontal and vertical rules, as seen in Table 2.1.

2.4 Figures

Like tables, figures cannot be split across pages; the best placement for them is typically the top or the bottom of the page nearest their initial cite. To ensure this proper “floating” placement of figures, use the environment *figure* to enclose the figure and its caption. This sample thesis document contains examples of *.pdf* files to be displayable with L^AT_EX.

Typically, in addition to a *figure* environment, we use use PowerPoint that allows us to easily align and position subfigures as well as labels, as done in Figure 2.1. By the way, the curves shown in Figure 2.1 have been generated with MATLAB. Please find the generating sample script in `figures/figures.m`.

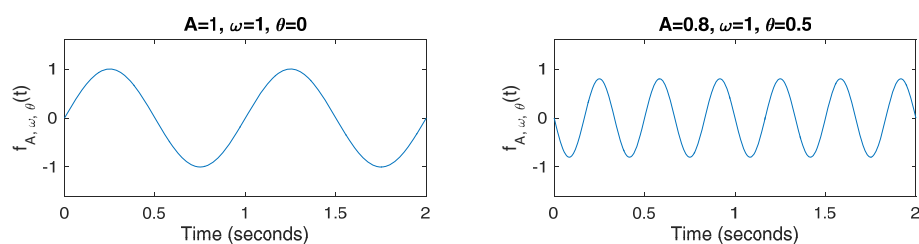


Figure 2.1. Sine functions with different amplitudes A , frequencies ω and phases θ can be calculated as $f_{A,\omega,\theta}(t) = A \sin(2\pi(\omega t - \theta))$.



Figure 2.2. Pixel graphics can also be included, but in low resolution it looks terrible and in high resolution it takes ages to load.

Including pixel graphics like in Figure 2.2 is also possible. As mentioned before, pixel graphics have to be converted to the allowed formats beforehand.

2.5 Theorem-like Constructs

Other common constructs that may occur in your thesis are the forms for logical constructs like theorems, axioms, corollaries and proofs. See the following example:

Theorem 2.1 *Let f be continuous on $[a, b]$. If G is an antiderivative for f on $[a, b]$, then*

$$\int_a^b f(t) dt = G(b) - G(a). \quad (2.3)$$

The following is a definition:

Definition 2.1 *If z is irrational, then by e^z we mean the unique number which has logarithm z :*

$$\log e^z = z. \quad (2.4)$$

Chapter 3

Practical Experiments

This is just a placeholder.

3.1 Small Experiment

3.2 Large Experiment

Chapter 4

Conclusions

Draw the conclusions in the big picture of the thesis! Then, indicate future work.

Appendix A

Source Code

In this chapter, the headers of selected MATLAB functions created during the writing of this thesis are reproduced. The headers contain information about the name of the described function and its input/output behavior.

Feature Extraction

The `file_to_feature` function is used as a wrapper for several low-level functions that perform feature extraction or loading of precomputed features.

Sample usage:

```
[f_pitch, f_peaks] = file_to_feature('features', 'pathetique.wav');  
  
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%  
% Name: file_to_feature  
% Version: 1.0  
% Date: 11.05.2010  
% Programmer: John Q. Public  
%  
% Description:  
%   Load or compute features for audio and MIDI files  
%  
% Input:  
% - dirname: Directory where the file or features are located  
% - filename: Name of the file for which to load/compute features  
% - parameter  
%           .win_len: Window length used for STMSF feature generation  
%           .win_res: Window resolution  
%  
% Output:  
% - f_pitch: Pitch features (STMSF)  
% - f_peaks: Energy peaks for onset computation  
% - f_onsets: Precise onsets (only generated in case of MIDI input data)  
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```


Bibliography

- [1] *Music free to download, print out, perform and distribute*. <http://www.mutopiaproject.org>, Retrieved 12.05.2009.
- [2] B. EDLER, S. DISCH, S. BAYER, R. GEIGER, AND G. FUCHS, *A time-warped mdct approach to speech transform coding*, in Proceedings of the Audio Engineering Society Conference (AES), May 2009.
- [3] E. A. P. HABETS, *Single- and multi-microphone speech dereverberation using spectral enhancement*, PhD thesis, 2007.
- [4] J. HERRE AND L. TERENTIV, *Parametric coding of audio objects: Technology, performance and opportunities*, in Proceedings of the Audio Engineering Society Conference (AES), Ilmenau, Germany, 2011.
- [5] M. MÜLLER, *Information Retrieval for Music and Motion*, Springer Verlag, 2007.
- [6] M. MÜLLER, *Fundamentals of Music Processing – Audio, Analysis, Algorithms, Applications*, Springer Verlag, 2015.

