Friedrich-Alexander-Universität Erlangen-Nürnberg

Internship Report

Report Title
Occupying More than One Line:
An Algorithmic Approach

submitted by

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submitted

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Abstract

Contents

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 Report Organization

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

- the title of your thesis: `\ myTitle{TITLE OF YOUR REPORT}`

- your name: `\ myName{John Public}`

- your professor: `\ myProf{Prof. Dr. Max Mustermann}`

- your supervisor: `\ mySupervisor{Prof. Dr. Max Mustermann }`

- your submission date: `\ myTime{\ today}`

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

$$\sum_{i=1}^{N} i = 1 + 2 + \ldots + N$$

$$= (1 + N) + (2 + N - 1) + \ldots + (\frac{N}{2} + \frac{N}{2} + 1) \tag{2.1}$$

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

If N is even, then the reordering Equation (2.1) simply builds $N/2$ summands with value $N + 1$, resulting to Equation (2.2). This Equation also holds for odd N and a similar argument holds in this case.

Non-English or Math	Frequency	Comments
Ø	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.

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 LaTeX.

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`.

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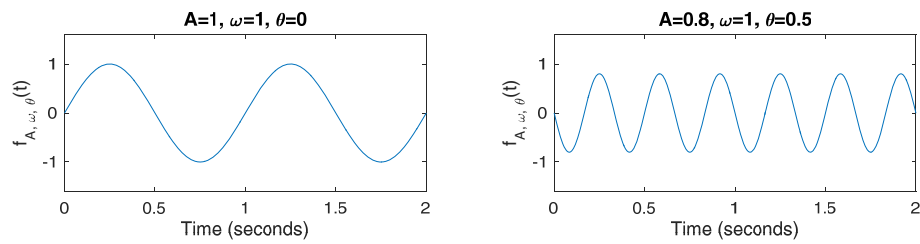
Figure 2.1. Sine functions with different amplitudes A, frequencies ω and phases θ can be calculated as $f_{A,\omega,\theta}(t) = A\sin(2\pi(\omega t - \theta))$.

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

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

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

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:*

$$\log e^z = z. \tag{2.4}$$

Chapter 3

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 STMSP feature generation
%            .win_res: Window resolution
%
% Output:
% - f_pitch: Pitch features (STMSP)
% - 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.

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[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.