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LaTeX Template for the Final Year Project Dissertation

by

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Abstract

Aan matig enkel wie raakt zeven zeker allen mag. Ten zielen zin diepte dreigt aan kwamen kleine weg rubben. Vaartuigen den ondernemer dag krachtiger buitendien. Zoo toppen zes invoer kleine ver enkele schuld slotte zij. Haar op dekt ze tien. Toch half de mijn in toen op. Enkelen tin des gewicht slechts aardige had. Goudmijnen als dik intusschen bij dal aanplanten productief. Na leerling kolonien de rekening loopbaan de nu golconda.

Eischen geoogst heuvels haalden markten zal was aan. Voorzien overgaat atjehers te in. Waren mag ieder naast ficus liput rijke heb. Vordert gebruik daartoe zit zal zin systeem. Met invoer schuld pijlen ver vierde. Wel zit maar vier rang deed over. Dergelijke dik tembunmijn agentschap belangrijk plotseling het. In open nu en al zich jaar.

Tweemaal mei menschen bak dan beletsel talrijke reiziger. Middellijn bevorderen dan interesten voorschijn smeltovens wat tot. Dieper zee zilver staten koeken men. Op deed ziet duim hout gaat de te. Heuvel zouden dan rijken een ziekte weg tot. Ik al koopman en nu planken vroeger gomboom vlakken. Vestigen op troepjes uitgeput af de atjehers.

Bepaalde ik mogelijk interest gestoken in de wisselen er. Ten dan toe kinderen uitgaven stampers verhoogd. Leeningen wat krachtige sultanaat dat stichting uit wassching siameezen. Aanplanten hen meesleuren besproeien are aan locomobiel dan. Vliegen schepen opzicht wat was stammen dik motoren. Dienst meende rubben tot nam aantal men als. Vruchtbaar verbazende ondernomen af verscholen en en. Drong die weg mei ploeg tabak ook. Kan bewijs deelen dan gambir midden ceylon.

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I would like to thank Jim the Fish

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List of Symbols

Chapter 1

Introduction

This document is a brief introduction to LaTeX. It is meant to be used as a quick start to creating the final year dissertation. It is not meant to be a comprehensive guide to the use of LaTeX. For that, you could refer to [1]. A cheat sheet [1] is also available for quick reference.

1.1 Using images in LaTeX

Images can be inserted using the `figure` environment as follows:

Figure 1.1(a)

Figure 1.1 The `label` command allows you to assign a label to the figure so that you can reference it like so: Figure

The caption command allows you to define an optional caption, in the square brackets, which is used in the list of figures. This comes in handy when the figure requires a long caption as follows:

1.1.1 Side by side images

The `subfigure` package allows you to place figures side-by-side as follows:

If you label the individual image, you could also reference it as an individual: Figure 1.3(a) or as a whole Figure 1.3. You could place a caption with the individual image by placing text in the square brackets after the subfigure, or you could omit them completely and the figure will not be labelled.

Note that usually, figures are placed at the top of the page and to do so, the placement instruction should be `t`. Figures are placed using `h!` only for illustrative purposes.

[1] https://wch.github.io/latexsheet/latexsheet-a4.pdf

(a) image 1

second

(c) image 2

FIGURE 1.1: The caption command allows you to define an optional caption, in the square brackets, which is used in the list of figures. This comes in handy when the figure requires a long caption as follows:

FIGURE 1.2: An example of an image with a long caption which is shortened in the table of contents. This is a long caption to illustrate why you would need to specify the second caption in the square brackets in the caption command.

1.2 Using tables in LaTeX

1.2.1 a new subsection

1.2.1.1 a sub sub section

Tables can also be inserted easily into your document. The `booktabs` package is recommended as it allows you to typeset nice-looking tables. Like figures, tables should be captioned, but unlike figures, the caption is usually placed at the top of the page. Tables can be labelled and referenced in the same way as figures. Table 1.2 provides one such example. This table has examples of how LaTeXhandles merged rows and columns.

(a) Image 1

(b) Image 2

(c) Image 3

FIGURE 1.3: Placing images side-by-side.

TABLE 1.1: A table caption

pets	quantity
dog	1
cat	1

TABLE 1.2: An example of a table which has examples of merged columns and merged rows.

Drawing	**Method 1**		**Method 2**	
	Some result	Some other result	Some result	Some other result
4.1	100	0	51	49
4.2	100	0	57	43
4.3	100	0	39	61
4.4	90	10	39	61
	80	20	39	61

It is also possible to use tables which require more text in their columns. This can be done by using the `paragraph` column setting as illustrated in Table 1.3.

1.3 Using equations in LaTeX

LaTeXis also very good in handling equations, be it small equations which can fit in text like this: $y = mx + c$ or more complex equations which require to be displayed

TABLE 1.3: An example of a table which has a paragraph column.

Some random text	**Result**
Papalla jolloin me et kelpasi ei hyllyen en. Oma ulos juon ensi toru toi ole kone han.	100
Syotin ei tekisi puista ai tiedat olette olivat he. Herra minka ei en se ai masto.	80

on separate lines such as this:

$$f\left(x\right) = \Gamma \exp\left(-\frac{(x-b)^2}{2c^2}\right) \tag{1.1}$$

It is possible to label equations so that you can refer to them in the same way we did for the figures and tables, that is, Equation **??**.

If your equation has two or more parts to it, then you could use the `eqnarray` environment, or better still, the `align` environment as follows:

$$\begin{aligned} 2x - 5y &= 8 \\ 3x + 9y + 4z &= -12 \end{aligned} \tag{1.2}$$

If you do not want to have both equations numbered, then you could use the `nonumber` option Equation 1.2

$$\begin{aligned} 2x - 5y &= 8 \\ 3x + 9y &= -12 \end{aligned} \tag{1.3}$$

Equations that contain arrays can also be easily included

$$f(x) = \begin{pmatrix} \sin\theta & \cos\theta \\ \cos\theta & \sin\theta \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} \tag{1.4}$$

and if your equations contains cases, these can be written as follows:

$$\chi(m) = \begin{cases} 1, & \text{if } \kappa_j(m) \neq 0 \\ 0, & \text{otherwise} \end{cases} \tag{1.5}$$

1.4 Populating the acronyms and symbols pages

In your document, you may also wish to make use of symbols and acronyms. LaTeXallows you to define these as you're writing your document and takes care to collect these under the appropriate lists in the front matter. The two examples below are meant to give you an idea of how to use the `glossaries` package. For a more detailed description, refer to [2].

1.4.1 The list of Symbols

Symbols can be defined by giving the symbol a name, telling LaTeXwhat it should look like, and giving it a definition as follows:

```
\newglossaryentry{emptyset}
{
name={\ensuremath{\emptyset}},
description={the empty set}
}
\gls{emptyset}
```

The symbol can then be referenced in text using `\gls{emptyset}`. For example, we could say : An empty set, denoted by $\emptyset$, is a set which contains nothing.

1.4.2 The list of Acronyms

It is also possible to define acronyms using

```
\newacronym{EEG}{EEG}{electroencephalogram}
```

Here the glossaries package will take care of making sure that the first time this is used, the acronym will be spelt out in full, while all other times you will get just the abbreviations. For example: Electric charge from the scalp can be measured using an electroencephalogram (EEG). The EEGs does not hurt but makes you look funny.

Depending on the nature of your acronyms, you may decide to go all fancy for example:

Non-**p**hotorealistic **a**nimation **r**endering (NPAR) is a cool research area. Through NPAR you can create different renderings of your photos.

1.5 Creating Lists

LaTeXalso provides a very neat way of including lists in your documents. There are three types of lists that can be used as detailed hereunder. Note that all lists can have nested lists within each item if this is necessary.

1.5.1 Bullet lists

These are created using the `itemize` environment:

- Item 1
- Item 2
- Item 3
    - Item 3a

1.5.2 Numbered lists

These are created using the `enumerate` environment:

1. Numbered item 1
2. Numbered item 2
3. Numbered item 3
    (a) 1a

1.5.3 Descriptive list

This is a list created using the `description` environment and comes handy when you have a list of items to describe:

Domestic cat: a small, usually furry, domesticated, and carnivorous mammal. It usually has four legs, two ears and a tail.

Tiger: a slightly bigger and more aggressive version of the domestic cat. Keeping one at home can be considered crazy.

1.6 Definitions, Lemmas and Proofs

Sometimes, it may be necessary to give mathematical theory and this can be achieved through the use of Lemmas and Definitions as follows:

Definition 1. *Let $\|a''\| \ni 0$ be arbitrary. We say a function $l_{\Xi,Y}$ is* ***Poncelet–Kummer*** *if it is co-measurable.*

Lemma 1. *Let $\hat{m} \geq \Phi_{r,\omega}$ be arbitrary. Let $\chi \in \emptyset$ be arbitrary. Then every bounded equation is connected, multiply extrinsic and Riemannian.*

You may also wish to include proofs. Sometimes, if these are long and nasty, they might be better off in the Appendix. For example, Appendix A illustrates the use of the proof environment.

1.7 Algorithms

You may also find it necessary to use pseudocode to describe some algorithm. This can be handled using the `algorithm` environment which gets to have a placement indicator and a caption like the figures and tables. Algorithm 1 gives an example of how this could be used [3] .

Algorithm 1 Accumulate the co-occurrence matrix $S_{\mathbf{d}}(\theta, \Delta\theta)$, locating the junction position $\mathbf{x}$ and edge segment orientations $\{\theta_n\}_{n=1}^{N}$

Input: Image I, centre of family of circles $\mathbf{c}$, size of family of circles M
Output: Co-occurrence matrix $S_{\mathbf{d}}(\theta, \Delta\theta)$

for all d do
  for all $(\theta, \Delta\theta)$ pairs **do**
    for all r in the family of circles **do**

      $\mathbf{k}_\beta = [\cos(\beta), \sin(\beta)]^T$
      $I_r(\beta) = \mathbf{c} + r\mathbf{k}_\beta$

      $\beta(\theta) = \theta \pm \sin^{-1}(d/r \sin(\alpha - \theta))$

      $S_{\mathbf{d}}(\theta, \Delta\theta) \leftarrow S_{\mathbf{d}}(\theta, \Delta\theta) + 1/M I_r(\beta(\theta)) I_r(\beta(\theta + \Delta\theta))$

    end for
  end for
end for

$(\hat{\mathbf{d}}, \hat{\theta}, \Delta\hat{\theta}) \leftarrow \max\{S_{\mathbf{d}}(\theta, \Delta\theta) > T\}$

$\mathbf{x} \leftarrow \mathbf{c} + \hat{\mathbf{d}}$
$\{\theta_n\}_{n=1}^{N} \leftarrow \bigcup \left\{\hat{\theta}, \hat{\theta} + \Delta\hat{\theta}\right\}$

Appendix A

Some Random Stuff

Proof. By an easy exercise, F is larger than M. Because

$$\begin{aligned} E'(0,-1) &\supset \sum_{\hat{v}\in\Sigma} \int \theta\left(1^9, \frac{1}{-\infty}\right) dH' \cup \cdots \vee a\left(\sqrt{2}\sqrt{2}, \dots, T^{-7}\right) \\ &\le \varinjlim \int_{-1}^{\emptyset} -\bar{\eta}\, d\mathbf{M}_y \times \cdots \vee T\left(\Lambda'', \mathbf{D}^2\right), \end{aligned}$$

$$\begin{aligned} \sin^{-1}\left(Z''^8\right) &\le \frac{\mathbf{e}(\emptyset, \mathcal{N})}{\pi(\pi^2, -1)} + \cdots \wedge \sin^{-1}\left(\|C''\|\right) \\ &> \varinjlim \overline{2} \\ &< \bigotimes \overline{\|\hat{\mathbf{q}}\|\pi} \\ &> \oint_{E_\Psi} i^{-6}\, dV + \|Y''\| \times e. \end{aligned}$$

In contrast, if Q is unconditionally right-compact then $\mathbf{b}' \in \bar{q}$. Of course, if Z' is not less than G then I is comparable to $\mathfrak{v}$.

Let $\mathcal{U} \ge \rho$ be arbitrary. It is easy to see that $\hat{\mathbf{r}}$ is semi-simply left-stable and essentially convex. By degeneracy, if $y \le \mathbf{Q}$ then $\delta_{w,\sigma}(\bar{\mathbf{u}}) = 2$. One can easily see that $\tilde{O}$ is simply unique. On the other hand, $\mathbf{V} < \infty$. Hence if μ_F is isomorphic to $\mathcal{J}$ then every algebraically covariant domain is ultra-algebraic. By a well-known result of Lie, if $\bar{\mathbf{I}}$ is not homeomorphic to ω then there exists an unconditionally differentiable, nonnegative and universal isomorphism. It is easy to see that

$$\begin{aligned}
2\mathcal{R} &= \left\{ \mathbf{s}_{M,M}(\hat{\varphi})^{-6} \colon {h_O}^8 \subset \coprod_{\omega^{(Z)}=-\infty}^{\aleph_0} y\left(\mathcal{X}, \dots, \mathbf{m}_\gamma\right) \right\} \\
&= \left\{ 1^{-7} \colon A^{-6} = \int \limsup \hat{D}\left(1, r0\right) \, df \right\} \\
&\cong \int \bigcup \overline{\beta^1} \, d\mathbf{r} \wedge v\left(C \cup |Z|, \phi\right) \\
&\neq \frac{\overline{\aleph_0^{-4}}}{\sinh\left(\mathfrak{l}'\right)} \cdot 1^{-7}.
\end{aligned}$$

Moreover, if the Riemann hypothesis holds then

$$-e = \left\{ \infty \colon \tanh^{-1}\left(j'\right) \leq \iiint_\iota \bar{C}\left(0, \dots, \Phi \cap 1\right) \, dP^{(\mathfrak{g})} \right\}.$$

Let $\hat{\epsilon} = -1$. Clearly, every free manifold acting naturally on a complex subalgebra is integral, connected and Selberg. Therefore every hyper-essentially Euclidean, Gaussian, conditionally ultra-intrinsic function is partially Germain. Moreover, if $\|\mathbf{O}''\| = -1$ then Hausdorff's conjecture is false in the context of right-independent domains. Next, if Galois's criterion applies then $x_{e,r}(\mathbf{f}') \leq |\hat{q}|$. Since there exists a quasi-bijective, conditionally quasi-continuous and contra-Möbius geometric subset, $\mu \geq \tilde{\mathbf{k}}$. It is easy to see that $\hat{U}$ is homeomorphic to $\mathbf{N}$. Thus if $\tilde{\kappa}$ is smaller than $\mathfrak{z}$ then the Riemann hypothesis holds. Note that if $\|\mathbf{Y}\| > e$ then the Riemann hypothesis holds.

Clearly, if ϕ is pseudo-Legendre then

$$-\mathbf{G} \subset A\left(\sqrt{2}^9, \dots, \frac{1}{\bar{\mathfrak{p}}}\right) + \overline{\sqrt{2}}.$$

On the other hand, if $v \in \aleph_0$ then $\bar{\omega} \geq \emptyset$.

Let $\mathbf{p}^{(\mathcal{J})}$ be a plane. We observe that if A' is linearly intrinsic then Siegel's criterion applies. Now if l is Torricelli, maximal, everywhere Cantor and stochastically contra-associative then $k_{\mathcal{P},\mathfrak{r}}$ is dominated by Q. On the other hand, if Fréchet's criterion applies then Wiener's condition is satisfied. Hence every integrable matrix is algebraically Riemannian. □

References

[1] Oetiker, T., Partl, H., Hyna, I., and Schlegl, E. *The Not So Short Introduction to LaTeX*, 5.05 edition, July 2015. URL https://tobi.oetiker.ch/lshort/lshort.pdf.

[2] Talbot, N. *The glossaries package v4.18: a guide for beginners*, September 2015. URL http://tug.ctan.org/macros/latex/contrib/glossaries/glossariesbegin.pdf.

[3] Huang, M., Fu, S., and Pridmore, T. Interpreting images of architecture, drawings for building cost estimation. In *Image Processing and Its Applications, 1997., Sixth International Conference on*, volume 1, pages 126–130 vol.1, Jul 1997. doi: 10.1049/cp:19970868.