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Thesis title goes here

A thesis submitted to the University of Manchester for the degree of
Doctor of Philosophy
in the Faculty of Science and Engineering

202X

Author McAuthorFace
Department of Authoring

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1.1 An example of a figure 12

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List of publications

Publications go here.

Abstract

put abstract here

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Lay abstract

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Declaration of originality

I hereby confirm that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Acknowledgements

Acknowledgements go here.

Chapter 1

Example Chapter

1.1 How to write thesis chapters

Quarto uses markdown syntax. I use Rstudio as my IDE. **knitr** is the engine that interprets code chunks when using Rstudio, and it supports a variety of languages, including R, Python, SQL, JavaScript, and Ruby. For a full list of supported languages, type the following command:

```
names(knitr::knit_engines$get())
```

Citations are done like this [1], and point to references.bib in the parent directory.

1.2 Using code chunks

Code chunks can be inserted using a button in the top right corner of this window, or by using `Alt+shift+I`. Have a look at `example_chapter.qmd` in `quarto_chapters` for a demo of this. Figure 1.1 is produced using an `r` code chunk.

1.3 Using other languages

To use other languages, simply label the chunk accordingly. Doing this will require installation of the appropriate package - using `python` requires the `reticulate` package.

For an example, see the `.qmd` file associated with this chapter.

You can mix and match different languages throughout your report.

1.4 Models

Knitr includes the ability to cache models. This is very useful if your models are especially complex or you have a very large report. This is demonstrated below.

Setting `eval_models` to `TRUE` in line 9 means models are evaluated and cached with every knit. Setting to `false` means that knitr looks for the model in the cache, so you only have to set it once! The chunk below accomplishes this:

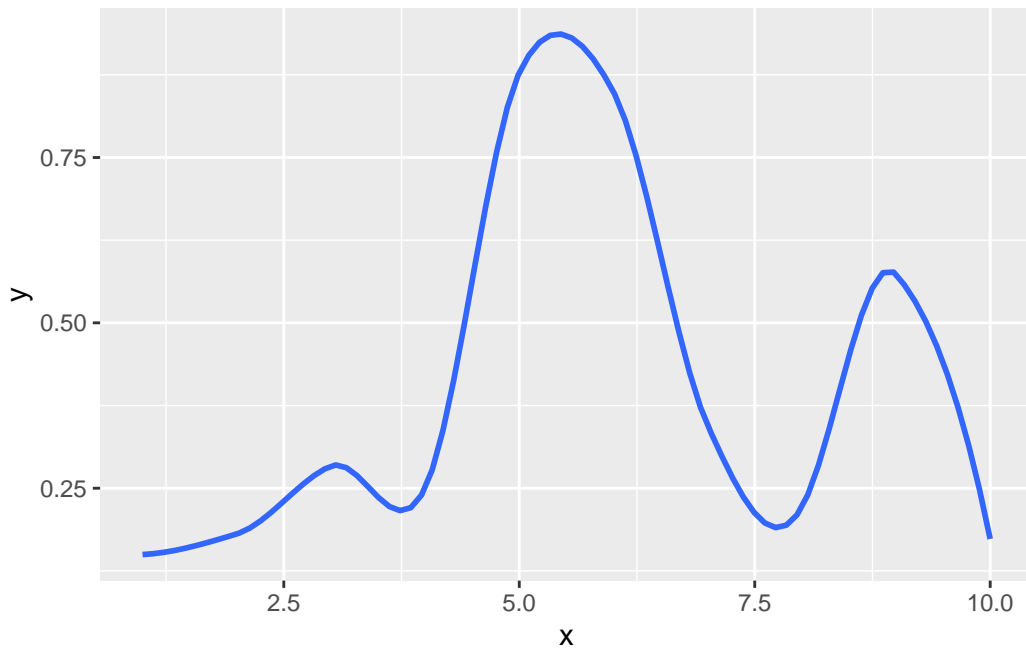


Figure 1.1. An example of a figure

1.5 Using this template

- chapters should be written using quarto markdown and are located in the `chapters_quarto` folder.
- `main.tex` in the top-level directory should be used to specify authors, declarations, abstracts etc.
- once chapters are all written, reformat the tex using the function provided in the `reformat_tex.r` file, then compile `main.tex`.

Itemise is demonstrated above.

1.6 Labelling

Chapters are referenced as such:

Chapter 1

As in, in Chapter 1...

Sections are labelled similarly, but you need to type the word “Section” in addition.

As in, in Section 1.6...

You will probably end up with multiple sections called “Introduction”, “Methods”, “Results” etc. If this is the case, you can manually specify the label for a section like so:

1.7 Introduction_test

1.8 Introduction_test

In Section 1.7 as opposed to Section 1.8

```
# Introduction_test
```

```
# Introduction_test {#introduction_test2}
```

In Section `\ref{introduction_test}` as opposed to Section `\ref{introduction_test2}`

In Section 1.7 as opposed to Section 1.8

1.9 Labelling Figures

Figures are labelled as so: in `@fig-example`, we can see...

Figures are labelled as so: in Figure 1.1, we can see...

If you are not generating figures from code, but rather including them using `knitr::include_graphics()`, you must set the `out-height` and `out-width` to `NA` to prevent LaTeX from trying to manually size them.

1.10 Lists

Lists use normal markdown syntax. Unnumbered lists are as so:

here's a list:

- item 1
- items 2

And numbered lists:

1. item 1
2. item 2

References

- [1] Gabriel Strain, Andrew J. Stewart, Paul Warren, and Caroline Jay. “The Effects of Contrast on Correlation Perception in Scatterplots”. In: *International Journal of Human-Computer Studies* 176 (2023), p. 103040. ISSN: 1071-5819. DOI: 10.1016/j.ijhcs.2023.103040. (Visited on 04/11/2023) (cited on p. 11).

Appendices

Appendix A

First appendix

A.1 Section in Appendix

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