

Department of *Your Department*
Imperial College London

Thesis Title

Author

Today's date

Submitted in partial fulfilment of the requirements for the degree of Doctor of
Philosophy in the Department of *Your Department*.

Statement of Originality

Declaration

Author

Date

Copyright Declaration

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Abstract

Write your abstract no more than 300 words.

Acknowledgements

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Nomenclature

Acronyms

MSE Mean Squared Error

Functions/operators

Δ Vector Laplacian operator

$\| * \|_2^2$ ℓ_2 norm

Matrix/tensors

Φ POD modes

U Dataset containing only the velocity

Non-dimensional group

Re Reynolds Number

Symbols

u Velocity (local, instantaneous)

v Vorticity (local, instantaneous)

t Time

x Spatial dimension

Chapter 1

Introduction

Let me introduce you to defining your own macros (Section 1.2) and customizing the template using preamble (Section 1.3).

1.1 Basic commands

Here are some examples of the basic things.

- Citing things
- Figures
- Tables
- Algorithm
- Maths
- Code

Cite things like Adrian (1979) and (Agostini 2020).

Insert a figure (like Figure 1.1), by using the `figure` environment.

Insert a table (like Table 1.1), by using the `table` environment.

Table 1.1: An example table

Column 1	Column 2
	something here

Write an algorithm with the package *algorithm2e*, which we have already included in the *preamble.sty*.

Figure 1.1: Photo by Hans-Jurgen Mager on [Unsplash](#)

Algorithm 1: Some algorithm

Input : A - Pre-computed matrix A
 B - Pre-computed matrix B
 α - A user defined coefficient
Output: C - The final output of this algorithm
 $C \leftarrow A + \alpha B$ // start with the output of the network
return C

Figures, tables and algorithms are all floats, meaning that they may get moved to a different page as you write depending on how much space there is. Of course, there are other things that are also floats. Use `\FloatBarrier` to place all the floats defined before this line above this line in the text.

Write an equation inline like this: $5 \sin \theta$, or like

$$a = 25. \tag{1.1}$$

Cross-reference this equation like Equation [\(1.1\)](#)

Write codes inline `import numpy`. Or write codes in a block. Right now I have set the styles to be Python, but you can change that.

```
import numpy as np

a = np.arange(10)*0.2
a[2] = 0.0
print(a)
```

1.2 Defining macros

Define all new commands that you plan to use repeatedly in *mymacros.sty*. Commands can be defined three different ways: `\edef`, `\def`, or `\newcommand`.

For now I have defined the following commands:

- `\comment{your text}` - makes your text red.
- `\high{superscript}` - make superscript.

And these Maths mode commands:

- `\mat{}` - matrix.
- `\vector{}` - vector.
- `\Tr{}` - trace of a matrix.
- `\argmin` - print argmin.
- `\sym{}` - for acronyms in Maths mode.
- `\Rey` - print Reynolds number Re

At the top of *main.tex*, we import our command file by using the line `\usepackage{mymacros}`.
When writing equations, we can use the commands we defined in *mymacros.sty*.

$$MSE = \|\mathbf{A}\|_2^2 \tag{1.2}$$

$$Re = 1/\nu$$

We can use our other defined commands as well, such as `\comment` to make text red.

1.3 Changing layouts and working with preamble

Customizable features

- Page margin
- import packages
- font and fontsize
- bibliography style, and the page format
- title page style

Bibliography

Adrian, R. J., 1979. 'Conditional eddies in isotropic turbulence', *The Physics of Fluids* **22**(11), 2065–2070.

Agostini, L., 2020. 'Exploration and prediction of fluid dynamical systems using auto-encoder technology', *Physics of Fluids* **32**(6).

Appendices

Appendix A

Derivations

A.1 Algorithm A

Appendix B

Copyright