Hydrodynamic vortex separator as a reaction vessel modelling with Computational Fluid Dynamics

Submitted by

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to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Applied Mathematics, December 2016.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

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Bernardas Jankauskas

Abstract

Put your abstract in here.

Remember that this should be about 300 words or so.

Best not to use equations here as it'll be used in lots of unscientific places such as on websites and the university's database.

Acknowledgements

Acknowledgements belong here.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

This can be our first chapter. Reviewing the literature is always a good idea!

This thesis template has 40mm margins to the left and 20mm margins everywhere else. We start counting from the title page (page 1) right up to the end of the bibliography.

The sequence things are included are as per the university's guidelines.

1.1 How to use BibTex

Here we can learn about using BibTex. To use BibTex you need to enter your papers into the `thesis.bib` file in the same manner as the template paper already included.

To setup the bibliography you will need to first run latex, then bibtex and then latex again twice (to make sure the table of contents and references are fine).

i.e. type

```
latex thesis
bibtex thesis
latex thesis
latex thesis
```

or use the shell script provided by typing

```
lat_bib thesis
```

1.1.1 How to cite papers using BibTex

Can be found in Part

Chapter 2

Literature review

2.1 Maybe we have a second part?

2.1.1 How to cite papers using BibTex

It is very simple to cite references using BibTex.

Typing

`\cite{Blockley_etal}`

will give you the reference number in brackets — i.e. [1]. The references will be numbered in the order you \cite them and are automatically listed in the Bibliography.

Chapter 3

Mathematical model

3.1 Maybe we have a second part?

3.1.1 How to cite papers using BibTex

It is very simple to cite references using BibTex.

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```
\cite{Blockley_etal}
```

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Chapter 4

Numerical implementation

4.1 Maybe we have a second part?

4.1.1 How to cite papers using BibTex

It is very simple to cite references using BibTex.

Typing

`\cite{Blockley_etal}`

will give you the reference number in brackets — i.e. [1]. The references will be numbered in the order you \cite them and are automatically listed in the Bibliography.

Chapter 5

Reaction solver validation

5.1 Maybe we have a second part?

5.1.1 How to cite papers using BibTex

It is very simple to cite references using BibTex.

Typing

```
\cite{Blockley_etal}
```

will give you the reference number in brackets — i.e. [1]. The references will be numbered in the order you \cite them and are automatically listed in the Bibliography.

Chapter 6

Precipitation solver validation

6.1 Maybe we have a second part?

6.1.1 How to cite papers using BibTex

It is very simple to cite references using BibTex.

Typing

`\cite{Blockley_etal}`

will give you the reference number in brackets — i.e. [1]. The references will be numbered in the order you \cite them and are automatically listed in the Bibliography.

Chapter 7

HDVS simulation results and discussions

7.1 Maybe we have a second part?

7.1.1 How to cite papers using BibTex

It is very simple to cite references using BibTex.

Typing

`\cite{Blockley_etal}`

will give you the reference number in brackets — i.e. [1]. The references will be numbered in the order you \cite them and are automatically listed in the Bibliography.

Chapter 8

Conclusions

8.1 Maybe we have a second part?

8.1.1 How to cite papers using BibTex

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Typing

```
\cite{Blockley_etal}
```

will give you the reference number in brackets — i.e. [1]. The references will be numbered in the order you \cite them and are automatically listed in the Bibliography.

Appendix A

Your appendix title!

Perhaps you wish to include some work in an appendix

Appendix B

Your second appendix title!

Perhaps you need another appendix

Bibliography

[1] E. W. Blockley, A. P. Bassom, A. D. Gilbert, A. M. Soward, *Pulse-train solutions of a spatially heterogeneous amplitude equation arising in the subcritical instability of narrow gap spherical Couette flow*, Physica D 228 (2007) p. 1–30.