MONASH University

My Thesis Title is Long: So I added A Line Break For Style

My Full Name

My previous academic degrees

A Thesis Submitted for the Degree of Doctor of Philosophy at

Monash University in year

My Department

My Faculty

Copyright notice

Abstract

Publications during enrolment

Journal Publications

- Brandon Johns, Elahe Abdi and Mehrdad Arashpour. 'Dynamical modelling of boom tower crane rigging systems: model selection for construction'. In: *Archives of Civil and Mechanical Engineering* 23.3 (2023), p. 162. DOI: 10.1007/s43452-023-00702-x
- Brandon Johns, Elahe Abdi and Mehrdad Arashpour. 'Crane payload localisation for curtain wall installation: A markerless computer vision approach'. In: *Measurement* (2023). (In press), p. 113459. DOI: 10.1016/j.measurement.2023.113459

Conference Publications

- Brandon Johns, Mehrdad Arashpour and Elahe Abdi. 'Curtain Wall Installation for High-Rise Buildings: Critical Review of Current Automation Solutions and Opportunities'. In: *Proceedings of the 37th International Symposium on Automation and Robotics in Construction (ISARC)*. 2020, pp. 393–400. DOI: 10.22260/ISARC2020/0056
- Kerry He, Brandon Johns, Elahe Abdi and Mehrdad Arashpour. 'Camera View from Crane Payload: Video Stabilization'. In: *Australasian Conference on Robotics and Automation, ACRA*. 2021. URL: https://ssl.linklings.net/conferences/acra/acra2021_proceedings/views/includes/files/pap104s2-file1.pdf

Research Data

- Brandon Johns, Elahe Abdi and Mehrdad Arashpour. *Glass Curtain Wall Installation Dataset*. 2023. DOI: 10.26180/23538198

Free & Open Source Code

- https://github.com/Brandon-Johns/crane-dynamics-simulator
- https://github.com/Brandon-Johns/monash-thesis-template-latex-reworked

Thesis including published works declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes COUNT original papers published in peer reviewed journals and COUNT submitted publications.. The core theme of the thesis is THEME. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the My Departmentunder the supervision of NAME and NAME.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

In the case of Chapters 4 and 5, my contribution to the work involved the following:

Thesis Chapter	Publication Title	Status	Nature and % Student Contribution	Co-author name(s) Nature and % of Co-author's contribution	Co-author(s), Monash student
4	The Title of My First Published Article	Published	(70%)	NAME: contribution 1, contribution 2 (10%)	No
				NAME: contribution 1, contribution 2 (10%)	No
				NAME: contribution 1 (5%)	No
				NAME: contribution 1 (5%)	No
5	The Title of My Second Published Article	In Press	(80%)	NAME: contribution 1, contribution 2 (10%)	No
				NAME: contribution 1, contribution 2 (10%)	No

I have not renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

Student name: My Full Name

Student signature: Siegned **Date:** 19/11/2023

I hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

Main Supervisor name: NAME

Main Supervisor signature: `tis I! **Date:** 19/11/2023

Acknowledgements

Thank you to everyone who has supported me[1] during my candidature.

NAME[2] — My main supervisor. Thanks for being a great supervisor!

NAME[3] — My 2nd supervisor. Thanks for being a great supervisor!

This research was supported by an Australian Government Research Training Program (RTP) Scholarship.

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[2]NAME https://orcid.org/0000-0000-0000-0000

[3]NAME https://orcid.org/0000-0000-0000-0000

Contents

List of Figures

List of Tables

Abbreviations

BIM	Building Information Modelling
CAD	Computer Aided Design
DAE	Differential Algebraic Equation
DOF	Degrees of Freedom
IMU	Inertial Measurement Unit
LiDAR	Light Detection and Ranging
NIR	Near Infrared
ODE	Ordinary Differential Equation

Constants

Speed of Light $c = 2.997\ 924\ 58 \times 10^8\ \mathrm{ms}^{-2}$

Symbols

a	distance	m
P	power	W (Js^{-1})
ω	angular frequency	$rads^{-1}$

1 Example Content

This section showcases the way I formatted my lists, tables, equations, etc. If you decide to do it differently, then you'll be on your own to debug any subsequent formatting problems.

The structure of this chapter is as follows: Section 1.1 showcases the use of SSSSR sections. Section 1.2 discusses the use of line breaks in section headings. Section 1.3 shows how to display many different types of content.

1.1 Displaying Sections

This section has many subsections, which I can refer to by their labels. e.g. Section 1.1, Section 1.1.1, Section 1.1.1.1, Section 1.1.1.1.1, Section 1.1.1.1.1.1, and Section 1.1.2.

Labeling sections is optional. Labels may be anything, but must be unique (hence my naming convention).

Example text.

1.1.1 My Subsection

Example text.

1.1.1.1 My Subsubsection

Example text.

1.1.1.1.1 My Subsubsubsection... WAIT WHAT!?

If you get this deep, the command is not 'subsubsubsection', but 'paragraph'. Why?

For the record, I suggest not to use this much depth unless you've really thought about your structure, and you are sure that it is the best way to do it.

1.1.1.1.1.1 My Subsubsubsubsection... rofl

This is the maximum section depth that the titlesec package defines. May you never need it.

1.1.2 My Other Subsection

Example text.

1.2 Displaying Different Text In The Contents Because You Can

The heading in this section is different to the heading in the table of contents. You can use this method if you wish to force line breaks in your heading, but not in the contents.

1.3 Displaying Different Types of Content

1.3.1 Citations

This is a citation [3], and this is another [2, 3, 4, 5].

This is a footnote[1]. The text continues.

1.3.2 Lists

An example list is as follows:

1. This is a list
2. This is a list
3. This is a list

[1]Source: Example.

1.3.3 Quotes

Quotes can be used as follows

Inline quotes can use 'single' or "double" quotes like this. To this, Brandon stated:

> "Turtles are cute."

1.3.4 Figures

This is a figure reference: Figure 1.1

Some different ways to show figures include full page width (Figure 1.1), side-by-side (Figure 1.2 and Figure 1.3), and subfigures (Figure 1.4 which consists of Figure 1.4a and Figure 1.4b).

If you have mathematical symbols in your figures and you're using inkscape, you can input latex maths into the figure with: Extensions > Render > Formula (pdflatex).

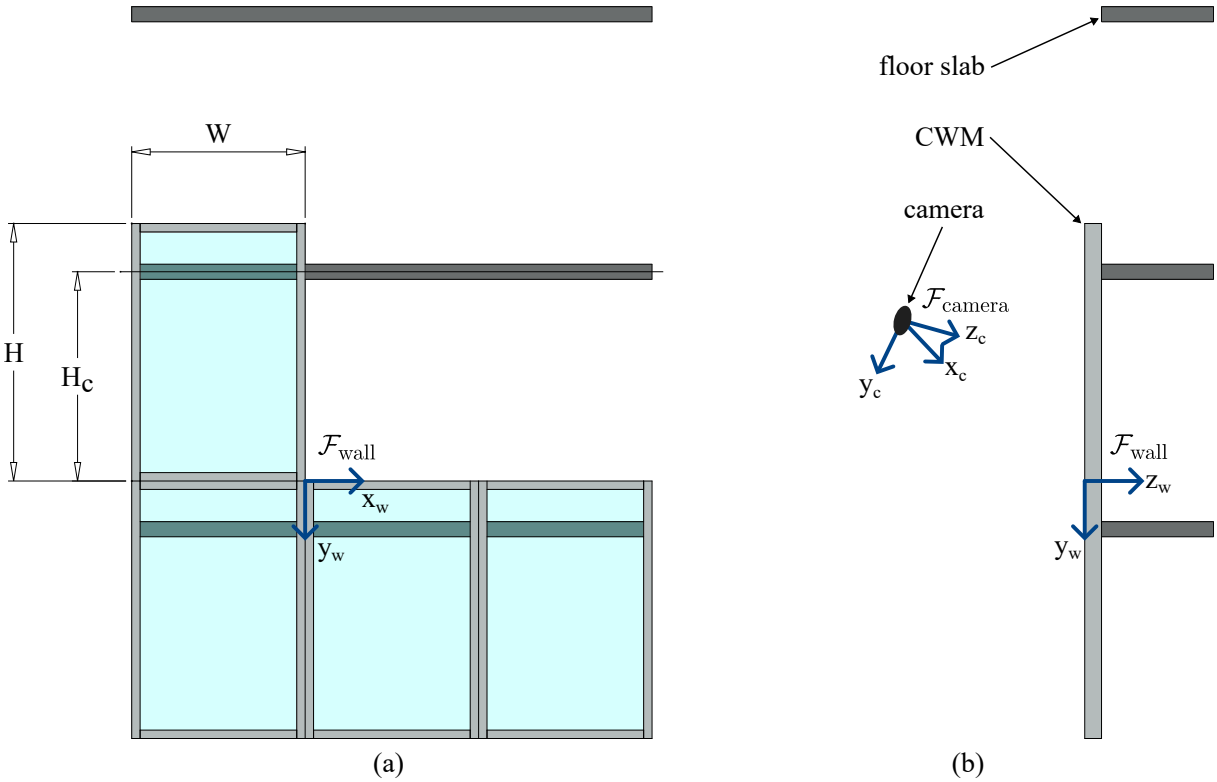


Figure 1.1: Export your graphics to pdf. Lovely vector graphics! If I see any jpeg text I am sad.

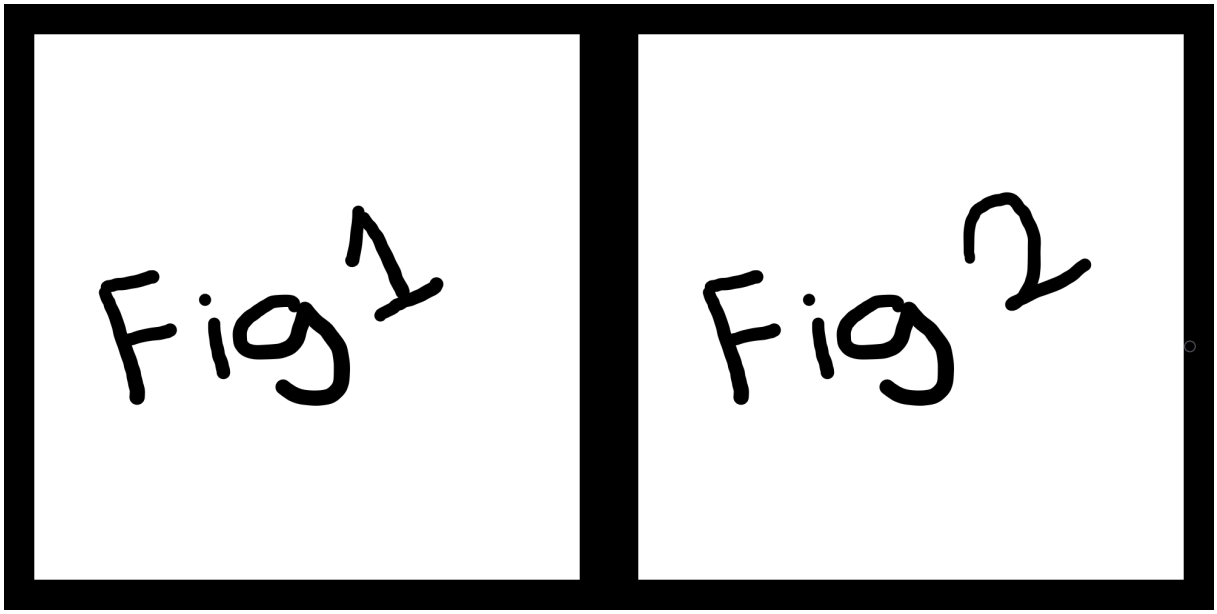
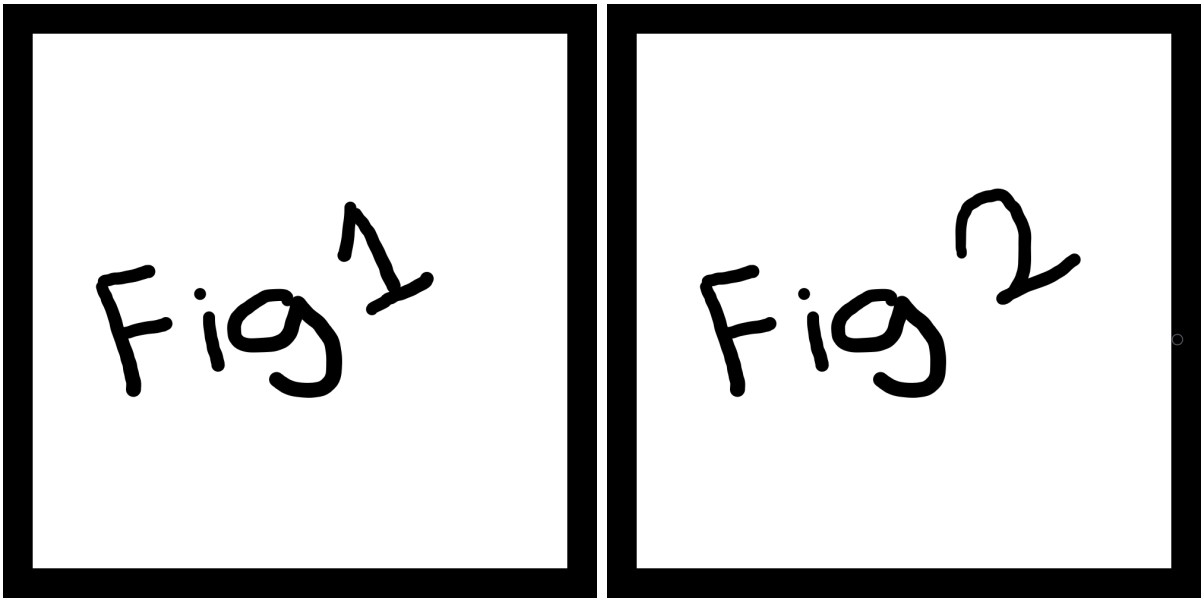


Figure 1.2: Cool graphic!

Figure 1.3: This is a very long caption that takes up multiple lines.



(a) Cool graphic!

(b) This is a very long caption that takes up multiple lines.

Figure 1.4: Cool graphics!

1.3.5 Equations

This is an equation reference: (1.1).

$$a = 2 \tag{1.1}$$

where a is a variable.

1.3.6 Tables

This is a table reference: Table 1.1.

This is a fairly basic table. See threeparttable if you want table notes (footnotes for tables). For more fancy tables, use NiceTabular of the package NiceMatrix.

		Measurement error	
Measurement	Unit	Mean	Standard deviation
x_n	mm	5.2	8.6
y_n	mm	3.5	3.0
z_n	mm	-6.5	9.1
θ_q	degrees	1.6°	2.9°

Table 1.1: Average measurement error over all 99 successful measurements. (x_n, y_n, z_n) are defined somewhere else. θ_q is the rotational misalignment as a quaternion angular distance.

1.3.7 Algorithms

Pseudocode of the algorithm is Algorithm 1. In the first stage of the algorithm, Lines 2–7 validate the inputs. Then Lines 8–12 do the calculation. Then Line 13 outputs the result.

Algorithm 1: Algorithm to find the area of an object.

Type Definitions
Length: A length measurement, with units in mm
Area : An area measurement, with units in mm^2

```
1  Function Multiply
       Input
       |  L      : [Length] Object length
       |  W      : [Length] Object width
       end
2      if L < 0
3      |  return Bad input: L
4      else if W < 0
5      |  return Bad input: W
6      else
7      |  Carry on citizen
       end
8      Copy L into the calculator
9      press the × button on the calculator
10     Copy W into the calculator
11     Press the = button on the calculator
12     Area A ← The result shown on the calculator
13     return A, The area as measured in units of mm^2
   end
```

2 Introduction

This thesis pertains to the field of ...

2.1 Motivations

2.2 Aims and Objectives

This thesis aims to ...

The key objectives are:

- Something
- Something
- Something

2.3 Summary of Thesis Contributions

Overall, this thesis contributes to ...

The key contributions of this thesis are:

- Something
- Something
- Something

2.4 Thesis Outline

Chapter 3 introduces the background and related literature.

Chapter 4 explores ...

Chapter 5 introduces ...

Chapter 6 concludes the thesis and discusses directions for future research.

3 Background and Literature Review

This chapter contains content from my publication [3].

The ... was undertaken with approval from the Monash University Human Research Ethics Committee (MUHREC) – project ID 00000.

This chapter introduces the background and related literature. ...

3.1 MySection

3.2 Summary & Research Directions

Background

This thesis focuses on ...

...

Key directions to ... are:

- Something
- Something
- Something

The remainder of this thesis investigates these research directions. Chapter 4 evaluates ... Chapter 5 introduces ...

4 My First Published Article

This chapter embeds a copy of my publication [1], which is distributed under the Creative Commons CC BY 4.0 license.

4.1 The Title of My First Published Article

List of Amendments to [1]

- Equation 6 contains a typographical error, in which ${}^{O}\mathbf{p}_i$ should be ${}^{O}\dot{\mathbf{p}}_i$

This document represents your published article. It is **letterpaper size**.

Example citation [1]. Test that clicking it jumps you to the reference list, and test that clicking the DOI in the reference list opens the webpage. You can also check the links in a pdf reader (e.g. In PDF XChange Editor, use 'View/Edit Links').

References

[1] Brandon Johns, Elahe Abdi, and Mehrdad Arashpour. "Dynamical modelling of boom tower crane rigging systems: model selection for construction". In: *Archives of Civil and Mechanical Engineering* 23.3 (2023), p. 162. DOI: 10.1007/s43452-023-00702-x.

4.2 Outlook

The outcomes of this work ...

The work finds that ...

The next chapter applies these results to ...

5 My Second Published Article

This chapter embeds a copy of my publication [2], which is distributed under the Creative Commons CC BY 4.0 license.

5.1 The Title of My Second Published Article

This document represents your published article. It is **A4 size**.

Example citation [1]. Test that clicking it jumps you to the reference list, and test that clicking the DOI in the reference list opens the webpage. You can also check the links in a pdf reader (e.g. In PDF XChange Editor, use 'View/Edit Links').

References

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5.2 Outlook

The outcomes of this work ...

6 Conclusions and Outlook

This thesis contributes to ... The key contributions are:

- Something
- Something
- Something

The outcomes of this work ...:

- In Chapter 4, it is found that ...
- In Chapter 5, ...

Future work is recommended to ... Specific directions for future work are:

- Something
- Something
- Something

A An Appendix

todo

A.1 Displaying Sections

Example text.

A.1.1 My Subsection

Example text.

A.1.1.1 My Subsubsection

Example text.

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A.1.2 My Other Subsection

Example text.

B Another Appendix

todo

Bibliography

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[3] Brandon Johns, Mehrdad Arashpour and Elahe Abdi. 'Curtain Wall Installation for High-Rise Buildings: Critical Review of Current Automation Solutions and Opportunities'. In: *Proceedings of the 37th International Symposium on Automation and Robotics in Construction (ISARC)*. 2020, pp. 393–400. DOI: 10.22260/ISARC2020/0056.

[4] Kerry He, Brandon Johns, Elahe Abdi and Mehrdad Arashpour. 'Camera View from Crane Payload: Video Stabilization'. In: *Australasian Conference on Robotics and Automation, ACRA*. 2021. URL: https://ssl.linklings.net/conferences/acra/acra2021_proceedings/views/includes/files/pap104s2-file1.pdf.

[5] Brandon Johns, Elahe Abdi and Mehrdad Arashpour. *Glass Curtain Wall Installation Dataset*. 2023. DOI: 10.26180/23538198.