



**QUEEN'S  
UNIVERSITY  
BELFAST**

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# Project Title

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**FIRST YEAR DISSERTATION**

submitted towards differentiation for the degree of

**Doctor of Philosophy (PhD)**

by

**Student Name**

Astrophysics Research Centre  
School of Mathematics and Physics  
Queen's University Belfast

**Supervisor(s)**

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# Contents

|                                      |          |
|--------------------------------------|----------|
| <b>Abstract</b>                      | <b>1</b> |
| <b>1 Background</b>                  | <b>2</b> |
| <b>2 Research to date</b>            | <b>3</b> |
| 2.1 Methodology . . . . .            | 3        |
| 2.2 Results and Discussion . . . . . | 3        |
| 2.3 Conclusions . . . . .            | 3        |
| <b>3 Research Plan</b>               | <b>4</b> |
| 3.1 Short-term Goals . . . . .       | 4        |
| 3.2 Long-term Goals . . . . .        | 4        |
| <b>Bibliography</b>                  | <b>5</b> |

# Abstract

Provide an abstract summarising the key information in the report. As a guide, the overall report length should be approximately 10 pages, not including cover page, table of contents or references. The layout of sections provided here is a suggested structure but can be adapted as seen fit by the student and/or supervisor. There are also examples of how to cite references, include figures and cross-reference different parts of the report.

## Ethics Declaration

I confirm that I have discussed any ethical considerations with my supervision team and, where required, have followed the approval process required by the [Faculty Research Ethics Committee](#):

NAME

If ethical approval was needed, please outline here the outcome / status of that process and any implications for your research project.

# 1 | Background

In this section, provide a background to the research in the form of a literature review<sup>1</sup> with appropriate citations to relevant work.

You can add both textual and parenthetical references as appropriate — e.g., Aad et al. [1] published an article with very rapid citation rates, but is gradually becoming eclipsed from competition in recent years [e.g., 2–4, to name but a few].

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<sup>1</sup>A literature review may not be suitable for, e.g., pure mathematics students. However, these students should still try to set the scene and explain the need for their research project, i.e., why is it novel and timely to do this research now?

## 2 | Research to date

In this section, please summarise the research undertaken to-date, including figures, tables, initial interpretations of results, etc.. The title can be changed to something more relevant to the work discussed and can be divided into separate sections and subsections as appropriate. A basic layout is below but can be adapted as seen fit.

### 2.1 Methodology

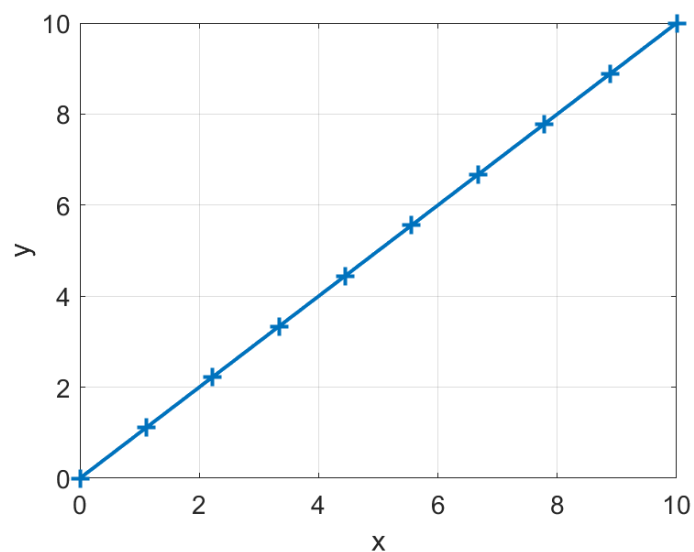
Techniques employed to conduct the presented research.

### 2.2 Results and Discussion

The original hypothesis is clearly supported by the data shown in figure 2.1...

### 2.3 Conclusions

Summarise the work in this chapter and provide the key scientific conclusions.



**Figure 2.1:** Plot of  $y = x$ . Here  $y$  represents the really important data and the trend line has been determined using method A.

# 3 | Research Plan

In this section, please outline the short- and long-term goals of the research including how these will fit into a thesis framework<sup>1</sup>. For example, you can refer the reader to Section 3.1 for your short-term goals, and Section 3.2 for your long-term goals.

## 3.1 Short-term Goals

My immediate short-term goals are outlined below.

1. Short-term goal 1.
2. Short-term goal 2.
3. Short-term goal 3.

## 3.2 Long-term Goals

The project's long-term goals are outlined below.

1. Long-term goal 1.
2. Long-term goal 2.
3. Long-term goal 3.

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<sup>1</sup>The descriptions of goals and deliverables can be transformed into Gantt charts where applicable

# Bibliography

- [1] Aad, G., Abajyan, T., Abbott, B., et al. 2012, Physics Letters B, 716, 1, doi: [10.1016/j.physletb.2012.08.020](https://doi.org/10.1016/j.physletb.2012.08.020)
- [2] Cao, Y., Fatemi, V., Fang, S., et al. 2018, Nature, 556, 43, doi: [10.1038/nature26160](https://doi.org/10.1038/nature26160)
- [3] Ivezić, Ž., Kahn, S. M., Tyson, J. A., et al. 2019, The Astrophysical Journal, 873, 111, doi: [10.3847/1538-4357/ab042c](https://doi.org/10.3847/1538-4357/ab042c)
- [4] Tanabashi, M., Hagiwara, K., Hikasa, K., et al. 2018, Physical Review D, 98, 030001, doi: [10.1103/PhysRevD.98.030001](https://doi.org/10.1103/PhysRevD.98.030001)