

**Unknown**

by

**Unknown**

A dissertation submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of  
DOCTOR OF PHILOSOPHY

Major: Mathematics

Program of Study Committee:  
John Smith, Major Professor  
Jane Dee  
Allen Wrench

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2024

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# DEDICATION

I would like to dedicate this thesis to my wife Glenda and to my daughter Alice without whose support I would not have been able to complete this work.

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## ACKNOWLEDGMENTS

I would like to take this opportunity to express my thanks to those who helped me with various aspects of conducting research and the writing of this thesis. First and foremost, Dr. Susan D. Ross for her guidance, patience and support throughout this research and the writing of this thesis. Her insights and words of encouragement have often inspired me and renewed my hopes for completing my graduate education. I would also like to thank my committee members for their efforts and contributions to this work: Dr. August Tanner and Dr. Lewis Hargrave. I would additionally like to thank Dr. Tanner for his guidance throughout the initial stages of my graduate career and Dr. Hargrave for his inspirational teaching style.

## **ABSTRACT**

This is the text of my abstract that is part of the thesis itself. The abstract describes the work in general and the heading and style match the rest of the document.



# CHAPTER 1

## GENERAL INTRODUCTION

This chapter will have the introduction to your thesis as a whole.

This is the opening paragraph to my thesis which explains in general terms the concepts and hypothesis which will be used in my thesis.

With more general information given here than really necessary.

### 1.1 Overview

Here initial concepts and conditions are explained and several hypothesis are mentioned in brief.

#### 1.1.1 Hypothesis

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

##### 1.1.1.1 Parts of the hypothesis

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

### **1.1.2 Second Hypothesis**

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

#### **1.1.2.1 Parts of the second hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny buiEveryGeneratingPolytope2023, abcd.

## **1.2 Criteria Review**

Here certain criteria are explained thus eventually leading to a foregone conclusion.

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# CHAPTER 2

## PAPER 1 TITLE GOES HERE

Authors and Affiliations

### 2.1 Abstract

This is the text of my abstract that is part of the thesis itself. The abstract describes the work in the first paper general. You can use the same abstract as your paper here.

### 2.2 Overview

The construct of this section or any further section is same as the authors paper. This is the opening paragraph to my thesis which explains in general terms the concepts and hypothesis which will be used in my thesis.

With more general information given here than really necessary.

### 2.3 Introduction

Here initial concepts and conditions are explained and several hypothesis are mentioned in brief.

kleeHellyTheoremIts1963 the definitive model is seen.

---

Modified from a manuscript to be submitted to/ under review/ published in *Name of the Journal*

### **2.3.1 Hypothesis**

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

#### **2.3.1.1 Parts of the hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

### **2.3.2 Second Hypothesis**

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

#### **2.3.2.1 Parts of the second hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

## **2.4 Criteria Review**

Here certain criteria are explained thus eventually leading to a foregone conclusion.

## **2.5 Conclusion**

The conclusion of the paper goes here. buiEveryGeneratingPolytope2023

[heading=subbibnumbered]

## **2.6 Appendix A: Appendix A Title Goes Here After The Colon**

If there is an appendix that needs to go with the paper it can be as a section  
kleeHellyTheoremIts1963

### **2.6.1 Procedure details**

Details of the paper specific appendix procedures

## **2.7 Appendix B: Appendix B Title Goes Here After The Colon**

If there is an appendix that needs to go with the paper it can be as a section  
 chenGraphHomotopyGraham2001

### **2.7.1 Procedure details**

Details of the paper specific appendix procedures

# CHAPTER 3

## PAPER 2 TITLE GOES HERE

Authors and Affiliations

### 3.1 Abstract

This is the text of my abstract that is part of the thesis itself. The abstract describes the work in the first paper general. You can use the same abstract as your paper here.

### 3.2 Overview

The construct of this section or any further section is same as the authors paper. This is the opening paragraph to my thesis which explains in general terms the concepts and hypothesis which will be used in my thesis.

With more general information given here than really necessary.

### 3.3 Introduction

Here initial concepts and conditions are explained and several hypothesis are mentioned in brief.

did the initial work the definitive model is seen.

---

Modified from a manuscript to be submitted to/ under review/ published in *Name of the Journal*

### **3.3.1 Hypothesis**

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

#### **3.3.1.1 Parts of the hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

### **3.3.2 Second Hypothesis**

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

#### **3.3.2.1 Parts of the second hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

## **3.4 Criteria Review**

Here certain criteria are explained thus eventually leading to a foregone conclusion.

## **3.5 Conclusion**

The conclusion of the paper goes here.

zieglerLecturesPolytopes1995

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## **3.6 Appendix: Appendix Title Goes Here**

If there is an appendix that needs to go with the

### **3.6.1 Procedure details**

Details of the paper specific appendix procedures



# CHAPTER 4

## PAPER 3 TITLE GOES HERE

Authors and Affiliations

### 4.1 Abstract

This is the text of my abstract that is part of the thesis itself. The abstract describes the work in the first paper general. You can use the same abstract as your paper here.

### 4.2 Methods and procedures

This is the opening paragraph to my thesis which explains in general terms the concepts and hypothesis which will be used in my thesis.

With more general information given here than really necessary.

### 4.3 Introduction

Here initial concepts and conditions are explained and several hypothesis are mentioned in brief.

As can be seen in Table [4.1](#) it is truly obvious what I am saying is true.

table/header-rows=1

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Bach	Cello Suite Number 1
Beethoven	Cello Sonata Number 3
Brahms	Cello Sonata Number 1

Table 4.1 This table shows a standard empty table. In case of long captions, we want to use the long caption as the description to the table and image but not use it in the table of contents and list of figures/ tables. In order to do this, there are two captions which have been provided, remove the first square bracket options if there is only one small caption. You can use citations like this to

#### 4.3.1 Hypothesis

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

This can also be seen in Figure [4.1](#) that the rest is obvious.

Figure 4.1 This table shows a standard empty figure

#### **4.3.1.1 Parts of the hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

#### **4.3.2 Second Hypothesis**

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

##### **4.3.2.1 Parts of the second hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

### **4.4 Criteria Review**

Here certain criteria are explained thus eventually leading to a foregone conclusion as can be seen in Table [4.2](#).

Table 4.2 This table shows a standard empty table  
with a limited caption width

## 4.5 Results

Include any results

## 4.6 Conclusion

The conclusion of the paper goes here.

dochtermannMinimalGraphsContractible2023

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## 4.7 Appendix: Appendix Title Goes Here

If there is an appendix that needs to go with the paper it can be as a section

virkContractibilityRipsComplexes2024

### 4.7.1 Procedure details

Details of the paper specific appendix procedures

CHAPTER 5

PAPER 4 TITLE GOES HERE

Authors and Affiliations

5.1 Abstract

This is the text of my abstract that is part of the thesis itself. The abstract describes the work in the first paper general. You can use the same abstract as your paper here.

This is the opening paragraph to my thesis which explains in general terms the concepts and hypothesis which will be used in my thesis.

With more general information given here than really necessary.

5.2 Introduction

Here initial concepts and conditions are explained and several hypothesis are mentioned in brief.

Of course, data on this as seen in Table 5.1 is few and far between.

Table 5.1 Moon Data

table/header-rows=1	Element	Control	Experimental
	Moon Rings	1.23	3.38
	Moon Tides	2.26	3.12
	Moon Walk	3.33	9.29

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### 5.2.1 Hypothesis

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

Or graphically as seen in Figure 5.1 it is certain that my hypothesis is true.



Figure 5.1 Durham Centre

#### 5.2.1.1 Parts of the hypothesis

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

### 5.2.2 Second Hypothesis

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

#### **5.2.2.1 Parts of the second hypothesis**

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny.

### **5.3 Criteria Review**

Here certain criteria are explained thus eventually leading to a foregone conclusion.

### **5.4 Results**

### **5.5 Conclusion**

The conclusion of the paper goes here.

[heading=subbibnumbered]

### **5.6 Appendix: Appendix title goes here**

If there is an appendix that needs to go with the paper it can be as a section  
zieglerLecturesPolytopes1995

#### **5.6.1 Procedure details**

Details of the paper specific appendix procedures

buiEveryGeneratingPolytope2023

# CHAPTER 6

## GENERAL CONCLUSION

This is the opening paragraph to my thesis which explains in general terms the concepts and hypothesis which will be used in my thesis.

With more general information given here than really necessary.

### 6.1 Summary And Discussion

Here initial concepts and conditions are explained and several hypothesis are mentioned in brief.

#### 6.1.1 Hypothesis

Here one particular hypothesis is explained in depth and is examined in the light of current literature.

As can be seen in Table [6.1](#) it is truly obvious what I am saying is true.

##### 6.1.1.1 Parts of the hypothesis

Here one particular part of the hypothesis that is currently being explained is examined and particular elements of that part are given careful scrutiny. [chenGraphHomotopyGraham2001](#), [chenGraphHomotopyGraham2001](#), [virkContractibilityRipsComplexes2024](#) Here is an equation

$$x^2 + y^2 = 8.$$



Table 6.1 This table shows almost nothing but is a sideways table and takes up a whole page by itself

Element	Control	Experimental
Moon Rings	1.23	3.38
Moon Tides	2.26	3.12
Moon Walk	3.33	9.29

[heading=subbibnumbered]