

A decorative graphic on the left side of the page, consisting of a network of blue lines and circles. The lines are of varying thickness and connect to circles of different sizes, creating a circuit-like or orbital pattern that extends from the top to the bottom of the page.

SPACE ENGINEERING 3  
Assignment 1  
24th March 2016

---

**ORBIT SIMULATION AND  
DETERMINATION**

---

Lydia Drabsch  
311217591  
ldra3557@uni.sydney.edu.au

**STUDENT PLAGIARISM: COURSE WORK – POLICY AND PROCEDURE****MTRX 2700 COMPLIANCE STATEMENT****INDIVIDUAL / COLLABORATIVE WORK**

**I/We certify that:**

1. I/We have read and understood the *University of Sydney Student Plagiarism: Coursework Policy and Procedure*;
2. I/We understand that failure to comply with the *University of Sydney Student Plagiarism: Coursework Policy and Procedure* can lead to the University commencing proceedings against me/us for potential student misconduct under Chapter 8 of the *University of Sydney By-Law 1999* (as amended);
3. The Work undertaken in this course is substantially my/our own, and to the extent that any part of this Work is not my/our own I/we have indicated that it is not my/our own by Acknowledging the Source of that part or those parts of the Work.

Name	Signature	SID	Date
Melissa Mitrevski		440207636	05/06/2015
Meg Flannery		440291196	05/06/2015
Lydia Drabsch		311217591	05/06/2015

# CONTENTS

<b>1</b>	<b>Simulation of Orbits</b>	<b>1</b>
1.1	Introduction . . . . .	1
1.2	Results/Discussion . . . . .	1
<b>2</b>	<b>Simulating Perturbations</b>	<b>1</b>
2.1	Introduction . . . . .	1
2.2	Methodology . . . . .	1
2.3	Results/Discussion . . . . .	1
<b>3</b>	<b>Orbital Determination</b>	<b>1</b>
3.1	Introduction . . . . .	1
3.2	Methodology . . . . .	1
3.3	Results/Discussion . . . . .	1
<b>4</b>	<b>Conclusions</b>	<b>1</b>
<b>5</b>	<b>Appendix</b>	<b>2</b>

# LIST OF FIGURES

# LIST OF TABLES

# INTRODUCTION

Write an intro here

## 1. SIMULATION OF ORBITS

### 1.1 Introduction

- keplers three laws
  - perifocal frame
  - The true anomaly  $\theta$  is the angle taken at the focus of the perifocal frame to the satellite from the perigee. The eccentric anomaly  $E$  is the angle taken at the centre of perifocal frame to the satellite from the perigee.
- The mean anomaly  $M_t$  is the mean number of orbits per day.

### 1.2 Methodology

From Kepler's second law, the mean anomaly at time  $t$  is calculated using the mean motion  $n$ ,

$$M_t = M_0 + n(t - t_0) \quad (1)$$

### 1.3 Results/Discussion

## 2. SIMULATING PERTURBATIONS

### 2.1 Introduction

### 2.2 Methodology

### 2.3 Results/Discussion

## 3. ORBITAL DETERMINATION

### 3.1 Introduction

### 3.2 Methodology

### 3.3 Results/Discussion

## 4. CONCLUSIONS

## 5. APPENDIX