MECH ??? Project Part ?
Clever Title

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1 Introduction

In the introduction, you introduce the problem, provide motivation, etc. Notice, you can reference sections with a label. A label is like a variable name. For example, this is Section 1.

1.1 A Subsection

This is a subsection. Say you want to make a numbered list. Here's how you to it.

1. I wanted to get this done ...
2. ... and this ...

   Say you want to make a bulleted list. Here's how you do it.

- Here' something ...
- Solving $\mathbf{Ax} = \mathbf{b}$.
- Solve for this ...

  This list is really spread out. You can make a packed list, like this.

- Root-finding.
- Solving $\mathbf{Ax} = \mathbf{b}$.
- Solving ODEs.

2 Writing Math

Linear equations, such as

$$\begin{aligned} y &= mx, \\ \mathbf{Ax} &= \mathbf{b}, \end{aligned} \tag{1}$$

satisfy superposition and scaling. Equation (1) is from grade-school. Notice that

$$\boldsymbol{\Xi}\dot{\mathbf{q}} = \mathbf{0}, \tag{2}$$

meaning $\dot{\mathbf{q}}$ lies in the null space of $\boldsymbol{\Xi}$. In (2) the matrix $\boldsymbol{\Xi}$ does not have full column rank.

If you want to write an equation without a number, you can write

$$m\ddot{q}(t) + kq(t) = 0,$$

which is the equation of a homogenous, second order, ODE.

You can reference papers and books using bibtex. For example, in [1] is discussed state estimation. In the textbook [2] and course notes [3] is discussed control.

Depending on our IDE (e.g., TeXShop vs VS Considerations), you must manually compile as follows: latex bibtex latex latex.

3 Making a Table

A table is shown in Table 1.

Table 1: This is a table example. Put numbers in a table.

Left	Right
1	2
3	4

4 Making Figures

Other things, like how to make a figure. For example, Figure 1 is a figure on its own.

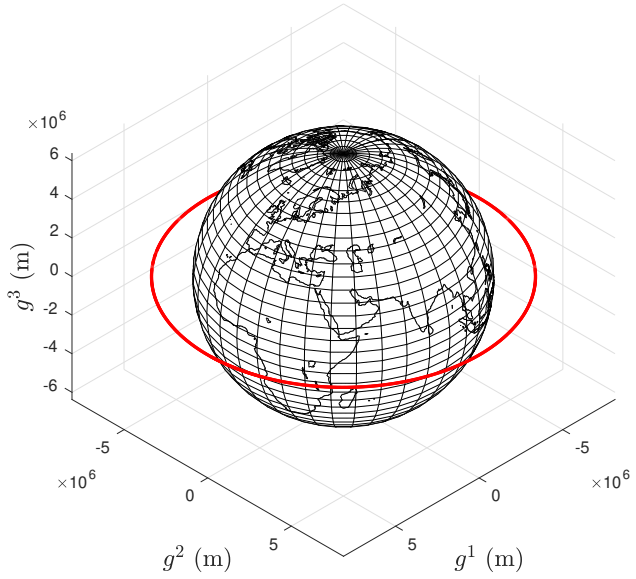
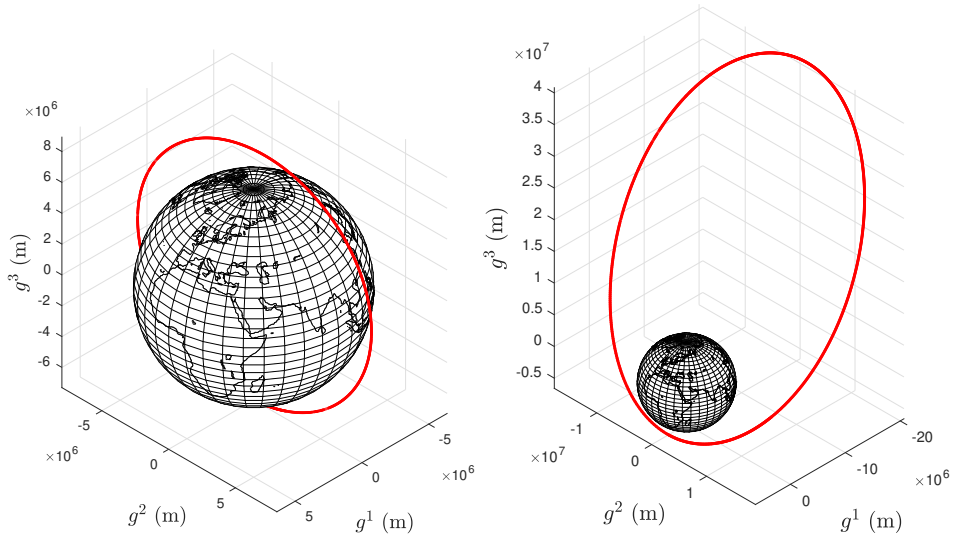


Figure 1: Low eccentricity, equatorial orbit.

On the other hand, Figure 2 has two subfigures, that being Figure 2(a) and Figure 2(b). Notice how labels are used to reference figures properly.



(a) Medium eccentricity, polar orbit.

(b) High eccentricity, inclined orbit.

Figure 2: Different kinds of spacecraft orbits around the Earth.

References

[1] R. Zanetti, M. Majji, R. H. Bishop, and D. Mortari, "Norm-Constrained Kalman Filtering," *AIAA Journal of Guidance, Control, and Dynamics*, vol. 32, pp. 1458–1465, September-October 2009.

[2] L. Guzzella, *Analysis and Synthesis of Single-Input Single-Output Control Systems*. ETH Zurich: vdf Hochschulverlag AG, Third ed., 2011.

[3] B. A. Francis, *ECE311S Dynamic Systems and Control*. Toronto, ON: University of Toronto, January 2010.