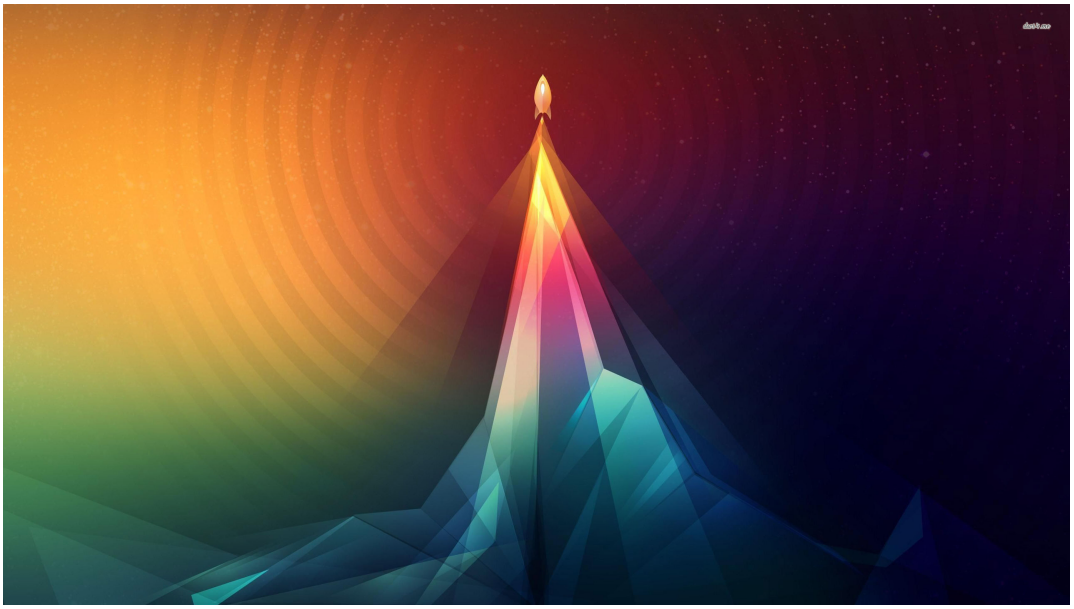
Rocket Navigation System



Project Report

Group CE6-633

Aalborg University
Electronic Engineering and IT

This report is compiled in LaTeX.

AALBORG UNIVERSITY
STUDENT REPORT

Electronic Engineering and IT
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Title:
Rocket Navigation System

Abstract:
□

Theme:
Control Engineering

Project Period:
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Project Group:
Group CE6-633

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Preface

This report is composed by group CE6-633 during the 6th semester of Electronic Engineering and IT at Aalborg University, 2017. The study of wireless power transfer and drone tracking described in this report is part of the theme *Control Engineering*.

For citation the report employs IEEE style referencing. If citations are not present by figures or tables, these have been made by the authors of the report. Units are indicated according to the SI system.

The natural logarithm is denominated by ln and $\log_{10}$ is the base 10 logarithm.

A period is used as a decimal mark. Half a space is used as a 100 0 separator.

Aalborg University, February 13, 2017

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Contents

Part I

Pre-analysis & requirements

Chapter 1

Introduction

Start with an explanation of why space exploration and orbitting technology is an advantage. Transition into how to put stuff in orbit or leave earth's gravity (rockets). Talk about issues with having basically a stick with thrusters beneath. It can tip over and variances in air currents have a large influence on the direction of the rocket. End with saying a control system that can make sure it's going straight is an advantage. Now we have a reason for making the control system we want.

Chapter 2

Initial Problem Statement

In order to design and implement a controller that can ensure a stable launch and flight of a rocket the following questions needs answering:

How is it possible to counteract the instability that occurs during launch and flight of a rocket, and how can rocket instability be defined.

Should Be Changed - Mathias

- Which factors contribute to an unstable rocket during launch and flight?
- Can the rocket be modelled based on another system with similar instability problems?

Chapter 3

Preliminary Analysis of a Rocket

The following chapter describes the functionality and structure behind a rocket. The goal is to determine which factors that leads to instability in flight and launch of a rocket.

The rocket which will described is based on:

- A payload system.
- A guidance system to control the rocket.
- A propulsion system to launch the rocket with.
- Structure system consisting of nose cone, frame and fins.

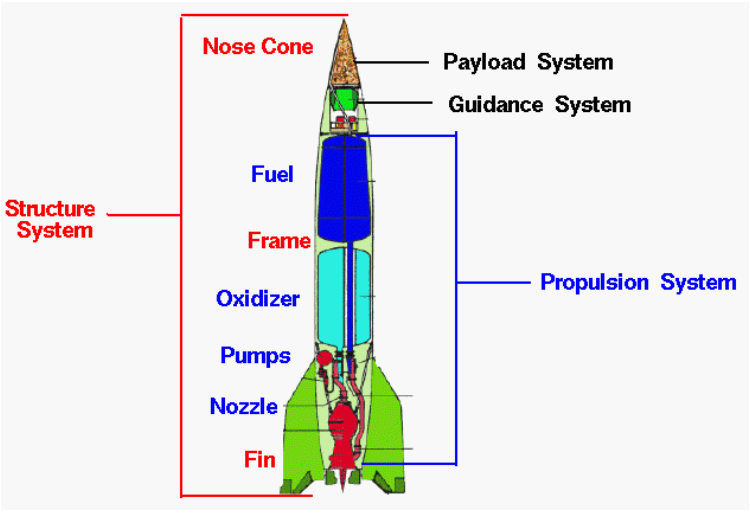

Figure 3.1: Basic structure of a rocket.

3.1 Stability of a Rocket

Describe why stability is important to for a rocket.

3.2 Mechanical System of a Rocket

Input/output relation of a rocket.

3.3 The Inverse Pendulum

relate the rocket model to a Inverse Pendulum

Part II

Design

Part III

Test & conclusion