User Manual

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Abstract

This document explains how to recreate the Cubli Project. Go to `https://github.com/ABonnefoy/Cubli_ENS_Rennes/` for more information.

Keywords: Cubli, Inertial wheels, ENS Rennes

1. Project

The Cubli project started in February 2018 and ended in April 2018. It was an educational project, aiming to create a model and using it as an educational object. The goal was to stabilise a cube using an inertial wheel, in order to orientate an educational satellite (Heptasat) without using propulsion.

This project was conducted by two students studying the master degree *Engineering of complex systems* at the ENS Rennes, in cooperation with the CNES.

2. Equipment needed

In order to create your own model, you can use the CAD provided on the website. The references of the different pieces of equipment needed are listed in the *Equipment* file.

Once the model created, you might need :

1. Different types of connectors
2. A function generator
3. A 15V power supply
4. A computer with the software *Code Composer Studio* installed

3. Tests

The first thing you need to do is to learn how to use the motor's driver. there are three main ways to control it :

1. Using a potentiometer
2. Controlling the speed
3. Controlling the current

The details are explained in the driver's user manual provided. During the programation, you will need to use the current control method.

Warning : Eventhough the driver can handle more, the motor must be supplied with 15V !

There is another command you might need : *Direction*. According to the voltage supply on this pin, the rotation direction of the motor changes.

4. Programmation

Unfortunately, the programmation part was not completed during the project, so a fully-working code with a connection map cannot be provided. The code written is still provided, and can be used as a starting point for your project.