Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institute for Dynamic Systems and Control
Institut für Dynamische Systeme und Regelungstechnik

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Title

Subtitle

Bachelor's Thesis

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Supervision

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Abstract

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Keywords: First keyword, Second keyword.

Contents

Chapter 1

Hardware

1.1 Components

In the following section, we will shortly describe the relevant parts already built into the kart, as well as all other components we installed. We will also explain their importance and why we decided for these compontents.

1.1.1 Built into Go-Kart

The go-kart used for this project was a SinusiON, an electric kart manufactured by Rimo Germany. An electric kart offers an easier implementation of a throttle-by-wire system over more common petrol-fueled kart, as the basis for such a system is already in place. It's weight prior to modifying it was roughly 170 kg, making it much heavier than a petrol-fueled kart. The dimensions (l/w/h) are 2020mm/1390mm/600mm.

ACD 4805 Motor controller

Each of the electric motors is controlled by an ACD 4805 motor controller, mounted on top of the motor. The ACD communicates via CANOpen and allows for easy modification of parameters and performance curves. The motor controller was likely the most important in-built part, as the whole throttle-by-wire system was based on it.

Brake

Rimo offers a dual-circuit hydraulic disc brake system. A simple lever arm connects the brake cylinder to the brake pedal. This configuration requires a precise actuator, as the way difference between a mild and hard brake was minimal.

Steering

The go-kart's steering mechanism was realized with a bell-crank linkage. This setup resulted in a non-linear steering behaviour, which needed to be accounted for when configuring the power steering. The steering shaft was short and it's surroundings offered limited space, therefore the required steering servo needed to be small as well.

Battery

The battery consists of 16 x 3.2 V LiFeMnPO4 cells and offers 40 Ah of battery charge. The nominal on-board voltage is 48 V. Because of the capacity of the battery, it makes a separate power supply for the additional electric actuators redundant.

Motor

The kart features two "PMS 100 R" 2.8 kW double-sided synchronous motors, each controlled by one of the two ACD 4805 motor controllers. The motors also offered regenerative braking, offering longer driving time and assisting in braking the car.

1.1.2 LinMot

1.1.3 Power steering

1.1.4 DC-DC converter

In order to power the Microautobox and the drive for the linear motor, an SD-50C-24 DC-DC converter was used.

1.1.5 Microautobox

1.1.6 cases/cables/adapters

Chapter 2

Appendix

The following code is the definition of the bibliography entry of the document class IDSCreport [1].

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@manual{IDSCreportClass,
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organization = {Institute for Dynamic Systems and Control ({IDSC})},
address = {ETH Z\"{u}rich, Switzerland},
month = dec,
year = 2016
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Bibliography

[1] A. Ritter, P. Elbert, and C. Onder, *How to Use the IDSCreport LaTeX Class*, Version 1.4.0, Institute for Dynamic Systems and Control (IDSC), ETH Zürich, Switzerland, Dec. 2016.

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