ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Autonomous Systems Lab

SCALEVO

Prof. Dr. Roland Y. Siegwart

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System Modeling and Control for a Self-Balancing Wheelchair

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Supervised by:
Péter Fankhauser
Dario Bellicoso

Authors:
Dario Mariani
Ian Stähli

Abstract

This report covers the design of such a controller for the case of a balancing wheelchair, using the system that was created during the focus project Scalevo. A controller is implemented that is robust enough for a user to sit on top and drive around, as well as for the wheelchair to be able to drive by itself.
For this, two linear controllers are compared and analysed. Additionally, a simulation environment is created to get a deeper understanding of the system and test the controllers.
Finally, a disabled person is able to get on the wheelchair and with the press of a button start balancing and drive around. This is done by using the tracks and the support system that the wheelchair also has. The algorithms implemented to handle these transitions are also covered in this report.