

# Master's Thesis: Modelling and Simulation of an Autonomous Forklift

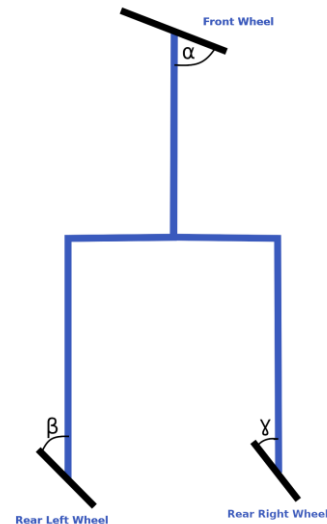
The KNAPP Open Shuttle Fork implements a unique drive concept which makes it possible to perform In-Place rotations and sideways movements with only one propelled wheel. This design comes with significant advantages in the agility and flexibility of the vehicle. However, this design introduces challenges in the controller and observer design.



## Problem Statement:

One important part in every autonomous robot application is to determine its movement from available measurements, the so-called odometry. In the picture on the right, the wheel configuration of the vehicle is shown. All three wheels can be turned individually, and the front wheel is propelled.

Currently, only a kinematic model is used to determine the motion of the vehicle. However, it turned out that in some scenarios this model is not sufficient. Therefore, in this master thesis a dynamic motion model which considers friction on the wheels should be developed and simulation results should be compared with the currently implemented solution.



All the hardware and infrastructure needed will be provided by KNAPP. During the master's thesis, the applicant can be employed (up to full-time) by KNAPP.

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