MPC for forklift

# Introduction

# Kinematic

Control input:

where is linear speed of drive wheel, is angular speed of drive wheel.

State:

kinematic mode:

Linearization:

Linearization it at reference point ():

Substitute into it, we get

So the new state is , control input

with

# Constraints

1. Maximum limit:

Where:,,,

So, we get:

That is

Rewrite it to a compact form:

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1. Smoothness constraint:

Substitute into it, we get：

Rewrite it to a compact form in :

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