FUNCTION DEVELOPMENT

Ko-HAF
KOOPERATIVES HOCHAUTOMATISIERTES FAHREN

Nonlinear Vehicle Control

OBJECTIVES

1. Only a minimal sensor setup is required
2. Control law valid for full velocity range
   ➡ only few parameters and small calibration effort
3. Simple and easy to understand control law

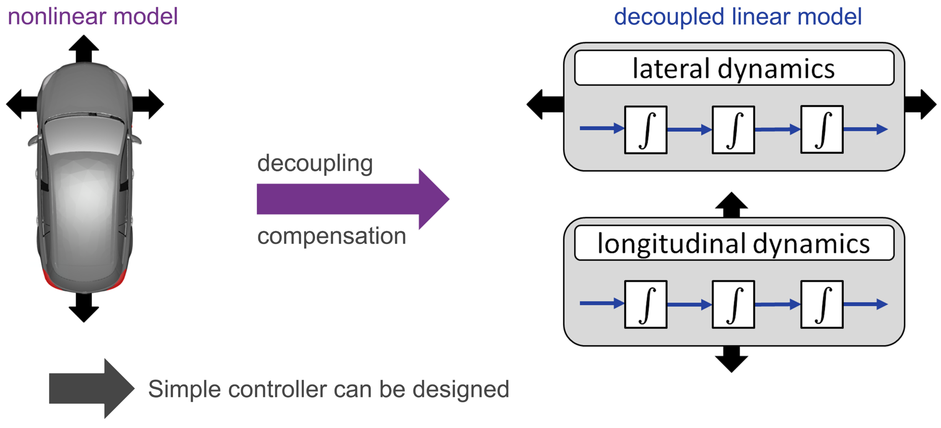
APPROACH

1 + 2 Set up proper vehicle model

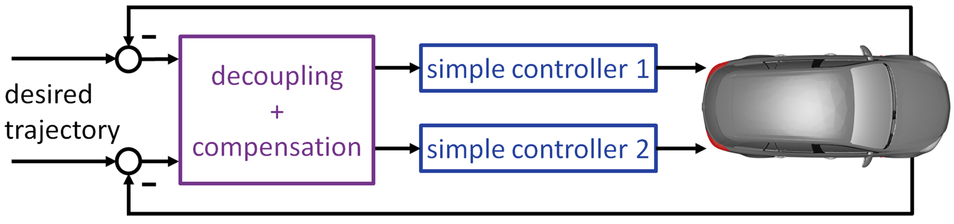
- Choose model states that can be measured with minimal sensor setup
- Use **nonlinear** model to map vehicle dynamics for full velocity range

3 Simplify system

- **Decouple** longitudinal from lateral dynamics i. e. ‘steering’ is independent from ‘braking and accelerating’
- **Compensate nonlinearities** of the model and obtain **linear** dynamics



RESULT



Closed-loop structure of nonlinear control strategy

[1] Schucker, J. and Konigorski, U. (2018), Nonlinear Vehicle Trajectory Guidance for Automated Driving on Highways, IFAC Proceedings

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Gefördert durch:
Bundesministerium für Wirtschaft und Energie
aufgrund eines Beschlusses des Deutschen Bundestages