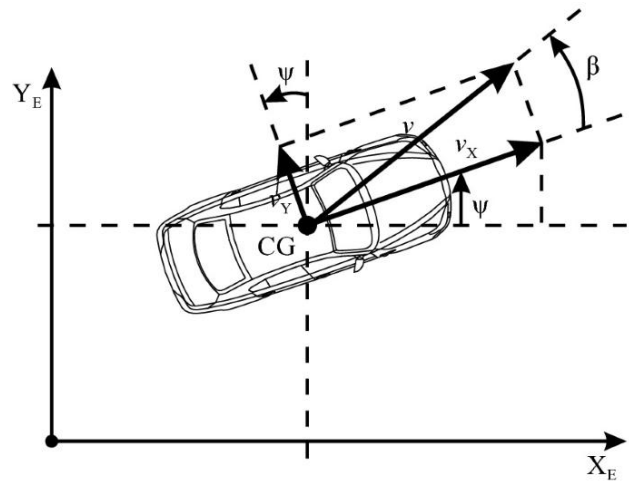


Master Thesis

Vehicle state estimation using an unscented /extended Kalman filter

Background:

Present day vehicle controllers for traction control (TCS), stability control (ESP) or active suspension systems require multiple inputs to make decisions and control vehicle parameters. The control effect greatly relies on the accuracy of the state information and parameters. Some of the required state information can be easily measured by sensors, such as accelerometers, yaw angle sensor or the wheel speed sensor. But some vehicle parameters are difficult to measure or need special sensors for state estimation, such as unsprung mass velocity, chassis displacement or the side slip angle. In practice a common technique to obtain parameters such as displacements and velocities is to integrate signals from accelerometers. However, it is well known that integrator-based estimations present larger errors due to drift and eliminating the number of sensors is also a potential approach to cutting down the cost, improving the reliability and performances of the suspension controller. State observer is a system which provides the internal state of a given system in real-time; it inputs the online measurements to the observer and outputs the estimated values. So it has gained increasing attentions in the field of automobile industry. The objective of this thesis would be to develop a suitable kalman filter for vehicle state estimation which would then be tested on a suspension control platform.



Tasks:

- Research and study in the field of controllers and state estimation
- Development of suitable vehicle models for estimation (7 DoF car model, single track or 2 track model)
- Development of an unscented /extended Kalman filter
- Verification and Validation of the model

Required profile:

- Study in the field of Mechanical, Mechatronics or Automotive engineering
- An independent and structured approach to work
- Prior knowledge of automotive engineering, control systems and mathematical modelling necessary

Bei Interesse senden Sie uns bitte Ihre Bewerbungsunterlagen per E-Mail.

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