

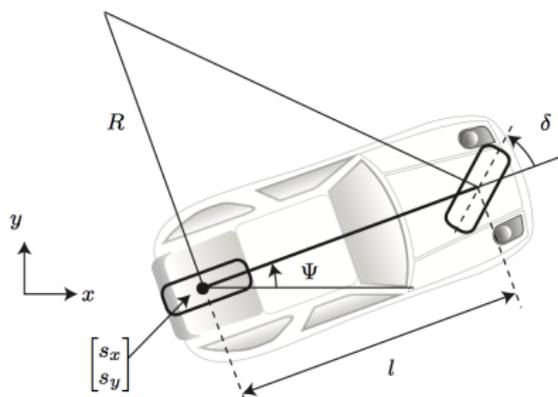
# Novel Control Techniques for Complex Dynamical Systems such as Autonomous Cars and Robotic Manipulators

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# Control of Dynamical Systems



- Dynamical systems can be modeled using differential equations with states (position, velocity, etc.) and inputs (steering, acceleration, breaking, etc.)
- **Goal:** Find a feedback-controller which stabilizes the system around a trajectory while satisfying given constraints

# Constrained Control of Complex Dynamical Systems

- Control task might become challenging for several reasons
  - Complex, nonlinear system dynamics
  - Constraints on states and inputs
  - Safety-critical application cases which require formal guarantees
- Many current research projects focus on one or more of these challenges
- Different control techniques are being developed depending on which of the above challenges are present

# Topic: Novel Control Techniques for Complex Dynamical Systems such as Autonomous Cars and Robotic Manipulators

- Choose one or more of the previously mentioned challenges
- Review literature/read papers about different control approaches which take these challenges into account
- Implement one or more for an example system
- Compare the approaches

**Chance to learn more about novel and state-of-the-art control methods, which are not included in lectures, but necessary for many real-life applications**

**Required:** Background in control theory

# Questions?

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