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

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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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