Open Thesis Topic

Saddle Points in Control - Theory and Applications

Description:
In many fields, the optimization of a static, convex function over a convex set plays an important role. Semidefinite, Linear and Quadratic Programs are examples that arise in technical, biological or economic problems. Whereas the literature is dominated by optimization algorithms that are formulated in discrete time, we consider dynamical systems in continuous time and construct controllers that stabilize the solution of a given convex problem of the form

\[
\inf_{x} f(x) \quad \text{s.t.} \quad g_i(x) \leq 0, \; i = 1, \ldots, m,
\]

with \( x \in \mathbb{R}^n, \; f, g_i : \mathbb{R}^n \to \mathbb{R} \). We use methods like convex optimization, differential geometry and various tools from nonlinear control theory. Besides the theoretic parts, we also consider many applications where such algorithms are important. This covers formation control of robots, multi-agent optimization and even power network control.

Prerequisites:

- Courses: Konzepte der Regelungstechnik, Convex Optimization
- Experience with \LaTeX, Matlab
- Interested in theoretical and mathematical work but also implementation

Supervisor:

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Area:
Optimization
Nonlinear Systems

Properties:
Type: SA, DA, MA

Beginning:
now

Weitere Informationen: www.ist.uni-stuttgart.de/education/sada

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