

EINLADUNG ZUM MATHEMATISCHEN KOLLOQUIUM

Es spricht

Herr Prof. Dr. Matthias Gerds
(Universität der Bundeswehr München)

zum Thema:

Optimal control of nonlinear DAEs with applications in robotics and automatic driving

Abstract:

The talk aims to give an introduction to optimal control problems with (nonlinear) differential-algebraic equations (DAEs). Such problems naturally occur in the context of mechanical multibody systems, process engineering, simulation of electric circuits, or discretizations of certain partial differential equations like Navier-Stokes equations. Another source of DAEs are path planning problems in robotics or automated driving.

Finding suitable reference trajectories in motion planning problems will be the main motivation throughout the talk. The aim is to find those trajectories which optimize a given performance criterion (e.g. fuel consumption, comfort, safety, time, etc) and obey constraints (e.g. collision avoidance, safety regions, control bounds, etc). This task leads to optimal control problems, which need to be solved efficiently, especially, if solutions need to be computed in realtime.

To this end we use direct discretization schemes and model-predictive control in combination with sensitivity updates to predict optimal solutions in the presence of perturbations. Direct discretization methods enjoy great popularity in solving optimal control problems owing to their user friendliness and robustness. Mathematically it is desirable to support (and thus to justify) the direct discretization methods by the investigation of convergence properties. Recent results for DAEs will be summarized.

**Mittwoch, 14.11.2018, 17:00 Uhr, Raum C 113 im Curiebau
(Kaffee 16:30 Uhr im Raum C 325)**

Alle Interessenten sind herzlich eingeladen.

Die Hochschullehrer des Institutes