



Der Vorsitzende des Promotionsausschusses

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## EINLADUNG

Hiermit lade ich ein zum öffentlichen Promotionskolloquium von

**Herr M. Sc. Abdurrahman Irscheid**  
Systemtheorie und Regelungstechnik  
(Prof. Dr.-Ing. Joachim Rudolph)

am

**Montag, 27. Januar 2025, 13:00 Uhr s.t.**

per Videokonferenz; Link für MS Teams: <https://msteams.link/70Z3>

Raum für die Prüfung: Gebäude A5.1, Konferenzraum 0.09.

### Thema der Dissertation:

#### **Contributions to Boundary Control of Distributed-Parameter Systems**

A new framework is presented for late-lumping boundary control of linear hyperbolic or parabolic partial differential equations (PDEs) interconnected with nonlinear ordinary differential equations (ODEs) at the unactuated boundary. For that, a nonlinear state transformation is used to map the plant into a desired target system. A central result of the thesis is a construction of the state transformation via the solution of a Cauchy problem. This is facilitated by using flatness-based parameterizations of the corresponding PDE subsystems. Combining backstepping and flatness-based parameterizations allows this work to build upon a substantial body of existing literature. For linear systems, the approach is equivalent to backstepping for both hyperbolic and parabolic PDE-ODE systems. The new control strategy overcomes previously unsolved problems and enables a systematic development of advanced designs for a broader system class.

Saarbrücken, 13. Januar 2025

Prof. Dr. Uli Kazmaier