

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II  
DOTTORATO DI RICERCA / PHD PROGRAM IN  
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

## Seminar announcement

Wednesday 01 June 2022, Time: 15:00 - 16:00

Sala Riunioni, Floor 4, Building 3, DIETI - Via Claudio, 21 – NAPOLI

Teams Code: m5yms9o

Link:

[https://teams.microsoft.com/l/team/19%3a0xsRIx\\_DLucFSw5Rhx0IarXoQCAv3aT5Zh5oocqeyUA1%40thread.tacv2/conversations?groupId=fd4484ad-ba35-47da-ad16-6267b7575332&tenantId=2fcfe26a-bb62-46b0-b1e3-28f9da0c45fd](https://teams.microsoft.com/l/team/19%3a0xsRIx_DLucFSw5Rhx0IarXoQCAv3aT5Zh5oocqeyUA1%40thread.tacv2/conversations?groupId=fd4484ad-ba35-47da-ad16-6267b7575332&tenantId=2fcfe26a-bb62-46b0-b1e3-28f9da0c45fd)



### Prof./Dr. Stephan Trenn

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## Switched differential algebraic equations: jumps and impulses

**Abstract:** In this talk switched differential algebraic equations (switched DAEs) as a modeling framework for dynamical systems are presented. Switched systems are used to model sudden structural changes induced e.g. by component faults or by intentional switches in electrical circuit. Since structural changes may also change algebraic constraints it is necessary to consider these explicitly in the form of differential algebraic equations (DAEs). This recently introduced system

class of switched DAEs is highly relevant for applications (e.g. analysis and control of the power network), but at the same time it poses many mathematical challenges. In particular, it is necessary to enlarge the solution space in order to also treat jumps and impulses. This talk will present a suitable solution concept based on piecewise-smooth distributions and will discuss impulse-freeness and observability of switched DAEs.

**Lecturer short bio:** *Stephan Trenn received his Ph.D. within the field of differential algebraic systems and distribution theory at the Ilmenau University of Technology, Germany, in 2009. Afterwards, he held Postdoc positions at the University of Illinois at Urbana-Champaign, USA (2009–2010) and at the University of Würzburg, Germany (2010–2011). After being an Assistant Professor (Juniorprofessor) at the University of Kaiserslautern, Germany, he became Associate Professor for Systems and Control at the University of Groningen, Netherlands, in 2017. He is Associate Editor for the journal Systems & Control Letters and member of the editorial board of the Springer book series Differential Algebraic Equations Forum.*

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