

Workshop: Advanced Modeling and Simulation of Power Electronic Systems

RWTH Aachen, Aachen, August 9 & 10, 2010

Speaker Dr. Wolfgang Hammer, Chief Scientist, Plexim GmbH
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Aug 9 09:00 **Beginning of Workshop: Welcome and Introduction**

Introduction into PLECS

- General use of PLECS
 - Instantaneous switching
 - Variable and fixed step operation
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10:00 Coffee break

Thermal modeling of power electronic systems

- Combined electrical thermal simulation using lookup tables
- Thermal loss descriptions of conduction & switching losses
- Electrical feedback of thermal losses

Exercise: Thermal modeling of a buck converter

11:30 Application Example from RWTH Aachen

12:30 Lunch

Numerical Simulation of Dynamic Systems

- Stiff vs. non-stiff solvers, stability domains
- Accuracy considerations, step-size control
- Proper handling of discontinuities, zero-crossing detection

Advanced features of PLECS

- AC sweep and impulse response analysis
- Advanced modeling techniques for increasing simulation speed
- Implementing of custom components

Example: Doubly-fed induction generator

Exercise: Implementing a custom PV string model

17:30 **End of day 1**

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Aug 10	08:30	Use of the C-script block <ul style="list-style-type: none">• Function call interface• Time settings and macros• High speed logic emulation Example: Space vector control of a three phase boost rectifier
	10:00	Coffee break
	10:30	Exercise: Implementing a digital PI controller with control delay. Exercise: Using a state machine for sequence generation
	12:30	Lunch
	13:30	Control system design and advanced modeling techniques <ul style="list-style-type: none">• Introduction to the flyback converter• A design flow using PLECS tools• Use of the state-space extraction tool Exercise: Control design for a flyback converter
	15:30	Coffee break
		Exercise: Control design for a flyback converter (cont) Discussion and Outlook
	17:00	End of workshop

Venue

RWTH Aachen

The workshop contains hands on exercises. Please bring your own computer with MATLAB/Simulink installed with you.

PLECS 3.0 licenses may be obtained ahead of the workshop from www.plexim.com.

Contact

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