PLECS Workshop

Tallinn University of Technology, Energy Building (NRG), Ehitajate tee 5, Tallinn, Estonia

13.01.2026, TalTech, NRG-223	
Advanced Modeling and Simulation of Power Electronic Systems	
09:30	Registration
10:00	Introduction to PLECS • General use of PLECS Blockset and PLECS Standalone • Instantaneous switching • Variable and fixed-step operation Exercise: Modeling a switched-mode power supply!
11:30	Break
12:00	Solver Settings • Definition of stiff and non-stiff systems • Explicit and non-explicit solvers • Stability domains • Accuracy considerations, step size control • Proper handling of discontinuities, zero-crossing detection
13:00	Lunch
14:00	Introduction to Thermal Simulation • Switching & conduction loss descriptions • Combined electrical-thermal simulation • Determining loss values from data sheets Exercise: Thermal modeling of a buck converter!
15:30	Break
16:00	Bringing Simulation and Real Hardware Together (Code Generation Workflow in PLECS) • Automatic code generation for microcontrollers • Plant code generation for the RT Box • Nanostep®, FlexArray and CPU solver engines • Real-time simulation with 4ns step size for MHz switching Demonstration: HIL testbench with microcontroller and RT Box
17:00	Q&A
17:15	End of Day

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Real-Time Simulation Using the PLECS RT Box	
09:30	Registration and Installation of Necessary Features
10:00	Overview and Introduction to RT Box Workflow using PLECS • PLECS overview! • From PLECS offline models to RCP and HIL! • Code Generation!
10:45	RT Box Introductory Exercise • PLECS RT Box features • Exercise: Introductory exercise using I/O ports
11:30	RT Box Library Overview
11:45	Break
12:00	Real-time Simulation of a Voltage Source Inverter (VSI) • PLECS model creation using the target blocks library • Deployment on the RT Box • Exercise: Voltage Source Inverter (VSI)
13:00	Lunch
14:00	Solver Engine • RT Box architecture • Sub-cycle averaging concept • FPGA simulation using FlexArray solver • FPGA simulation using Nanostep® solver Exercise: Solver engine
16:00	Break
16:15	Solver Engine Exercise: Solver engine
17:00	RT Box Hardware-in-the-Loop (HIL) Application Demo, Q&A
17:30	End of Workshop