

# REAL-TIME WORKSHOP

Advanced Modeling, Simulation and Code Generation of Power Electronic Systems  
Plexim GmbH, 23. / 24. April 2024

08:30	<b>Registration</b>
09:00	<b>Introduction to PLECS</b> <ul style="list-style-type: none"><li>▶ General use of PLECS</li><li>▶ Instantaneous switching</li><li>▶ Variable and fixed-step operation</li></ul> Exercise: Modeling a switched-mode power supply
10:00	<b>Break</b>
10:30	<b>Solver Settings</b> <ul style="list-style-type: none"><li>▶ Definition of stiff and non-stiff systems</li><li>▶ Explicit and non-explicit solvers</li><li>▶ Stability domains</li><li>▶ Accuracy considerations, step size control</li><li>▶ Proper handling of discontinuities, zero-crossing detection</li></ul>
12:00	<b>Lunch</b>
13:00	<b>Introduction to Thermal Modeling &amp; Simulation</b> <ul style="list-style-type: none"><li>▶ Switching &amp; conduction loss descriptions</li><li>▶ Combined electrical-thermal simulation</li><li>▶ Approach for determining the loss values from the data sheet</li></ul> Exercise: Thermal modeling of a buck converter
14:30	<b>Break</b>
15:00	<b>Overview of PLECS Tools</b> <ul style="list-style-type: none"><li>▶ Custom components</li><li>▶ Steady state analysis</li><li>▶ Small signal analysis</li><li>▶ State machine</li><li>▶ Simulation scripting (Octave and Python)</li><li>▶ Parallel simulations</li></ul>
16:00	<b>Q&amp;A with Plexim Engineers</b> <ul style="list-style-type: none"><li>▶ Open discussions</li><li>▶ Bring your questions/models</li></ul>
16:30	<b>End of workshop day 1</b>

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08:30	Registration
09:00	<b>Introduction to PLECS Coder for Embedded Targets</b> <ul style="list-style-type: none"><li>▶ Embedded code generation motivation</li><li>▶ Code generation workflow</li><li>▶ Control task execution and timing</li><li>▶ Multitasking</li></ul>
10:00	Break
10:30	<b>Tutorial 1: Workflow</b> <ul style="list-style-type: none"><li>▶ Blinking an LED</li><li>▶ Generate PWM output signals</li><li>▶ Use the external mode and parameter inlining</li></ul>
12:00	Lunch
13:00	<b>Tutorial 2: Timing Configuration and Real-Time Setup</b> <ul style="list-style-type: none"><li>▶ Control task execution and timing</li><li>▶ Code generation workflow</li><li>▶ Real-Time Example</li></ul>
15:00	<b>Overview and Introduction to the PLECS RT Box</b> <ul style="list-style-type: none"><li>▶ Hardware-in-the-Loop (HIL)</li><li>▶ Rapid control prototyping (RCP)</li><li>▶ Demonstration of a real-time simulation</li></ul>
16:00	End of workshop day 2
Contact	Plexim GmbH, +41 44 533 51 00, <a href="mailto:info@plexim.com">info@plexim.com</a>
Location	Plexim GmbH, 3 <sup>rd</sup> Floor, Zeppelin Wing, Technoparkstrasse 1, 8005 Zurich, Switzerland