

Workshop on the Design of Digital Controllers for Power Electronic Converters: From Modeling to Hardware Implementation

27 April 2024, from 9h am to 1h pm @ LATIS, ENISO, Sousse

Abstract

Electronic systems have recently undergone rapid evolution thanks to high-performance integrated systems and computer technologies. The demand for numerical control algorithms to manage the operations of electronic components and the system as a whole has increased, and the complexity of the system has increased with faster execution times. As a result, it has become common practice in engineering to test the control algorithm through real-time simulation before using it on a digital power management system or motor drive. In this context, the processor-in-the-loop (PIL) approach offers a much cheaper and simpler alternative for evaluating control algorithms, with better accuracy and a closer approximation to the actual dynamics of the system and controller. The workshop aims to provide students with a powerful tool for the design and implementation of embedded algorithms in numerical targets through the exploitation of the 'PIL' concept in the PSIM simulation environment. The training will include a comprehensive approach from model development to the implementation on a hardware target.

Content

1. *Power converters modeling (average modeling, small signal modeling): Case study of DC-DC converters*
2. *Straightforward design of a linear controller for power converters in the Smart-Control environment (PSIM): a step-by-step workflow.*
3. *Derivation of a digital controller and its implementation in a DSP target (TI28f335/TI28f379D)*
4. Validation with processor in the loop (PIL) approach

Speaker's Biography



Prof. Aissa Chouder received his engineering and master degrees in electronics from the Université Ferhat Abbas, Sétif, Algeria, in 1991 and 1999 respectively, and his Phd in electronic engineering from the Universitat Politècnica de Catalunya (UPC), Barcelona, Spain, in 2010.

He is currently full professor in the Department of Electrical Engineering at Mohamed Boudiaf University in M'sila, Algeria, and head of the 'Micro-Grids' team at the Electrical Engineering Laboratory (LGE). He has co-authored more than 150 articles in international journals and conference proceedings. His research focuses on modelling of power electronics, control of renewable energy systems and AC and DC microgrids

Registration is free. Send your application to mahmoudhamouda@yahoo.fr

The number of attendees is limited to 10.