The objective of the Master’s thesis is to develop a simplified model for a digitally controlled switch-mode DC/DC converter with constant switching frequency. The controller is based on the sliding mode theory, and comprises various additional features and functionalities that make the existing simulation model quite complex. Therefore, the objective of the Master’s Thesis is to develop a simplified model of the converter that allows a fast assessment of the basic behavior of the system. The aim is to employ the SIMPLIS simulator with the SystemDesigner toolbox (http://simplis.com/systemdesigner) in order to perform simulations in time and frequency domain.

The main tasks of this proposal can be summarized as:
› Getting familiar with the operation of the digital controller
› Getting familiar with the existing MATLAB-based model
› Getting familiar with the SystemDesigner toolbox from SIMPLIS
› Comparison of different modelling and simulation approaches
› Continuous time vs. discrete time (modeling of digital effects)
› Frequency domain analysis
› Setup of a modelling and simulation environment based on SIMPLIS
› Comparing/matching results with experimental results, thanks to an existing hardware prototype

For the duration of the thesis, the student is expected to be located in Villach, Austria. Details upon the monthly salary for the student will be given by HR Infineon after the technical interview.

Interested applicants are invited to contact Prof. Corradini or Prof. Mattavelli. For further information, please contact Matteo.Agostinelli@infineon.com.

Prerequisites

› Familiarity with theory of operation of switch-mode DC/DC converters
› Basic knowledge of digital control theory
› Basic knowledge in the field of modelling of DC/DC converters
› Familiarity with MATLAB
› Familiarity with SIMPLIS is a plus, but not required
› Good analytical skills
› Ability to work independently
› Good English language skills (German language skills are welcome but not required)