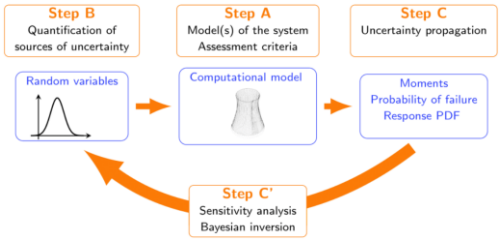

Master's thesis

In cooperation with the Swiss Federal Institute of Technology (ETH) Zurich

Calibration of Complex Computer Models

Current Status and Motivation: Electromagnetic modeling is indispensable in electronics design of, e.g., traction inverters of electric vehicles. Due to the enormous increase in computer power, the required solution of a large system of equations is not a challenge anymore. Model accuracy suffers instead from the lack of knowledge of all the input parameters, be it geometrical dimensions, material parameters, or parasitic properties of semiconductors. Model Calibration uses a probabilistic approach to solve this problem. Combining few measurements of the real system with a statistical evaluation of the computer model, uncertain input parameters are calibrated. In this thesis, you will apply model calibration to improve the accuracy of computer models of electronic devices.

Research Topic(s):

- Electromagnetic system modeling with varying level of complexity
- Machine Learning, Uncertainty Quantification, Bayesian Inference

Approach / Methodology:

- Apply the UQLab MATLAB or the pyUQ python Toolbox of the ETH Zurich Institute for Risk, Safety, and Uncertainty Quantification
- Adapt toolbox to electromagnetic problems
- Quantify the improvement of model accuracy on electronic models

Organisational Matters:

- Start of work: Spring 2022
- Workplace: IFE/TU Graz & ETH Zurich, D-BAUG, Chair of Risk, Safety and Uncertainty Quantification

Contact person / Supervisor:

IFE: Jan Hansen (jc.hansen@ieee.org)