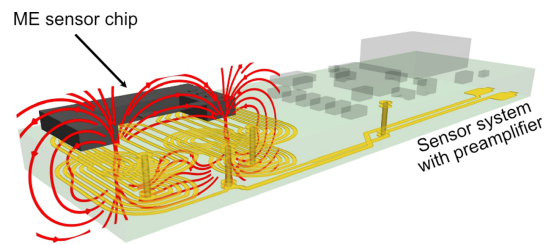
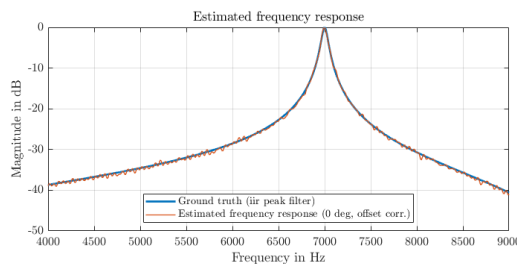


Bachelor/Master Thesis

Design and Evaluation of an Adaptive ME-Sensor Calibration Using Onboard Coils

Magnetolectric (ME) sensors, which are being researched in the Collaborative Research Centre (CRC) 1261 in Kiel, could be a promising technology for magnetic sensing in medical applications in the future. A good knowledge of the sensor behavior is necessary for reliable processing of the received signal. For this purpose, coil arrays are placed under the sensor element in the printed circuit boards (PCBs) of the sensor systems and can be excited with noise signals in order to record the sensor output with a known excitation. This can be used to quickly estimate and tune a sensor model, e.g. based on an FIR or IIR peak filter or a more complex Lorentzian peak fit. The estimated sensor frequency response can then be used to design appropriate equalizers.



The goal of this thesis is to develop and implement an adaptive calibration procedure based on the onboard PCB coils of the sensor systems. Using literature and simulations, suitable modeling and adaption/fitting approaches will be identified. Selected methods will then be implemented in software and evaluated with measurements. The complexity of the applied methods and the scope of the subtasks will depend on the type of thesis (B.Sc./M.Sc.) and will be discussed in a preliminary meeting.

Requirements and skills

- Sound knowledge in MATLAB/Python (and C/C++)
- Structured and independent working style
- Interest (knowledge) in filter design and adaptive algorithms
- Experience with measurement equipment

Contact

Prof. Dr.-Ing. Gerhard Schmidt

Moritz Boueke, M.Sc.

Room C-01.027 (ZEVS)
+49 431 880-6125
gus@tf.uni-kiel.de

Room C-01.022 (ZEVS)
+49 431 880-6129
mobo@tf.uni-kiel.de