Master Thesis

Automatic Tuning Loop for a Continuous-Time Collocated Force Feedback

Recently, a continuous-time collocated force feedback (CCFB) scheme was developed at the Fritz Huettinger Chair of Microelectronics. It allows for detecting the deflection of the proof mass of a capacitive sensor, e.g., a gyroscope or an accelerometer, and for concurrently applying a feedback signal using the same electrodes. This restoring force is required for a closed loop operation, e.g., in an electro-mechanical Delta-Sigma modulator. For the operation of the CCFB, a compensation voltage V_{compC} is required.
The task of this thesis is the design and implementation of an automatic tuning loop on transistor-level that controls the amplitude of the voltage V_{compC}, as shown in Fig. 1.

Focus of the work:

- Closed loop sensor readout based on Delta-Sigma modulation
- Analog and mixed signal design

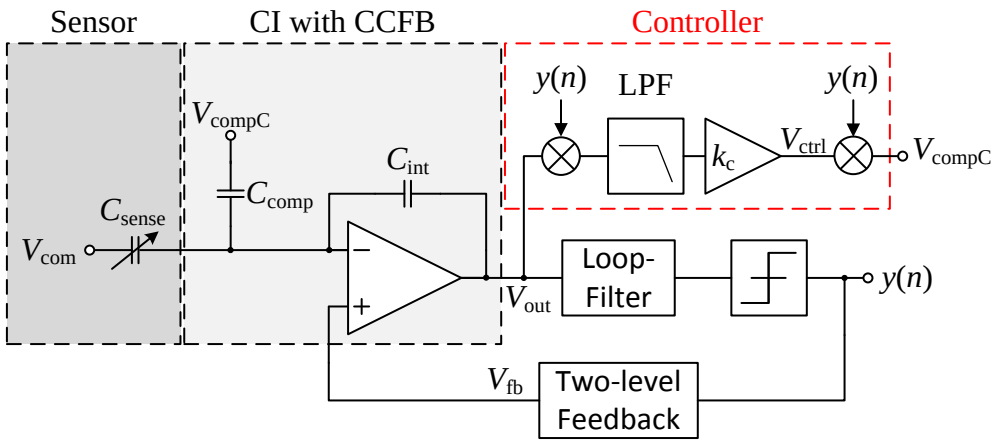

Figure 1: Simplified schematic of the Delta-Sigma closed loop sensor readout circuit with continuous-time collocated force feedback (CCFB) and the controller to implement.

What we expect:
Interest and fun in analog and mixed signal circuit design, autonomous working style, and well-documented work.

What we offer:
Intensive supervision of the thesis, nice work environment, latest CAD and EDA tools for the design of integrated circuits, well equipped laboratory, and free space for own ideas.

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