Lehrstuhl für Schaltungsentwurf
Fakultät für Elektrotechnik und Informationstechnik
Technische Universität München

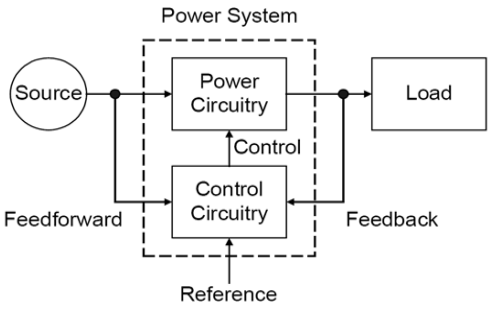
Low-Power and High Efficiency Power Management Circuit and System Design

Forschungspraxis / Master Thesis Positions at the Chair of Circuit Design

The research internship (PF) for a master student can be done full-time (9 weeks) or part-time (20 weeks). This topic can be offered as a master thesis (6 months) or a master thesis in combination with a research internship.

Introduction

As these applications of edge AI accelerators, low-power IoT sensors and wearable devices are often deployed in environments with limited power resources, the power management circuit and system (e.g., Energy harvester, DC/DC, LDO) must supply precise voltage/current regulation with minimal energy loss. You will be working on one of specified following topics:



- RF energy harvesting CMOS circuit design,
- Low-power buck/boost DC/DC CMOS circuit design,
- Low static current LDO CMOD circuit design with dynamic biasing technique,
- Low-power voltage/current reference CMOS circuit design with power gating,
- High efficiency maximum power point tracking (MPPT) CMOS circuit design.

For each of these topics, we already have enough information for you to start it smoothly.

Workflow

The following workflow are expected in your work:

- Literature Review: Read the state-of-art (SOA) papers on your topic. Analysis and summary the SOA techniques and corresponding circuit design.
- Define Specifications: Based on system application, define the circuit architecture and design specifications. Analysis circuit, summary the verification/simulation check list and performances which we would like to reach in circuit design.
- Circuit Design: Design and simulate the circuit with Cadence tool and 180nm/22nm CMOS technology. Depending on practical topic, it maybe also including layout and post-simulation, PCB design and measurement.

Requirement

- MSEI study focus on design of electronic circuits and systems.
- Background in analog and mixed-mode circuit design is preferred.
- Knowledge of Cadence Tools is preferred.

Reference

- Design of Analog CMOS Integrated Circuits, Behzad Razavi
- Design of Power Management Integrated Circuits, Bernhard Wicht

Interested or Question?	→ contact:	Dr. Pengcheng Xu Email: pengcheng.xu@tum.de Office: N5306