EPFL

MICRO-705   **Low-voltage analog CMOS IC design**

Kayal Maher

Cursus	Sem.	Type
Electrical Engineering		Opt.
Microsystems and Microelectronics		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Written & Oral
Workload	60h
Hours	**32**
Courses	32
Number of positions	

Remark

Next time: Spring 2021

Summary

The course is covering following aspects: MOS Transistor Modeling for Low-Voltage and Low-Power Circuit Design, Noise Performance of Elementary Transistor Stages, Stability of Operational Amplifiers, Important Opamp Configurations and Distortion in Elementary Transistor Circuits.

Content

Day 1:
- MOS Transistor Modeling for Low-Voltage and Low-Power Circuit Design
- Basic Low-Power, Low-Voltage Circuit Techniques
- Differential Amplifying Blocks with Positive Feedback

Day 2:
- Noise Performance of Elementary Transistor Stages
- Stability of Operational Amplifiers
- Systematic Design of Low-Power Operational Amplifiers
- Important Opamp Configurations

Day 3:
- Important Opamp Configurations
- Bandgap and Current Reference Circuits
- Distortion in Elementary Transistor Circuits
- Low-Power Continuous-Time Filters

Day 4:
- Matching of MOS Transistors in Deep-Submicron
- Micropower ADCs

Day 5:
- Layout Considerations in Mixed-Signal Circuit Design
- Ultra-Low Voltage Analog Circuit Design

Keywords

Low-Voltage Analog, Op-Amps, Sigma-Delta Converters, Switched-Capacitor

Learning Prerequisites

Recommended courses

Analog IC Design

Resources

Ressources en bibliothèque

- Understanding Delta-Sigma Data Converters / Pavan
- Understanding delta-sigma data converters / Schreier
- Analog-to-Digital Conversion / Pelgrom
- Charge-Based MOS Transistor Modeling: The EKV Model for Low-Power and RF IC Design / Enz
- RF analog impairments modeling for communication systems simulation : application to OFDM-based transceivers / Smaini
- All-Digital Frequency Synthesizer in Deep-Submicron CMOS / Staszewski
- Structured Analog CMOS Design / Kayal
- Analog Design Essentials / Sansen
- Methodology for the Digital Calibration of Analog Circuits & Systems / Kayal