Progettazione Mixed Signal (Design of Mixed Signal Circuits and Systems)

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P. Bruschi – Microelectronic System Design

The Sensor Systems Engineering program (15 CFU)

Curriculum: Sensor System Engineering

Sistemi sensoriali per l'automazione, l'ambiente e la salute (6 cfu)

Progettazione mixed signal (9 cfu)

Design of integrated cells for:

- Sensor interfacing
- Analog control systems
- Analog signal processing

□ Data conversion (ADCs & DACs)

Digital and Analog circuit integration

Main Topics (not in chronological order)

1) High level description of a collection of fundamental Analog and Mixed Signal (AMS) systems:

- DAS (Data Acquisition Systems) and elementary sensor interfaces
- Methods for offset and flicker noise cancellation
- Fully-differential architectures
- Analog Integrated Filters
- Data converters (ADC-DAC)
- 2) Complement of Mixed Signal Analysis & Design Methods
 - Design friendly MOSFET and BJT noise models
 - Useful network theorems (feedback system design, parameter variation effects, ...)
 - Mixed Signal design flow

3) Transistor level Analysis & Design of main analog cells

- Elementary blocks: Switches and Current Mirrors
- Operational amplifiers (S/E and Fully-Differential)
- Integrated Comparators

Experimental Lectures

- 1) Design and Simulation of a few important analog blocks (LTSpice)
- 2) Experiments performed by the teacher with dedicated analog circuits and computer-controlled oscilloscopes / signal generators

Final Exam

1) Only oral: typically, two questions (transistor-level topic + system level topic)

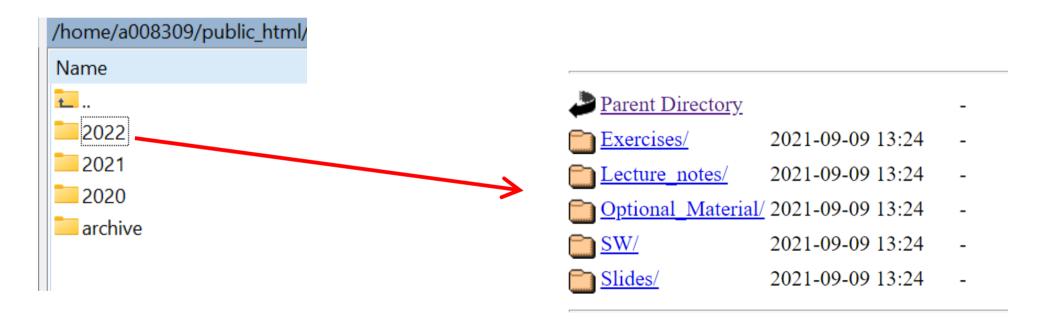
Suggested Prerequisites

- 1) Progettazione di Sistemi Microelettronici (PSM)
- 2) Elettronica Analogica

Didattic material

From teacher's web page:

http://www2.ing.unipi.it/~a008309/mat_stud/lista_dida.html



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