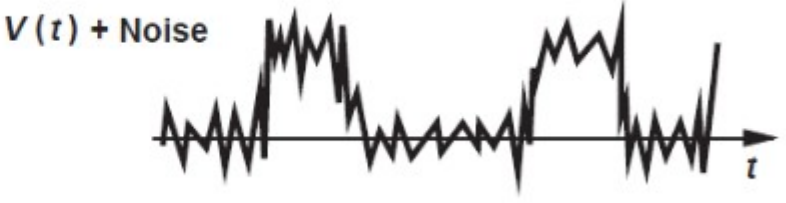
Analog IC DESIGN

Lecture 1 Introduction

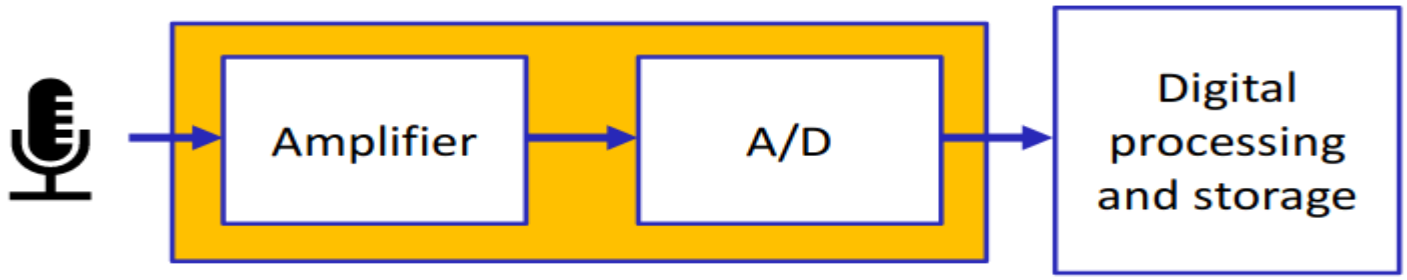
Digital vs Analog

- Digital benefits
  - Noise immunity
  - Easier to store and process
  - Easier to automate the design and testing
  - Direct benefit of scaling



Digital vs Analog

- Analog Benefits:
  - You need analog interface to sense any physical phenomena and convert it to digital
  - At high speed digital design is analog design
  - You will always Amplifiers,ADC’ s,DAC’ s and Power Management blocks



Why CMOS?

- Consumed negligible static power in the past but not now (due to leakage)
- Required very few devices per gate (for example And or not)
- Can be scaled down and get higher density and lower power consumption
- Lower fabrication cost
- For Analog:
  - CMOS is used today because market is mainly driven by digital which driven by CMOS
  - And we want to integrate analog and digital on the same ship

Analog IC Design Challenges

- Device scaling
  - Transistors become faster, but the gain declines
- Supply voltage scaling
  - Will limit the available headroom for the transistor
- Complexity
  - Continuous increase in transistor count and system complexity
- PVT variations
  - Tolerate large process,voltage , and temperature variations

Analog IC Design Flow (Simplified)