

CU5001 ANALOG AND MIXED MODE VLSI DESIGN

DETAILED SYLLABUS

OBJECTIVES

- To study the concepts of MOS large signal model and small signal model
- To understand the concepts of D/A conversion methods and their architectures.
- To learn filters for ADC.
- To study about the switched capacitor circuits.

UNIT I INTRODUCTION AND BASIC MOS DEVICES

Challenges in analog design-Mixed signal layout issues- MOS FET structures and characteristics large signal and small signal model of single stage Amplifier-Source follower-Common gate stage – Cascode Stage – large and small signal analysis of differential amplifier with active load, pole-zero estimation, zero value time constant method, frequency response of CS, cascade and cascode amplifiers

UNIT II SUBMICRON CIRCUIT DESIGN

Submicron CMOS process flow, Capacitors and resistors, Current mirrors, Digital Circuit Design, Delay Elements – Adders- OP Amp parameters and Design

UNIT III DATA CONVERTERS

Static and dynamic errors in DAC and ADC – Architectures & Characteristics of Sample and Hold Digital to Analog Converters- DAC- R-2R, weighted DAC, multiplying DAC, segmented DAC and sigma delta DAC. ADC – Flash ADC, pipelined ADC, successive approximation ADC, sigma delta ADC.

UNIT IV SNR IN DATA CONVERTERS

Overview of SNR of Data Converters- Clock Jitters- Improving Using Averaging – Decimating Filters for ADC- Band pass and High Pass Sinc Filters- Interpolating Filters for DAC

UNIT V SWITCHED CAPACITOR CIRCUITS

Resistors, first order low pass Circuit, Switched capacitor Amplifier, Switched Capacitor Integrator – Design of flip around sample and hold circuit – pipelined ADC.

Diploma, Anna University-UG, PG., HSC & SSLC

Notes
Syllabus
Question Papers
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REFERENCES

1. J. Jacob Wikner, Mikael Gustavsson, Nianxiong Tan "CMOS Data Converters for Communications" Springer, 2000.
2. Van de Plassche, Rudy J., "CMOS Integrated Analog-to-Digital and Digital-to-Analog Converters" Springer, 2003.