

Fachbereich Ingenieurwissenschaften
Abteilung Elektrotechnik und Informationstechnik
Institut für Nachrichten- und Kommunikationstechnik

Prof. Dr.-Ing. K. Solbach
Prof. Dr.-Ing. A. Beyer

Diplomarbeit / Masterarbeit

AUFGABE DER DIPLOMARBEIT im Hauptstudium II

für: Herrn Öner B. Ergin

gestellt von: Herrn Prof. Dr.-Ing. K. Solbach

Fakultät für Ingenieurwissenschaften - Hochfrequenztechnik

Thema: Investigation of Comparator Topologies and their Usage in a Technology Independent Flash-ADC Testbed

Description of Problem:

Target of the investigation is how to define an appropriate comparator topology for high speed Flash-ADCs starting with the technical specification and leading to design parameter optimized architecture.

Parameters like:

- supply voltage,
- power dissipation,
- speed,
- bit resolution
- area

have to be considered.

The demonstrator platform as a parameterize able Flash-ADC circuit with variable resolutions (4 to 10 bit) has to be developed in a 65 nm CMOS technology.

The GEM (Generic Engineering Model) concept has to be used for schematic, layout, testbench and datasheet creation.

Time and Task Schedule:

- Identify the state-of-the-art of comparators and fast ADCs considering latest CMOS processing technologies. (1Month)
- Investigation and categorization of different comparator topologies for a preselection corresponding to given specifications. (1 Month)
- Development of all schematics (Comparators, digital circuit for thermometer code generation) and testbenches using the GEM concept; showing the characteristics of the ADC by simulations. (1 Month)
- Development of a parameterizable comparator layout using the GEM approach; the digital part should be built with standard cells as far as possible. (1 Month)
- Execution of all verifications (DRC, extraction, LVS, back-annotation and extracted view based simulation to identify parasitic effects); Testing of the comparator selection methodology. (1 Month)
- Documentation; discussion and results comparison. (1 Month)

After completion of the thesis work a public presentation of results is to be given at the department.