Structured Electronic Design

EE3C11
Outline of the Design Approach

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Basic functions

Electronic information processing systems can be composed from a limited number of basic functions

The functional behavior is the idealized behavior of its implementation (embodiement, object)

Physical operating mechanisms form the basis for its implementation

Amplification is an (important) analog information processing function

Amplifiers are the physical objects that perform this function

Other basic functions and their associated objects are listed in Chapter 1

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Performance limitations

The amount of information that can be processed by a physical system is limited

- Fundamental physical limitations:
  - Addition of noise
  - Limitation of the power of a signal
  - Limitation of the rate of change of a signal
- Technological limitations:
  - Imperfections in the physical operating principle

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Cost factors

The processing of information is not free of costs (resources)

Operational cost factors:

Time
Energy
Space
Matter

Error reduction techniques

The performance-to-costs ratio of a system can be improved through application of a limited number of error reduction techniques

Maintain the way the information is embedded in the signal (data)

Reduction of imperfections of the function implementations

- Compensation
- Error-feedforward
- Negative feedback

Change of the way the information is embedded in the signal (data)

Reduction of the susceptibility of the signal for system imperfections

- Modulation
- Digitization

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Orthogonalization

Straightforward, subsequent design of the various performance aspects

Requires knowledge of performance limitations in the implementation technology

Requires knowledge of the error reduction capabilities of the error reduction techniques

In this course:

Technology:	Error reduction technique:
PCAs with operational amplifiers and passive components	Negative feedback

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