Digital Signal Processing Introductory class

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Syllabus

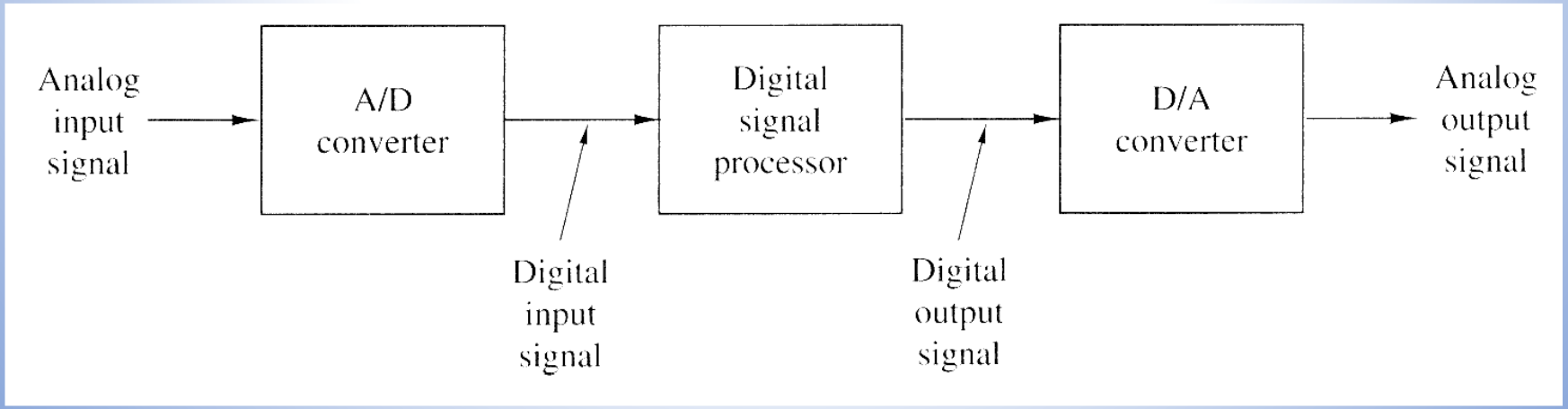
- DFT
- Realization of filters
- IIR filters
- FIR filters
- Power Spectrum Estimation

Textbooks

1. Proakis J. G, Manolakis D. G. Mimitris D., “Introduction to Digital Signal Processing” Prentice Hall, India, 2007.
2. Oppenheim A.V, Schafer R. W, “Discrete Time Signal Processing”, Pearson Education, 2004.
3. Ifeachar, Jervis, “Digital Signal Processing - A Practical approach”, Pearson Education, Asia, 2003.

Why DSP?

- Accurate, Cheaper and Programmable
- Digital → Analog – Discretise (Sampling) – Quantization (ADC)
- Signal → Information carrying entity
- Processing → Obtain in more desirable form
- Example – ECG powerline noise removal



Advantages of DSP

- Less sensitivity to component tolerance and environmental changes
- Accuracy increases as word length increases
- Time sharing - multiple tasks
- Easy storage
- Exact linear phase
- Accurate
- Cheaper (due to advances in VLSI)

Signals

- Impulse
- Step
- Ramp
- Exponential
- Sinusoidal

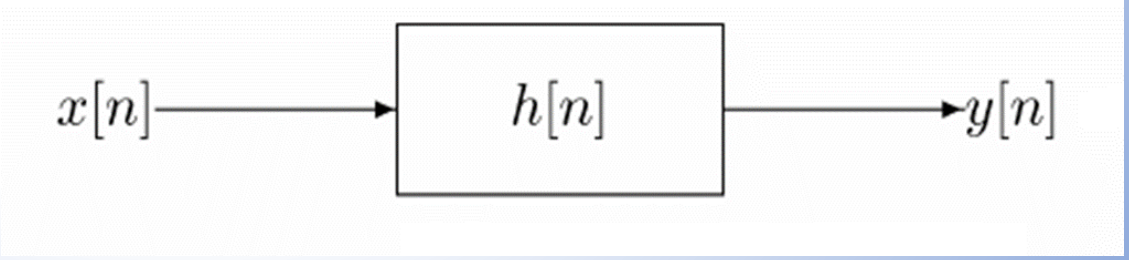
Signal classification

- Even and Odd
- Periodic and Non-periodic
- Deterministic and Random
- Energy and Power

Systems - properties

- Linearity
- Time invariance
- Causality
- Stability
- Memory

LTI systems - convolution



Transforms:

- Continuous time – Laplace transform
- Stable and periodic – Fourier Series
- Stable and non-periodic – Fourier Transform

- Discrete time – Z transform
- Stable and periodic – Discrete Time Fourier Series
- Stable and non-periodic – Discrete Time Fourier Transform


Thank
you