

Module 3 : Sampling and Reconstruction

Lecture 27 : Digital signal processing

Objectives:

Scope of this Lecture:

In this lecture we introduce concepts regarding **Digital Signal Processing**.

- Definition of digital signal processing .
- Advantages of digital signal processing.
- To understand how DSP works .

What is DSP ?

Digital Signal Processing is used in wide variety of applications .

Digital : Operating by the use of discrete signals to represent data in the form of digits.

Signal : A variable parameter by which information is conveyed through an electronic circuit.

Processing : To perform operations on data according to need or instruction.

Hence,

Digital Signal Processing can be defined as :

"Changing or analysing information to a discrete sequences of numbers."

Two unique features that differentiates DSP from ordinary Digital Processing :

- a) Signals from the real world.
- b) Signals are discrete.

Why should we use DSP ?

a) Versatility :

- Digital Systems can be reprogrammed.
- Digital Systems can be ported to different hardware.

b) Repeatability :

- Digital systems can be easily duplicated.
- Digital systems do not depend on strict component tolerances.
- Digital system responses do not drift with temperature.

c) Simplicity :

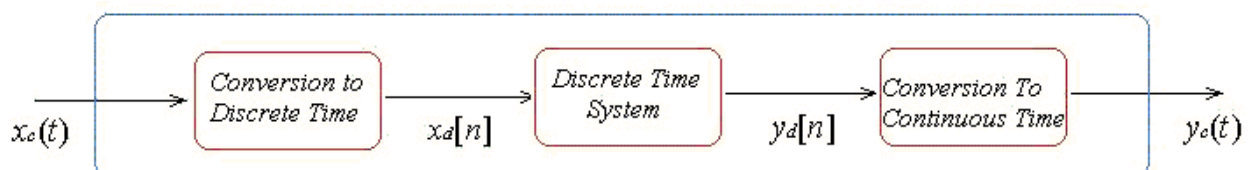
- Some things can be done more easily digitally than with analogue systems.

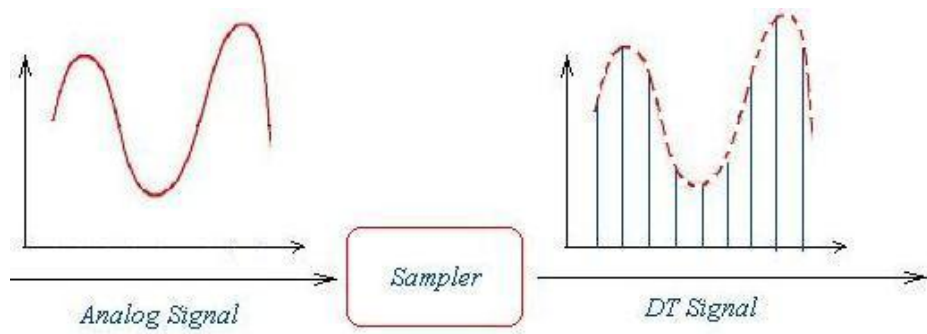
Some common features :

- They use a lot of maths (multiplying and adding signals).
- They deal with signals that come from the real world.

How DSP works?

A continuous time signal is converted to a discrete time signal and then reprocessed to get continuous time signal. This is how the sampling theorem is used in practice. It forms the link between analog and digital signal processing, and allows us to use digital techniques to manipulate analog signals.





Conclusion:

In this lecture you have learnt:

- Digital Signal Processing can be defined as *"Changing or analyzing information to a discrete sequences of numbers."*
- DSP is *Versatile, Repeatable & Simple* way of processing signals.
- Sampling theorem forms the bases of DSP.
- In DSP a continuous time signal is converted to a discrete time signal and then *reprocessed* to get continuous time signal.

Congratulations, you have finished Lecture 27.