ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Disal

Lab 2

Signals, Instruments and Systems

School of Architecture, Civil and Environmental Engineering

http://disal.epfl.ch/teaching/signals_instruments_systems/

Meeting room

Same as lab 01

- Tutorial -> https://epfl.zoom.us/j/93318997001
  No waiting room or breakout rooms, just a simple presentation

- Q&A -> https://epfl.zoom.us/j/92181587760
  One of 2 TAs will accept you through a waiting room.After you finish, we expect you to leave the session.

- Discussion among students-> https://epfl.zoom.us/j/97706947172
  You can use this channel to discuss the lab among yourself.

Lab 2 Outline

- Concepts:
  - Convolution
  - Sampling
  - Aliasing
  - Reconstruction
- Tools:
  - Matlab

Part 1: Sampling and reconstruction

Signal generation

- $f(t) = \sum_i A_i \sin(2\pi f_i t)$
- frequencies
- amplitudes

Filtering

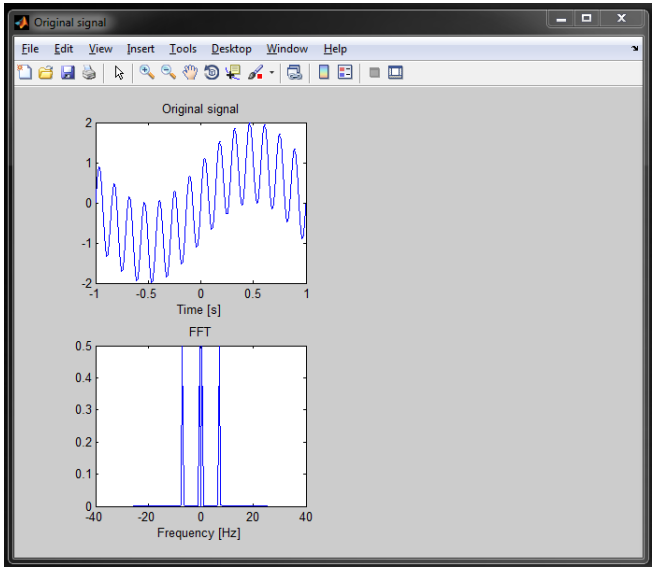
- Not in this lab

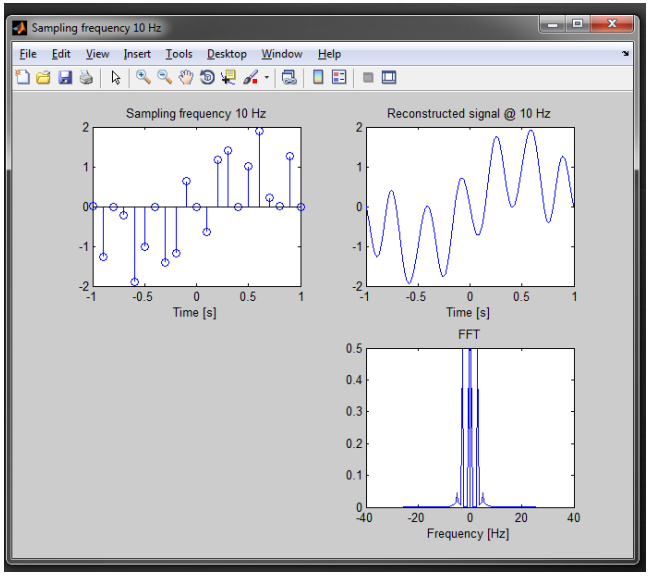
Sampling

- Sampling frequency

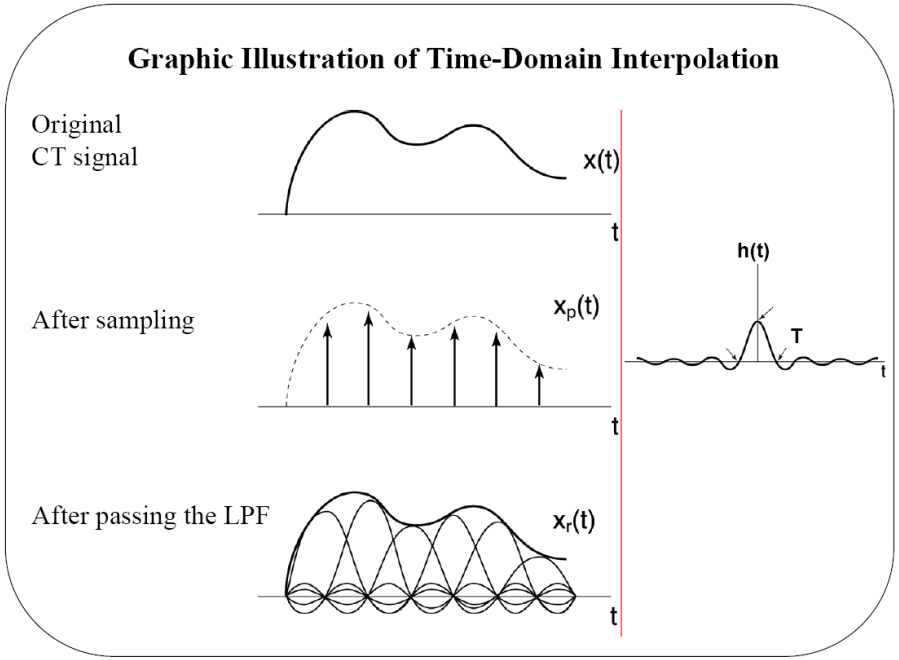
Reconstruction

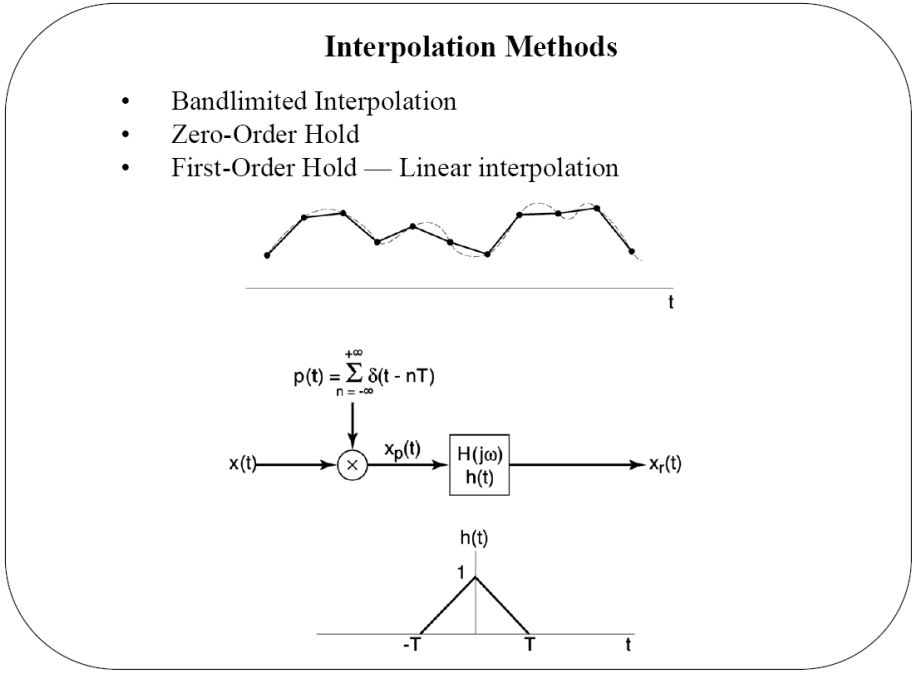
- Linear interpolation
- Whittaker-Shannon





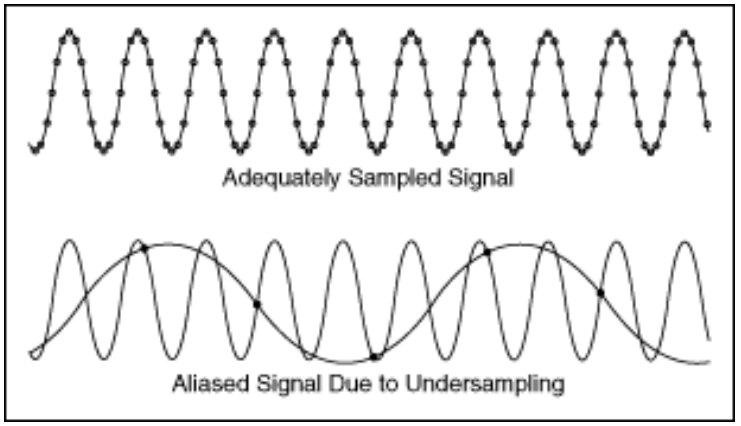
Part 1: Reconstruction: Linear vs. Wittaker-Shannon





Part 2: Aliasing

- An effect that causes different signals to become indistinguishable when sampled



- Nyquist rate: fs > 2B

Sampling frequency fs must be at least two times greater than the maximal signal frequency B

Part 3: Applications

- You will work with real data.
- Use DFT to extract the presence of lighthouses
- Separate the signals in the frequency domain