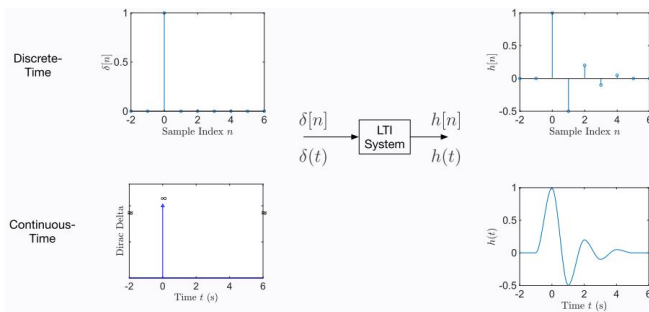# 2: LTI

Xin Wang

I. IMPULSE RESPONSE H OF AN LTI SYSTEM

- Impulse response represents the LTI system behaviour
- Unknown systems determined with impulse input:
  - Discrete: Unit impulse function
  - Continuous: Approximated Dirac delta function
- Response used to determine the output to any input
- Linked to system inputs:

II. CONVOLUTION *

- LTI output is convolution of input with impulse response
  - Continuous (Convolution integral):

$$y(t) = x(t) * h(t) = \int_{-\infty}^{\infty} x(\tau)h(t-\tau)d\tau$$

  - Discrete (Convolution sum):

$$y[n] = x[n] * h[n] = \sum_{k=-\infty}^{\infty} x[k]h[n-k]$$