Properties of LTI System

## Last time:

- LTI System has characteristic impulse response

(System starts from rest

Starts from rest

## Impulse Response

For LTI System

- We can tell about “causality” from “shape” of impulse response:

- An LTI system is causal iff for ALL

- If any value of for , system is noncausal

LTI systems can have either:

- Finite (duration) impulse response (F.I.R.)

or

- Infinite (duration) impulse response (I.I.R.)

## F.I.R. System

## I.I.R. System

- h[n] continues as nonzero in at least one direction as

- Hopefully tapers towards zero in limit

## Properties of convolution as a math operation

Linear:

Distributive:

Communicative

Associative:

)\*

Identity:

Impulse at origin is identity element for convolution

Shift:

## Calculating Convolution by Brute Force

- is an “irony function”, it only outputs 0 when it is given a non-zero number, else 1