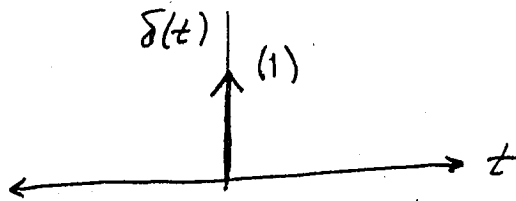


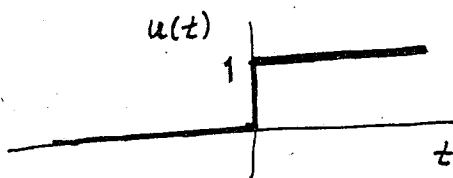
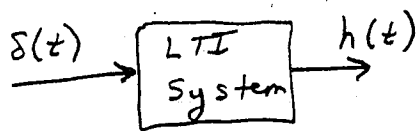
Review Session for the Final Exam Prof. Brian Evans

1. Impulse and step responses.

Continuous-Time Domain



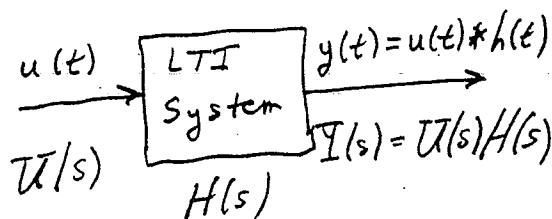
Dirac Delta Functional



IMPULSE

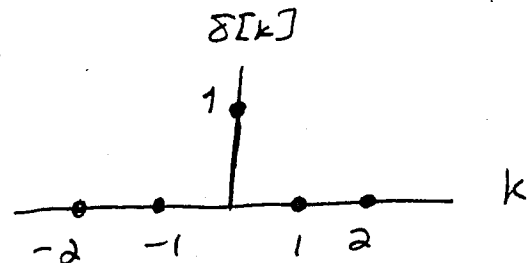
IMPULSE RESPONSE

STEP FUNCTION

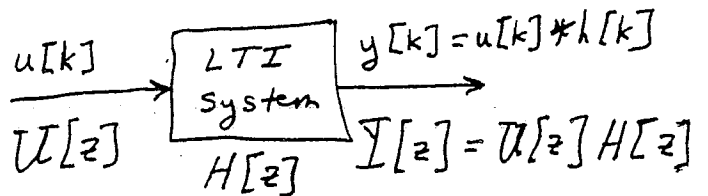
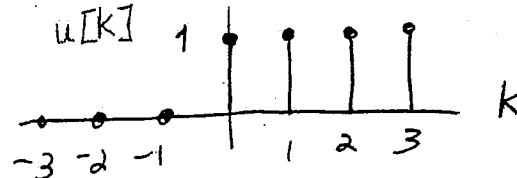
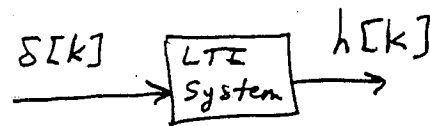


$$U(s) = \frac{1}{s}$$

Discrete-Time Domain



Kronecker Delta Function



$$U[z] = \mathcal{Z}\{u[k]\} = \frac{1}{1 - z^{-1}}$$

2. Tapped Delay Lines

Tapped delay lines have impulse responses that are finite in extent. Therefore, their transfer functions cannot have any poles.

Continuous-Time Domain

$$\frac{1}{s+a} \xrightarrow{\mathcal{L}^{-1}} e^{-at} u(t)$$

Infinite extent

SINGLE
POLE
SYSTEM

Discrete-Time Domain

$$\frac{1}{1 - a z^{-1}} \xrightarrow{\mathcal{Z}^{-1}} a^k u[k]$$

Infinite in extent

The coefficients of the tapped delay line can be chosen to realize different types of phase responses, including linear phase.