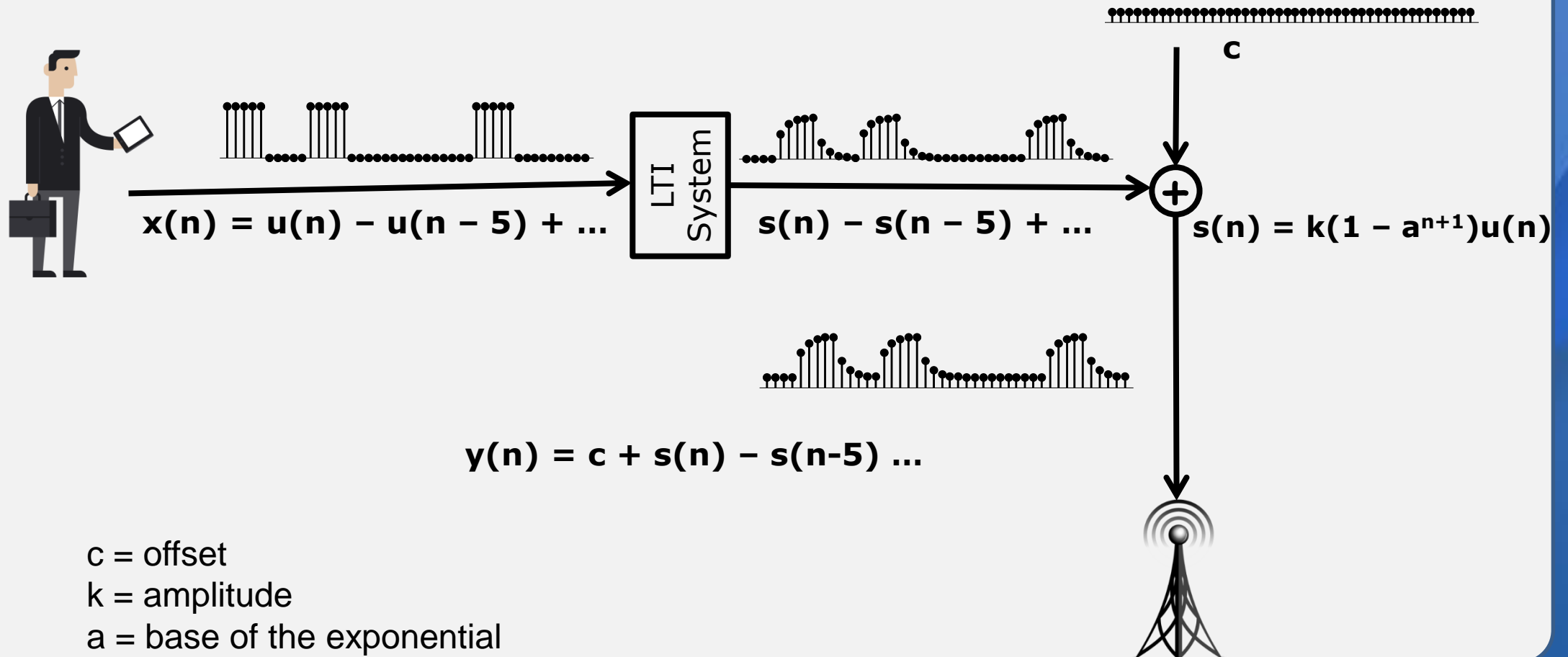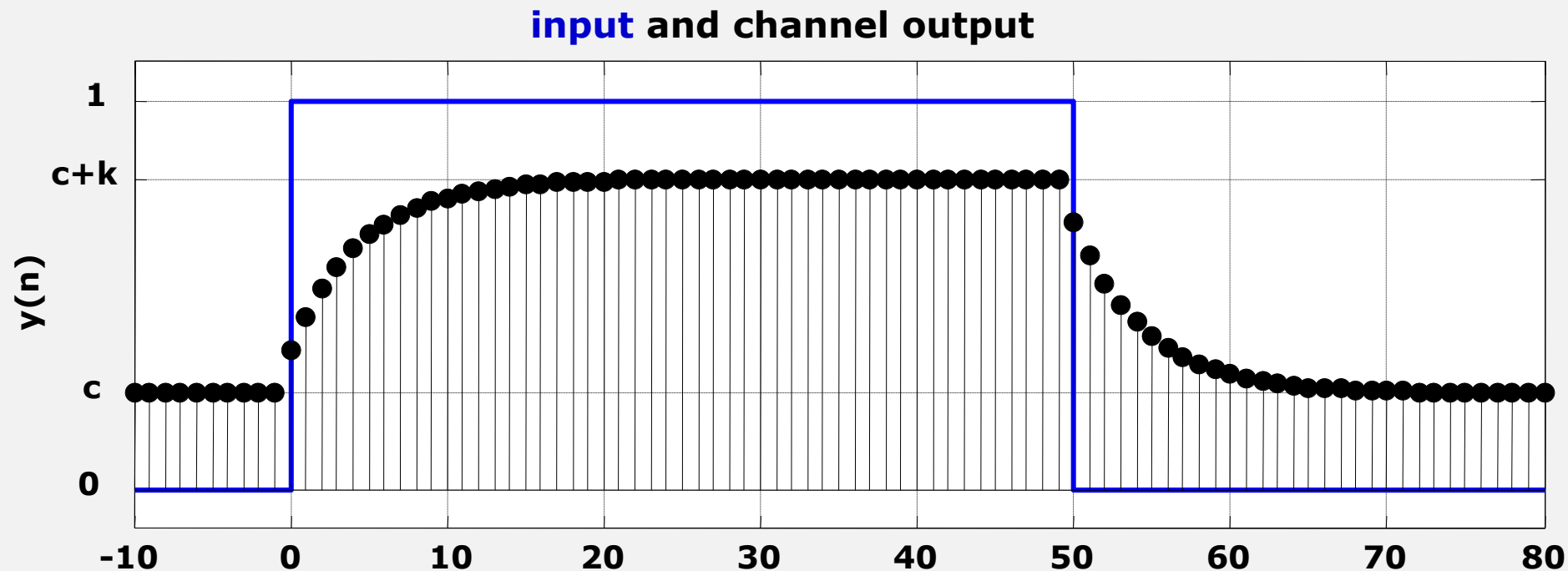# Communication Protocols

Recap

- **The output of a communication channel can be modeled as the sum of the response to the transmitted signal and other variables.**

$x(n) = u(n) - u(n - 5) + \ldots$

LTI System

$s(n) - s(n - 5) + \ldots$

c

$s(n) = k(1 - a^{n+1})u(n)$

$y(n) = c + s(n) - s(n-5) \ldots$

c = offset
k = amplitude
a = base of the exponential

Channel Response to a Bit Sequence

input and channel output

Question: How do we recover (decode) the original bit stream?

Protocols

- **Protocol is an agreement on a set of rules or procedures to follow during communication.**

- **Protocols are necessary for any communication system.**
  - **If the transmitter does not follow the protocol, the receiver may be able to "hear" what is being said, but not "understand" it.**

- **What are examples of protocols used in human communication?**

Protocols in Data Communication Systems

In data communication, protocols cover all aspects of data representation and signaling including

- The representation of text characters
  - ASCII vs Unicode

- The order in which bit sequences are sent
  - LSB or MSB first

- The representation of individual bits
  - e.g. 1 = light on, 0 = off

- The bit time (SPB) or bit rate

- Training sequence

- Synchronization method

This topic's main focus