

Abhishhek Indal - PhD - communication - wireless
areas of interest - Wireless", CPS, Information
security
- applications of Deep learning to
WC & finance.

4 different categories of signals - depending upon the
characteristic of the time (inde-
pendent) variable & " values they
take .

$[x(t)]$
→

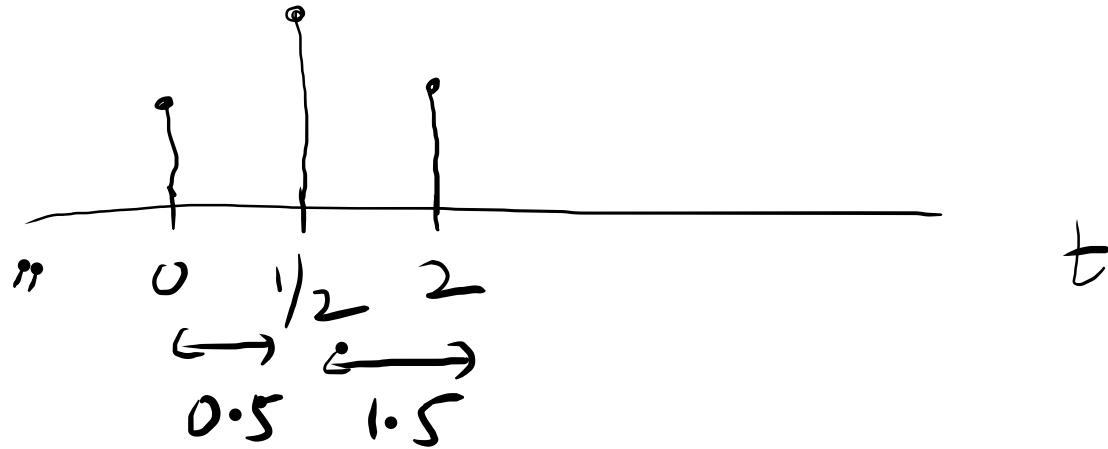
a. continuous time signal :- (or analog signal) - defined
for every value

of time & they take on values in the continuous interval (a, b) where a can be $-\infty$ & b can be ∞ . ex - $\cos \pi t$

2. Discrete-time signal:-

defined only at certain time instants. Note that

" need not be equidistant "



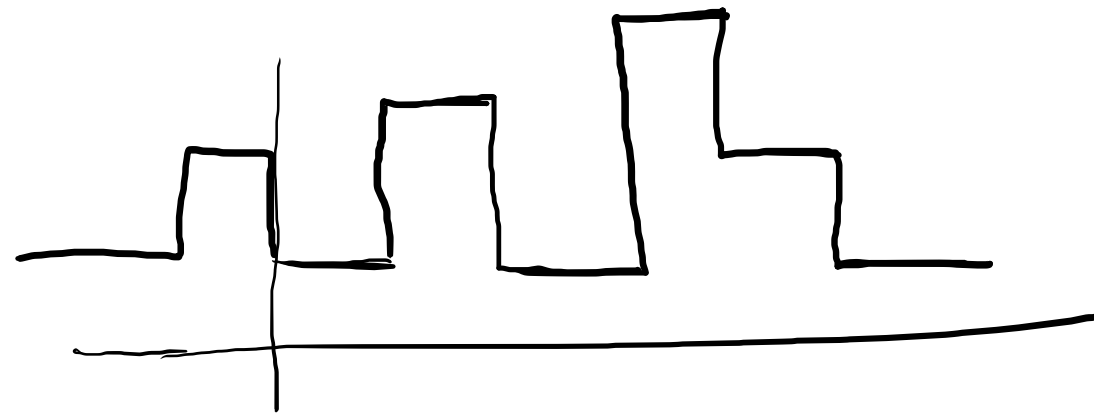
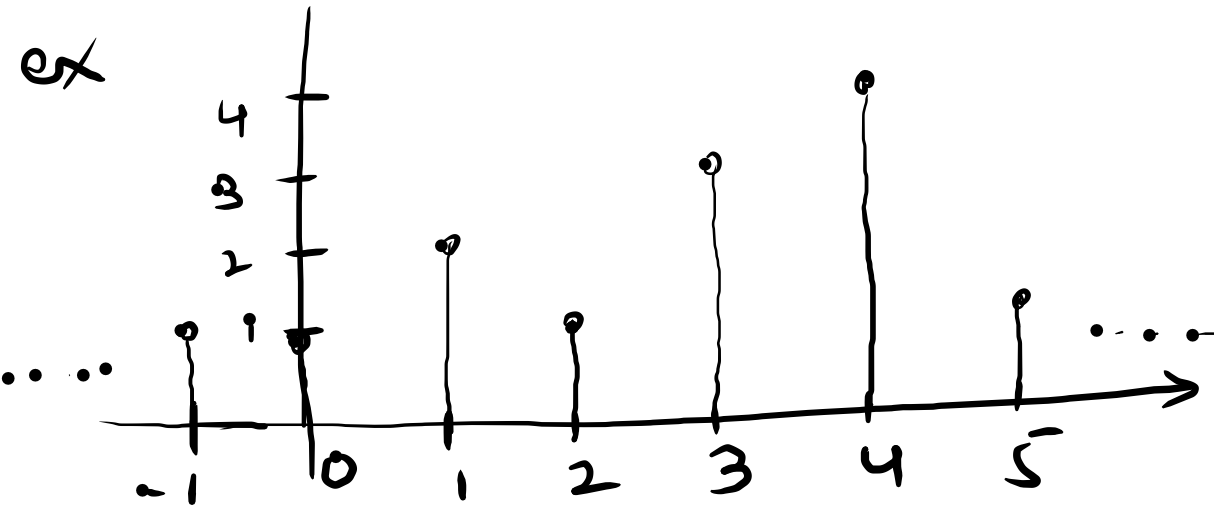
but in practice they are usually taken at equally spaced intervals for computational convenience & mathematical tractability. - seq. of real or complex nos

ex -
$$x(n) = \begin{cases} (0.8)^n, & n \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

3. Continuous-valued :- Signal takes on all possible values on a finite or infinite range
(a, b) $(-\infty, \infty)$

4. Discrete-valued :- values from a finite set of possible values.

→ A discrete-time signal having a set of discrete values is called a digital signal. $\{1, 2, 3, 4\}$



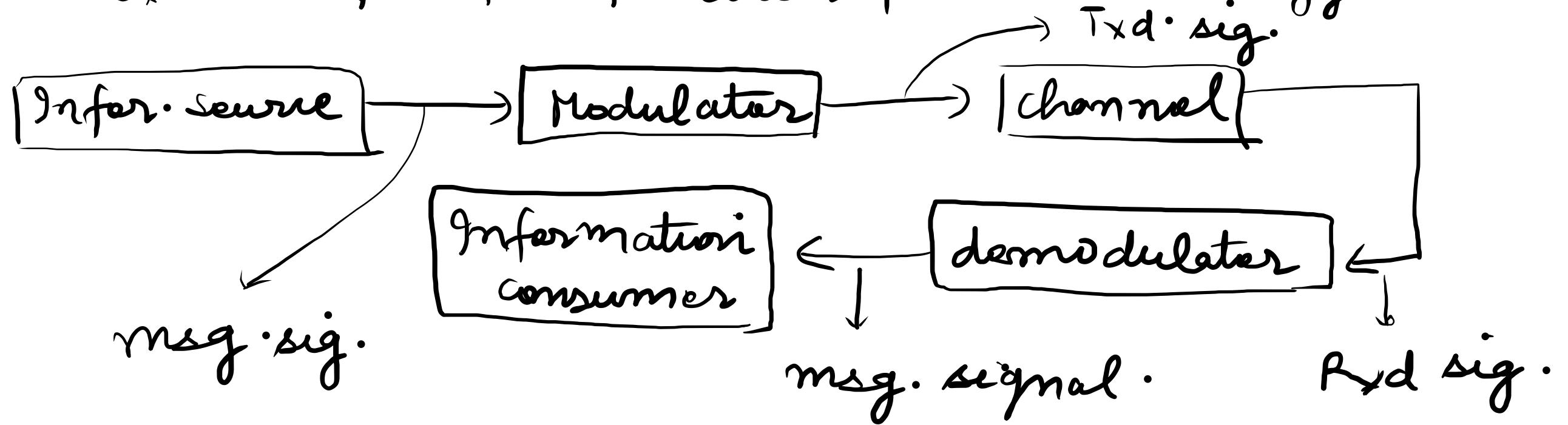
1. Analog vs. Digital - Analog or digital?

- A. Speech, audio & video, popularly the 'message' signals -
generation & consumption are analog. ↳ they contain information
- B. transmitted signal corresponding to physical comm. media are also analog ex - wireless & optical commⁿ employ EM waves. 1948, C.E. Shannon

Typical choice is AC - analog communication
Given analog nature of both the message & the comm. medium, natural choice is to map analog msg. signal to an analog tx'd signal that is 'compatible' with

over which we wish to communicate.

ex- AM, FM, 1G cellular phone technology.



ex- an audio signal,