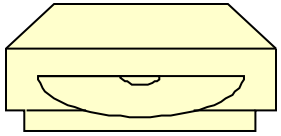
SIGNALS

Information expressed in different forms

Stock Price

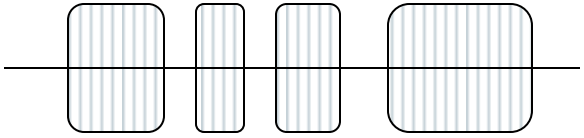
$1.00, $1.20, $1.30, $1.30, …

Data File



00001010 | 00001100 | 00001101

Transmit Waveform

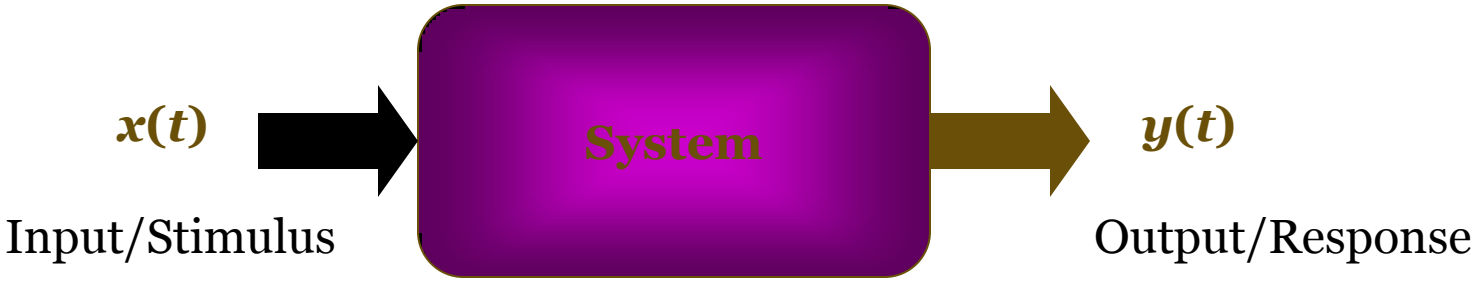


$x(t)$

Primary interest of Electronic Engineers

SIGNALS PROCESSING AND ANALYSIS

Processing: Methods and system that modify signals

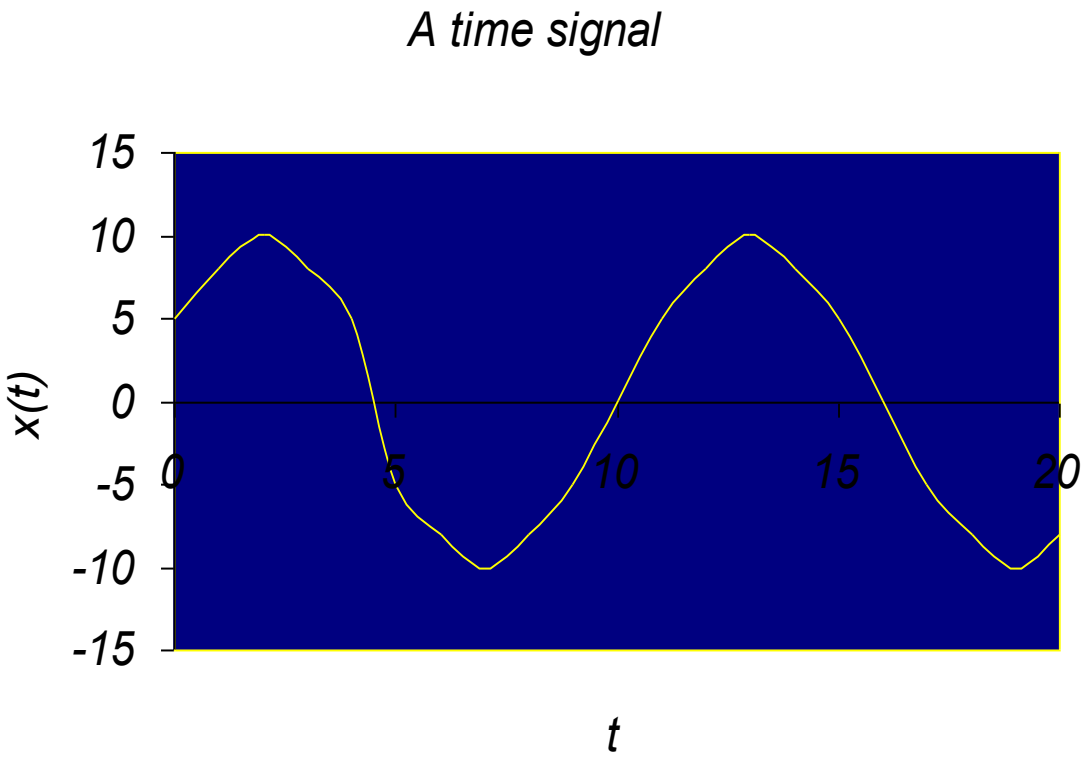


Analysis:

- What information is contained in the input signal $x(t)$?
- What changes do the System imposed on the input?
- What is the output signal $y(t)$?

SIGNALS DESCRIPTION

To analyze signals, we must know how to describe or represent them in the first place.



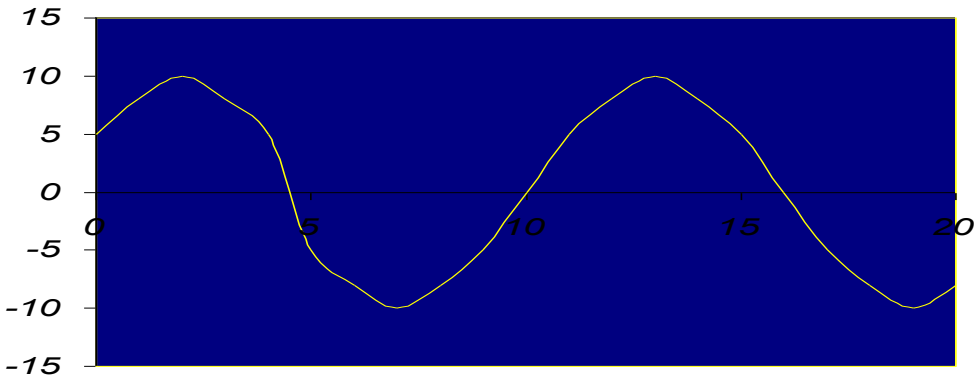
t	*x(t)*
0	0
1	5
2	8
3	10
4	8
5	5

Detail but not informative

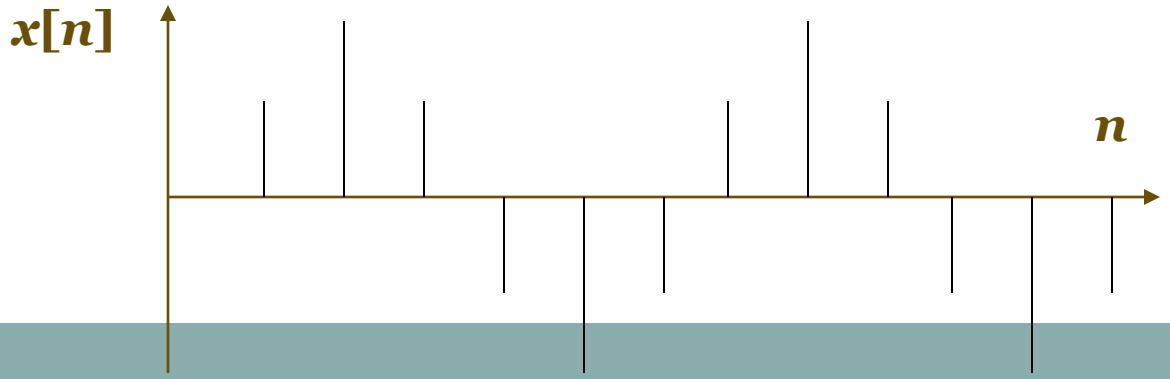
TIME SIGNALS DESCRIPTION

1. Mathematical expression: $x(t)=A\sin(\omega t+\phi)$

2. Continuous (Analogue)



3. Discrete (Digital)

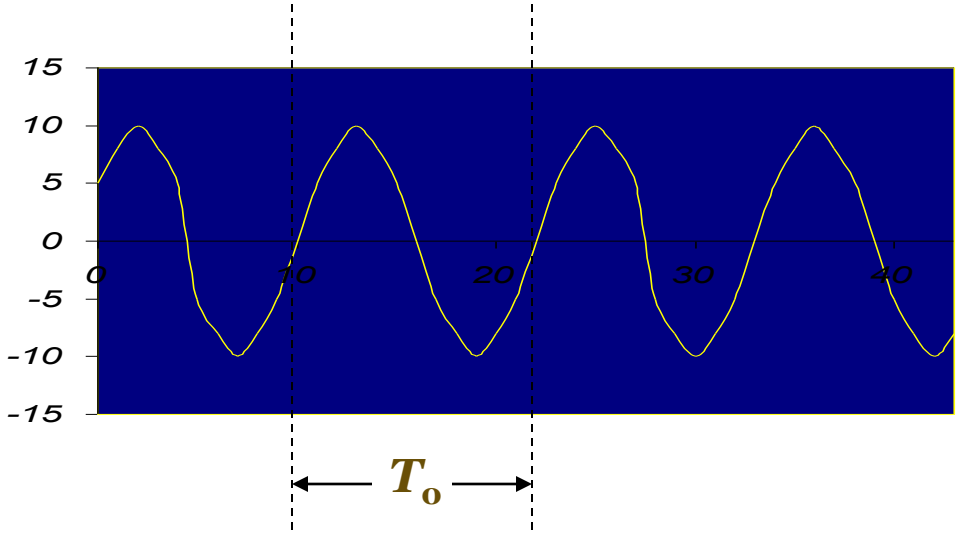


TIME SIGNALS DESCRIPTION

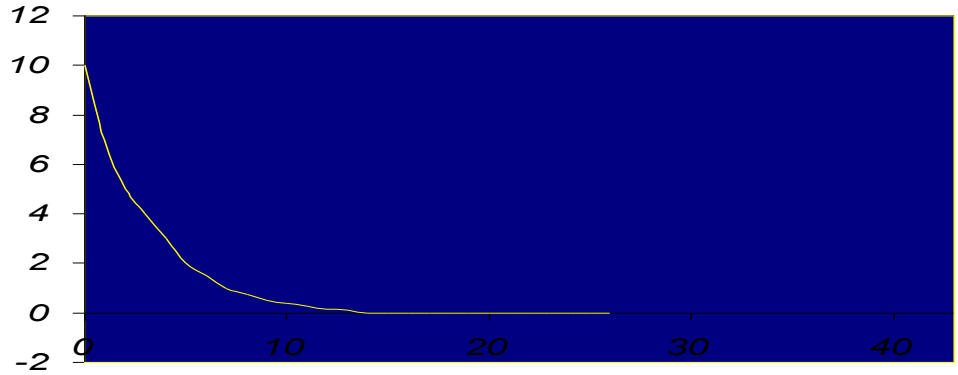
4. Periodic

$x(t) = x(t+T_o)$

Period = T_o

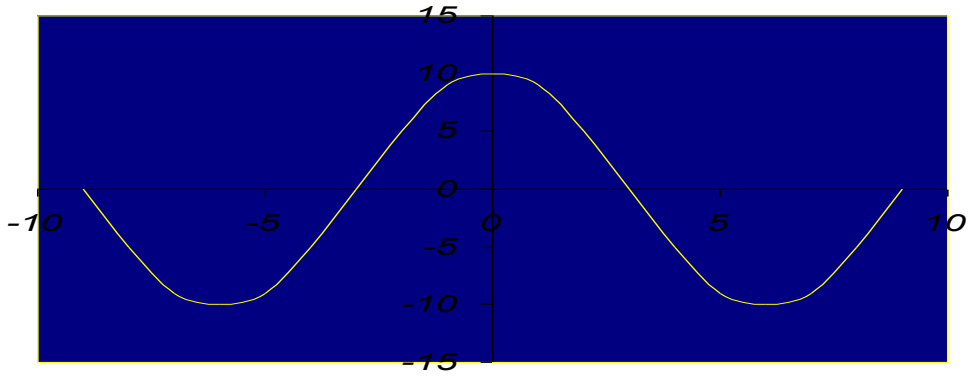


5. Aperiodic

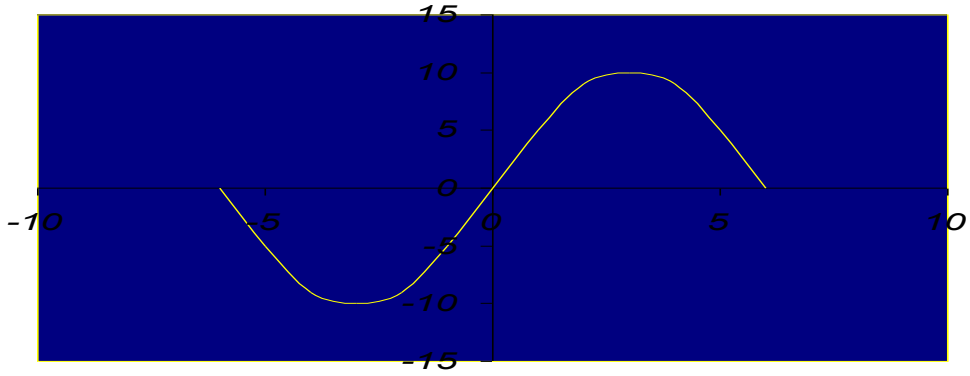


TIME SIGNALS DESCRIPTION

6. Even signal $x(t) = x(-t)$



7. Odd signal $x(t) = -x(-t)$



Exercise: Calculate the integral $v = \int_{-T}^{T} \cos \omega t \sin \omega t dt$

TIME SIGNALS DESCRIPTION

8. Causality

Analogue signals: $x(t) = 0$ **for** $t < 0$

Digital signals: $x[n] = 0$ **for** $n < 0$