Classification of Signals :-

1) Continuous time and discrete time :-

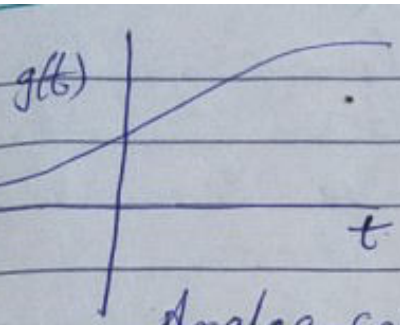
(Con) A signal specified for every value of time.

(Dis) A " " " only discrete val of time.

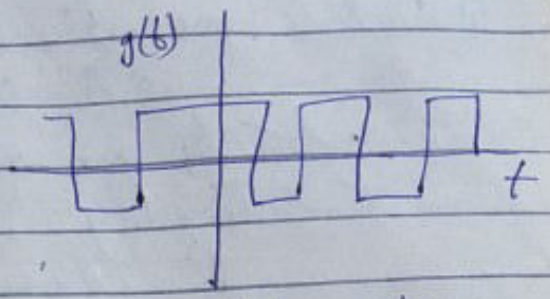
2) Analog and Digital Signals :-

A signal whose amplitude can take any value in a continuous range is analog.

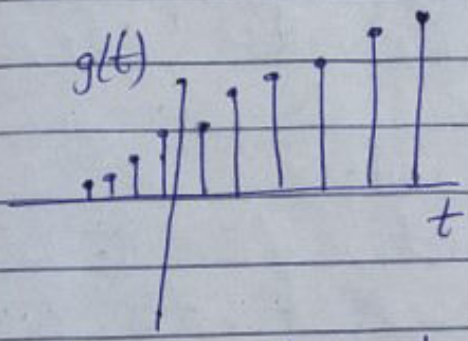
A signal whose amplitude can tak only a finite no. of values



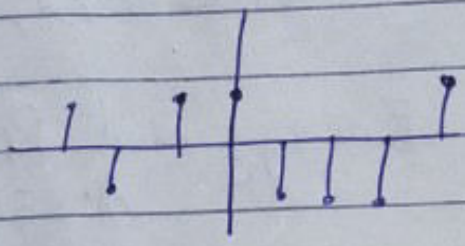
Analog-cont



Digital continuous



Analog discrete

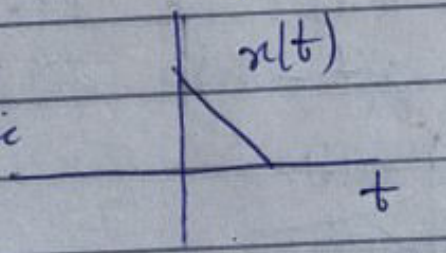


Digital discrete

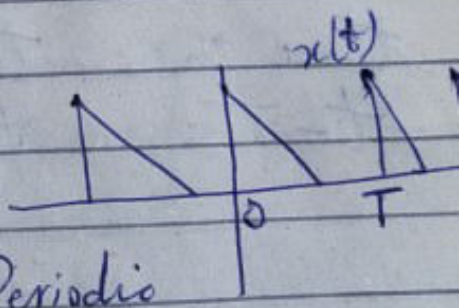
) Periodic and Aperiodic :-

A signal is periodic if $g(t) = g(t+T_0)$ for all t and for some +ve const T_0.

Otherwise, it is aperiodic.



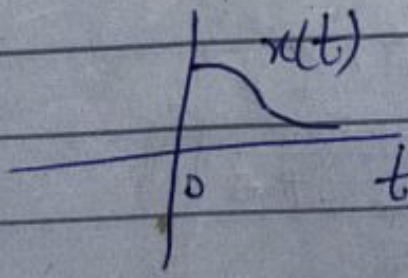
Aperiodic

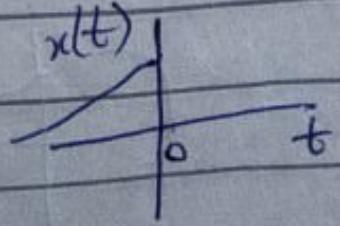


Periodic

Causal vs non causal system :-

A causal signal is zero for $t < 0$ and a non-causal signal is zero for $t >$



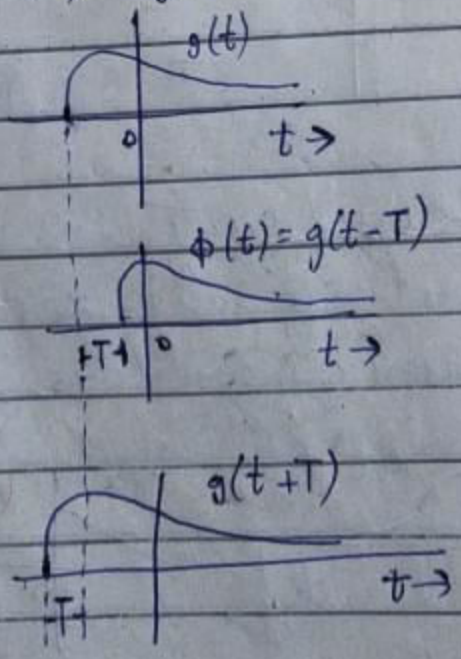


5) Deterministic and Random signals:-
A signal is determ. if it is completely known and can be described mathematically.
Random signal can be described only by terms of probabilistic description e.g. distribution, mean value, std dev.

6) Energy and Power signals:-
A signal with finite energy has zero power and a signal with finite power has infinite energy. A signal cannot both be an energy and power signal.

Signal operations:-

1) Time Shifting:-
To time shift a signal by T, time parameter t must be replaced by $t-T$: $\phi(t) = g(t-T)$

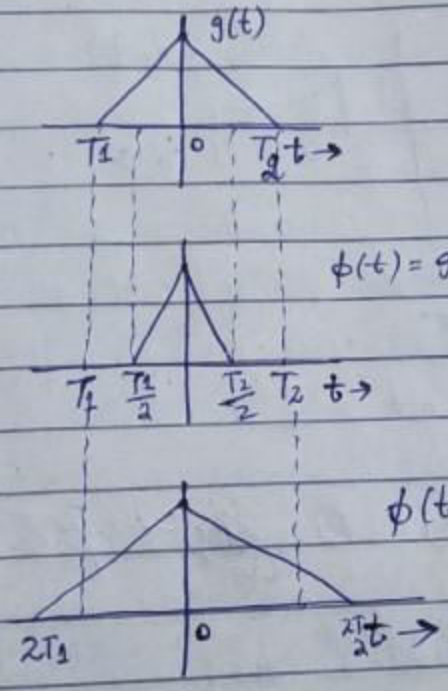


If T is +ve, signal shifted
// // -ve, // // //

2) Time Scaling :-

To time scale a signal $g(t)$ by a factor a, the time parameter t must be replaced by at:

$$\phi(t) = g(at)$$



If $a > 1$, the signal is compressed in time.
" $a < 1$, " " " expanded " "

3) Time Reversal :-

A signal $g(t)$ can be inverted, if the time parameter t is replaced by $-t$

$$\phi(t) = g(-t)$$

The operation is time reversal.