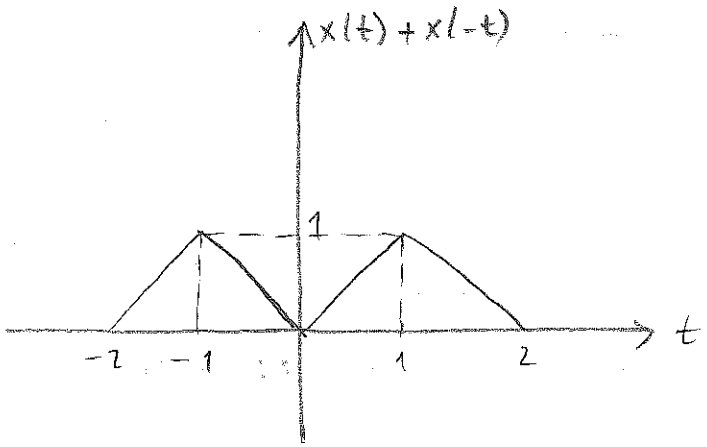

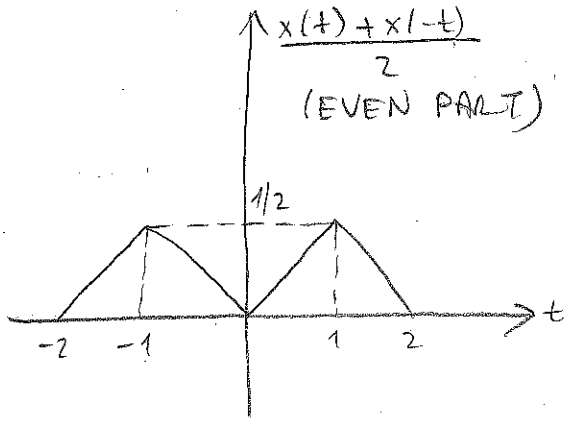

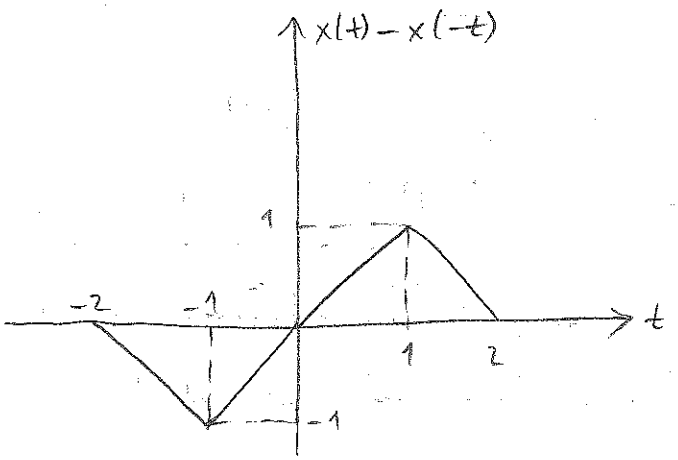

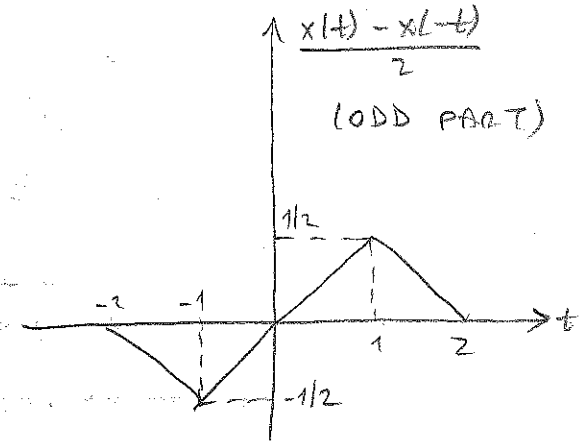

EXPONENTIAL AND SINUSOIDAL SIGNALS

Another function used in telecommunication is exponential function.

$$f(t) = \begin{cases} ce^{at} & t \geq 0 \\ 0 & \text{else} \end{cases}$$ can also be represented as $\boxed{f(t) = ce^{at}u(t)}$

$$\boxed{e^{j\omega_0 t} = \cos(\omega_0 t) + j\sin(\omega_0 t)}$$

On the other hand, sinusoidal function is defined as;

$$f(t) = K\cos\left(\frac{2\pi}{T}t + \phi\right) = K\cos(\omega_0 t + \phi)$$

- ϕ → phase shift
- T → signal period
- $\frac{2\pi}{T}$ → angular frequency

Example

$f = \cos\left(\frac{\pi}{3}t + \frac{\pi}{2}\right)$ find the period, angular frequency and the phase shift of the signal.

$\omega_0 = \frac{\pi}{3}$ (angular frequency)

$\phi = \frac{\pi}{2}$ (phase shift)

$\omega = 2\pi f \Rightarrow f = \frac{\omega}{2\pi} = \frac{1}{6} \Rightarrow \boxed{T = 6}$