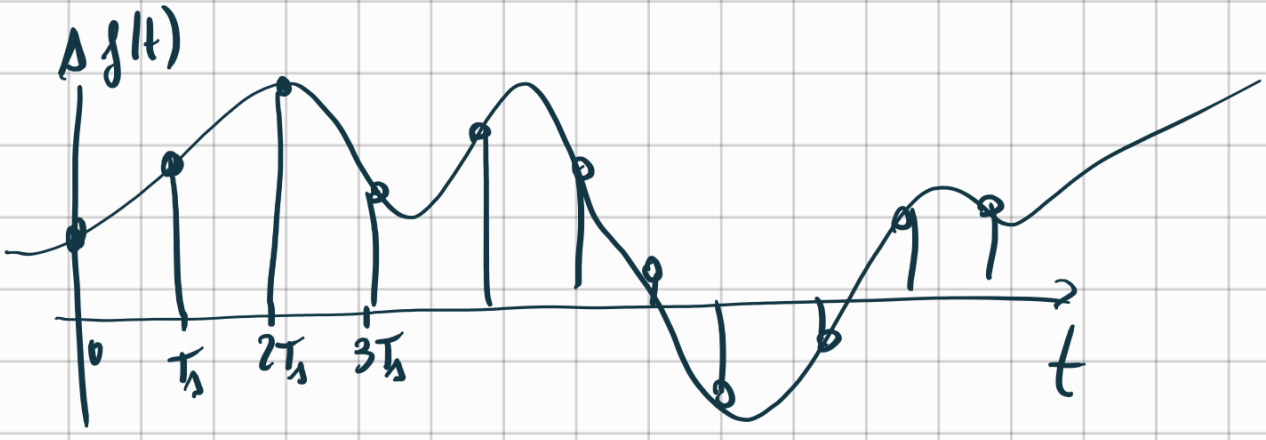
Welcome to "Sistemas Multimídia"

2023-09-18

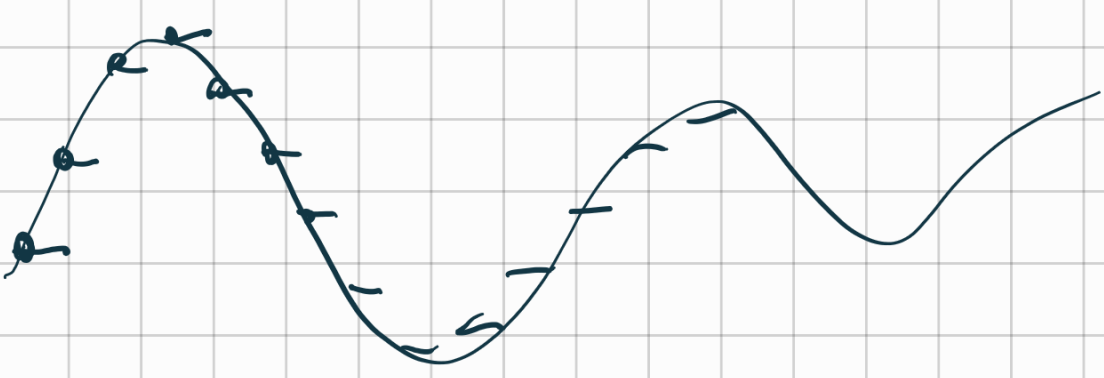


↓ sample

$f(t) \rightarrow f(nT_s)$

↑ sampling period

Quantize $\quad f(nT_s) \simeq \lfloor A f(nT_s) \rfloor$



$f(t) = \sin(\theta(t)) \qquad \theta(t) = 2\pi f_0 t$

$\downarrow \qquad f_0 = \frac{1}{2\pi} \frac{d\theta(t)}{dt}$

$$f(t) = \sin(2\pi f_0 t)$$

$$= \sin\left(2\pi \frac{f_0}{F_s} n\right)$$

$$t = nT_s = \frac{n}{F_s}$$

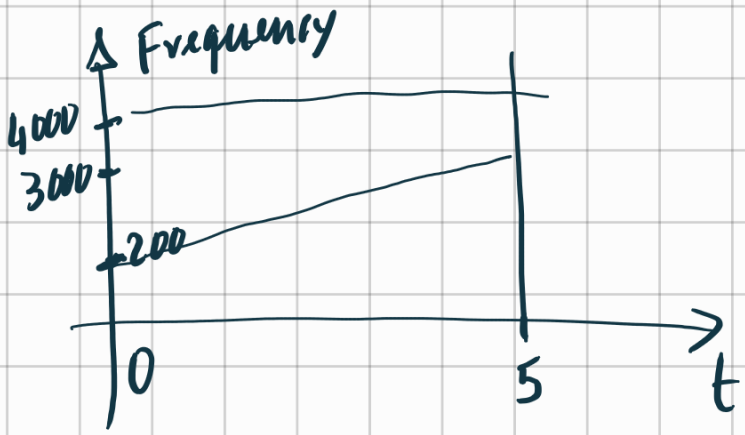
T_s: period, F_s: frequency

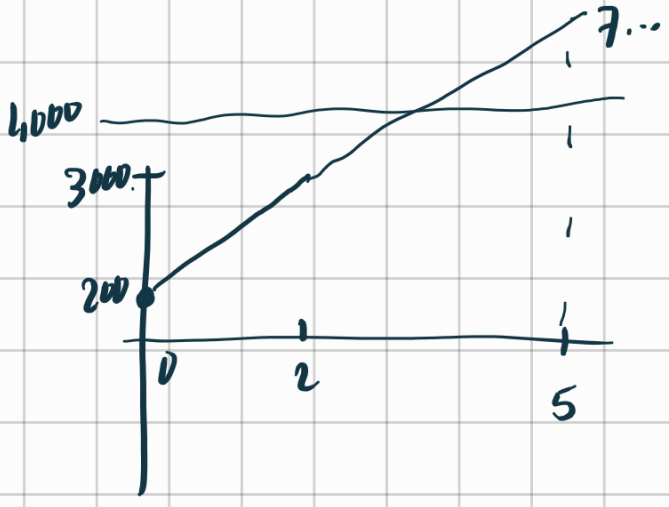
$$= \sin\left(2\pi\left(\frac{f_0}{F_s} + K\right) n\right)$$

$K \in \mathbb{Z}$

Unique representation if $\left|\frac{f_0}{F_s}\right| < \frac{1}{2}$

$$2|f_0| < F_s$$



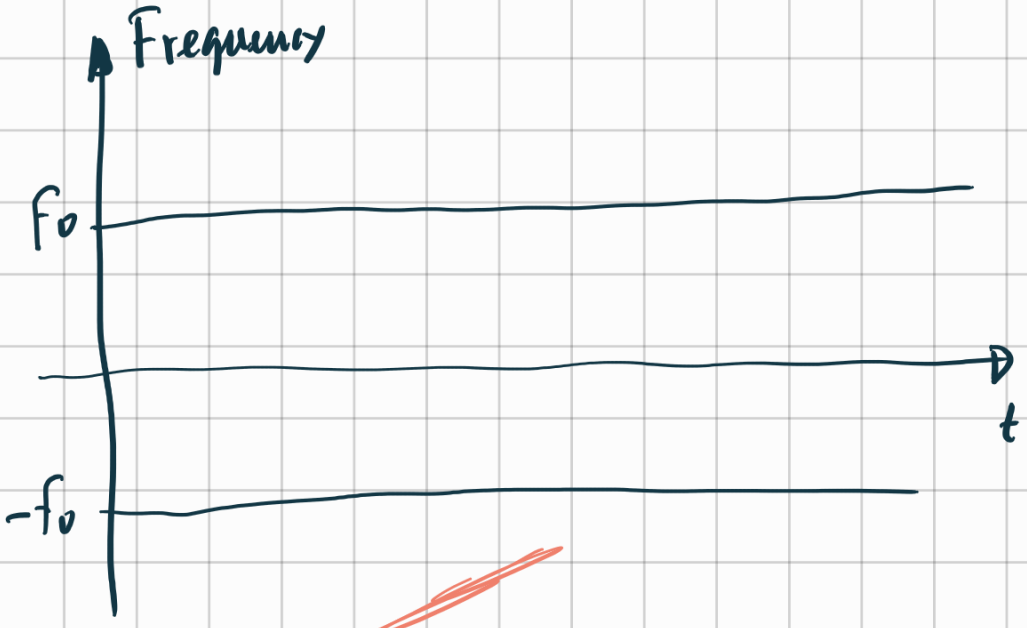


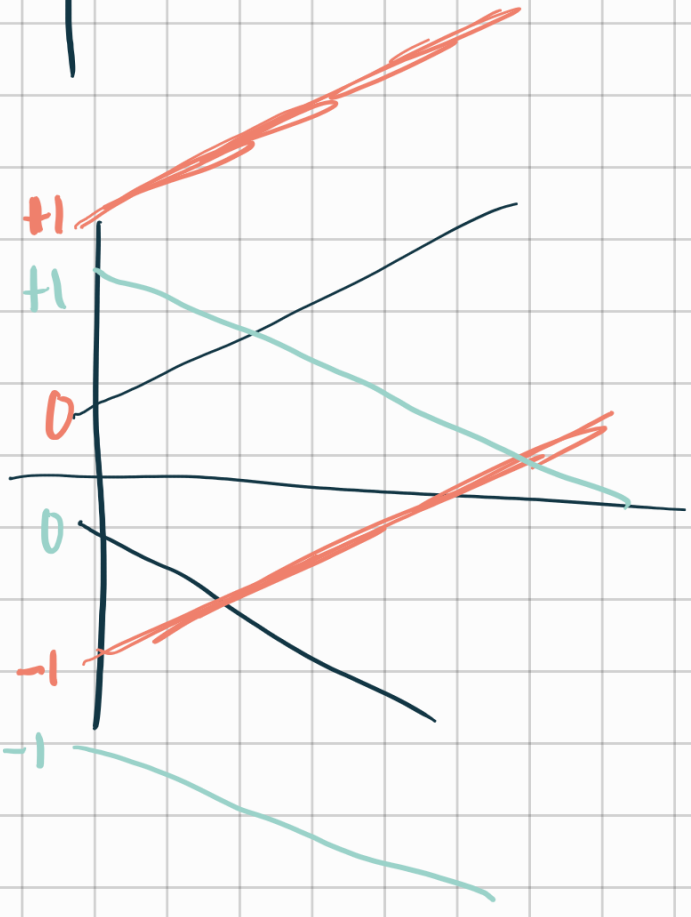
$$e^{ix} = \cos x + \underset{j}{(i)} \sin x$$

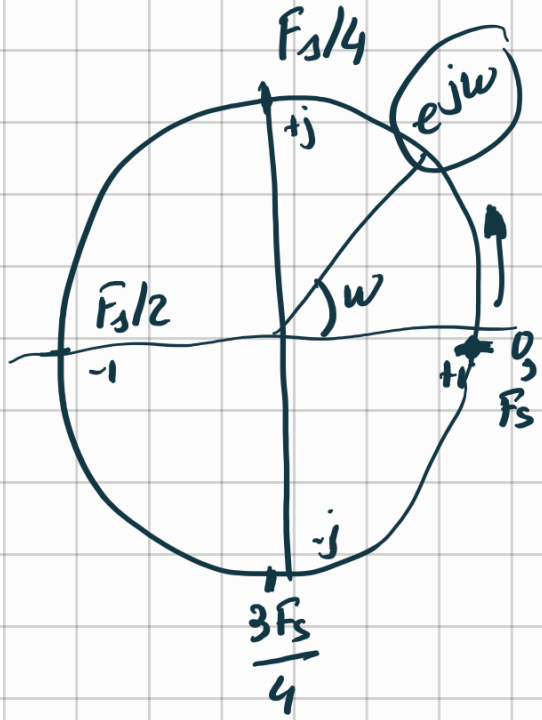
1i 1j

$$\cos x = \frac{e^{ix} + e^{-ix}}{2} \qquad \sin x = \frac{e^{ix} - e^{-ix}}{2i}$$

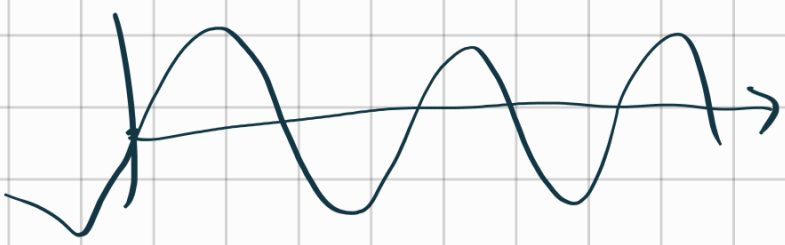
$$\sin(2\pi f_0 t) = \frac{e^{j 2\pi f_0 t} - e^{-j 2\pi f_0 t}}{2j}$$





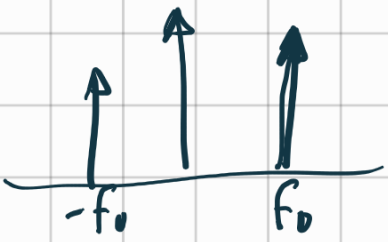


$\sin(2\pi f_0 t)$



Fourier

transform



$$\frac{1}{2\pi}\int_{-\infty}^{+\infty} g(t)\, e^{-j\omega t}\, dt$$

limit