Image Function (37-45)

i) image bits

each pixel is 8 bits

each bit gives 6 dB

so 8 bits gives 48 dB

(video bandwidth is 56 dB)

human vision is 5-6 bits

ii) resolution

depends on task

for TV 576 x 576

determine from sampling thm

a Fourier transform.

Here is an inverse Fourier transform

$$\text{time} = f(\text{frequency})$$

Note $F(\omega) = \text{Re}(\omega) + \text{imaginary}(\omega)$.

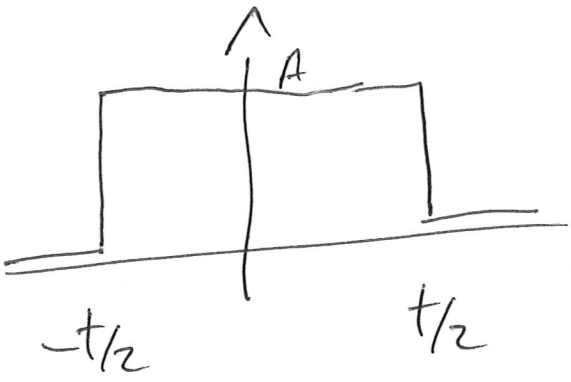
$$\text{Magnitude} = \sqrt{Re^2 + Im^2}$$

$$\text{Phase} = \tan^{-1}(\text{Im}/\text{Real})$$

Here is an inverse Fourier transform

iv/ applying the Fourier transform.

eg. hilting dt desh



pulse

$$F(w) = \int_{-t/2}^{t/2} A e^{-jwt}\, dt$$

$$= \left\{ \frac{A e^{-jwt}}{-jw} \right\}_{-t/2}^{t/2}$$

$$= -A \left\{ \frac{1}{jw} \left(e^{jwt/2} - e^{+jwt/2} \right) \right)$$

$$\text{Sin}(wt) = \frac{e^{jwt} - e^{-jwt}}{2j}$$

$$= \frac{2A}{w} \text{Sin}\left(\frac{wt}{2}\right).$$

iii). Continuous Fourier transform

$$F(\omega) = \int_{-\infty}^{\infty} e^{-j\omega t} f(t)\, dt$$

Fourier (frequency) = sum (sine wave x time) over time

$$e^{-j\omega t} = \cos(\omega t) \pm j \sin(\omega t)$$

j = complex variable

Fourier = sine waves that make up a signal.