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# Image Formation

q. image bits

each pixel is 8 bits (24 bits colour).

each bit is 6 dB. 8 bits = 48 dB

lowest bit is noise

human vision is  $\sim$  6 bits.

q. image size — depends on application.  
are there guidelines?

Sampling th<sup>m</sup>

ii). continuous Fourier transform.

changes signals into frequency.

Fourier

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

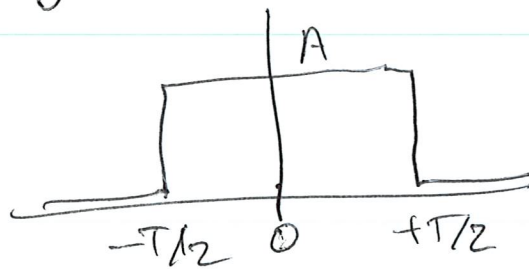
frequency

function of time e.g. sound.

$$e^{-j\omega t} = \cos(\omega t) - j \sin(\omega t) \quad j = \sqrt{-1}$$

$j$  = complex variable

e.g. hitting a desk



$$F(\omega) = \int_{-T/2}^{T/2} A e^{-j\omega t} dt$$

$$= \frac{-A e^{-j\omega t}}{j\omega} \Big|_{-T/2}^{T/2}$$

$$= \frac{2A}{\omega} \sin\left(\frac{\omega T}{2}\right)$$

$$F(\omega) = \text{Real} + j \times \text{Imaginary}.$$

$$\text{magnitude} = \sqrt{\text{Real}^2 + \text{Imaginary}^2}$$

$$\text{phase} = \tan^{-1} \frac{\text{Imaginary}}{\text{Real}}$$