2 Image Formation 37-45

a. image bits B/W each pixels has 8 bits
colour $3 \times 8 = 24$ bits

each bit is 6 dB
∴ bandwidth = 48 dB

lowest bit is noise
(human vision is 5-6 bits)

b. image size depends on task
what is an appropriate resolution?

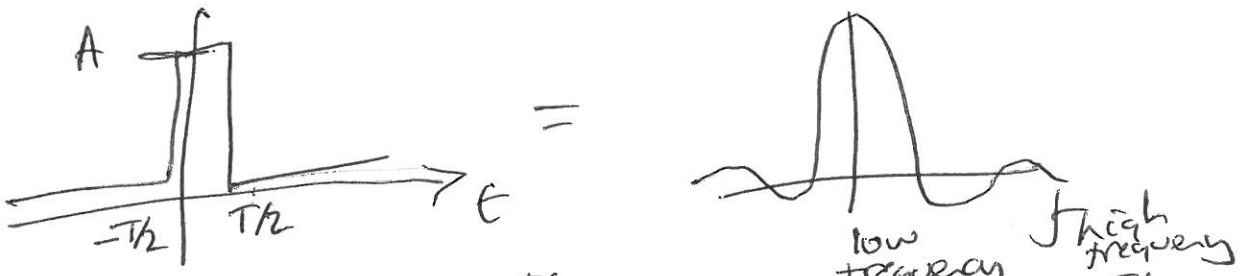
c. Fourier transforms
represents an image by frequencies
reversible & complete

d). continuous Fourier transform

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

ω: frequency; t: time; $f(t)$: function

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



$$F(\omega) = \int_{-\infty}^{\infty} f(t) e^{-j\omega t} dt = \int_{-T/2}^{T/2} A e^{-j\omega t} dt = \left[\frac{A e^{-j\omega t}}{-j\omega} \right]_{-T/2}^{T/2}$$

$$= \frac{A e^{-j\omega T/2} - A e^{j\omega T/2}}{-j\omega}$$

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

Complex number so has magnitude & phase

can reconstruct the original signal.