

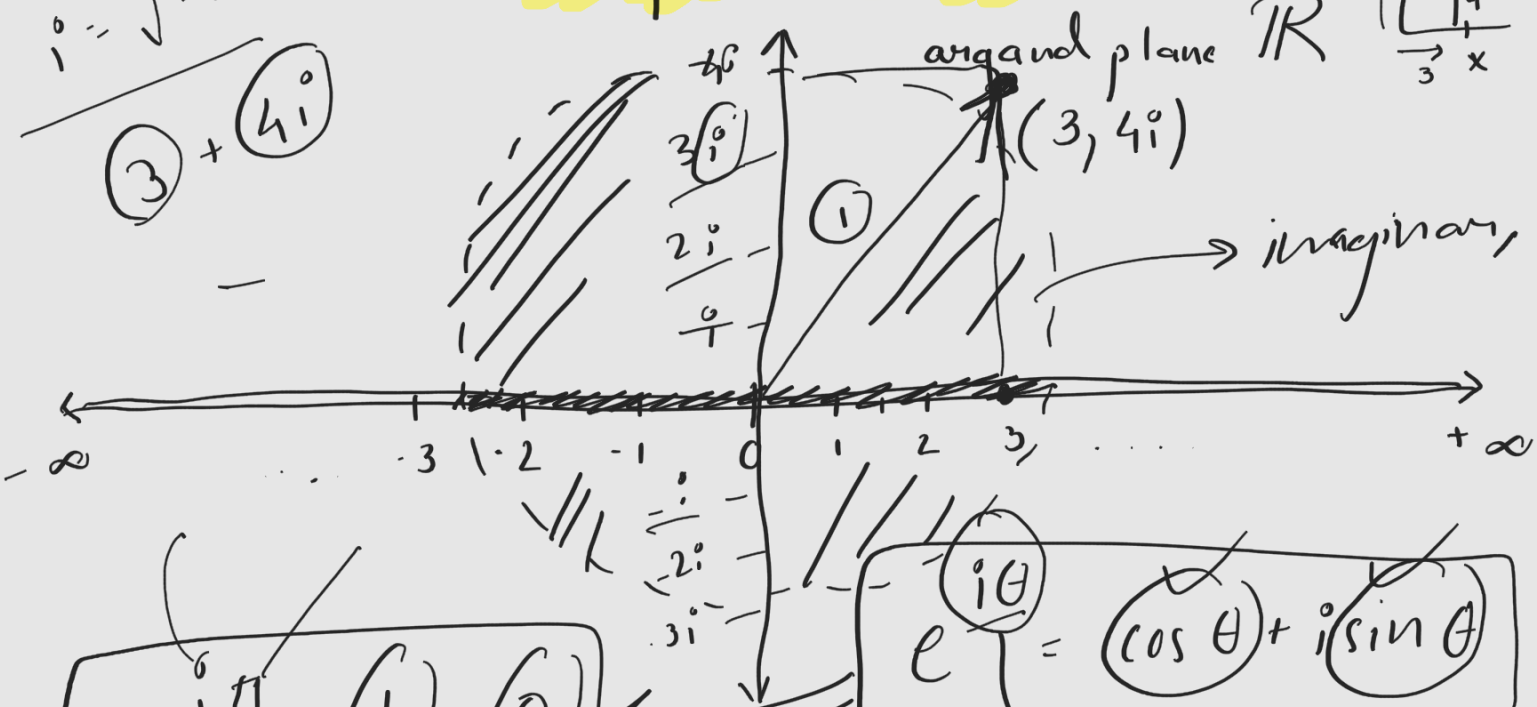
# Complex Numbers

$x \neq \text{cartesian}$

$$\vec{r} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} = (3, 4)$$

$$i = \sqrt{-1}$$

$$(3) + (4i)$$



$$e^{i\pi} + 1 = 0$$

$$e^{i\theta} = \cos \theta + i \sin \theta$$

taylor expansion

illusion



$$x^2 + y^2 = 1$$

$$x^2 + 1 = 0$$

$$\text{or, } x^2 = -1$$

absurd

$$x = \sqrt{-1}$$

feature  
extraction

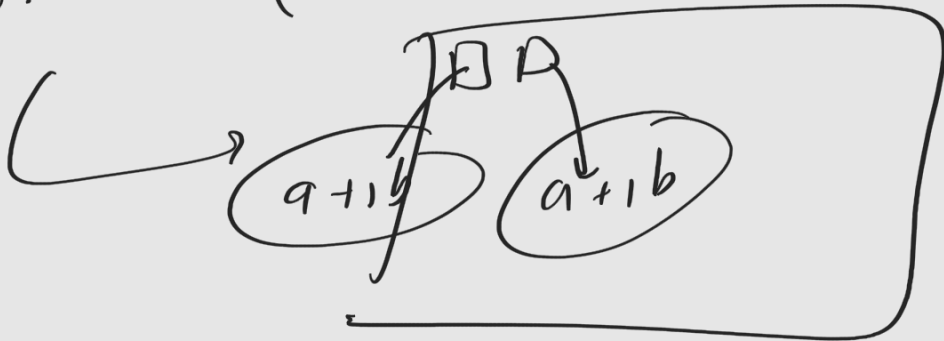


Waveform



Log frequencies  
(modulating  
notation)

$\text{librosa.stft}(\text{audio})$



SF

$$i\hbar \frac{\partial}{\partial t} (\psi) = \hat{H} \psi$$

f

img  
number

$\hbar$   
Planck's  
constant

time

LH (img)

Real

probability clouds

electron clouds  
("orbital shells")

$$|\psi|^2$$



$$\approx |\psi|^2$$