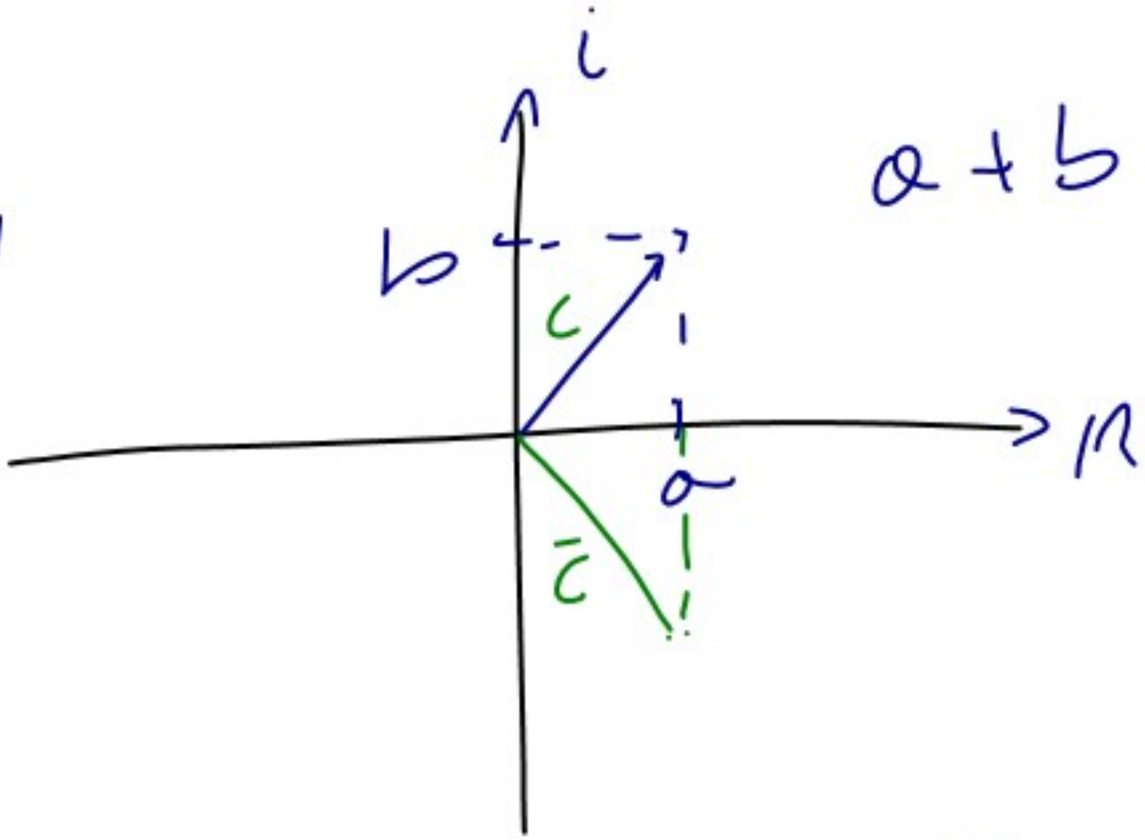
$i = \sqrt{-1}$



$a + bi$

$\|c\| = \sqrt{a^2 + b^2}$

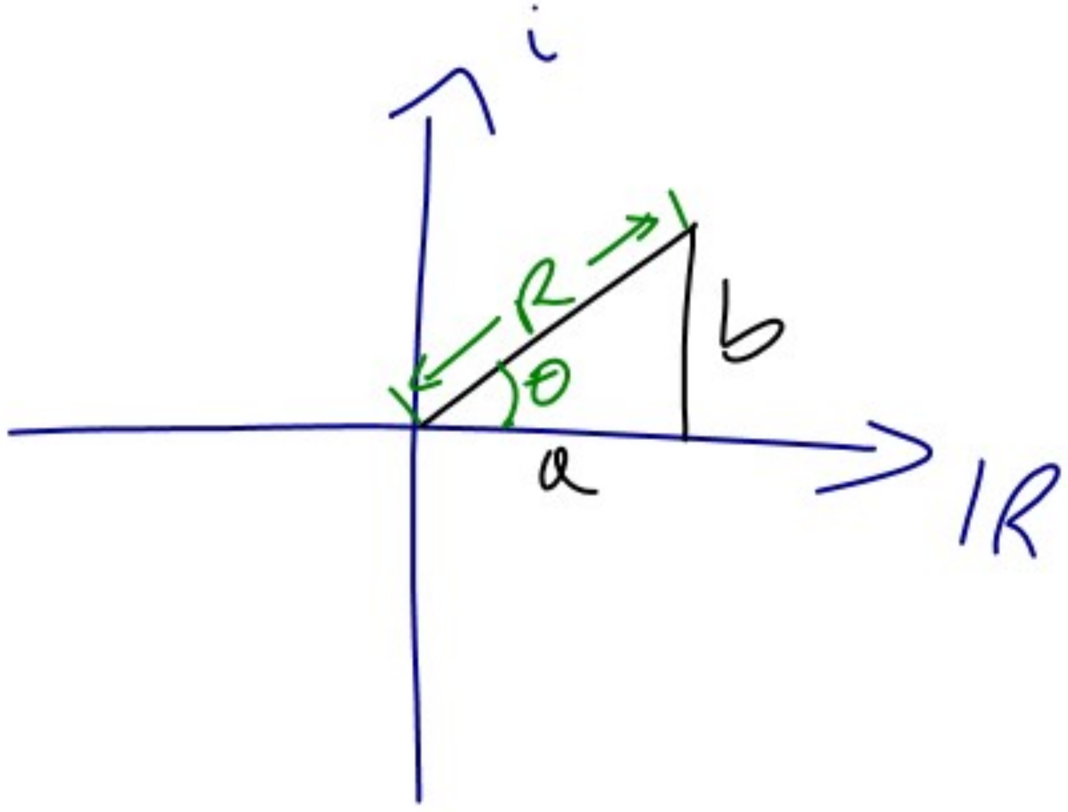
$c = a + bi$

$\bar{c} = a - bi$

$c\bar{c} = (a+bi)(a-bi) = a^2 - (bi)^2 = a^2 + b^2$

$c + \bar{c} = (a+bi) + (a-bi) = 2a$

$c - \bar{c} = (\cancel{a}+bi) - (\cancel{a}-bi) = 2bi$



$$b = R \, \text{SEN}\, \theta$$

$$a = R \cos \theta$$

$$C = R(\cos \theta + i \, \text{SEN}\, \theta)$$

$$C = R e^{i\theta}$$

$$C = a + bi$$

$$C^{\pi} = (a + bi)^{\pi}$$

$$C^{\pi} = (R e^{i\theta})^{\pi}$$

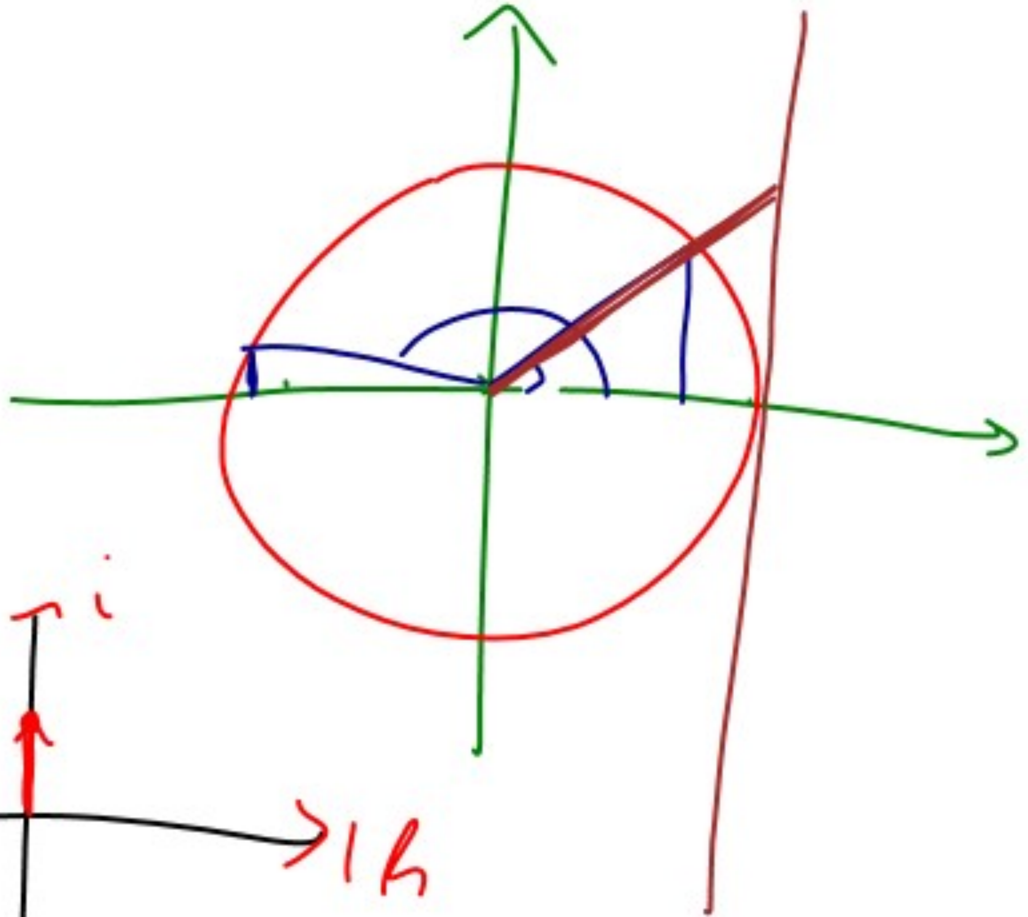
$$\boxed{C^{\pi} = R^{\pi} e^{i\theta\pi}}$$

$$\left.\begin{aligned} C_1 &= R_1 e^{i\theta_1} \\ C_2 &= R_2 e^{i\theta_2} \end{aligned}\right\} \; C_1 \cdot C_2 = R_1 e^{i\theta_1} R_2 e^{i\theta_2} = R_1 R_2 e^{i(\theta_1 + \theta_2)}$$

$$c^{\pi} = r^{\pi} e^{i\theta\pi}$$

$$e^{i\alpha} = \cos\alpha + i\,\mathrm{sen}\,\alpha$$

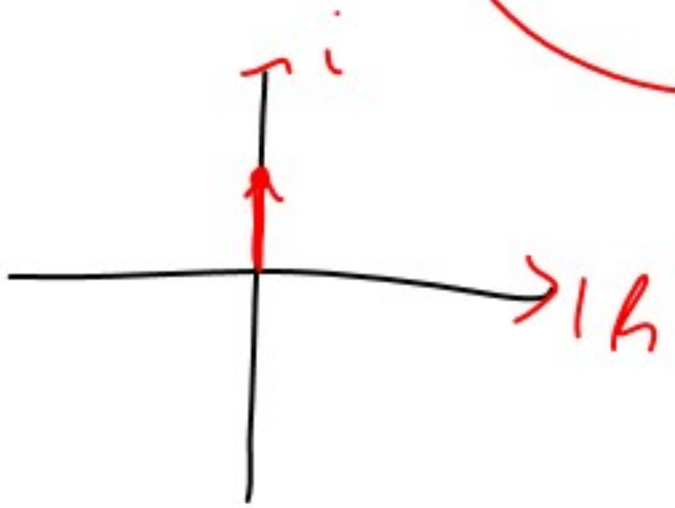
$$c^{\pi} = r^{\pi}\left[\cos(\theta\pi) + i\,\mathrm{sen}(\theta\pi)\right]$$



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

$$\cos\pi + i\,\mathrm{sen}\,\pi = -1$$

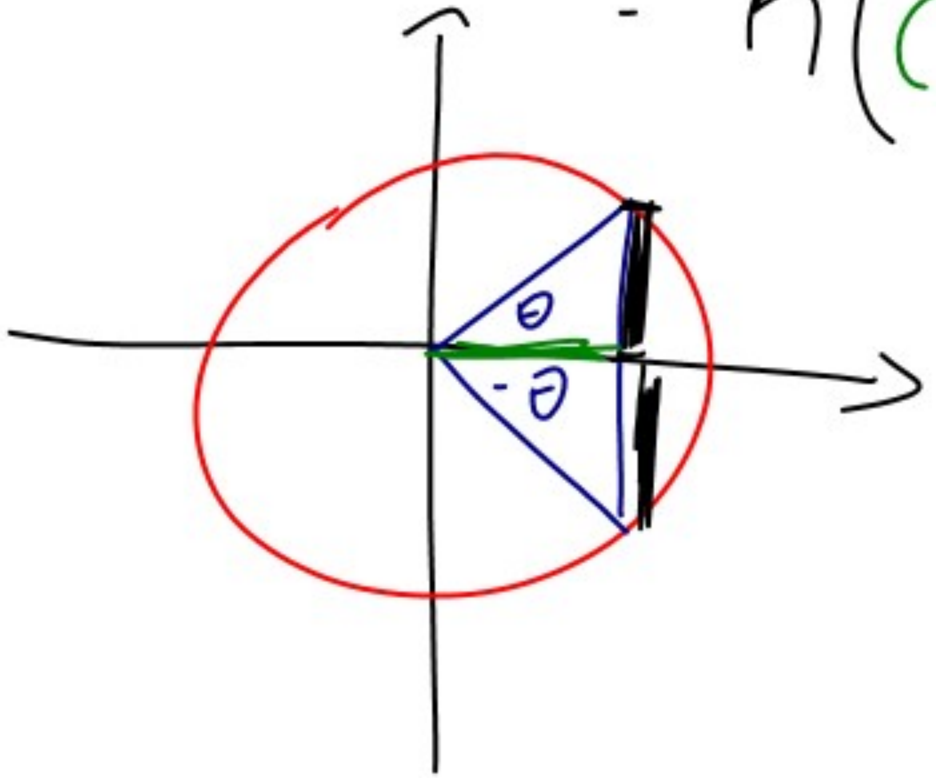
$$\left(\sqrt{-1}\right)^{2\pi} = \left(e^{i\frac{\pi}{2}}\right)^{2\pi} = e^{i\pi^2}$$



$$0 + 1i = \sqrt{-1} = Re^{i\theta} = e^{i\pi/2}$$

$$\overline{r e^{\theta i}} = r e^{-\theta i} = r\left(\cos(-\theta) + i\,\mathrm{sen}(-\theta)\right)$$

$$= r\left(\cos(\theta) - i\,\mathrm{sen}(\theta)\right)$$



$$\begin{pmatrix} \dot{x} \\ \dot{y} \end{pmatrix} = A \begin{pmatrix} x \\ y \end{pmatrix}$$

$$\lambda_1, \lambda_2 \in \mathbb{C}$$

$$\overline{AV} = \overline{\lambda V}$$

$$\begin{cases} \bar{A}\,\bar{v} = \bar{\lambda}\,\bar{V} \\ A\,\bar{v} = \bar{\lambda}\,\bar{V} \end{cases}$$

$$\lambda, V$$

$$\bar{\lambda}, \bar{V}$$

$$A = \begin{pmatrix} -2 & 6 \\ -3 & 4 \end{pmatrix}$$

$$\lambda_1 v_1 = A v_1$$

$$\lambda_2 v_2 = A v_2$$

$\lambda_1 , \lambda_2 \in \mathbb{R}$. $\quad \dot{\vec{X}} = A\vec{X}$

$$X = \alpha_1 e^{\lambda_1 t} v_1 + \alpha_2 e^{\lambda_2 t} v_2$$

$$\dot{X} = \alpha_1 \lambda_1 e^{\lambda_1 t} v_1 + \alpha_2 \lambda_2 e^{\lambda_2 t} v_2$$

$$\dot{X} = \alpha_1 e^{\lambda_1 t} A v_1 + \alpha_2 e^{\lambda_2 t} A v_2 = A\left(\alpha_1 e^{\lambda_1 t} v_1 + \alpha_2 e^{\lambda_2 t} v_2\right)$$

$$x = z e^{rt}$$

(5) $$x = K_1 z e^{(\lambda + \mu i)t} + K_2 \bar{z} e^{(\lambda - \mu i)t}$$

(6) $$x = K_1 z e^{\lambda t}\left[\cos(\mu t) + i\,\mathrm{sen}(\mu t)\right] + e^{\lambda t} K_2 \bar{z}\left[\cos(\mu t) - i\,\mathrm{sen}(\mu t)\right]$$

$$\begin{pmatrix} z_1 \\ z_2 \end{pmatrix} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} + i \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$$

(8) $$x = K_1 (a + bi) e^{\lambda t}(\cos(\mu t) + i\,\mathrm{sen}(\mu t)) + K_2 (a - bi) e^{\lambda t}(\cos(\mu t) - i\,\mathrm{sen}(\mu t))$$

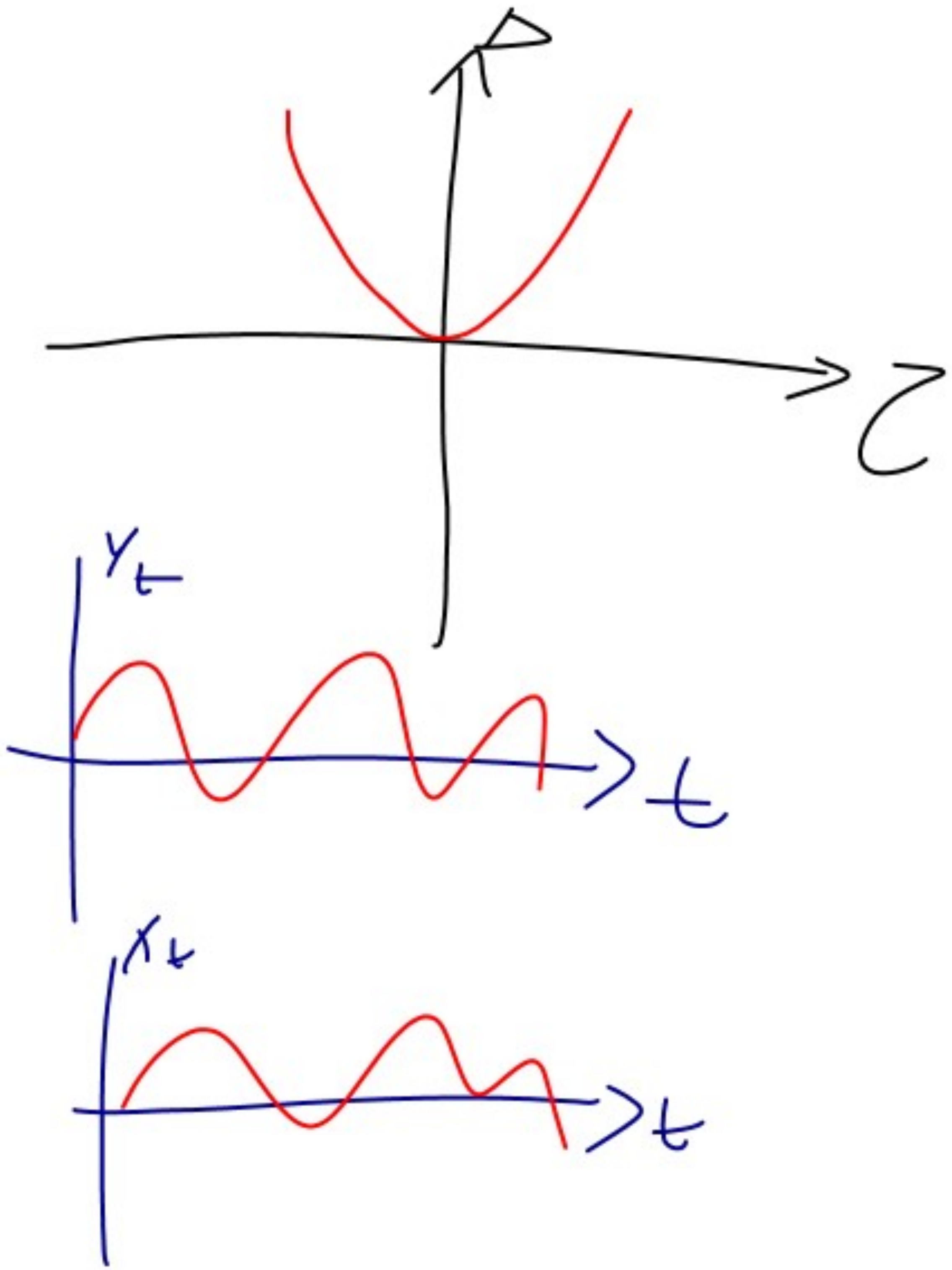
(8) $X = K_1(a+bi)e^{\lambda t}(\cos(ut) + i\,\mathrm{sen}(ut)) + K_2(a-bi)e^{\lambda t}(\cos(ut) - i\,\mathrm{sen}(ut))$

$$X = e^{\lambda t}\left\{ \begin{aligned} & K_1[a\cos(ut) - b\,\mathrm{SEN}(ut)] + K_2[a\cos(ut) - b\,\mathrm{sen}(ut)] \\ & + K_1 i[a\cancel{i}\,\mathrm{sen}(ut) + b\cancel{i}\cos(ut)] + K_2 i[-a\cancel{i}\,\mathrm{sen}(ut) - b\cancel{i}\cos(ut)] \end{aligned} \right\}$$

$$X = e^{\lambda t}\left\{ \overset{2\alpha}{(K_1 + K_2)}[a\cos(ut) - b\,\mathrm{sen}(ut)] + \overset{2\beta i}{(K_1 - K_2)}\,i(a\,\mathrm{sen}(ut) + b\cos(ut)) \right\}$$

$K_1 = \alpha + \beta i \quad K_2 = \bar{K}_1 = \alpha - \beta i \Rightarrow K_1 + K_2 = 2\alpha$

$K_1 - K_2 = 2\beta i$



$$r_1 = \frac{c}{2} \pm \frac{\sqrt{\Delta 4 - c^2}}{2}\, i$$

λ $\qquad$ μ

$$e^{\lambda t}\left[\ \mathrm{SEN}\ (o)\ \_\ \_\ \_\ \_\ \_\ \right]$$