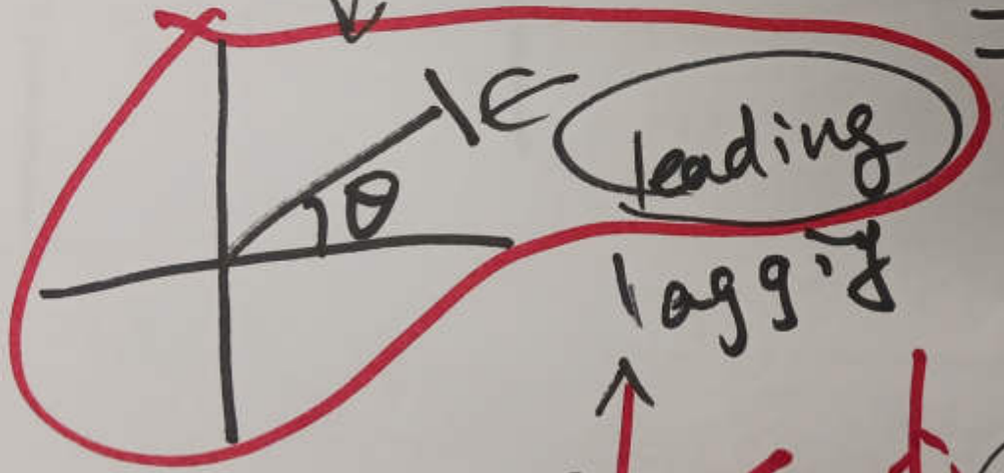
$A e^{j\theta} = A \angle \theta$

assuming $\theta > 0$

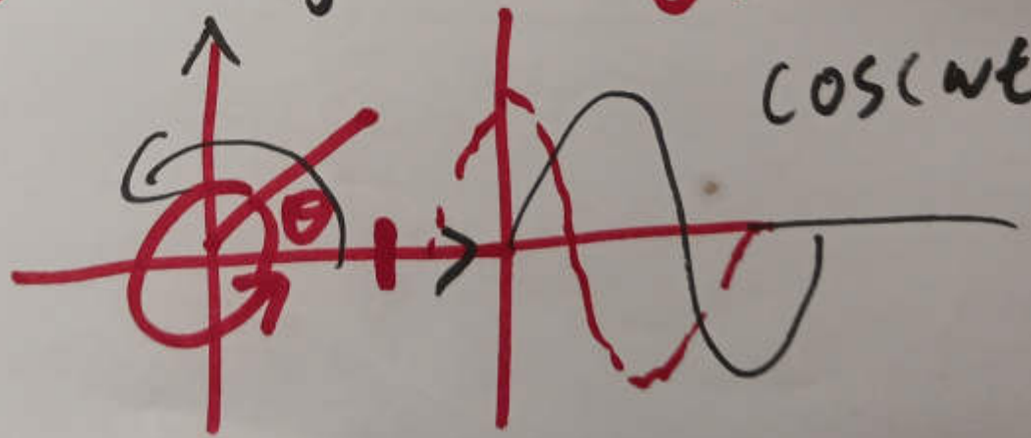
$A\cos(\omega t + \theta)$

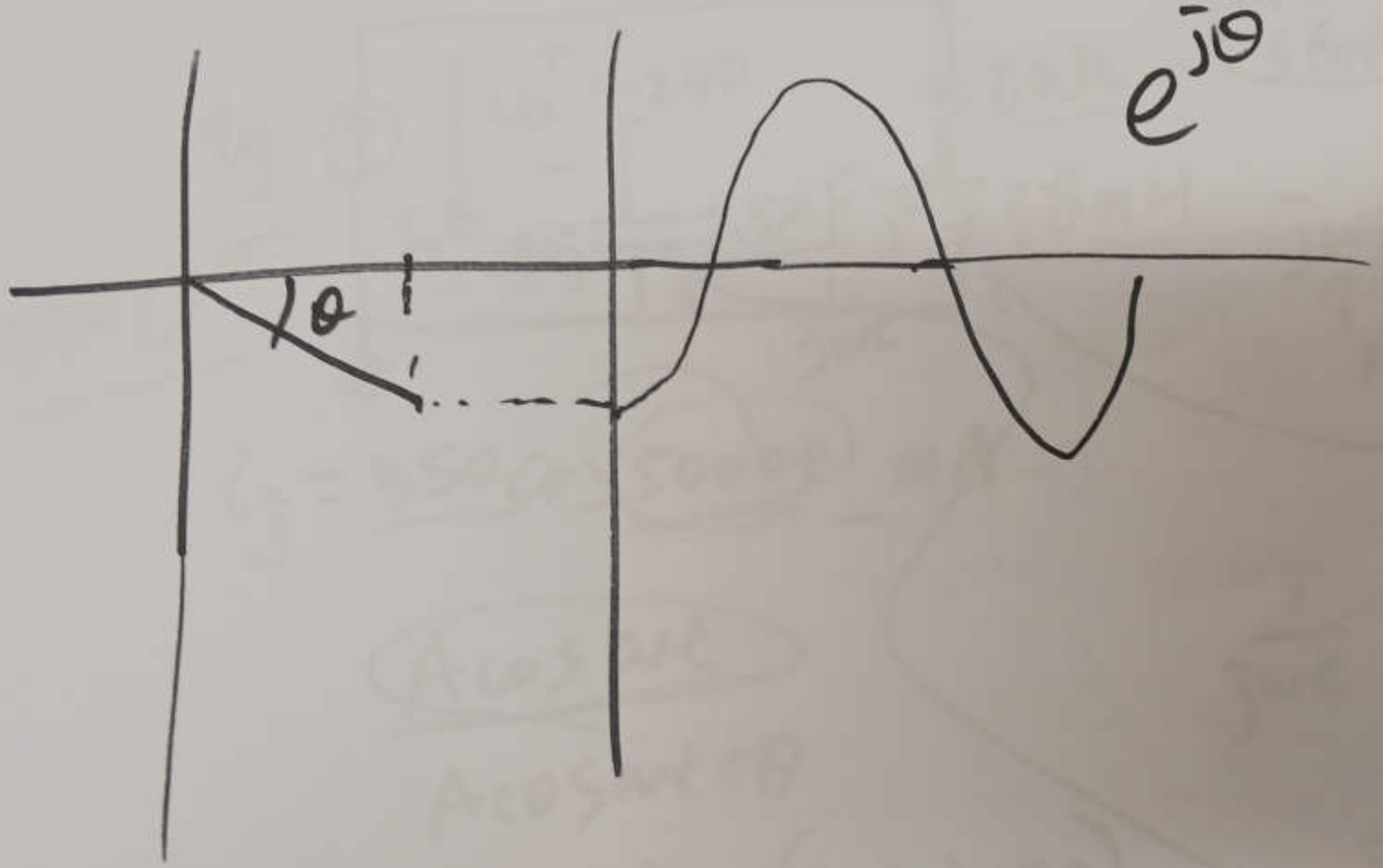


$$\frac{a+bj}{c+dj} = \frac{\sqrt{a^2+b^2}\angle \arctan\frac{b}{a}}{\sqrt{c^2+a^2}\angle \arctan\frac{d}{c}}$$

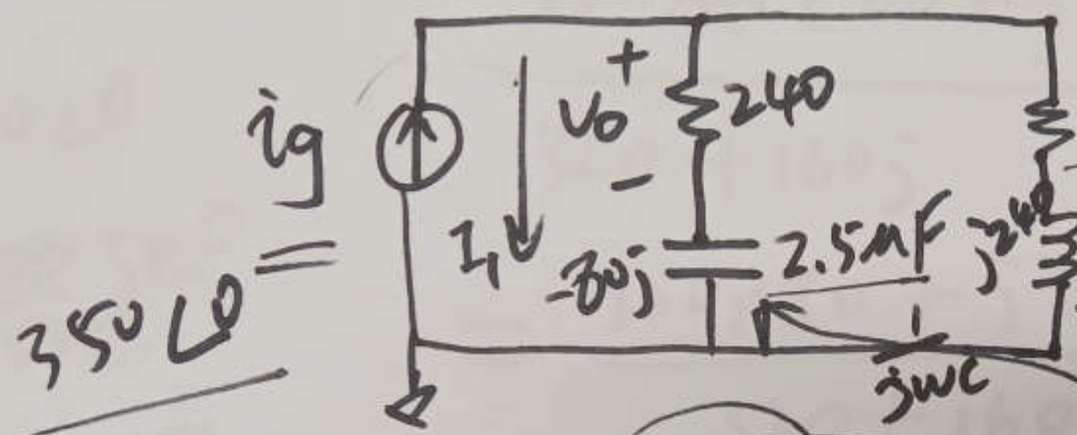
$\theta > 0$ leading

$\cos(\omega t \pm \theta)$




$e^{j\theta}$
θ

steady state



$350\angle 0$

$j\omega L = j5000 \cdot 48 \cdot 10^{-3}$

rad/s

$= j240$

$i_g = 350\cos(5000t)$ mA

$A\cos\omega t$

$A\cos\omega t + \theta$

$\frac{1}{j\omega C} = \frac{-j}{\omega C}$

$= \frac{-j}{5000 \cdot 2.5 \cdot 10^{-6}}$

$= -80j$

$I_1 = \frac{i_g \cdot (80 + j240)}{(240 \| -80j) + 80 + j240}$

$I_1 = \frac{I \cdot R_2}{R_1 + R_2}$

$$\frac{350\angle 0\,(80+j240)}{320+160j}$$

$350\angle 0$

$= 350\angle 0$

$= 350$

$$= \frac{350\times 80 + j\,350\times 240}{320+160j}$$

$$= \frac{350 + j\,350\times 3}{4+2j}$$

$$= \frac{175 + j\,175\times 3}{2+j}$$

$$= \frac{(175+j175\times 3)(2-j)}{5\,(2+5)(2-j)}$$

$z^2 - j^2$

$= 4+1 = 5$

(4)

$$= \frac{175x2 - 175j + j350.3 + 175x3}{5}$$

$$= 55x2 - 35j + j210 + 35x3$$

$$= 70 + 105 + 175j$$

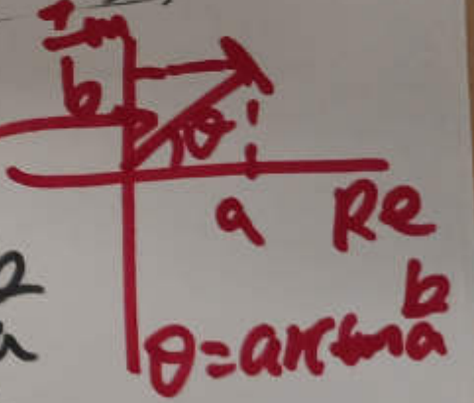
$$= 175 + 175j$$

$$V_o = R \cdot I_1 = 2405 \times (175 + 175j)$$

$$= a + bj$$

$$= \sqrt{a^2+b^2} \angle \arctan\frac{b}{a}$$

$$= \sqrt{a^2+b^2}\, e^{j \arctan\frac{b}{a}}$$



Time domain

$\sqrt{a^2+b^2}\cos(5000t + \arctan\frac{b}{a})$

(5)

$$\frac{a+bj}{c+dj}$$

$e^{j\theta}$

$A\angle\theta$

Method I: $\frac{(a+bj)(c-dj)}{(c+dj)(c-dj)}$

Method II: $\frac{\sqrt{a^2+b^2}\, e^{j\arctan\frac{b}{a}}}{\sqrt{c^2+a^2}\, e^{j\arctan\frac{d}{c}}}$

$\frac{A\cos(\omega t+300^\circ)}{A\sin(\omega t+58^\circ)}$

Method II: $\frac{\sqrt{a^2+b^2}\angle\arctan\frac{b}{a}}{\sqrt{c^2+d^2}\angle\arctan\frac{d}{c}}$

Method II and III:

$$\frac{\sqrt{a^2+b^2}}{\sqrt{c^2+d^2}} e^{j\left(\arctan\frac{b}{a} - \arctan\frac{d}{c}\right)}$$

$$\frac{8\angle 90^\circ}{4\angle 40^\circ} = 2\angle 50^\circ = 2e^{j50^\circ}$$

(3)

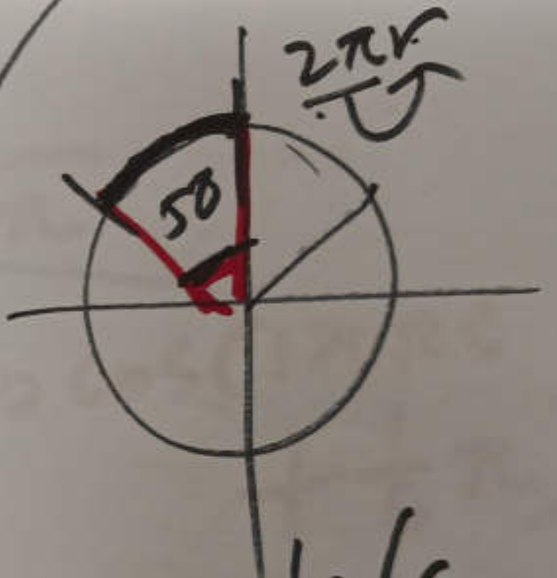
$$v(t) = 110\cos(120\pi t - 60^\circ)$$

$$\frac{\pi/3}{2\pi} = \frac{60^\circ}{360^\circ} \qquad \frac{60^\circ}{360^\circ} = \frac{x}{2\pi}$$

$$\frac{1}{6} = \frac{1}{6}$$

$$1\ \text{radian} = \frac{360^\circ}{2 \times 3{,}14}$$

$$= 57.x^\circ$$

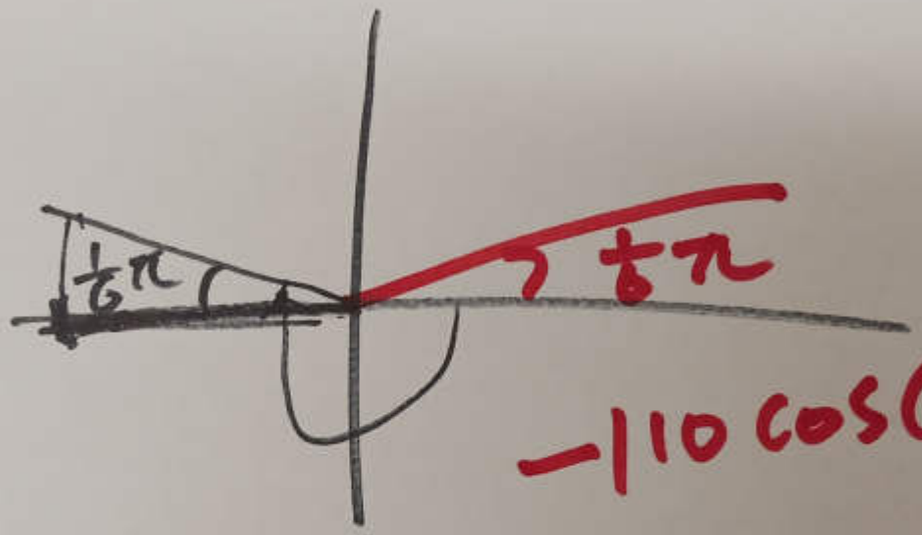


rads/s

$$\frac{125}{18}\ \text{m s} \Rightarrow \text{right}$$

$$v(t) = 110\cos\left(120\pi\left(t - \frac{125}{18}\cdot 10^{-3}\right) - \frac{\pi}{3}\right)$$

$$110\cos\left(120\pi t - \frac{7}{6}\pi\right)$$



$$-110\cos\left(120\pi t + \frac{1}{6}\pi\right)$$