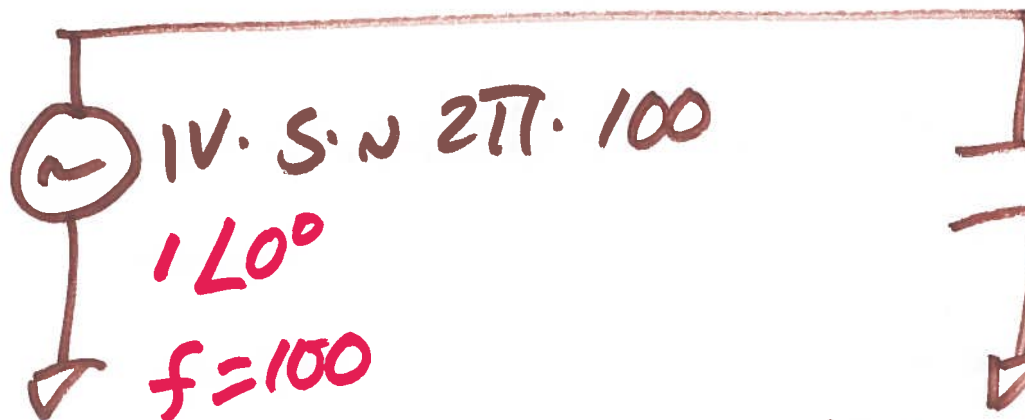


EE 221 Circuits II

Lecture 8

Feb. 20, 2019



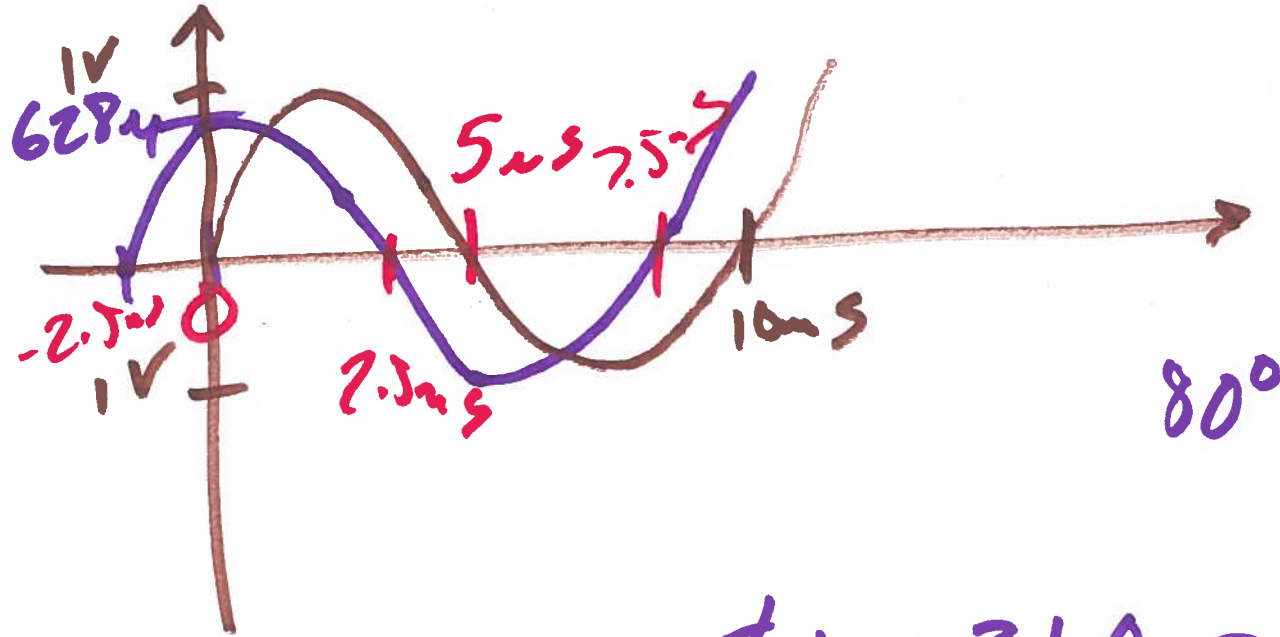
$$1.59\text{k}\angle -90^\circ$$

$$\frac{-j}{2\pi \cdot 100 \cdot 10^{-6}}$$

$$\vec{I} = \frac{1\angle 0^\circ}{1.59\text{k}\angle -90^\circ} = 628.4 \angle 90^\circ$$

$$= \frac{-j}{2\pi \cdot 10^{-4}} = 0 + j \frac{-1}{2\pi \cdot 10^{-4}}$$

1)

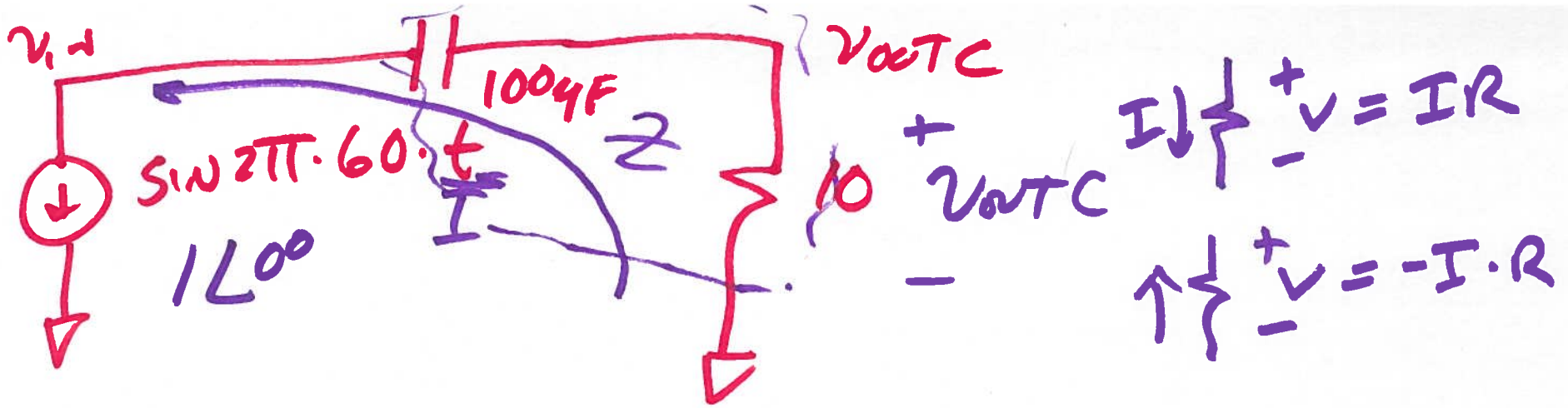


$$\frac{t_d}{10\text{ms}} \cdot 360 = 80^\circ$$

$$\frac{t_d}{10\text{ms}} \cdot 360 = 90^\circ$$

$$t_d = 2.5\text{ms}$$

2)



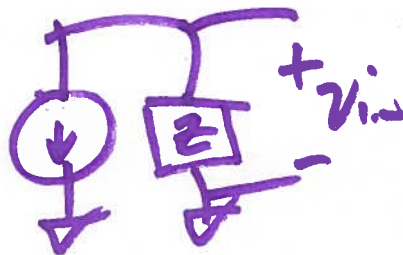
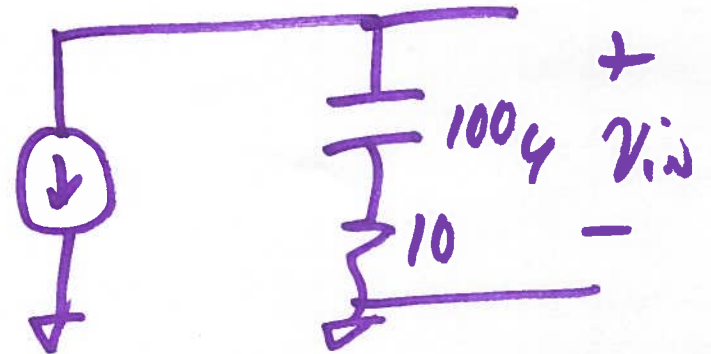
$$v_{out} = -\vec{I} \cdot 10 = 10 \angle 180^\circ = \underline{-10 \angle 0^\circ}$$

$$-10 \sin 2\pi \cdot 60 \cdot t = ?$$

$$10 \sin(2\pi \cdot 60 \cdot t \pm 180)$$

$$Z = \frac{1}{j \cdot 2\pi \cdot 60 \cdot 100\mu F} + 10$$

$$v_{in} = -\vec{I} \cdot Z$$



$$\frac{A \angle \theta_1}{B \angle \theta_2} = \frac{A}{B} \angle \theta_1 - \theta_2 \quad z = 10 + j \cdot \frac{-1}{2\pi \cdot 60 \cdot 10^4}$$

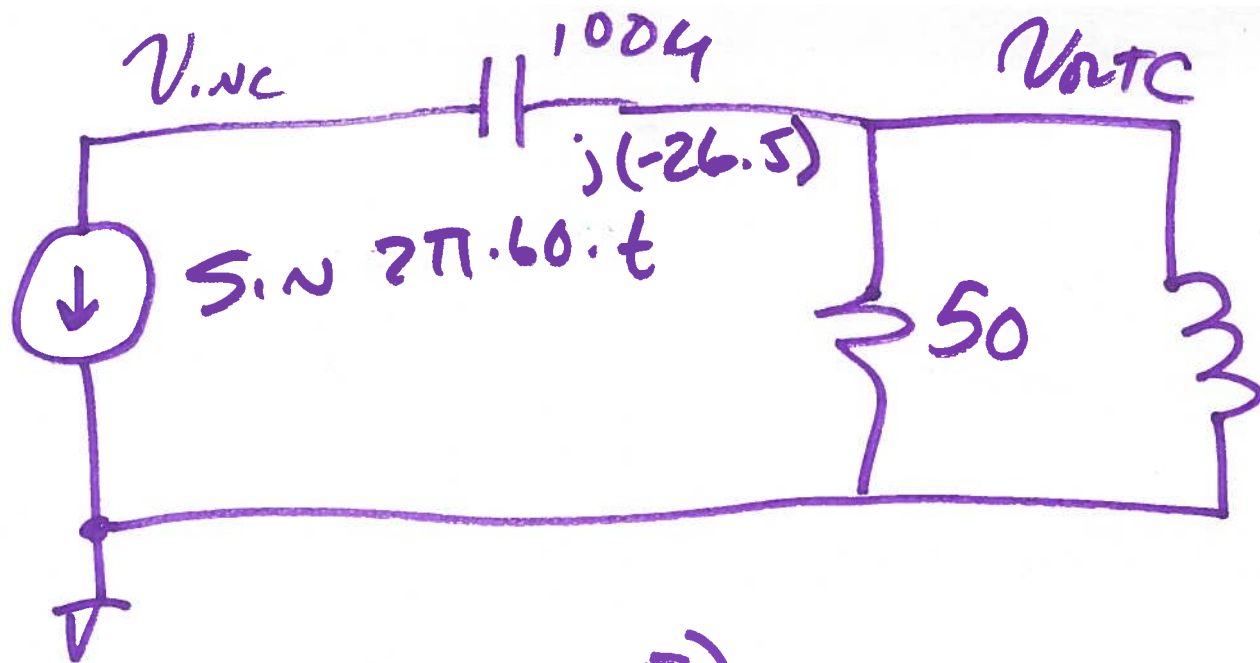
$$A \angle \theta_1 \cdot B \angle \theta_2 = AB \angle \theta_1 + \theta_2 = 10 + j(-26.5) \Rightarrow 28.32 \angle -69.3^\circ$$

$$v_{in} = \cancel{10 \angle 180^\circ} \cdot \overset{180}{\cancel{1 \angle 0^\circ}} \cdot 28.32 \angle -69.3^\circ$$

$$v_{in} = 28.32 \angle \cancel{-69.3^\circ}$$

$$28.32 \angle 110.7^\circ$$

$$v_{in}(t) = 28.32 \sin(2\pi \cdot 60 \cdot t + 110.7^\circ)$$



$$\frac{1 \angle 90^\circ}{1 - j}$$

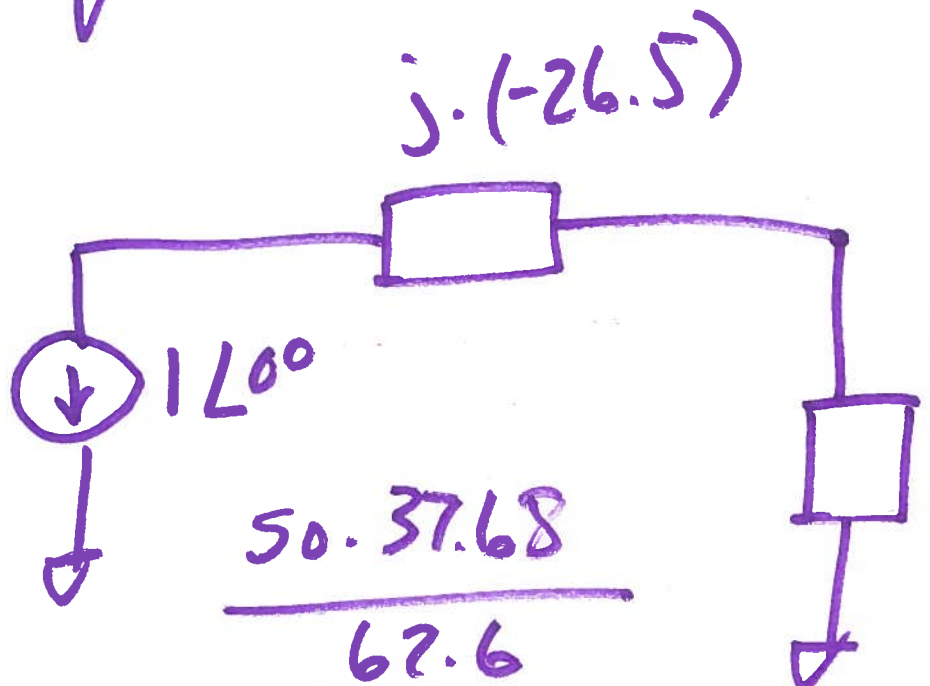
$$100 \text{ mH}$$

$$j \cdot 2\pi \cdot 60 \cdot 100 \text{ mH}$$

$$j \cdot 2\pi \cdot 6$$

$$j \cdot \underline{1.68}$$

$$37.68$$



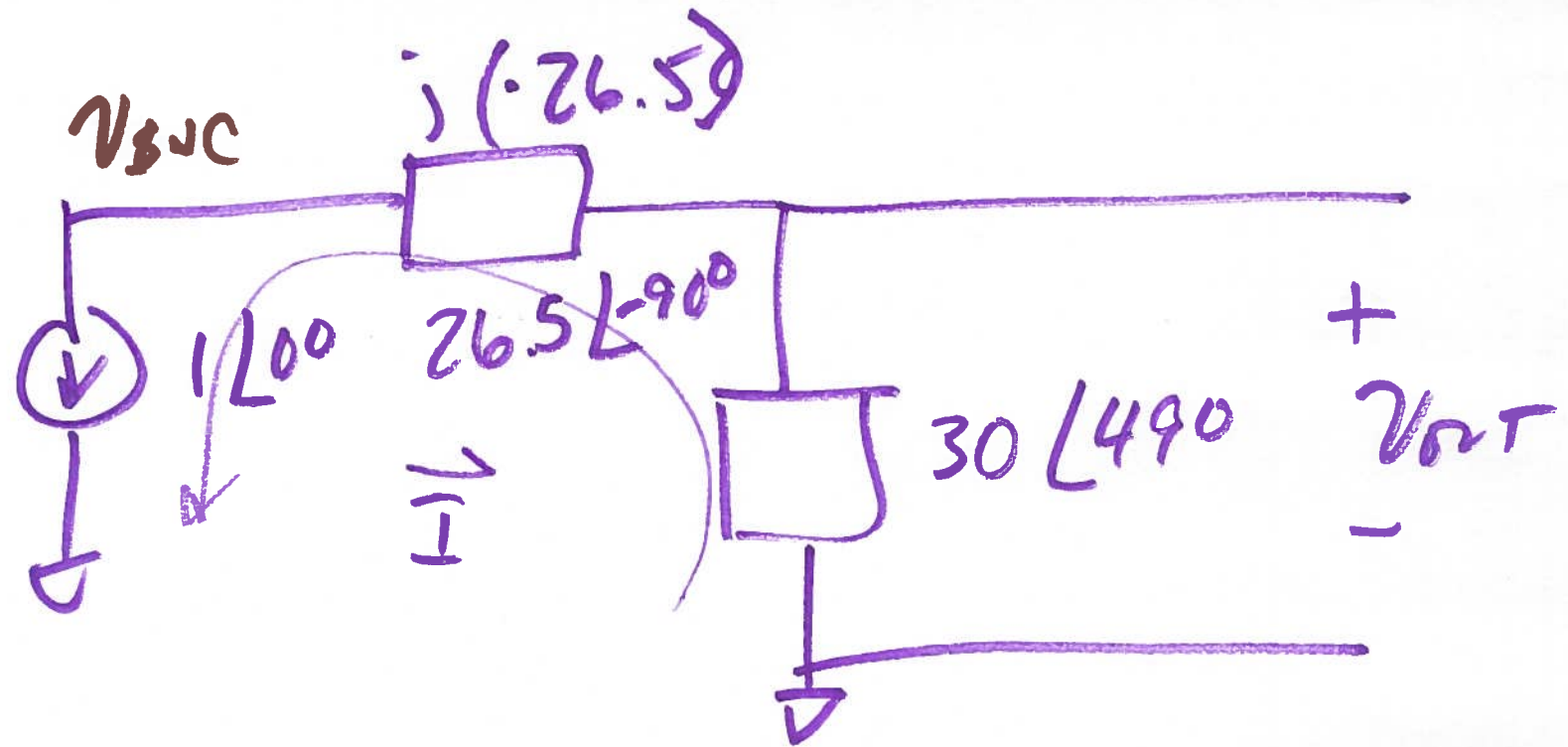
$$\frac{50 \cdot 37.68}{62.6}$$

$$\frac{50 \angle 0^\circ \cdot 37.68 \angle 90^\circ}{50 \angle 0^\circ + 37.68 \angle 90^\circ}$$

$$50 + j 37.68$$

$$62.6 \angle 41^\circ$$

$$\Rightarrow \underline{\underline{30 \angle 49^\circ}}$$



$$V_{out} = -\vec{I} \cdot 30 \angle 49^\circ = 1 \angle 180^\circ \cdot 30 \angle 49^\circ$$

$$V_{inc} = -\vec{I} (j \cdot (-26.5)) + 30 \cos 49$$

$$V_{out} = 30 \angle 229^\circ$$

$$= 30 \sin 2\pi \cdot 60t + 229$$