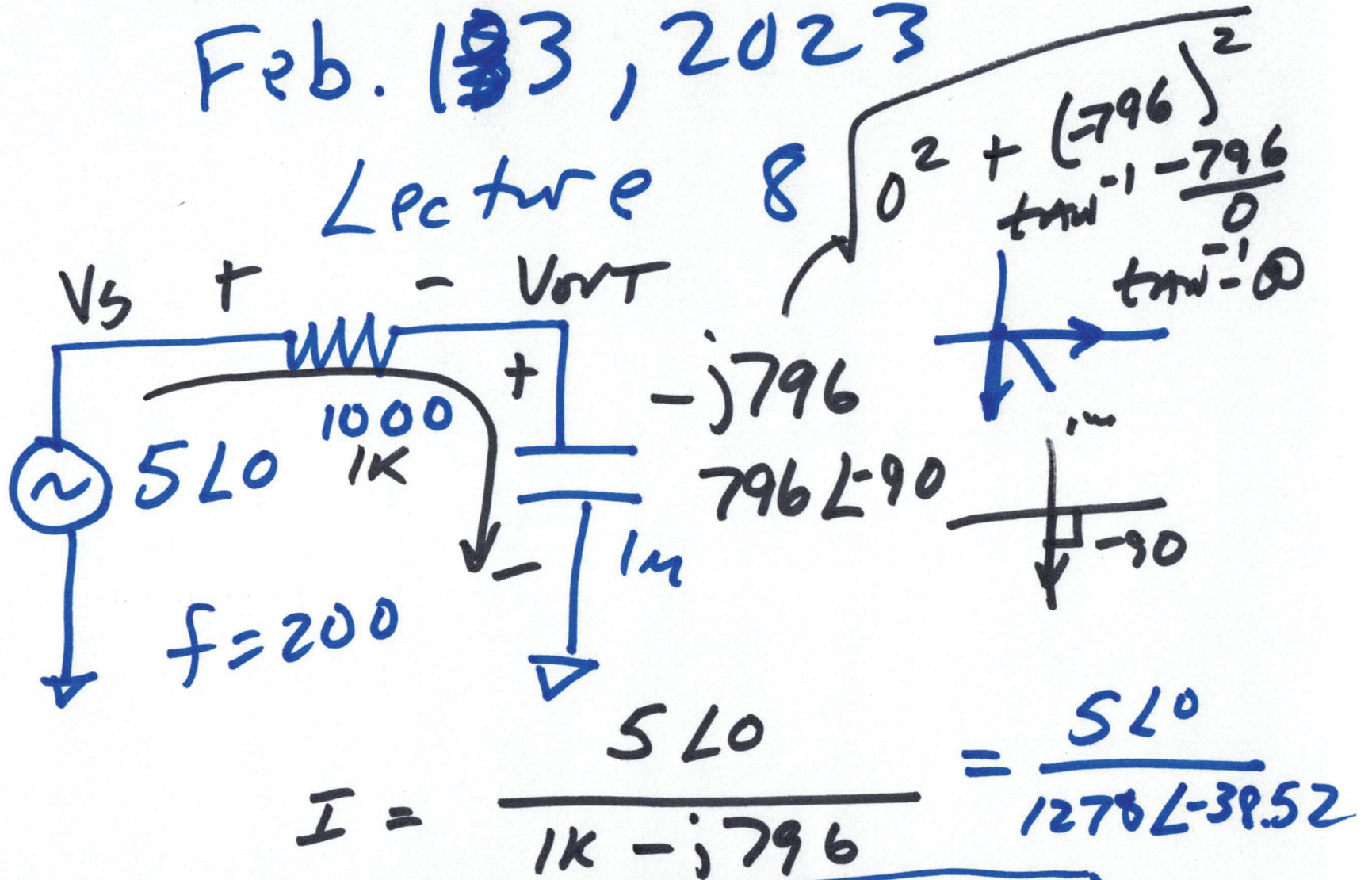


# EE 221 circuits II

Feb. 13, 2023

Lecture 8



$$I = 3.91 \text{ mA} \angle 38.52^\circ$$

$$\theta = \frac{t_d}{T} \cdot 360 \quad V_{out} = 3.91 \text{ mA} \angle 38.52 - 796 \angle 90$$

$$= t_d \cdot f \cdot 360 \quad V_{out} = 3.11 \text{ V} \angle -51.4^\circ$$

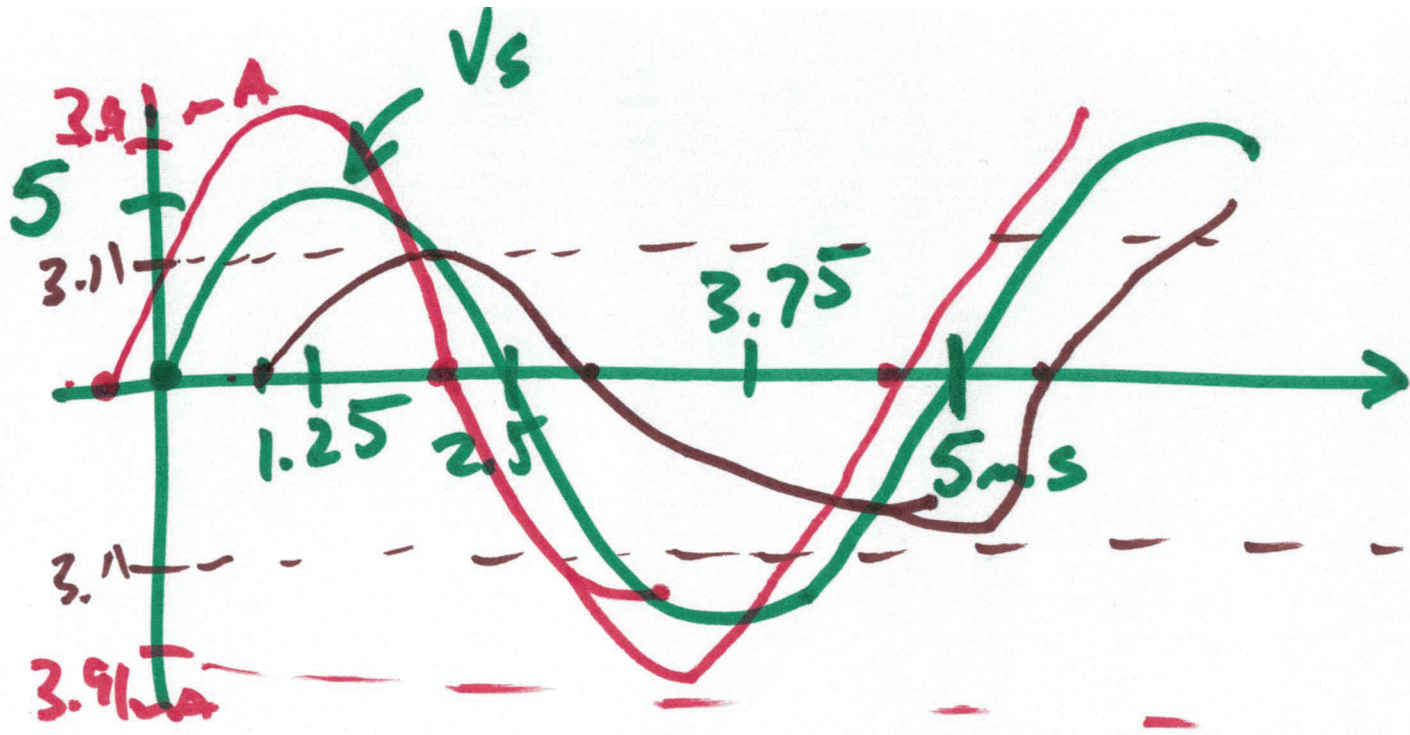
$$V_s = 5 \sin(2\pi \cdot 200 \cdot t)$$

$$V_{out} = 3.11 \sin(2\pi \cdot 200 \cdot t - 51.4^\circ)$$

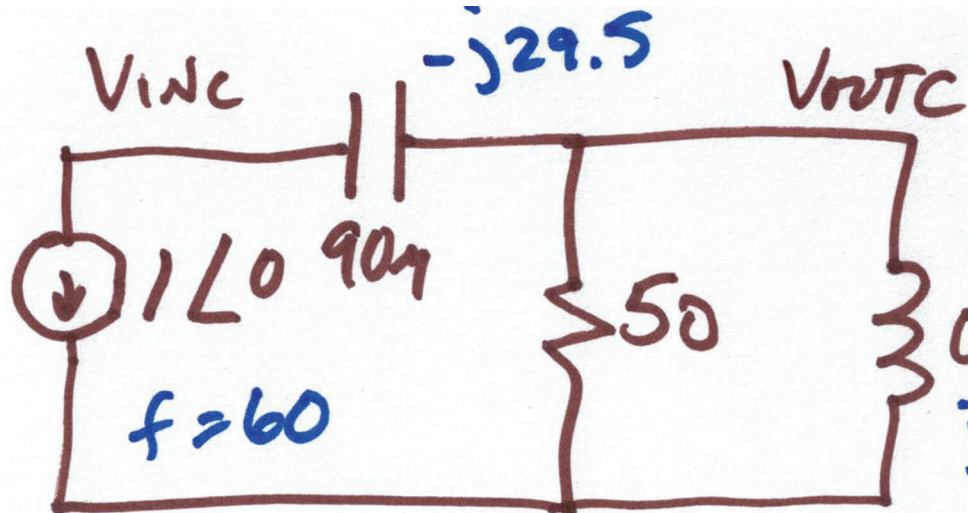
$$i = 3.91 \text{ mA} \sin(2\pi \cdot 200 \cdot t + 38.52^\circ)$$

$$51.4 = \frac{t_d}{5 \text{ms}} \cdot 360 \rightarrow t_d = 0.71 \text{ms}$$

$$38.52 = \frac{t_d}{5 \text{ms}} \cdot 360 \rightarrow t_d = 0.54 \text{ms}$$



3)



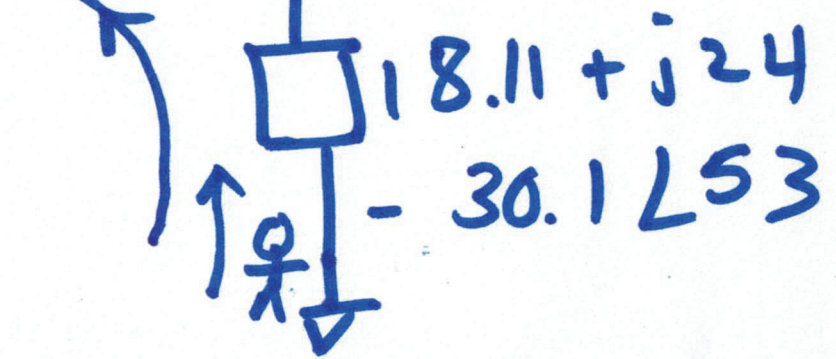
$V = IR$   
 $V = I \cdot R$   
 $V_{outC} = I \cdot R$

$-\frac{A}{B} = -\frac{A}{B}$   
 $= \frac{A}{-B}$

$$Z = \frac{50 \angle 0 \cdot 37.7 \angle 90}{50 + j0 + 37.7j + 0}$$

$$= \frac{1885 \angle 90}{50 + j37.7}$$

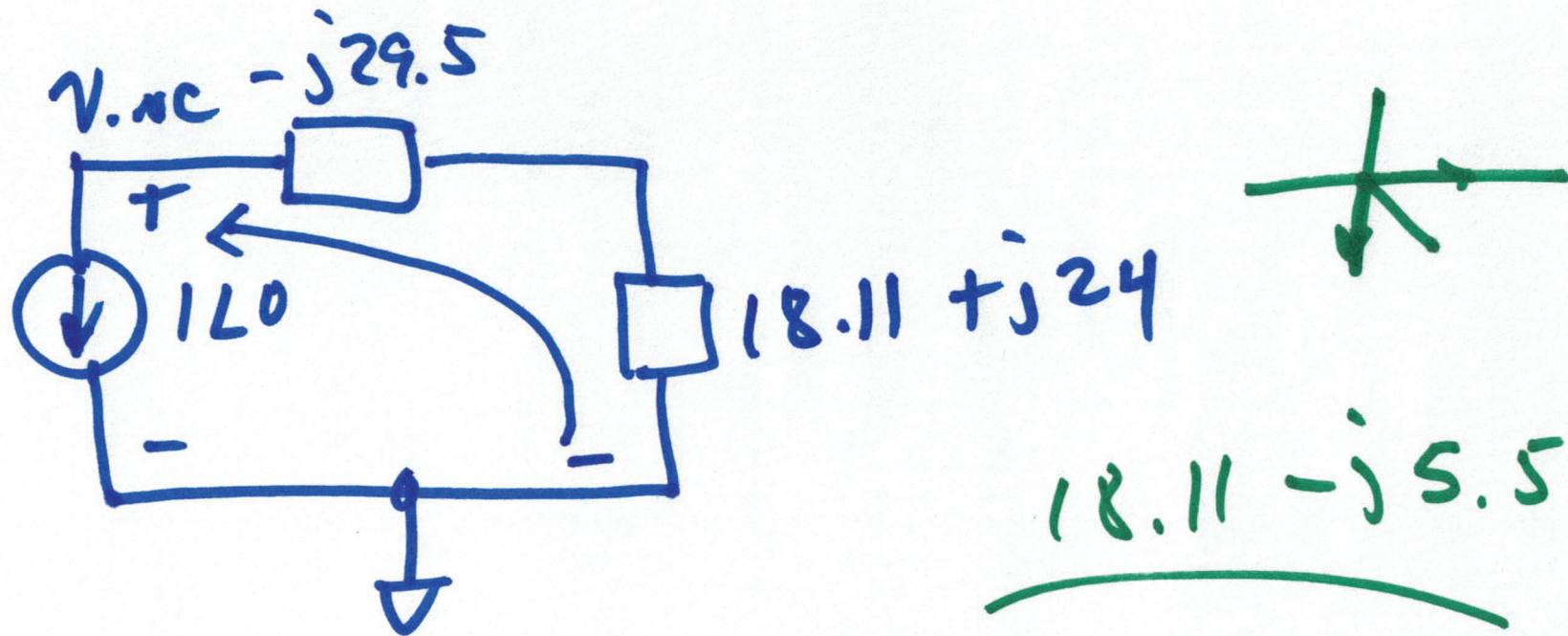
$$= \frac{1885 \angle 90}{62.62 \angle 37}$$



$Z = 30.1 \angle 53$   
 $= 18.11 + j24$

$$V_{outC} = -120 \cdot 30.1 \angle 53^\circ = -30.1 \angle -127$$

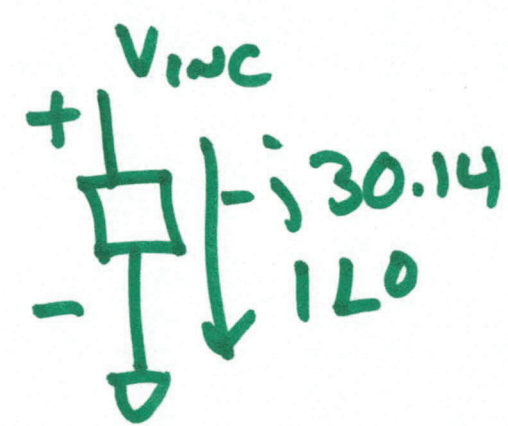
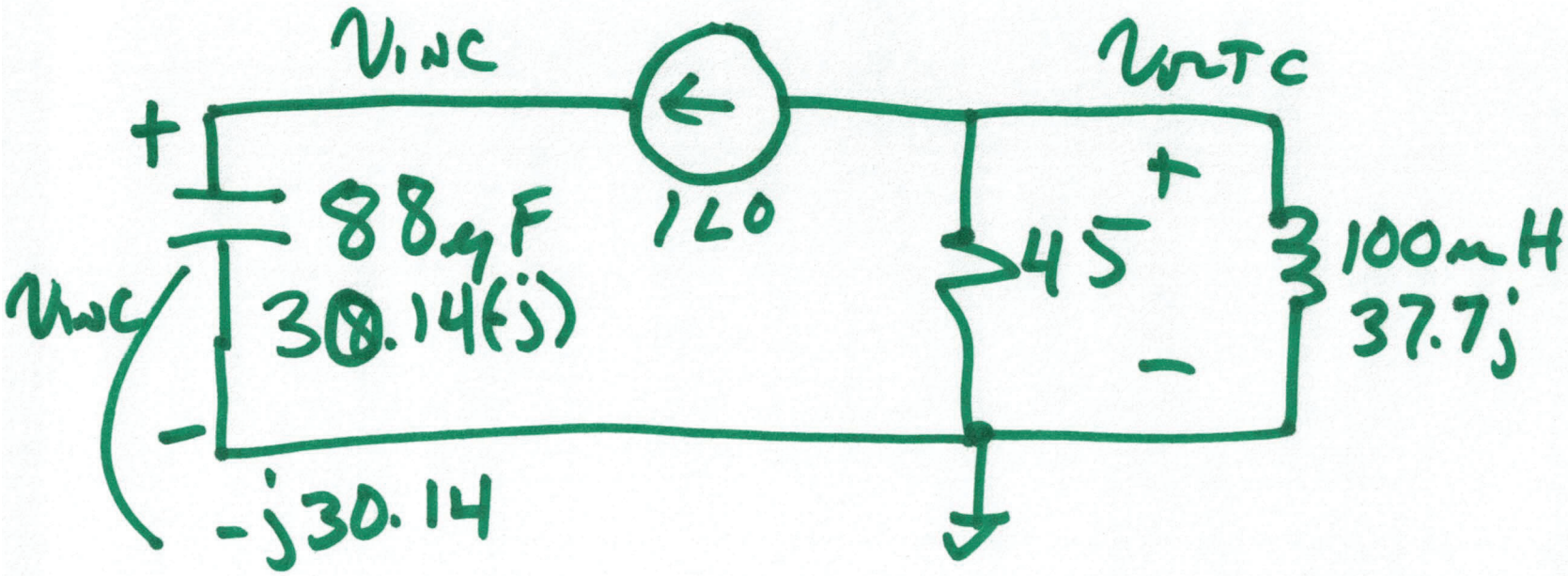
$t_d = 5.88 \mu s$



$$v_{oc} = -120 \cdot (18.11 + j24 - j29.5)$$

$$+ 1 \angle 180 \cdot 18.9 \angle -16.9^\circ$$

$$v_{oc} = 18.9 \angle 163^\circ$$



$$v_{inc} = 120 \cdot 30.14 \angle -90$$

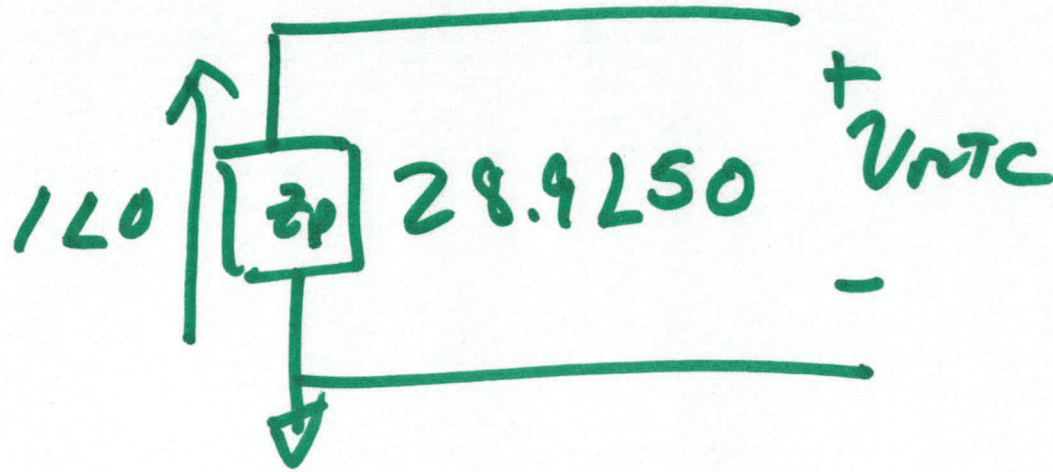
$$= 30.14 \angle -90$$

$$30.14 \sin(2\pi 60 \cdot t - 90)$$

$$z_p = \frac{45 \cdot 37.7 \angle 90}{45 + 37.7j}$$

$$= \frac{1697 \angle 90}{58.7 \angle 40}$$

$$z_p = 28.9 \angle 50$$



$$V_{MTC} = -120 \cdot 28.9250$$

$$= -14180 \cdot 28.9250$$

$$230 = \frac{t_d}{16.67ns} \cdot 360 \cdot 28.9250$$

$$28.9 \cdot \del{14180} \cdot 130$$

$$t_d = 10.65ns$$