EE 220 Circuits 1

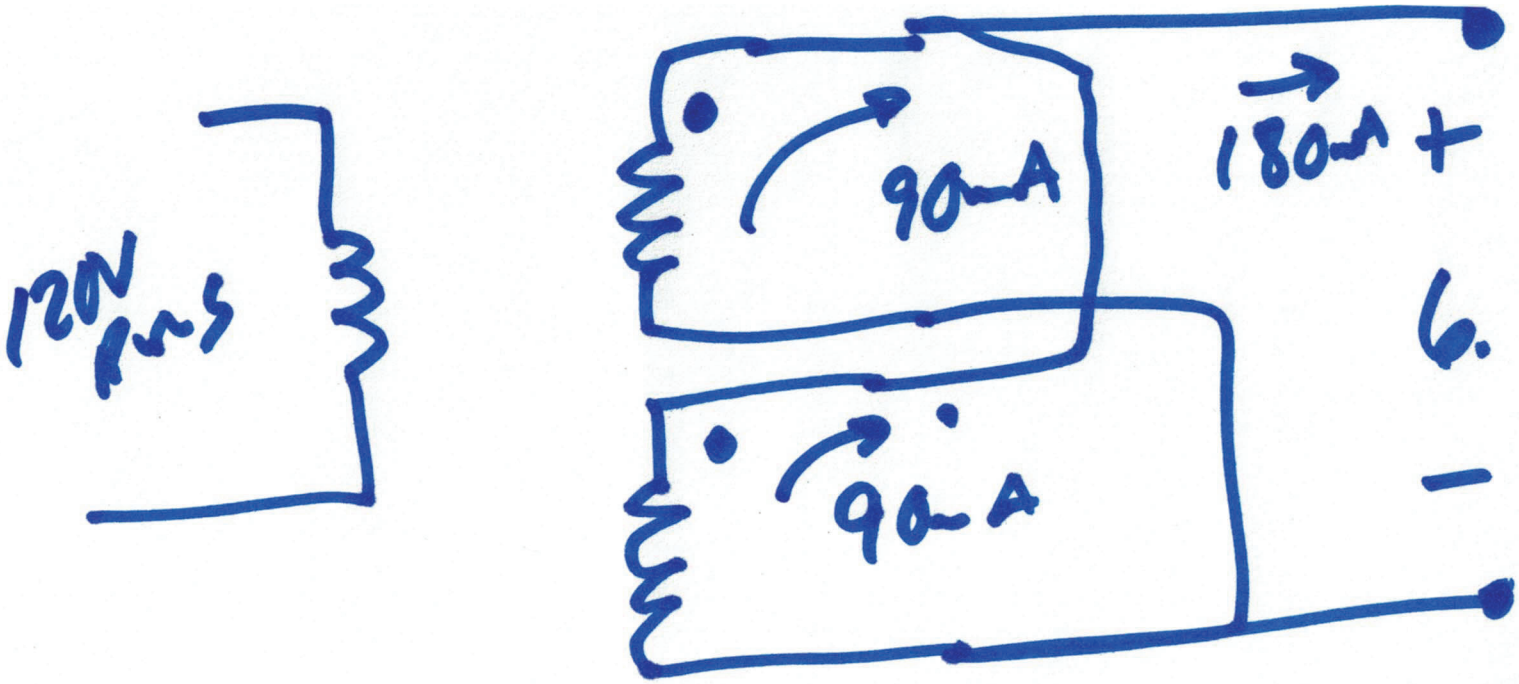
Lecture 26

NOV. 29, 2021

$$\frac{V_1}{V_2} = \sqrt{\frac{L_1}{L_2}} = \frac{\frac{169}{\sqrt{2}}}{\frac{8.9}{\sqrt{2}}} = \sqrt{\frac{1}{L_2}}$$

$$L_2 = \left(\frac{8.9}{169}\right)^2$$

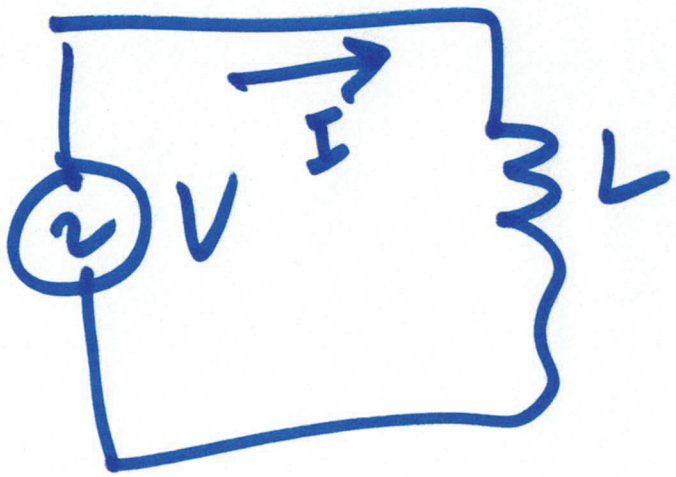
$$L_2 = 2.77\,\text{m}H$$



$$\frac{I_1}{180mA} = \frac{I_1}{I_2} = \sqrt{\frac{L_2}{L_1}} = \sqrt{\frac{2.77mH}{1}}$$

$$\boxed{I_1 = 9.47mA}$$

2)



$$V = \bar{I} \cdot j\omega L$$

$$120 = 9.47 \cdot |j\omega L|$$

$$|j\omega L| = 2\pi \cdot 60 \cdot L$$

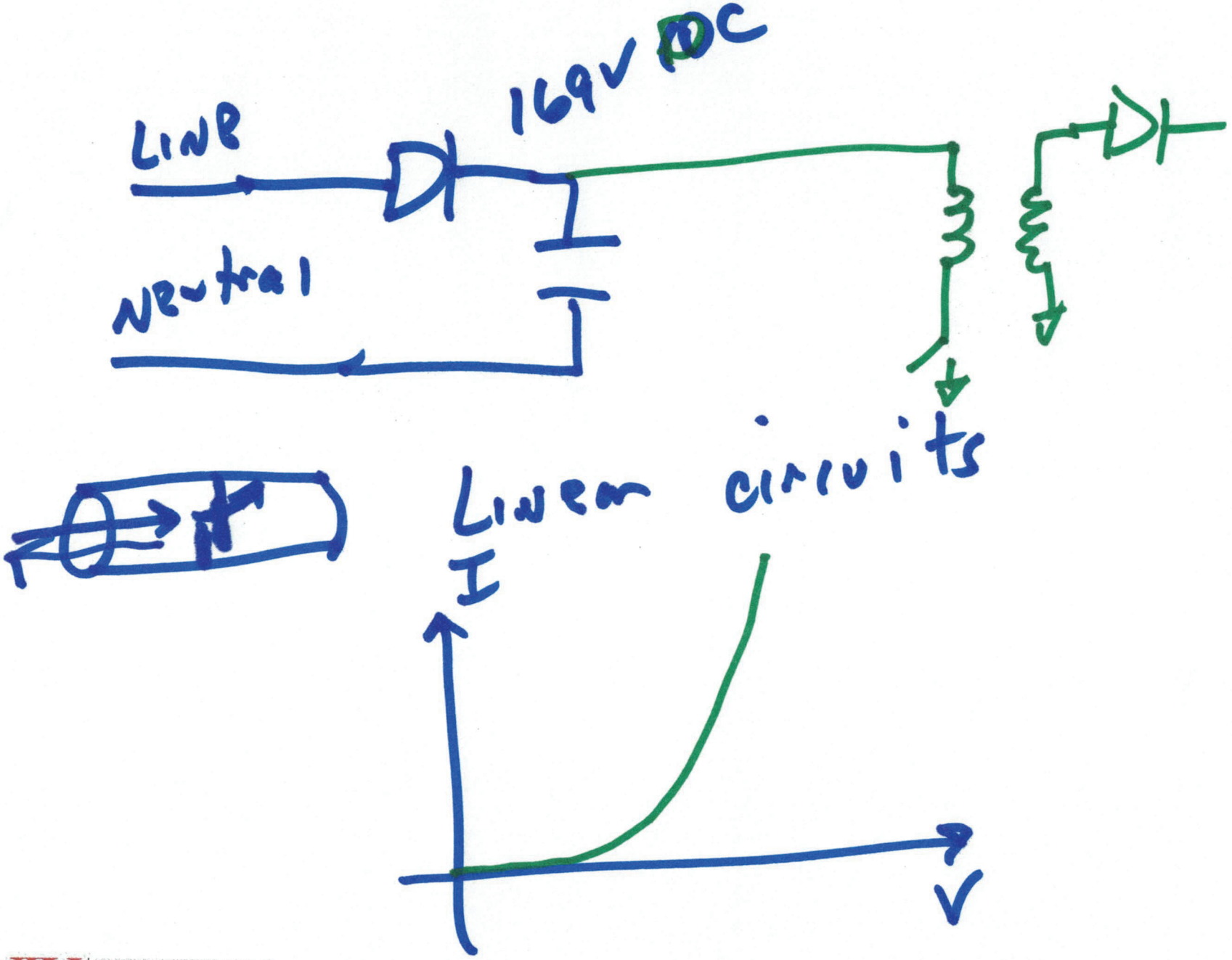
$$\frac{0 + j\omega L}{\sqrt{0^2 + \omega^2 L^2}}$$

$$L_1 = \frac{120}{9.47 \cdot 2\pi \cdot 60}$$

$$= \omega L = 2\pi f L$$

$$\boxed{L = 33.6 \text{ mH}}$$

3)


LINE
169V DC
Neutral
Linear circuits
I
V

Power factor