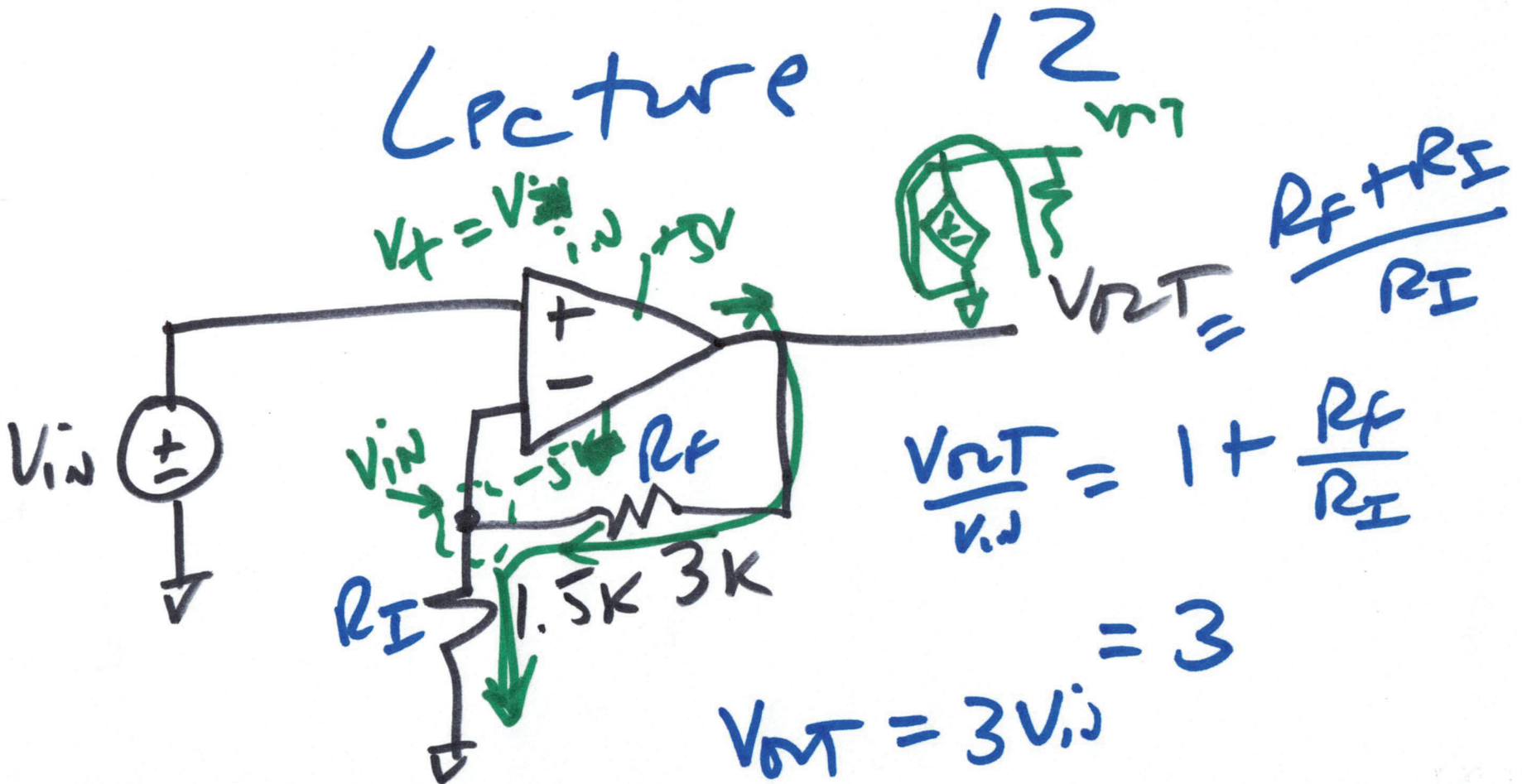


# EE 270 Circuits 1

OCT. 4, 2021

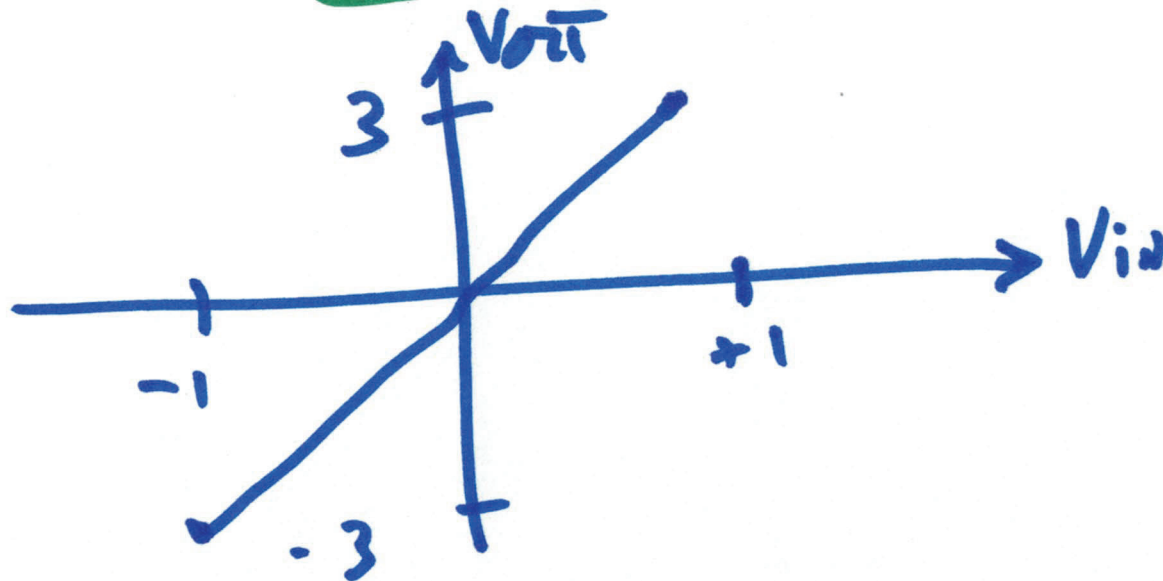
Lecture 12

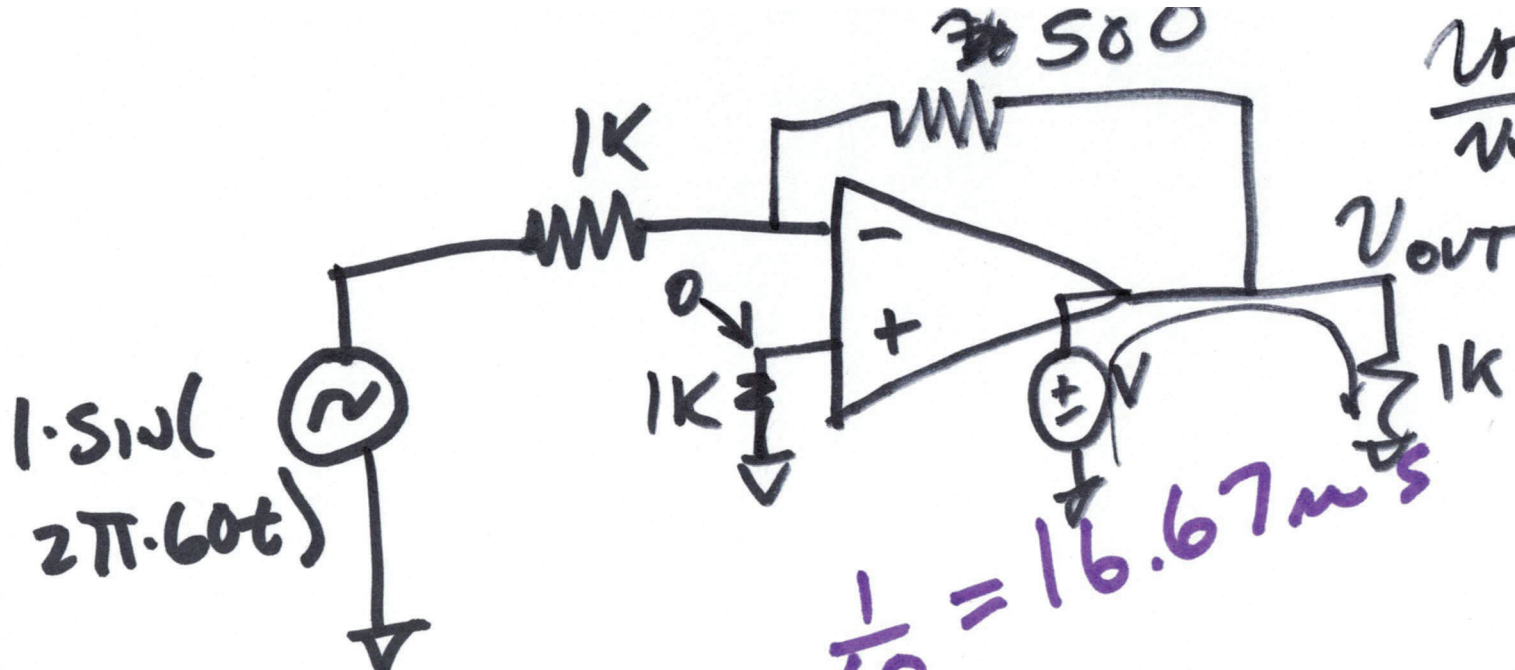


$$\frac{V_{in}}{1.5k} = \frac{V_{out} - V_{in}}{3k}$$

$$2V_{in} = V_{out} - V_{in}$$

$$V_{out} = 3V_{in}$$



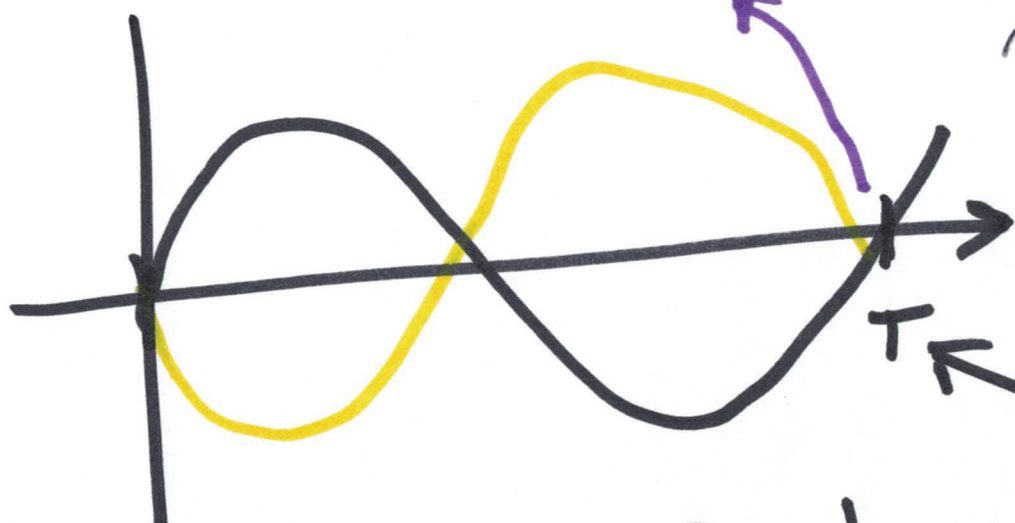


$$\frac{V_{OUT}}{V_{IN}} = -\frac{R_F}{R_I}$$

$$= -\frac{500}{1000}$$

$$= -\frac{1}{2}$$

$$\frac{1}{60} = 16.67 \text{ ms}$$



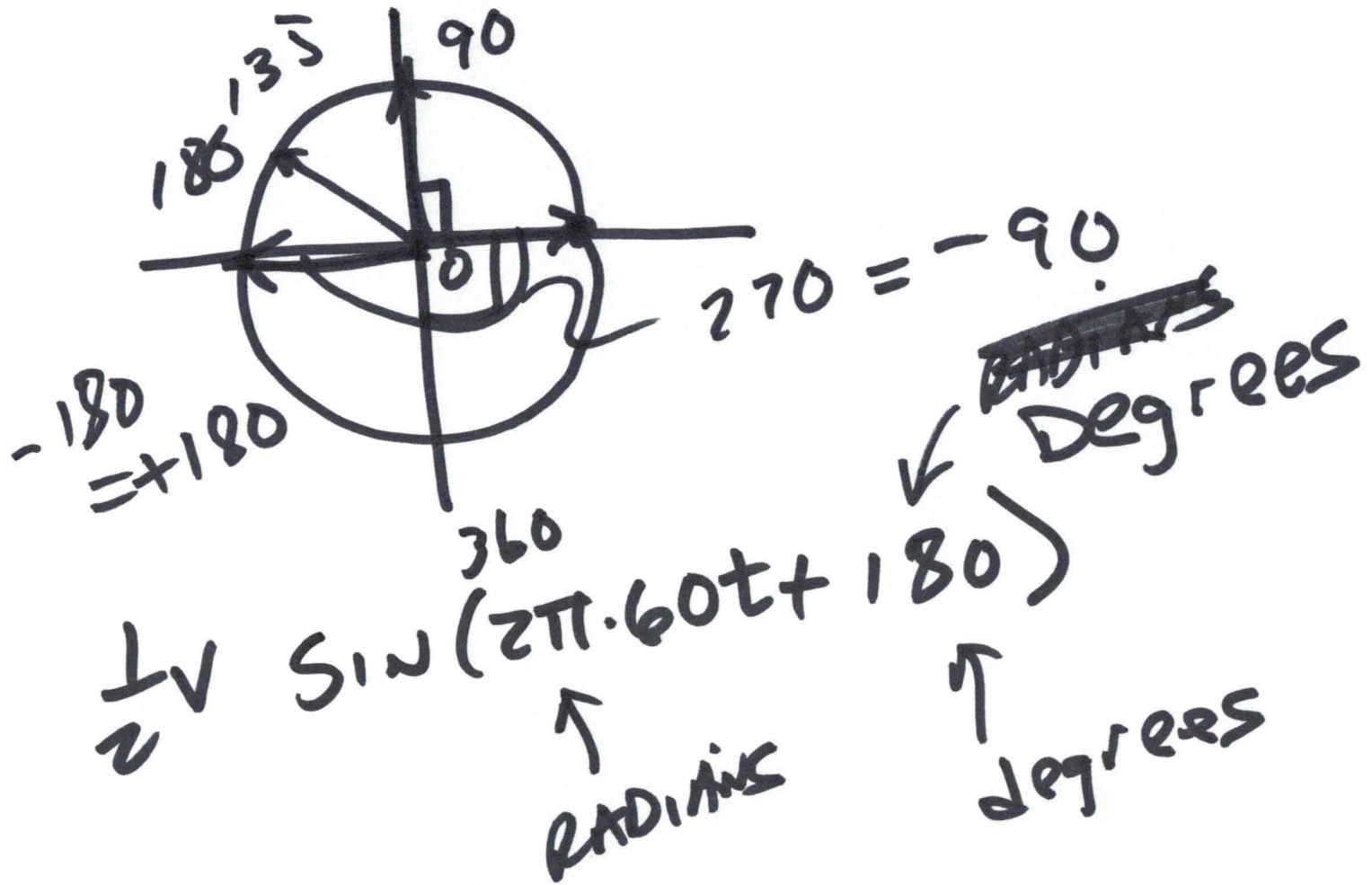
$$V_{OUT} = -\frac{1}{2} V_{IN}$$

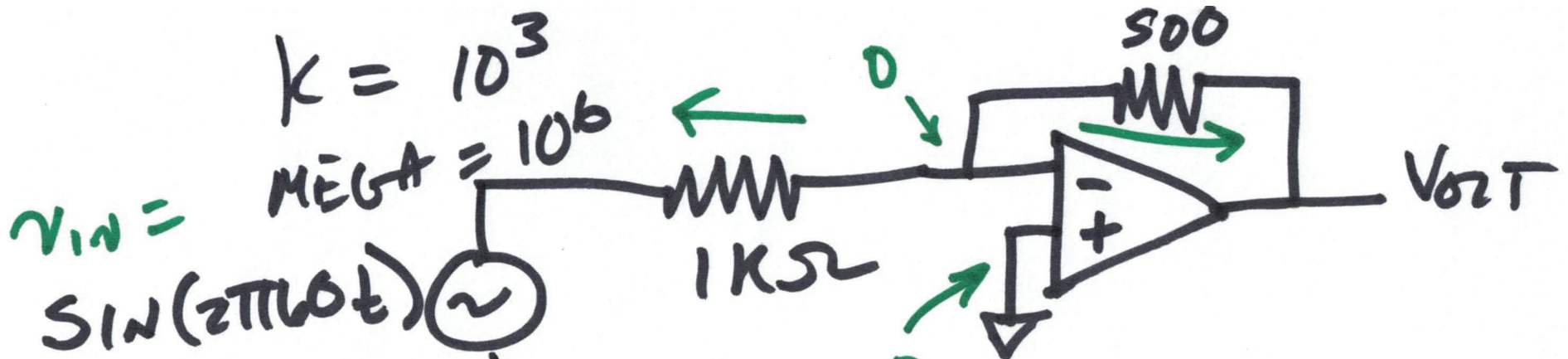
$$= -500 \text{ mV} \sin(2\pi 60t)$$

$$= 500 \text{ mV} \cdot \sin(2\pi 60t + 180)$$

$$f = \frac{1}{T} = \frac{1}{\text{period}}$$

3)





$16\text{Hz} = 10^9 \text{Hz}$   
 $\downarrow$

Tera =  $10^{12}$

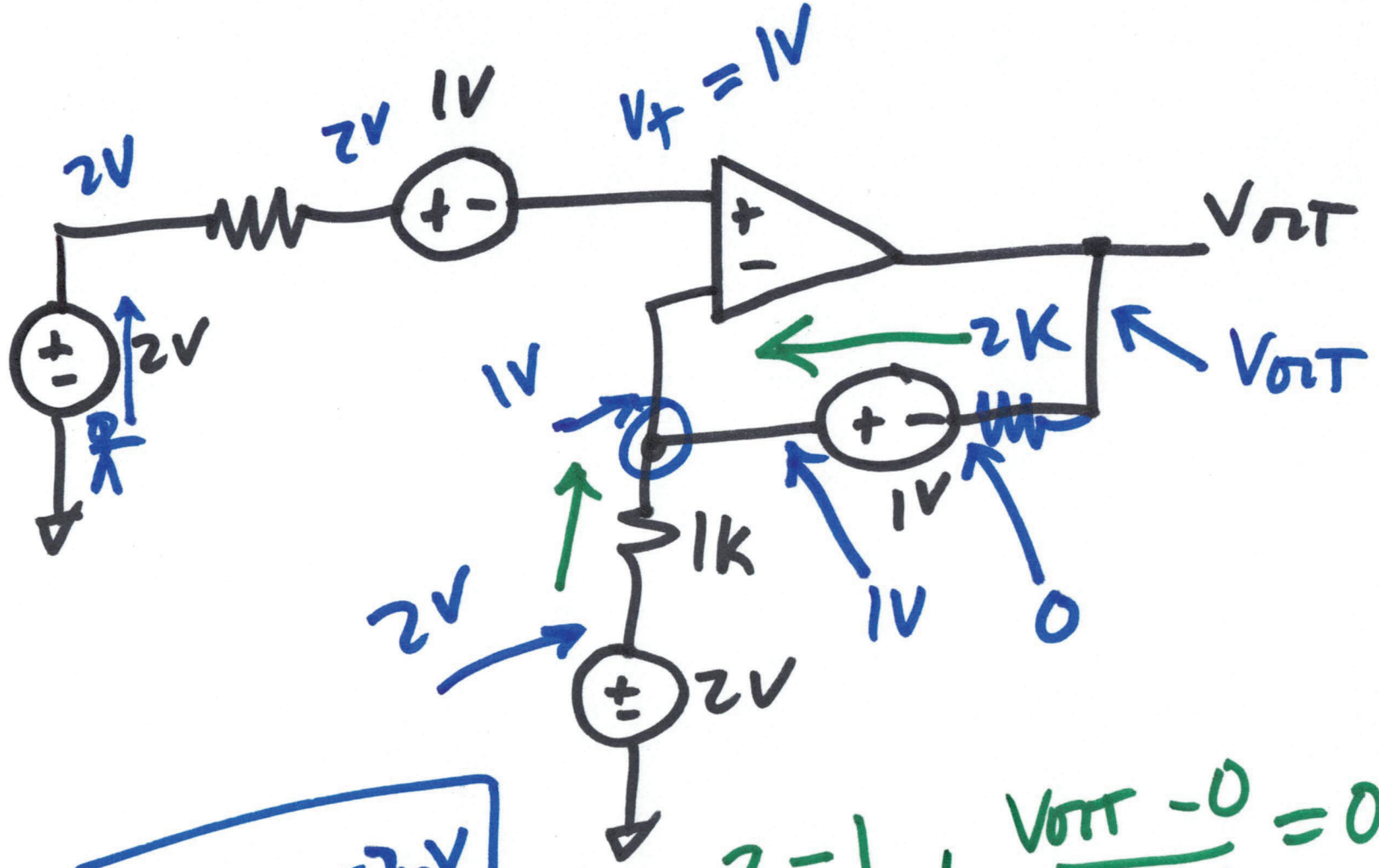


$\frac{1}{10^9} = 10^{-9} \text{s}$   
 $= 1 \text{ns}$

$$\frac{0 - v_{in}}{1\text{k}} + \frac{0 - v_{out}}{500} = 0$$

$$= \frac{1}{2} \sin(2\pi 60t - 180^\circ) - \frac{1}{2} v_{in} - v_{out} = 0$$

$$- \frac{1}{2} \sin 2\pi 60t = v_{out} = - \frac{1}{2} v_{in}$$

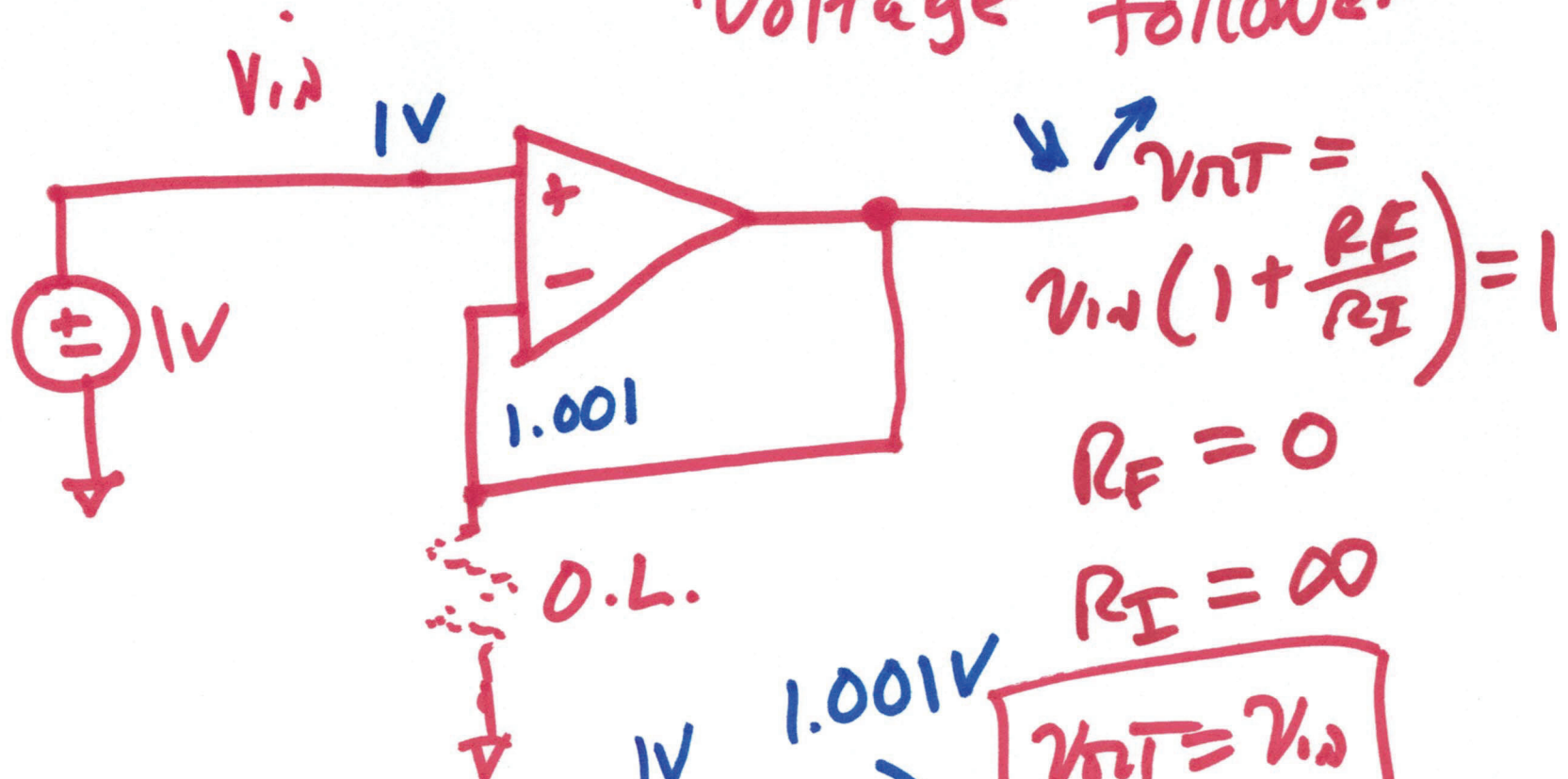


$$V_{out} = -2V$$

$$\frac{2-1}{1K} + \frac{V_{out}-0}{2K} = 0$$

6)

# Voltage follower



$$V_{OUT} = V_{IN} \left( 1 + \frac{R_F}{R_I} \right) = 1$$

$$R_F = 0$$

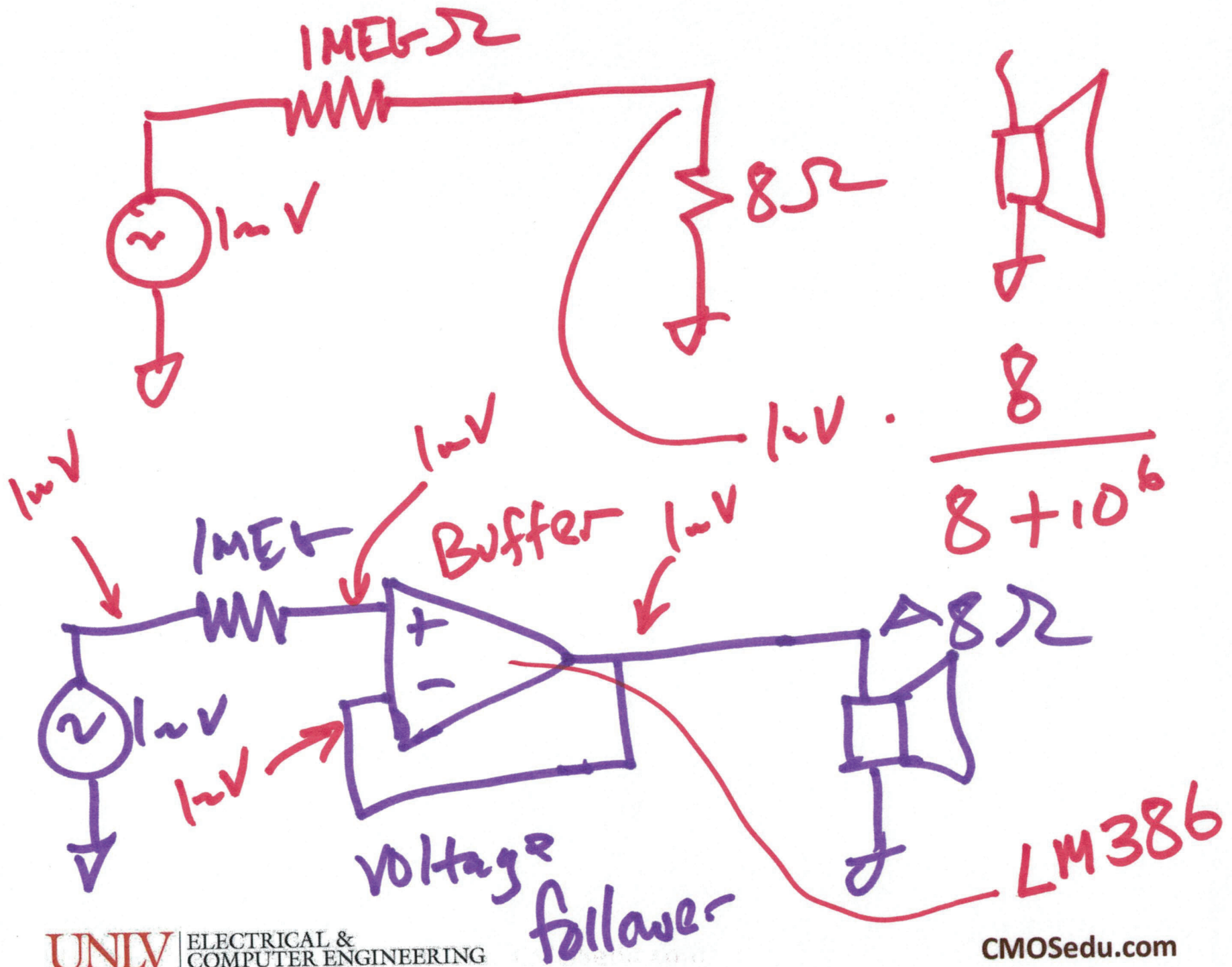
$$R_I = \infty$$

$$V_{OUT} = V_{IN}$$

$$V_{OUT} = 10^{23} (V_+ - V_-)$$

$$V_{OUT} = 10^{23} (-.001V)$$





$$\frac{8}{8 + 10^6}$$

8

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