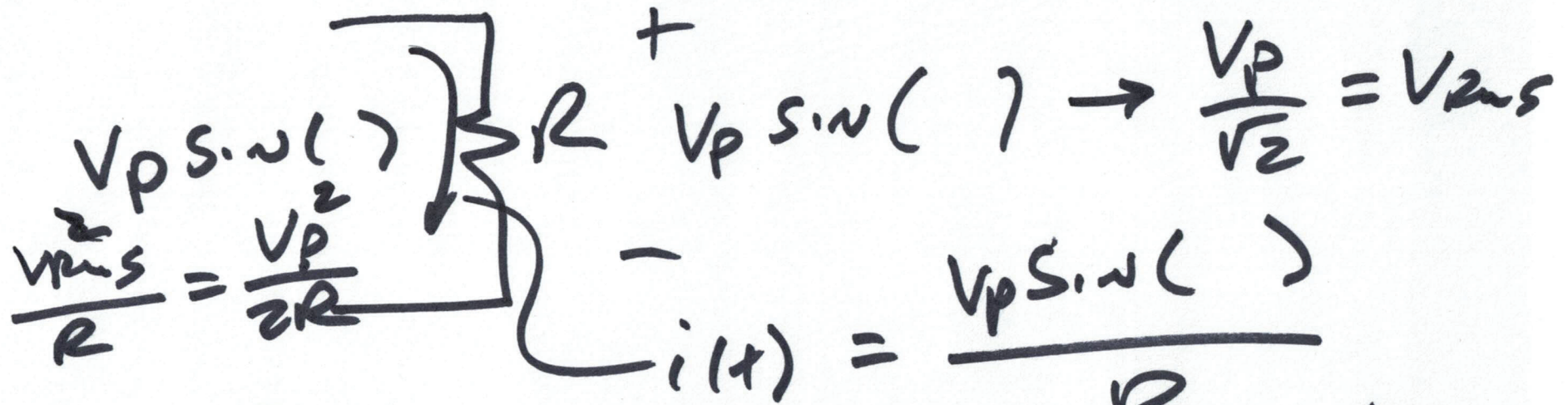


EE 221 CIRCUITS II

FEBRUARY 22, 2023

Lecture 10



$$V_{rms} \cdot I_{rms}$$

$$V_{rms} \cdot \frac{V_{rms}}{R}$$

$$I_{rms}$$

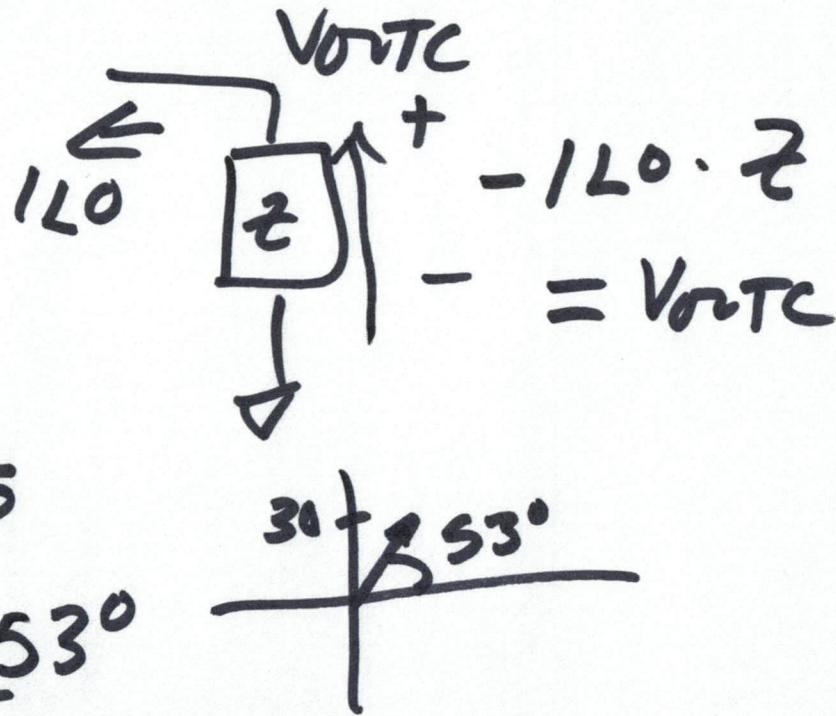
$$I_{rms} = \frac{I_p}{\sqrt{2}} = \frac{V_p}{R \sqrt{2}}$$



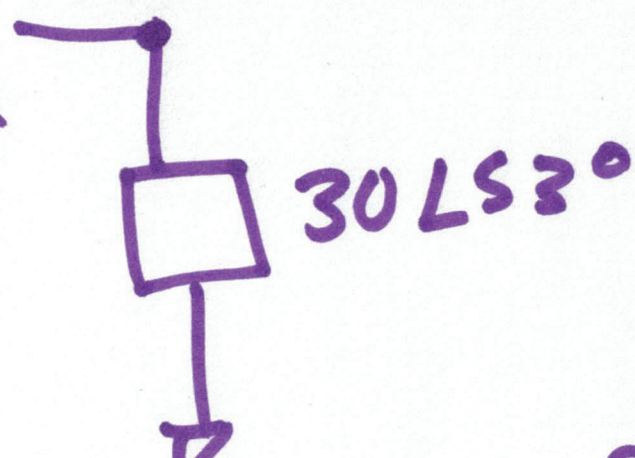
$$Z = \frac{50 \cdot 37.68 \angle 90}{50 + 37.68j}$$

$$= \frac{1884 \angle 90}{62.6 \angle 37^\circ}$$

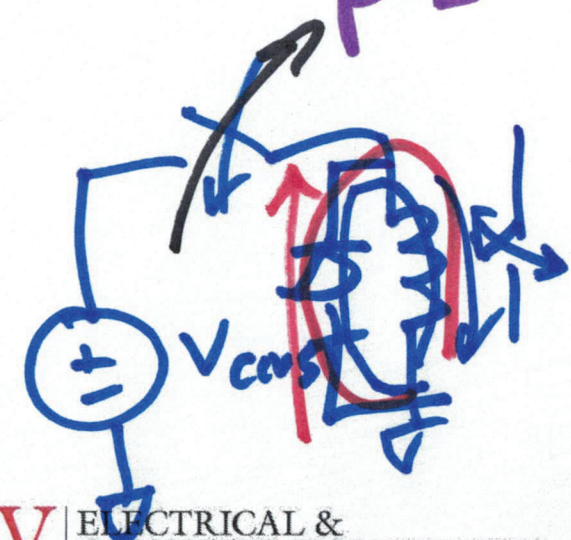
$$Z = 30 \angle 53^\circ$$



$$V_{\Omega T} = 30V \angle 30^\circ$$

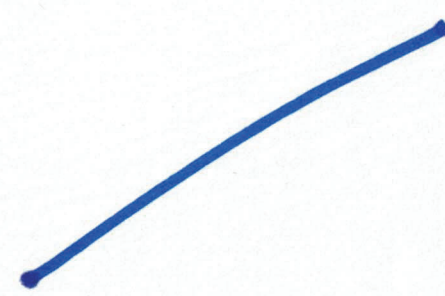


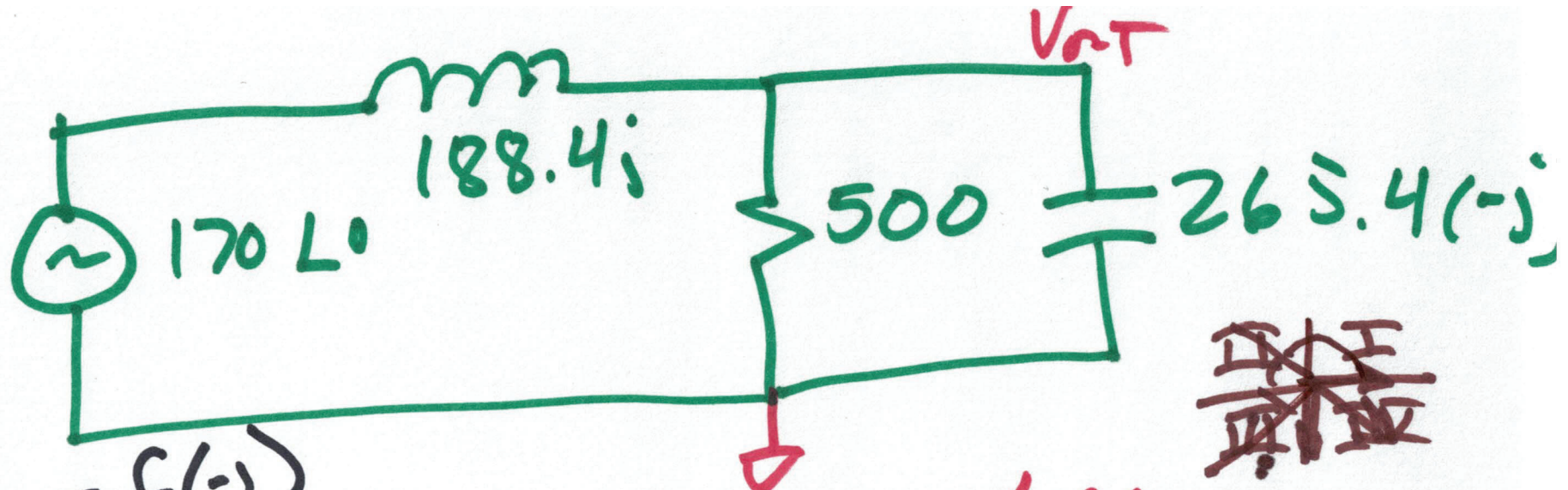
$$P = \frac{30^2}{2 \cdot 50} = \frac{900}{100} = 9W$$



$$V = L \frac{di}{dt}$$

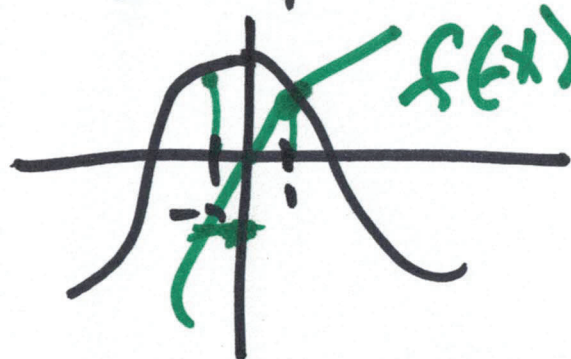
$$\frac{V_{const}}{L} = \frac{di}{dT}$$





$f(1) = f(-1)$

Even function $Z =$



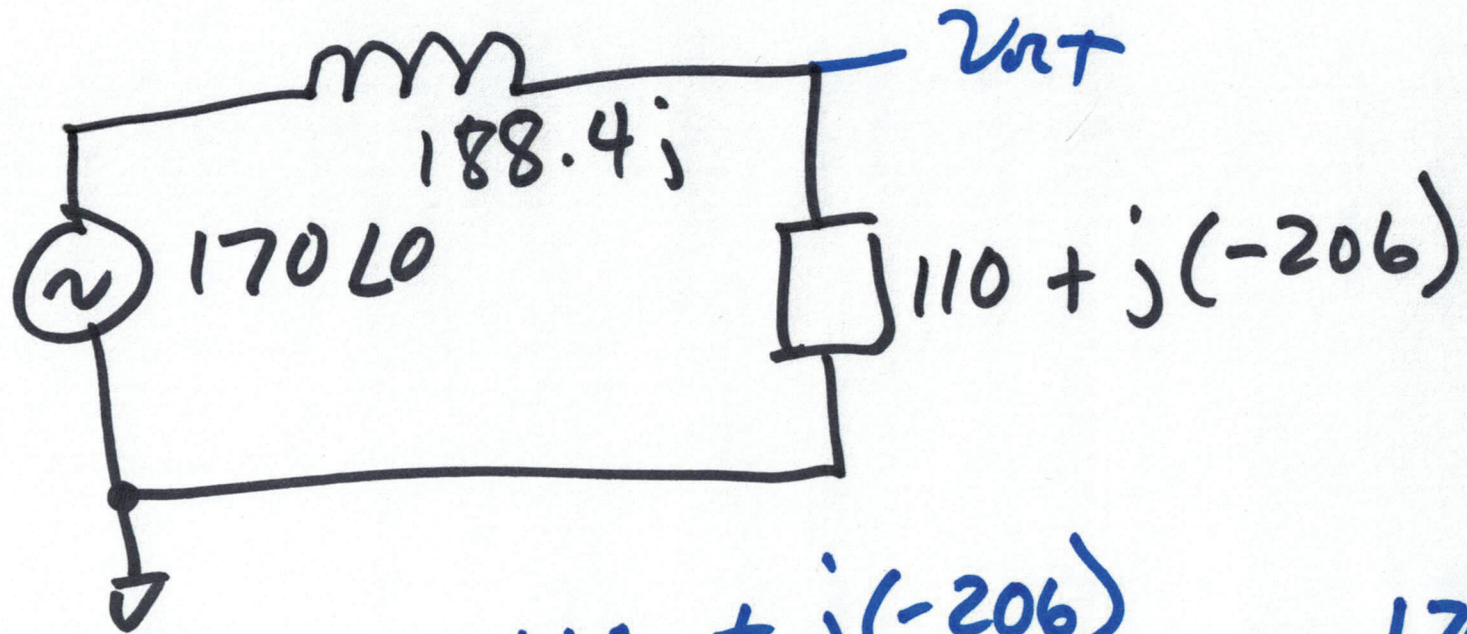
$f(x) = 500$
 $odd f(x) = -f(x)$

$$Z = \frac{500 \cdot 265.4 \angle -90^\circ}{-j 265.4}$$

$$= \frac{132,700 \angle -90^\circ}{566 \angle -28^\circ}$$

$Z = 234.5 \angle -62^\circ$
 $= 110 + j(-206)$





$$V_{Th} = \frac{110 + j(-206)}{188.4j + 110 + j(-206)} \cdot 170\angle 0$$

$$= \frac{110 + j(-206)}{110 + j(-17.6)}$$

$$= \frac{233.5 \angle -61.9}{111.4 \angle -9.1} \cdot 170\angle 0$$

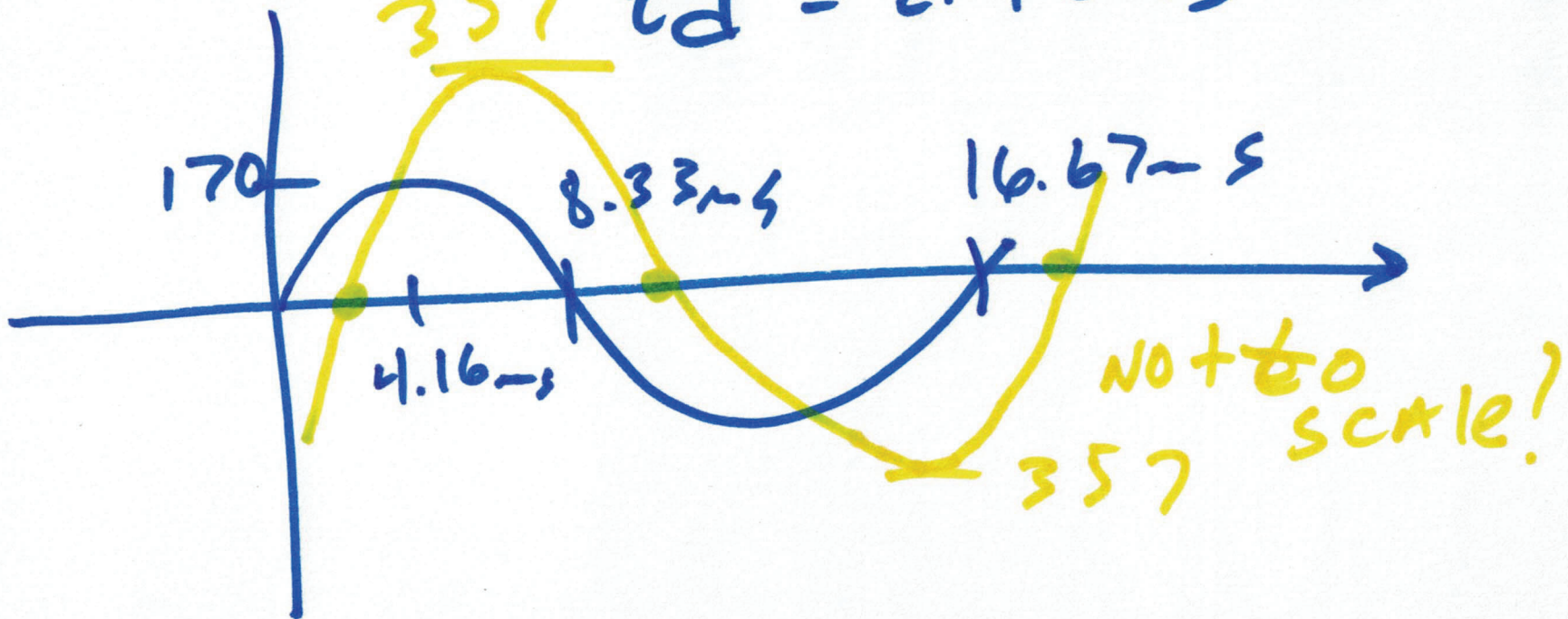
$$\frac{357 \angle -52.8}{170\angle 0} = 2.1 \angle -52.8^\circ$$

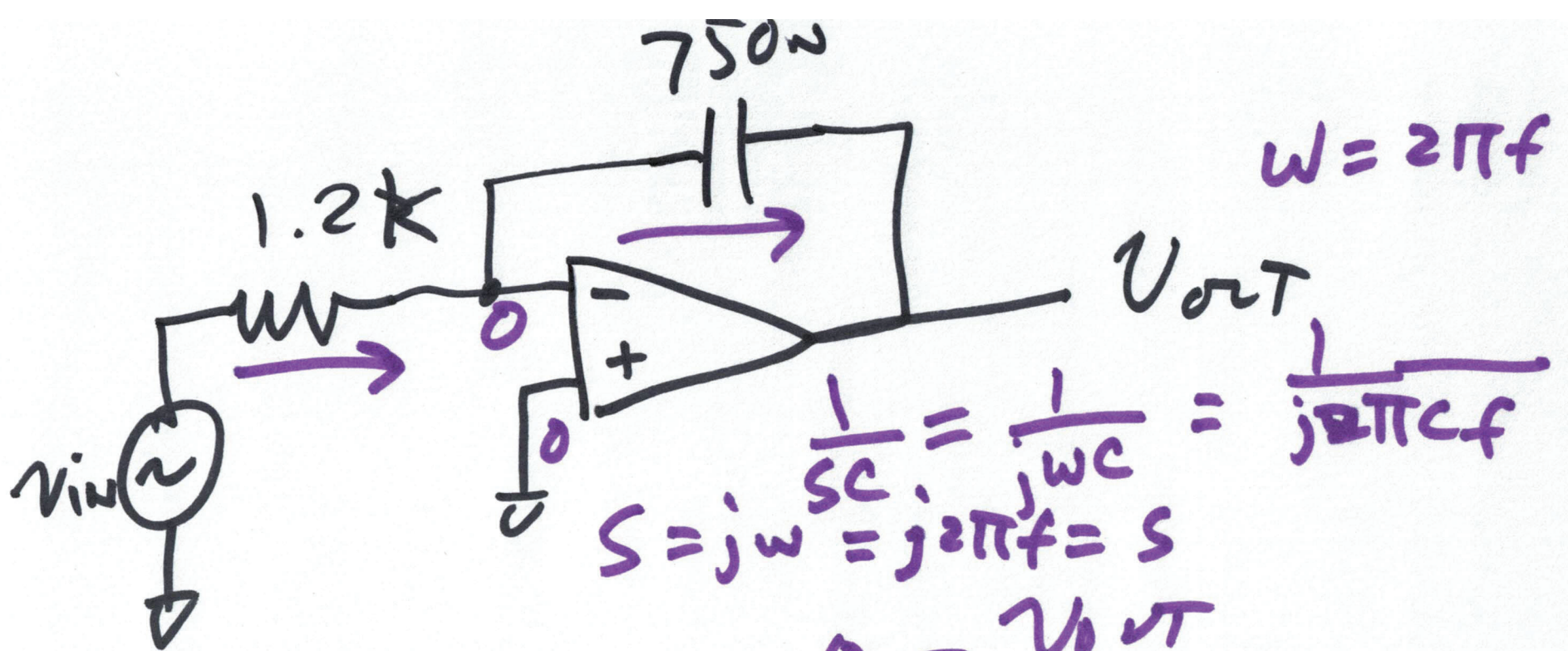
5)

$$V_{out} = 357 \sin(2\pi 60 \cdot t - 52.8^\circ)$$

$$52.8 = \frac{t_d}{16.67\text{ms}} \cdot 360$$

$$357 \quad t_d = 2.45\text{ms}$$





$$\frac{v_{in} - 0}{R} = \frac{0 - V_{out}}{\frac{1}{j \cdot 2\pi f \cdot C}}$$

$$\frac{V_{out}}{v_{in}} = -\frac{\frac{1}{j\omega C}}{R} = -\frac{1}{j\omega RC}$$

$$\frac{V_{out}}{V_{in}} = \frac{1}{j2\pi \cdot f \cdot RC} = \frac{-1}{j2\pi \cdot f \cdot 900\mu s}$$

transfer

$$\frac{176.9 \angle 90}{f} = \frac{1 \angle 180}{2\pi \cdot f \cdot 900 \angle 90} = \angle 90$$

$$\frac{1}{f} = \frac{1}{2\pi \cdot 900} \angle 90$$

$$\frac{1}{f} \Rightarrow \frac{176.9}{f}$$

$$\frac{1}{176.9 \text{ Hz}}$$