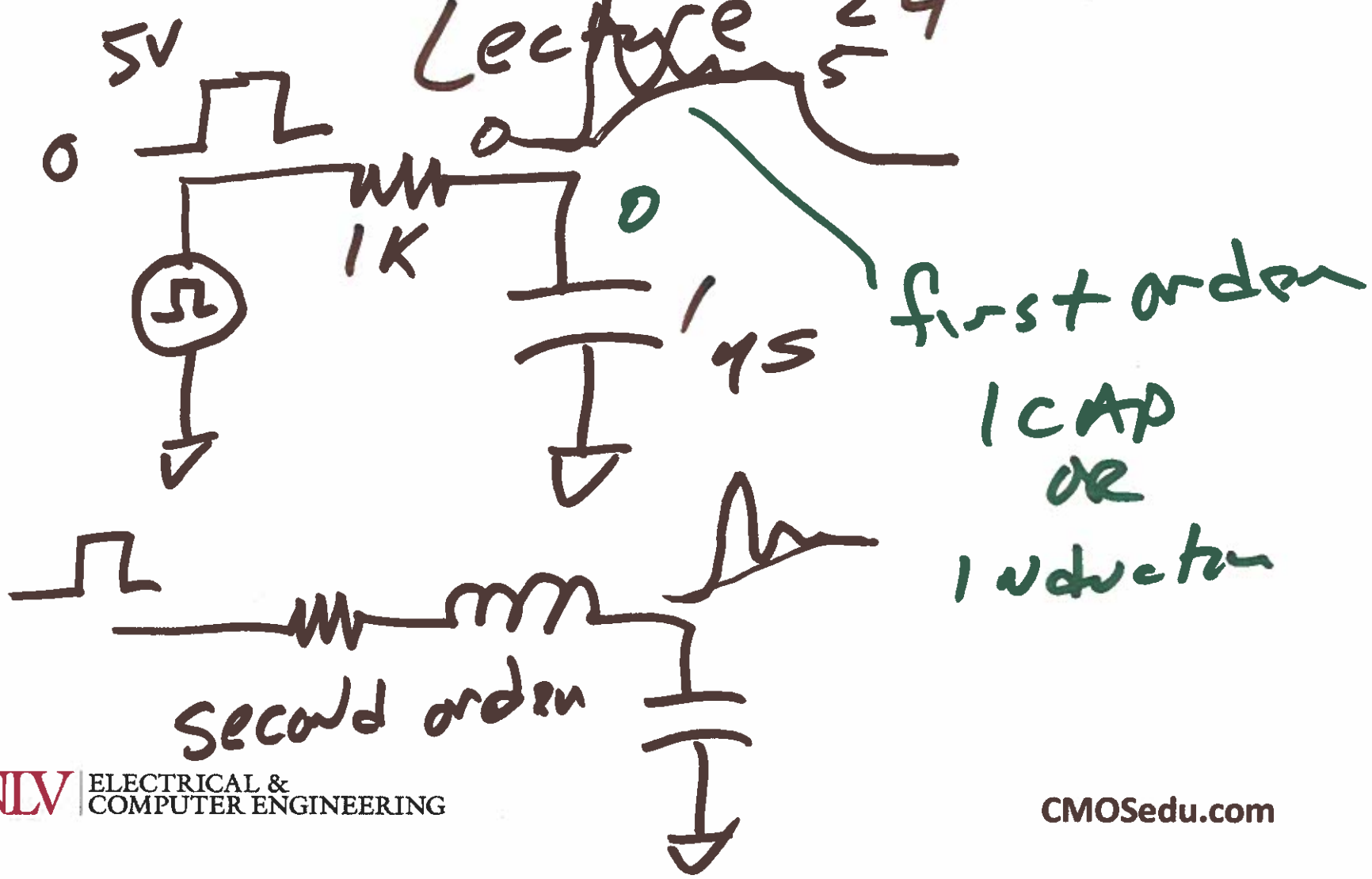
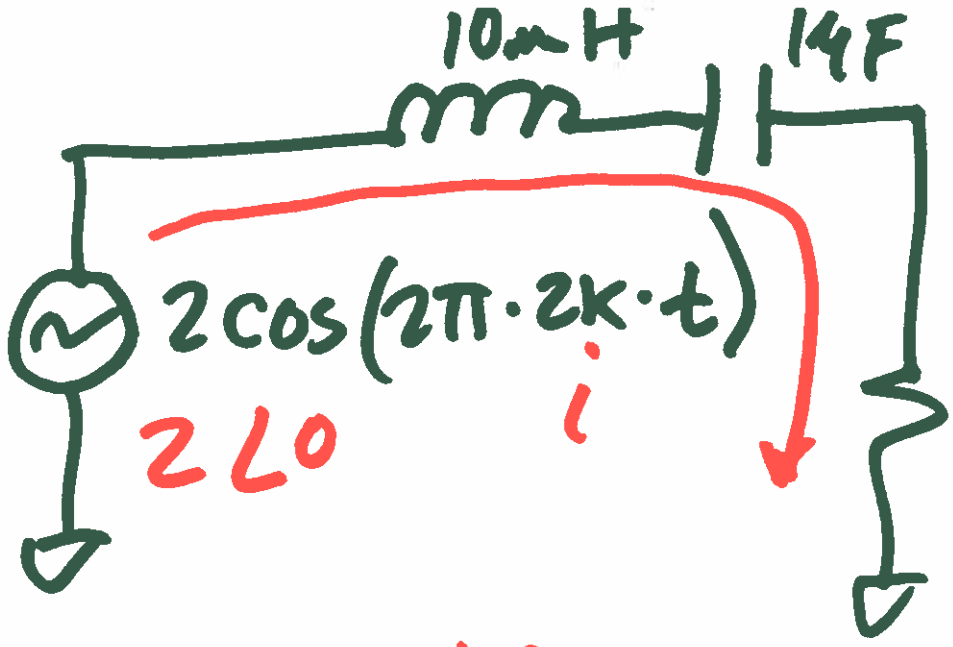
EE 220 Circuits I

Nov. 25, 2019

Lecture 24





$$Z_L = j\cdot 2\pi\cdot 0.010\cdot 2\cdot 10^3$$
$$= j\,2\pi\cdot 10\cdot 2$$
$$= 40\pi\, j$$
$$= j\cdot 125.6$$

$$Z_C = \frac{1}{j\cdot 2\pi\cdot 2\cdot 10^3\cdot 10^{-6}}$$
$$= \frac{1}{j\,4\pi\cdot 10^{-3}}$$
$$= -j79.6$$

$$i = \frac{2\angle 0}{100 + j(125.6 - 79.6)}$$

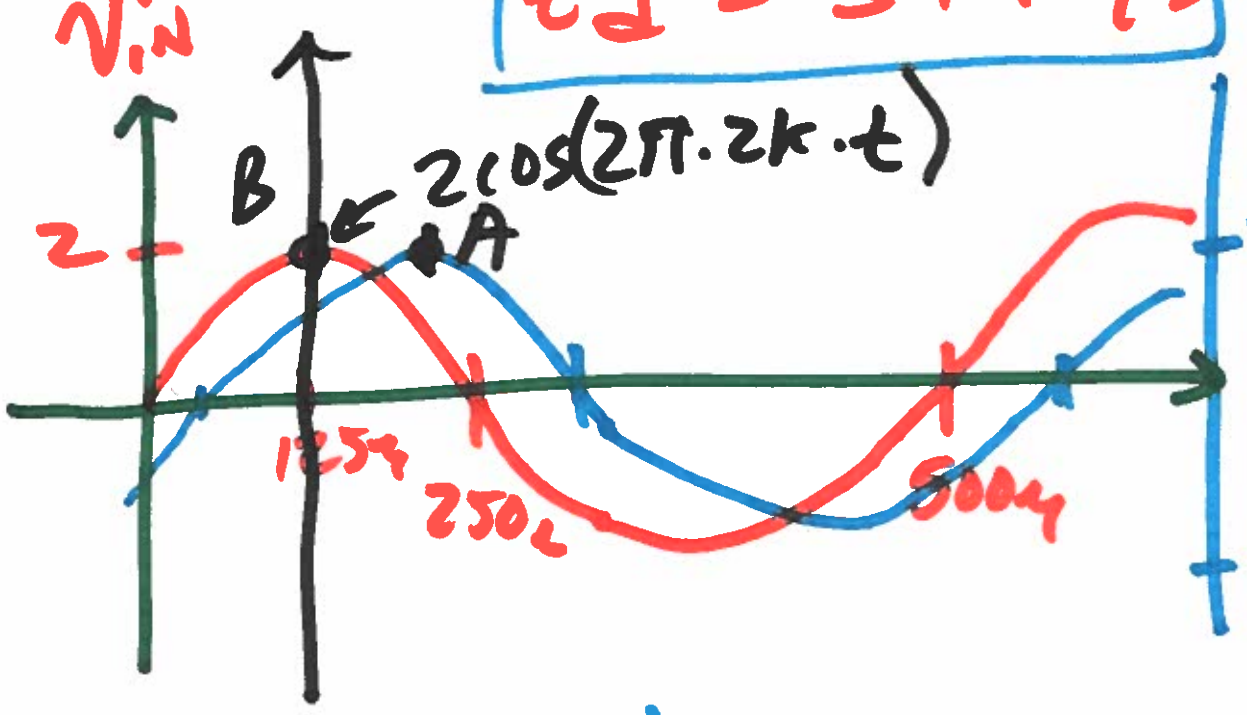
$$|100 + j46| = 110$$

$$\angle 100 + j46 = \tan^{-1}\frac{46}{100} = 25^\circ\ (24.7^\circ)$$

$$i = \frac{20}{110\angle 25} = i = 18.2\text{-A}\angle -25$$

$$-25 = \frac{t_d}{500\mu} \cdot 360$$

$$t_d = 34.7\,\mu s$$



$f = 1K, T = 1ms$

$f = 2K, T = \frac{1}{2}ms = 500\mu$

$f = 1MEG$

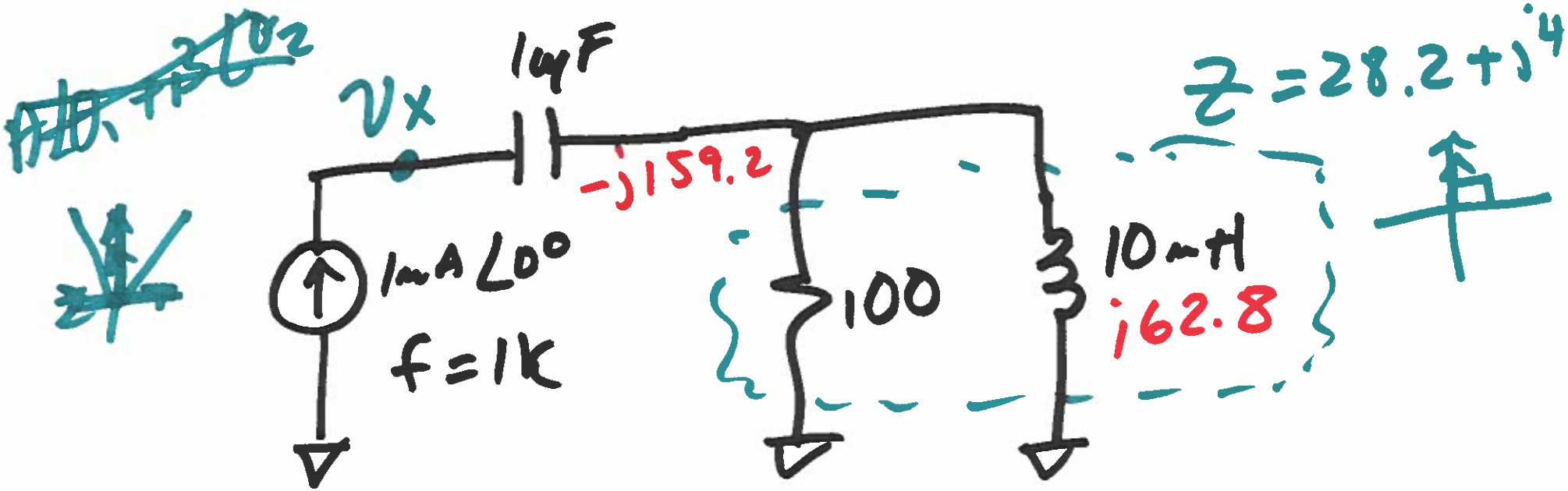
$T = 1\mu s$

$2\mu s =$

$i(t) = 18.2mA \sin(2\pi \cdot 10^3 \cdot 2 \cdot 500\mu - 25)$

$i(t) = 18.2mA \cos(2\pi \cdot 2 \cdot 10^3 t - 25)$

3)



$$Z = \frac{0 + 100 \cdot j62.8}{100 + j62.8} = \frac{6{,}280\angle 90}{118\angle 32^\circ}$$

$$28.2 + j45.1 = Z = 53.2\angle 58^\circ$$

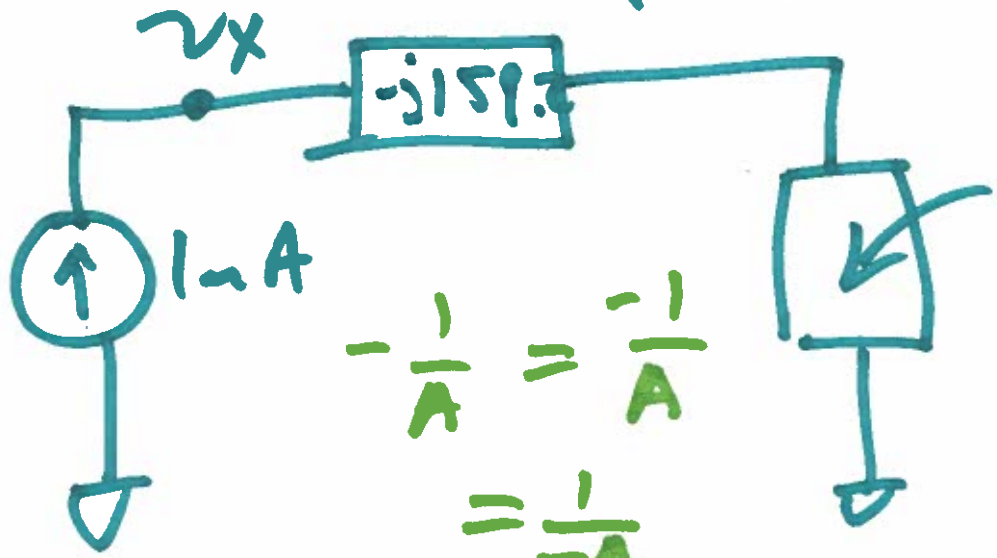
$$Re = X = 53.2\cos(58^\circ)$$

$$Y = 45.1 \qquad X = 28.2$$

$$i_y = 53.2 \sin 58$$

4)

$117.3 \angle -76^\circ$ mV $= V_x = 1\text{mA} \angle 0 \cdot \left(\frac{-j159 + 28.2 + j45.1}{117.3 \angle -76^\circ}\right)$

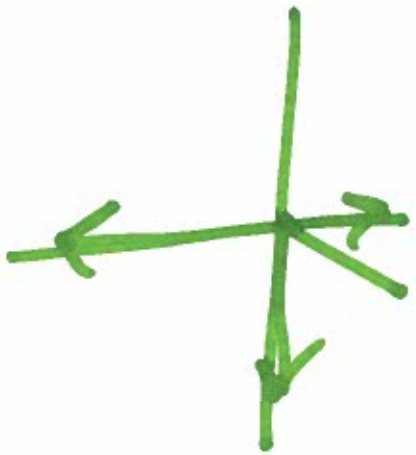


$-\frac{1}{A} = \frac{-1}{A}$

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

$\frac{1}{1} = 1 = \frac{A}{A}$

$= \frac{72}{72}$

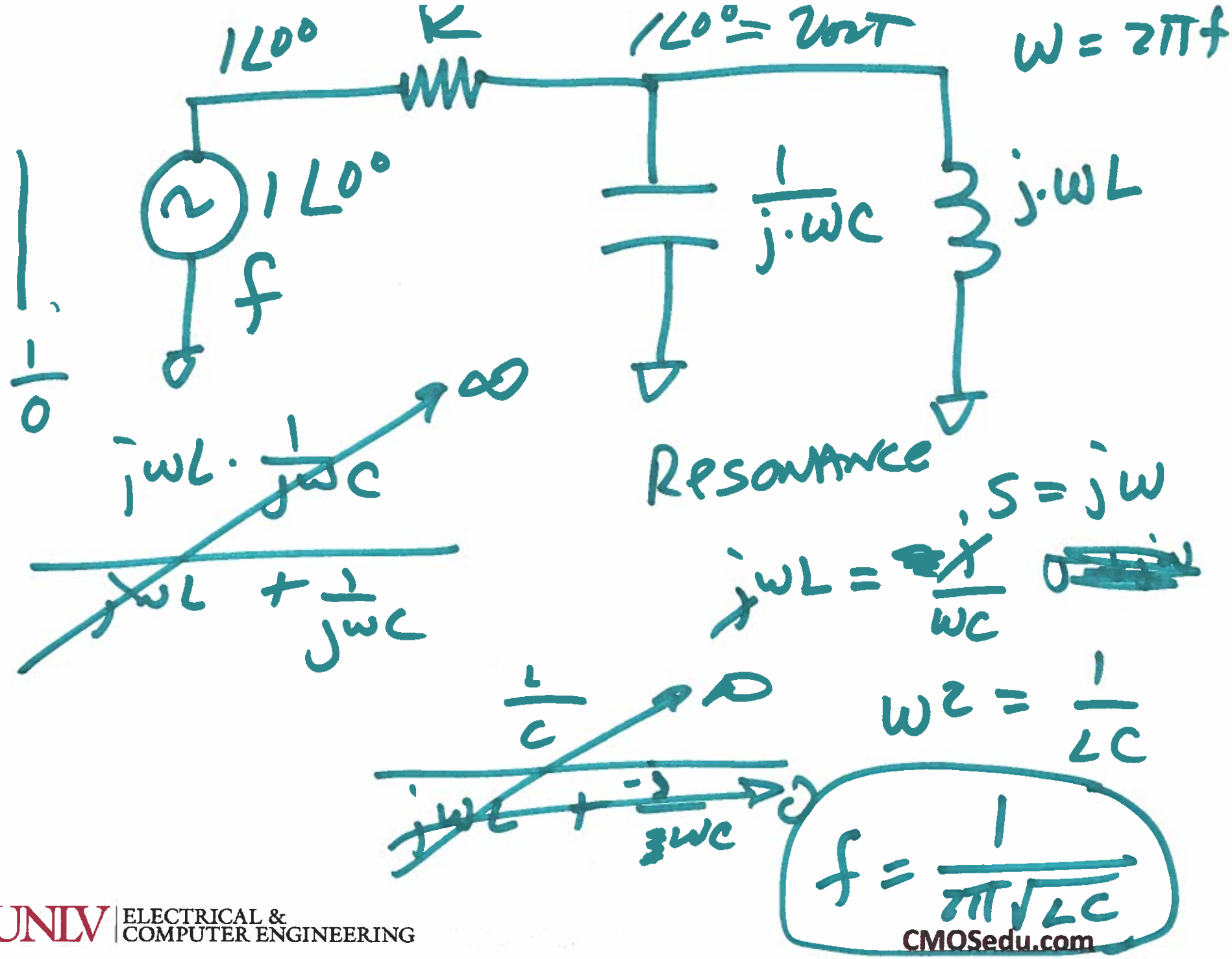


$|28.2 + j(45.1 - 159)|$

-113.9

$= 117.3$

$\angle \tan^{-1} \frac{-113.9}{28.2} = -76^\circ$



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