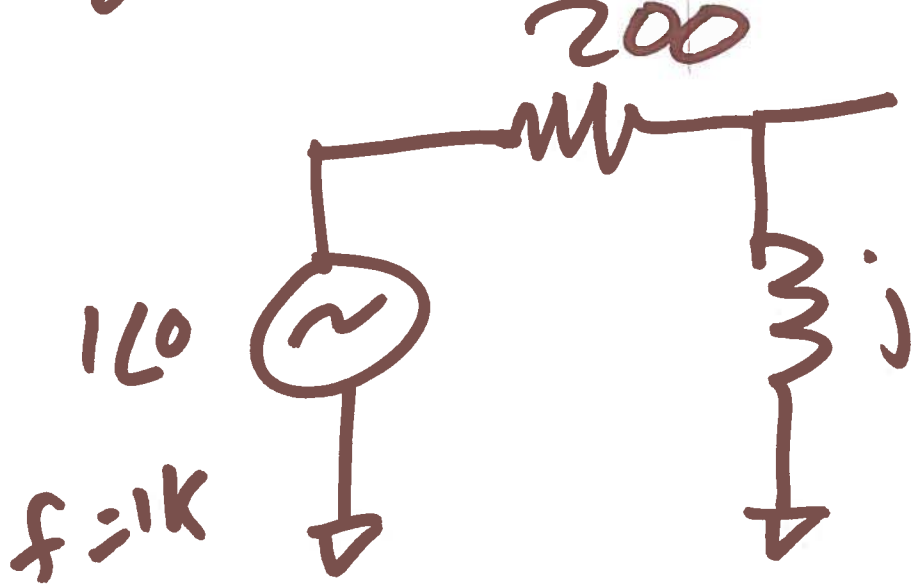
EE 220

$\sqrt{200^2 + 251^2} = 321$ circuits 1

$\tan^{-1}\frac{251}{200} = 51.5°$ Lecture 23



$$v_{out} = 1\angle 0 \cdot \frac{0 + j251}{200 + j251}$$

$|0 + j251| = 251$

$\angle\uparrow = 90° = \tan^{-1}\frac{251}{0} = 90$

1)

$$\text{RAD} \cdot \frac{360}{2\pi} \qquad Z_{TH} = \frac{10 \cdot 25 \angle 90}{32 \angle 51.5}$$

$$\text{RAD} \cdot \frac{180}{\pi} = \text{deg.} \qquad = \frac{1 \cdot 25}{32} \angle 0 + 90 - 51.5$$

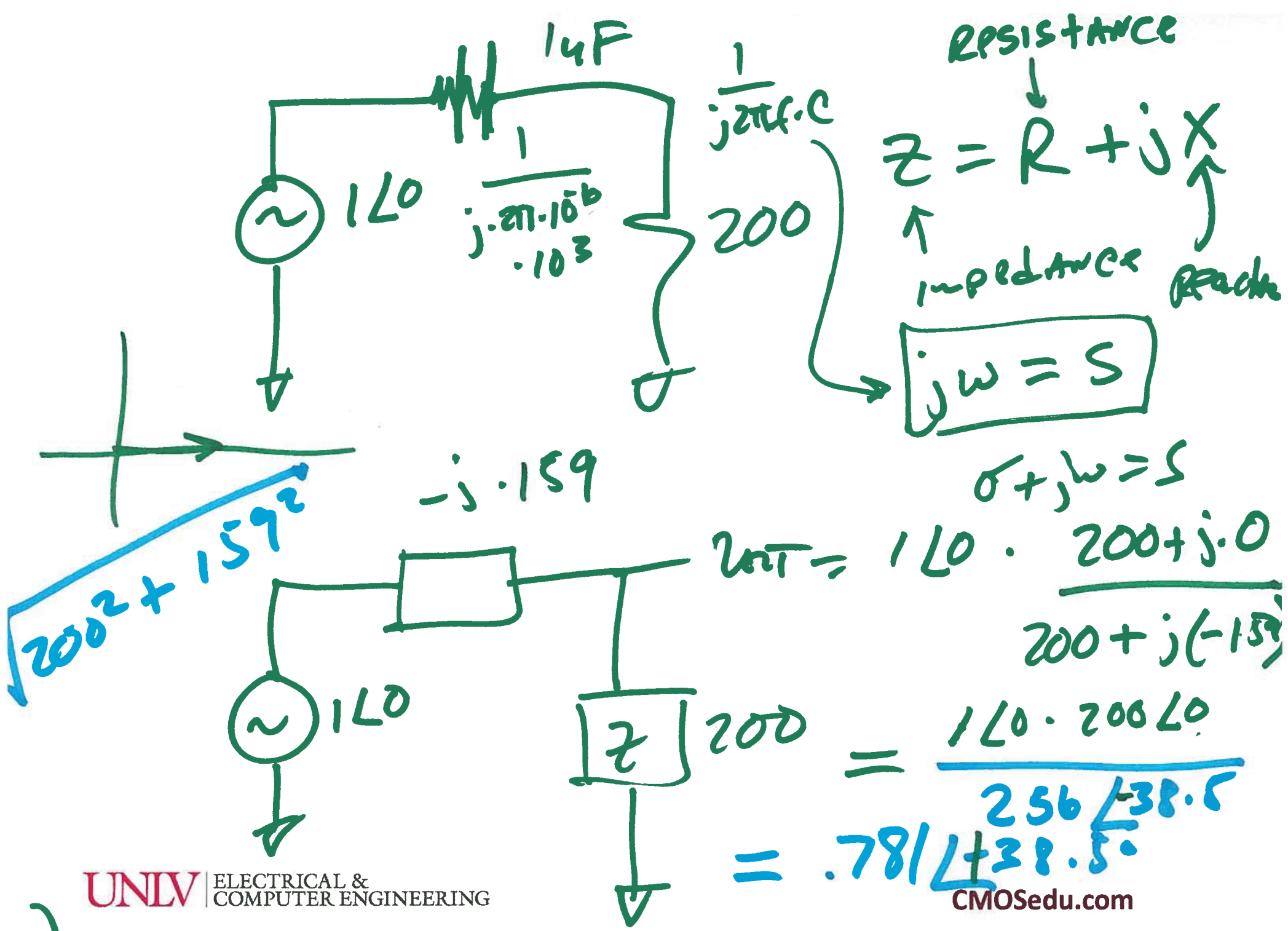
$$v_{TH} = 0.782 \cdot \sin(2\pi \cdot 1\text{KHz} \cdot t + 51.5) \qquad 0.782 \angle 38.5^\circ$$

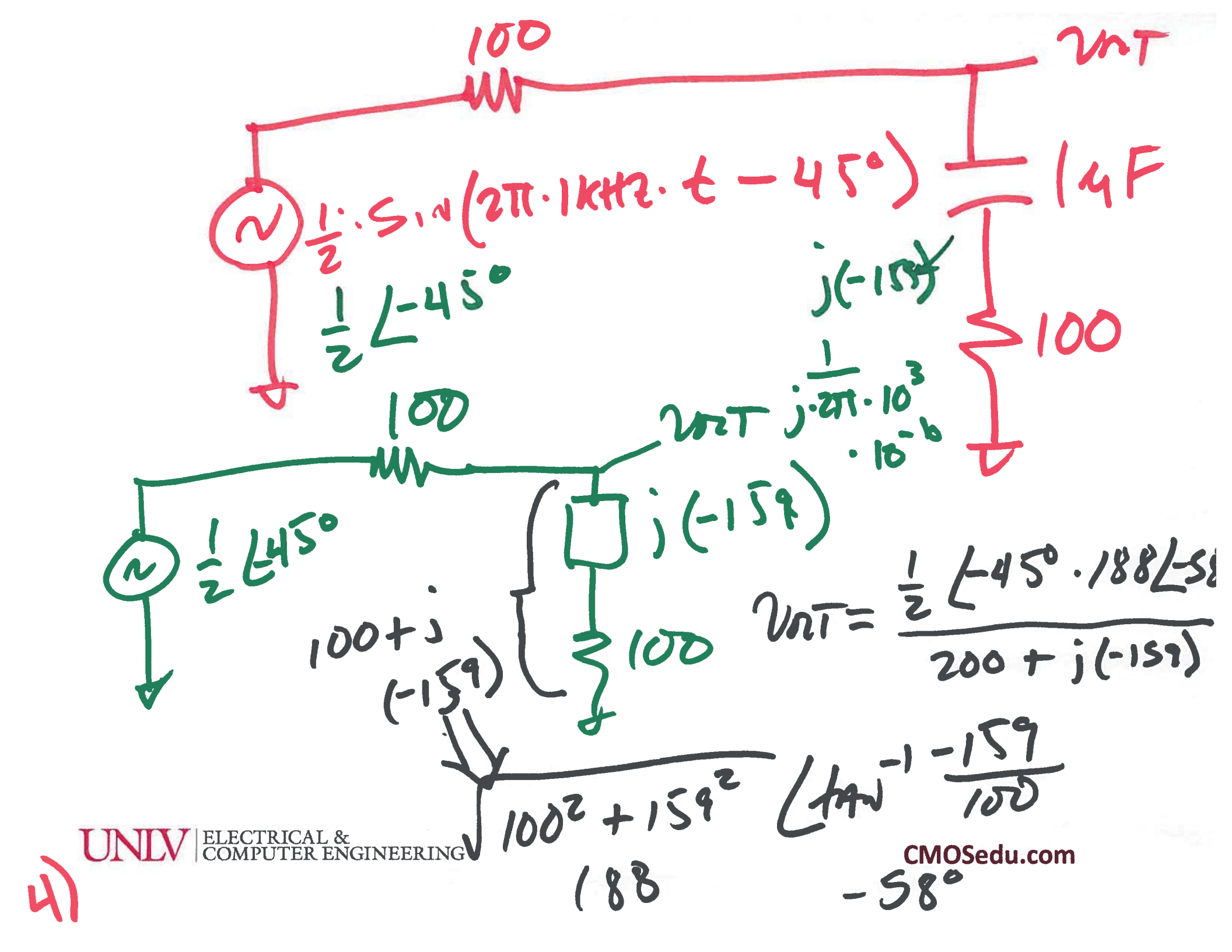
$$\theta = \frac{360}{2\pi} \cdot \frac{t_d}{T} = 360 \cdot t_d \cdot f$$

$$t_d = \frac{38.5}{360 \cdot 1\text{KHz}}$$

$$t_d = 0.11\text{mS}$$

2)


1μF
1
jωC
1
j·2π·10^6·10^3
1∠0
200
Resistance
Z = R + jX
impedance
Reactance
jω = s
σ + jω = s
-j·159
200² + 159²
Vout = 1∠0 · 200 + j·0 / 200 + j(-159)
1∠0
Z
200
= 1∠0 · 200∠0 / 256∠-38.5
= .781∠38.5°


100
2nF
$\frac{1}{2}\cdot\sin(2\pi\cdot 1\text{kHz}\cdot t - 45°)$
1μF
$\frac{1}{2}\angle -45°$
$j(-159)$
100
$\frac{1}{j\cdot 2\pi\cdot 10^3\cdot 10^{-6}}$
100
2nF
$\frac{1}{2}\angle 45°$
$j(-159)$
100
$100+j(-159)$
$V_{out} = \frac{\frac{1}{2}\angle -45° \cdot 188\angle -58}{200 + j(-159)}$
$\sqrt{100^2 + 159^2}$
$\angle \tan^{-1}\frac{-159}{100}$
188
$-58°$
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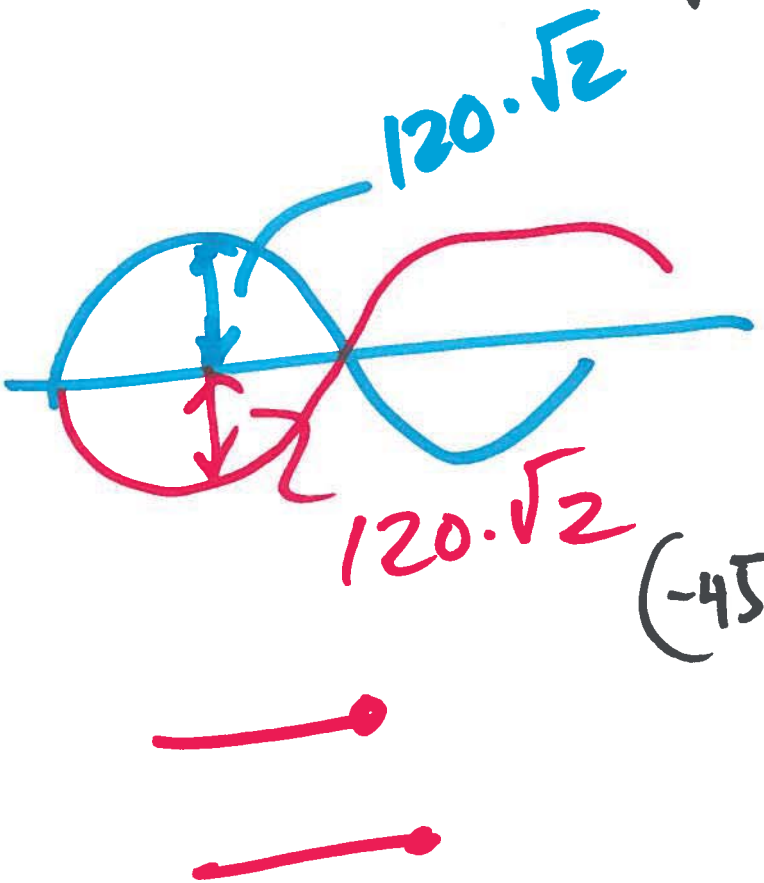
5)



$$\sqrt{200^2 + (159)^2} = 255.5$$

$$\tan^{-1}\frac{-159}{200} = -38.5^\circ$$

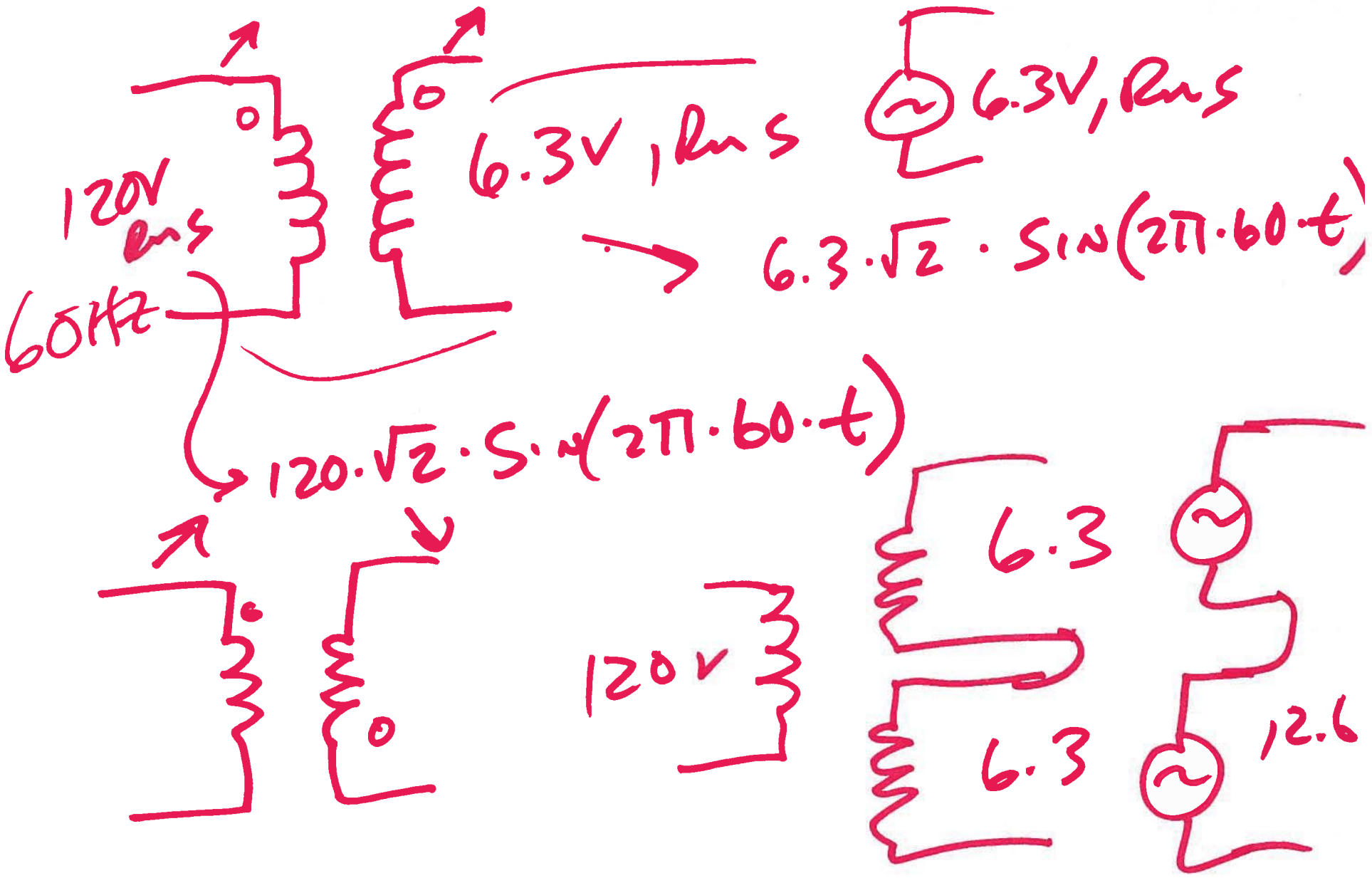
$$V_{OUT} = \frac{\frac{1}{2}\angle 45 \cdot 188\angle -58}{(-45)+(-58)\ 256\angle -38.5 - (-38.5)}$$

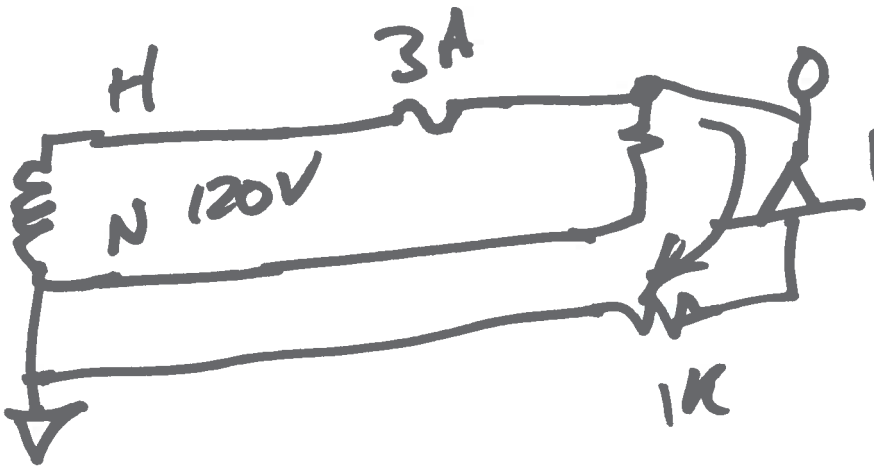
$$V_{OUT} = .367\angle -64.5^\circ$$

$$t_d = \frac{64.5}{360} \cdot 1ms$$

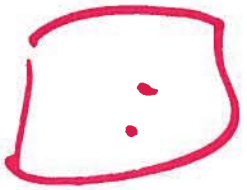
$$v_{OUT} = .367\sin(2\pi \cdot 1kHz \cdot t - 64.5^\circ)$$

$$= .179ms$$


120V rms
60Hz
6.3V, Rms
6.3V, Rms
$6.3 \cdot \sqrt{2} \cdot \sin(2\pi \cdot 60 \cdot t)$
$120 \cdot \sqrt{2} \cdot \sin(2\pi \cdot 60 \cdot t)$
120V
6.3
6.3
12.6



isolation transformer



0

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